Jeffrey F. Ingber

The Development of the Government Securities Clearing Corporation

- Despite its global importance, the U.S. government securities market was late in adopting centralized clearance and settlement services.
- The path toward provision of such services—and the accompanying boost in market efficiency and reduction in risk—began with the 1986 launch of the Government Securities Clearing Corporation (GSCC), now a part of the Depository Trust & Clearing Corporation.
- This history of the formation and development of the GSCC describes the state of the market in the 1980s; the establishment of the GSCC and its adoption of an automated comparison and netting system; the expansion of the system to include Treasury auction awards, and later, repos and reverse repos; the addition of services for brokered repos; and the launch of the General Collateral Finance Repo service (GCF Repo®).

1. Introduction

The U.S. government securities market is one of the largest and most liquid securities markets in the world, and arguably the single most important financial marketplace. Yields on Treasury securities are benchmarks for other interest rates globally. U.S. government repurchase agreements represent the most important short-term credit market in the country. The U.S. government securities market overall is the market others look to for safety and risk mitigation, particularly in times of trouble. And the market provides the federal government the ability to conduct monetary policy and, even more essentially, to fund itself.

Surprisingly, the government securities market was one of the last major securities markets to receive the benefits of centralized clearance and settlement services. This article reviews the development of such services through the formation of the Government Securities Clearing Corporation (GSCC) in 1986. The GSCC—which is now the Government Securities Division of the Fixed Income Clearing Corporation, a subsidiary of the Depository Trust & Clearing Corporation—is considered by many to be the largest and most significant clearing corporation in the world. (For a description of the processes involved in clearance and settlement services, see Box 1 on the next page.)

Jeffrey F. Ingber is a former managing director of the Depository Trust & Clearing Corporation (DTCC) and general counsel of the Fixed Income Clearing Corporation (earlier the Government Securities Clearing Corporation), a subsidiary of DTCC. At the time this article was written, he was a senior vice president in the Federal Reserve Bank of New York's Supervision Group.

jingber@gmail.com

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Box 1
Clearing and Settlement Functions

The process of clearing and settling trades includes three main functions.

- *Comparison*: The process of matching the terms of each side of a transaction to identify differences in reported trades. The ability to correct or resolve those differences is usually attendant on a comparison service.
- *Clearance*: The process of preparing compared trades for settlement. This preparation can take several forms, ranging from the most basic (producing individual receive and deliver instructions for each matched trade) to the most sophisticated (netting all deliver and receive obligations in each security on a continuous basis).
- *Settlement*: The actual exchange of securities and funds.

We begin our look at the history of this corporation by describing the government securities market in the 1980s and the events that led to the formation of the GSCC, including the impact of a market scandal. We then show how the adoption of a centralized, automated system of comparing the buy and sell sides of securities transactions increased efficiency and reduced risk in GSCC operations. Next, we outline the effect of process enhancements and broadened access on the growth of the netting system, and how the addition of proprietary Treasury auction awards to the system further increased efficiency and reduced risk for the GSCC, its members, and the U.S. Treasury. We also explore the extension of comparison and netting services to repurchases (repos) and reverse repurchases (reverse repos) of government securities, which provided the repo market with cost and efficiency benefits similar to those provided for buy-sell trades. Finally, we review the introduction of netting and settlement services for brokered repos—which lowered brokers' costs and eliminated counterparty risk—and the launch of the General Collateral Finance Repo service (GCF Repo®) for Treasury securities collateral.

2. The Government Securities Marketplace in the 1980s

Before the 1980s, the government securities market was thought to be transparent, efficient, and safe, even though it was essentially unregulated.[1] During the first half of that decade, however, a number of government securities dealers failed, including Bevill, Bresler, and Schulman Asset Management Corporation, Drysdale Government Securities, E.S.M. Government Securities Inc., and Lombard-Wall Inc. These failures led to congressional hearings in 1985 on the safety of the marketplace, and ultimately, to the signing by President Reagan of the Government Securities Act of 1986 (GSA), which, among other things, provided for the registration of government securities brokers and dealers. The enactment of the GSA, together with the Treasury Department's move to end issuance of certificated debt in 1986 (by then, all new Treasury securities were issued in book-entry form), prompted the establishment of GSCC.

The enactment of the GSA laid an important legal foundation for the formation of GSCC in at least two respects. First, the GSA amended the definition of "exempted security" in the Securities Exchange Act of 1934 (SEA) to include a new section stating that, "government securities shall not be deemed to be 'exempted securities' for the purposes of section 17A."[2] As a result, the GSA required the registration of any entity seeking to act as a clearing agency for government securities and granted the U.S. Securities and Exchange Commission (SEC) jurisdiction over such clearing agency activity. The motivation for this measure was to ensure appropriate supervisory oversight of entities performing clearance and settlement functions for the government securities marketplace, and to encourage the development of a clearing agency akin to those existing for other markets, such as the National Securities Clearing Corporation for corporate equities and municipal debt securities.

Another important legal foundation for the successful operation of a government securities clearing agency was Congress' decision through the GSA to make many of the prospective participants in such a clearing agency, such as government securities brokers, government securities dealers, and depository institutions, subject to federal regulation.

[1] The Securities Exchange Act of 1934 (SEA) specifically exempted U.S. government securities from its key provisions.

[2] Section 17A of the SEA (National System for Clearance and Settlement of Securities Transactions), among other things, directs the Securities and Exchange Commission to use its authority to facilitate the establishment of a national system for the prompt and accurate clearance and settlement of transactions in securities other than exempted securities.

This broad extension of federal regulation greatly facilitated the ability of any prospective government securities clearing agency to build and maintain the comprehensive risk management systems that would be essential for the agency's successful operation.

The idea for GSCC arose in the mid-1980s as government securities trading volume increased and the Federal Reserve, the Public Securities Association (PSA),[3] and several large primary dealers became concerned about the safety and soundness of the existing processes for clearing and settling government securities.[4] Their concerns included the risks associated with the failure of a major firm, the inefficiencies of manual paper processing of trade confirmations, and bilateral trade-for-trade settlement.

The Fed's concerns also included the large and increasing levels of intraday credit extensions, or "daylight overdrafts," on Fedwire (the Federal Reserve's system for transferring money and securities between banks and certain other financial institutions), as well as the frequent delays in the closing of Fedwire and the bunching of deliveries within peak "traffic periods."[5] It had become standard practice at many government dealer firms to hold large deliveries for which the firms had only part of the required securities (for example, $150,000,000 to make a $200,000,000 delivery) and at least some smaller deliveries until five minutes before the scheduled close of Fedwire. The Federal Reserve Bank of New York would announce at least five minutes prior to the scheduled close whether it was going to extend the wire. If the wire was not extended, the firms would try to minimize their failures to deliver either by borrowing securities to make their larger deliveries or by making their smaller deliveries. This practice contributed to late-day congestion on Fedwire as dealers made last-minute deliveries.[6]

The Fed also had long-standing concerns, dating back at least to the failure of Drysdale Government Securities in May 1982, about the risks arising from government securities trading.[7] One concern in particular was the potential for insolvency of a major firm and the consequences for the marketplace if that occurred. What was needed was a central guarantor. Not wanting that role, the Fed asked the private sector to devise a solution: a clearing corporation that risk-managed and guaranteed the settlement of government securities trades. The Fed was also concerned that the bilateral netting relied on by dealers and interdealer brokers did not have a solid legal underpinning and might unravel if a firm became insolvent.

3. Formation of GSCC

In May 1986, at the suggestion of several primary dealers, the board of directors of the National Securities Clearing Corporation (NSCC) established a Government Securities Committee to consider applying NSCC's expertise in automated comparison and netting to the government securities

[3] In 1997, the name of the PSA was changed to the Bond Markets Association (TBMA). In 2006, TBMA merged with the Securities Industry Association to form the Securities Industry Financial Markets Association (SIFMA).

[4] "In recent years tremendous investor losses have occurred in the government securities market due to dealer failures. Although the . . . SEC . . . generally has regulatory authority over broker-dealers in corporate and municipal securities, and the [Federal Reserve] has regulatory authority over dealer banks, dealers who trade only in government securities have operated outside the federal system of financial supervision. Most of these dealer failures occurred among dealers operating outside the federal regulatory structure. Alarmed by these losses, Congress enacted the [GSA], placing the government securities market under complete federal regulation. . . . Many of the failed dealers operated outside the federal regulatory structure because they dealt solely in exempt government securities. As a result of these failures, many savings and loans, municipalities, and other public institutions lost millions of dollars. In response to these dealer failures, Congress sought to provide for a formal system of regulation of government securities dealers and brokers by enacting the [GSA]." Joseph G. Fallon, "The Government Securities Act of 1986: Balancing Investor Protection with Market Liquidity," *Catholic University Law Review* 36, no. 4 (Summer 1987) [citing from the Act's legislative history].

[5] On December 12, 1986, at a PSA conference on regulation of the U.S. government securities markets, Cathy Minehan, vice president of the Electronic Payments Function at the Federal Reserve Bank of New York (later to become the president of the Federal Reserve Bank of Boston), reported that the settlement of Treasury securities was a significant portion of total transfers on Fedwire, and that, in 1986, the average closing time of Fedwire was 4:30 P.M., two hours later than the established closing time.

[6] In January 1988, in an attempt to reduce risk and daylight overdrafts and to even out the flow of traffic on Fedwire, the Fed instituted a maximum par value limit of $50 million per government securities transaction. However, this measure did not significantly alleviate the problem and market participants became concerned that the Fed would further react by imposing strict debit cap requirements.

[7] The failure of Drysdale had enormous implications for the marketplace. Prior to that, it was common practice in the repo market to ignore the value of accrued interest in pricing repos 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 that it had reversed in to settle short sales for an amount that included the accrued interest. Using the surplus cash generated, Drysdale was able to raise working capital and make interest payments to its repo counterparties. This strategy worked until May 17, 1982, when cumulative losses on Drysdale's interest rate bets caused it to be unable to pay the coupon interest on securities it had borrowed. As a result of the weaknesses exposed by the Drysdale matter, full accrual pricing, in which accrued interest was included in the initial purchase and resale prices, was adopted as standard repo market practice. See Stephen A. Lumpkin, "Repurchase and Reverse Repurchase Agreements," Federal Reserve Bank of Richmond, *Monograph*, no. 1998rarr, 1998.

market.[8] In doing so, the NSCC board noted the fact that many of the concerns expressed about the government securities marketplace were not dissimilar from those faced and resolved by NSCC in the corporate and municipal securities markets. Subsequently, the NSCC board created a more broadly representative Ad Hoc Committee on Clearance of Treasury Securities, which included representatives from each of the major industry groups in the government securities market—primary dealers, interdealer brokers, and clearing banks.[9]

In September 1986, in contemplation of the passage of the GSA, the NSCC board approved the establishment of Government Securities Clearing Corporation as a wholly owned subsidiary of NSCC, capitalized with $1 million. On October 28, 1986, the Government Securities Act was signed into law. Three weeks later, on November 18, GSCC was incorporated under the New York Business Corporation Law. At its December 11, 1986, meeting, the NSCC board selected the first board of directors and officers of GSCC.[10]

In December 1987, a private placement of GSCC shares began. About 81 percent of GSCC's shares were sold to forty-four participant firms, including a majority but not all of the primary dealers. (The rest of the shares were retained by NSCC.) By May of the following year, $10.4 million had been raised.[11] Also that May, the SEC granted GSCC temporary registration as a clearing agency.[12] On August 31, 1988, the first participant shareholder board of directors of GSCC was elected. The board was made up of representatives from primary dealers, interdealer brokers, and clearing banks, plus a management director (GSCC's president) and two directors designated by NSCC.[13]

4. Launch of the Comparison System

GSCC's operations began on August 26, 1988, with the implementation of its Comparison System, which provided for the reporting, validating, and matching of the buy and sell sides of securities transactions. GSCC began to match, in an automated fashion, the next-day and future-settling Treasury and agency trades of thirty primary dealers and interdealer brokers. The comparison of trade data was deemed to have occurred when GSCC made a report of the comparison of such trades available to its members.[14] By a rule filing

[8] NSCC, an SEC-registered clearing agency, was formed in 1977 as a result of the merger of the clearing corporations of the American Stock Exchange, the New York Stock Exchange, and the National Association of Securities Dealers. Now a subsidiary of the DTCC, NSCC was the nation's largest provider of post-trade processing, clearance, and settlement services for equity, corporate and municipal securities, unit investment trusts, and mutual fund transactions to the broker-dealer, bank, and mutual fund communities.

[9] William Tierney of Salomon Brothers Inc. was chairman of the Ad Hoc Committee.

[10] The members of the first GSCC board were taken from the Ad Hoc Committee.

[11] On March 14, 1988, the Legal Advisory Services Division of the Office of the Comptroller of the Currency issued a letter holding that the proposed acquisition of GSCC shares by a national bank was permissible. On April 18, 1988, the Board of Governors of the Federal Reserve System ruled that bank holding companies could invest in the voting shares of GSCC without filing an application under the Bank Holding Company Act, provided that no bank holding company acquired more than 5 percent of such shares. On June 8, 1988, the New York State Banking Department issued a letter approving the application filed on behalf of several state-chartered banks requesting the authorization to invest up to $250,000 in the capital stock of GSCC.

[12] The SEC took note of the fundamental change in the government securities market regulatory environment in its May 24, 1988, order granting GSCC temporary registration as a clearing agency (Release No. 34-25740). The SEC observed that, pursuant to the GSA, all government securities brokers and dealers were subject to registration, examination, and financial regulatory requirements. In footnote 21 of the order, the SEC linked this regulatory expansion to the newly required registration of government securities clearing agencies as follows:

> The [GSA], among other things, authorizes and directs the Secretary of the Treasury to issue financial responsibility, recordkeeping, and financial reporting and audit rules. The Secretary also must regulate the possession and control of customer securities and funds. The law requires clearing agencies that provide centralized clearance and settlement services in Government Securities to register with the Commission under Section 17A of the [Exchange] Act and requires dealers and brokers that were previously unregulated to register with the Commission and to join either an exchange or a registered securities association.

[13] The initial directors were Jorge Brathwaite of the Bank of New York; Allen B. Clark of Manufacturers Hanover Trust Company; Frank Cuoco of Garban Ltd.; Herbert Friedman of Salomon Brothers; Peter Gall of Discount Corporation; Edward Geng of Fundamental Brokers; David Kelly (president of NSCC and the first NSCC-designated director); Bruce Lakefield of Lehman Brothers; Charles Moran (president of GSCC); Alexander Neamtu of Morgan Stanley; Howard Shallcross of Merrill Lynch; and Ronald Upton of Irving Trust Company. The second NSCC-designated director—Andrew Threadgold of JPMorgan Securities Inc.—was named at the December 7, 1988, board meeting. At the January 1989 GSCC board meeting, Mr. Lakefield was elected chairman of GSCC, a position he held until 1994. By January 1989, senior management consisted of Mr. Moran, Thomas Costa (chief operating officer), and Jeffrey Ingber (general counsel).

[14] In 2000, when GSCC moved to a real-time trade-matching environment, the time of comparison effectively was moved from end of day to minutes after the execution of a trade.

approved by the SEC on February 22, 1989, GSCC comparison output was established as constituting the final and binding evidence of a correctly matched trade.

The Comparison System supported CPU-to-CPU (computer-to-computer) transmission and machine-readable input and output. While the system was built to support real-time interactive comparison, these capabilities would not be utilized for more than a decade.

The Comparison System, as well as GSCC's subsequent Netting System, was developed by SPC Software Services, a subsidiary of Security Pacific. The software, which was based on the "SPEED" system used by Security Pacific National Trust Company (SPNTCO) to clear government securities on a book-entry basis, was dubbed "IONS," for industry-owned netting system. (The term "netting" was used in anticipation of the software being used in the future to provide netting services.) The Securities Industry Automation Corporation (SIAC) was retained to manage GSCC's hardware and communication facilities.

The introduction of a centralized, automated comparison system was of critical importance to the industry. Prior to 1988, trades in Treasury securities among dealers and brokers (which were largely done for settlement on the next business day) were verbally confirmed between the parties on the trade date, with written confirmations to follow the next day.[15] The Comparison System eliminated the need for such physical confirmation, bringing more certainty, greater efficiencies, and lower costs to the comparison process. Use of the system also eliminated risk by providing for the easy (and early) resolution of trade data differences. As one participant indicated:

> The GSCC comparison [system] has reduced our operational cost by an estimated $100,000 a year and has increased our efficiency. We now process the computer information you make available and distribute reports to our traders before 7 A.M. These reports outline the compared and uncompared trades at our internal trading account level. As a result, the traders resolve previous day's differences before the opening of trading.[16]

[15] Representatives of the various brokers and dealers would physically exchange paper confirmations at a facility provided by Bankers Trust Co. (the "Bankers' drop") and bring back counterparty confirmations for comparison with their records in the hope of identifying any problems before the opening of Fedwire or, more importantly, before any market-moving news affected a trading decision based on a faulty position.

[16] Letter of February 21, 1989, from Alexander Neamtu, principal, Morgan Stanley & Co., to Charles Moran, president of GSCC.

The Comparison System was successful from the start. On average, more than 16,000 sides (a "side" being one-half of a trade—either the buy side or the sell side) were being compared each day by December 1988 and more than 24,000 sides were compared on November 9, 1988, the record number per day for that year. By December, the average comparison rate was 94 percent of all submitted sides. Comparison System participation grew rapidly in 1989, to fifty-six primary dealer and interdealer broker members by year-end, with a record volume on August 11 of $258.5 billion, representing more than 34,000 sides.

The capabilities of the Comparison System also grew rapidly. "As-of" trades (trades compared on or after their scheduled settlement date, commonly done for audit trail purposes) were made eligible for comparison in March 1989. Trade cancellation and replacement features were added in May 1989.

5. Commencement of Netting

The Comparison System was a prelude to a more ambitious initiative: the Netting System. On July 7, 1989, after months of planning, programming, testing, and training on the part of GSCC staff and member firms,[17] GSCC's Netting System was implemented.[18] The system aggregated and matched offsetting deliver and receive obligations resulting from netting members' trades, in order to establish a single net settlement position for a member's activity in each CUSIP.

As explained in Box 2, netting, in its essence, is math. For a member's activity in a particular CUSIP, all the buy activity par amounts that contributed to the creation of a long obligation were added, and then all the sell activity par amounts that contributed to the creation of a short obligation were added; the difference between the two totals was the member's net-long or net-short position for the CUSIP. (Buy activity later also included Treasury auction awards, reverse repo start-leg activity, and repo close-leg activity, while sell

[17] GSCC began distributing test output to participants in April and, in conjunction, held training classes for participant operations and system personnel.

[18] GSCC had announced on June 22 that July 7, 1989, would be the implementation date for the Netting System, but the necessary regulatory approvals were obtained virtually at the last minute. On the morning of July 7, at a meeting of the Board of Governors of the Federal Reserve System, and after a presentation by Ernest Patrikis, general counsel of the New York Fed, the Board determined that GSCC's proposed operating rules for the Netting System were consistent with its risk reduction policies. That afternoon, the SEC issued an order approving the extensive rules governing netting, settlement, and related risk management.

Box 2
Net Settlement

The easiest way to explain net settlement is with an example.

Suppose four market participants are members of a net settlement system, trade a security among themselves as shown in Table A1, and submit their purchases and sales to the system. (Note that the four participants may also have traded with other, nonmember market participants, but any resulting purchases and sales are not submitted to the net settlement system.)

The first step in settling the trades of the four participants is to mark all of the transactions to a common system settlement price—which we assume is $99 per unit.

Marking to the common price results in credits and debits for the accounts of the four participants, as shown in Table A2. For example, marking the sale by A to B of 1 unit of the security at $97 per unit to a sale by A to B of 1 unit at $99 per unit results in a $2 debit to A (because A is due $99 instead of $97 following the new mark) and a $2 credit to B (because B will now have to pay $99 instead of $97).

Adding up the credits and debits for each of the participants shows that A has a net credit of $1, B and C have net credits of $2 each, and D has a net debit of $5.

The next step is to net the purchases and sales of each participant. As shown in Table A3, A purchased a total of 7 units of the security and sold a total of 9 units and is, therefore, a net seller of 2 units. Similarly, B is a net buyer of 4 units, C is a net seller of 3 units, and D is a net buyer of 1 unit.

On the settlement day, A delivers 2 units of the security to the settlement system against payment of $198 ($198 = $99 system settlement price per unit, times 2 units) and C delivers 3 units (against payment of $297). The net settlement system redelivers 4 units to B (against payment of $396) and 1 unit to D (against payment of $99).

Additionally, but as a separate matter, D transfers $5 to the net settlement system to clear the debit balance that appeared when D's transactions were marked to the system settlement price of $99 per unit, and the net settlement system transfers $1 to A, $2 to B, and $2 to C to clear their respective credit balances.

Significantly, the net settlement arrangement results in transfers of 10 units of the security, including 5 from the two net sellers to the system and 5 from the system to the two net buyers. Bilateral settlement would have required transfers of 33 units of the security.

Table A1
Four Market Participants' Hypothetical Transactions in a Security
Number of Units at Specified Prices

	Buyer			
Seller	A	B	C	D
A	—	1 at $ 97 3 at $100	2 at $100 1 at $ 99	1 at $101 1 at $100
B	1 at $ 98	—	3 at $101	1 at $ 99 1 at $100
C	3 at $100 2 at $ 99	1 at $ 99	—	2 at $101 2 at $100
D	1 at $102	2 at $100 3 at $ 99	1 at $ 98	—

activity later also included repo start-leg activity and reverse repo close-leg activity.) Thus, there was complete fungibility between buys, sells, auction awards, and repos for settlement netting purposes. Once the net settlement position was established by GSCC, the identity of the underlying trade activity was lost for clearance and settlement purposes.

GSCC netted on a multilateral basis, meaning that netting members were fungible and indistinguishable for netting purposes. The netting was done with a full guarantee of settlement for each net settlement position established; the buyer was guaranteed to receive the specific securities it purchased and the seller was guaranteed to receive the precise dollar amount it agreed to. Once a trade entered the net, GSCC became, through "novation," the effective counterparty to each of the original parties for credit and settlement purposes. In other words, all of a member's obligations to pay or receive money and to deliver or receive securities arising from its trades with counterparty members were terminated and replaced by similar obligations to and from GSCC.

After net settlement positions were determined, on the night before a scheduled settlement date, the resulting receive and deliver obligations were established. Each business day, GSCC established and reported by CUSIP, in a manner that preserved anonymity, net settlement positions and deliver and

Table A2
Credits and Debits Consequent upon Marking Transactions to a Common Settlement Price of $99

Transaction		Consequence for the Seller	Consequence for the Buyer
A sells	1 unit to B at $ 97	A debited $2	B credited $2
	3 units to B at $100	A credited $3	B debited $3
	2 units to C at $100	A credited $2	C debited $2
	1 unit to C at $ 99	—	—
	1 unit to D at $101	A credited $2	D debited $2
	1 unit to D at $100	A credited $1	D debited $1
B sells	1 unit to A at $ 98	B debited $1	A credited $1
	3 units to C at $101	B credited $6	C debited $6
	1 unit to D at $ 99	—	—
	1 unit to D at $100	B credited $1	D debited $1
C sells	3 units to A at $100	C credited $3	A debited $3
	2 units to A at $ 99	—	—
	1 unit to B at $ 99	—	—
	2 units to D at $101	C credited $4	D debited $4
	2 units to D at $100	C credited $2	D debited $2
D sells	1 unit to A at $102	D credited $3	A debited $3
	2 units to B at $100	D credited $2	B debited $2
	3 units to B at $ 99	—	—
	1 unit to C at $ 98	D debited $1	C credited $1

Note: In the table, A sells one unit for $97 and is entitled to receive $97. However, A will deliver the unit to the Government Securities Clearing Corporation (GSCC) at the common price of $99, requiring GSCC to recover the $2 difference.

Table A3
Total and Net Purchases and Sales of a Security by Four Market Participants

	Total Purchases	Total Sales	Net Purchases	Net Sales
A	7	9	—	2
B	10	6	4	—
C	7	10	—	3
D	8	7	1	—
Total	32	32	5	5

receive obligations. GSCC interposed itself between all receive and deliver obligations so that a long position represented securities that the member would receive from GSCC, while a short position represented securities that were due to be delivered to GSCC by the member.

Settlement of netted positions was done through GSCC's settlement process, which had three basic underpinnings: 1) every securities delivery, whether to or from GSCC, was made against full payment; 2) GSCC did not "build a box" during the day; rather, deliveries that came in to GSCC were instantaneously redelivered to another netting member (in other words, GSCC specified to each dealer the exact par and dollar amounts that were to be received or delivered, so that all movements were in a pre-bound status); and 3) all settlements were made over Fedwire (or intrabank, meaning that both the buying and selling members cleared at the same bank and thus payment needed to be made only on the books of that bank); therefore, finality of settlement was obtained at the time of the securities movement. Deliver and receive obligations were satisfied through delivery to and receipt from clearing banks designated by GSCC. All deliveries were made against simultaneous payment at that day's system value for the obligations.

Net settlement positions (including "fail" and "forward" positions[19]) and any resultant deliver and receive obligations of a netting member were fixed and guaranteed by GSCC at the time GSCC made available to the member the reports of such positions and obligations. (At the outset of the Netting System, that time was around 2:30 A.M. the following day.) At that point, all deliver, receive, and related payment obligations between members that had been created by the trades that determined the net settlement positions were terminated and replaced by the GSCC-issued settlement obligations. GSCC did not unwind positions that it had netted and guaranteed, meaning that it would not return a buyer and seller to their original positions.

Twenty firms, including three interdealer brokers and seventeen primary dealers, participated in the first net settlement.[20] The then-current four-year note was the first security netted. As the list of eligible securities expanded, the necessary clearance, settlement, custody (for margin), and financing services were provided to GSCC by SPNTCO (for notes)[21] and the Bank of New York (for all other products). It is interesting to note that in the early years of GSCC, the Fed, the Treasury, and GSCC had ongoing discussions about taking GSCC out of the business of moving securities, which requires the use of an intermediary clearing bank. GSCC argued that the most efficient and least risky scenario for settling government securities would involve GSCC issuing settlement balance orders directly to the Fed through a GSCC account at the Fed, which would have acted like a transfer agent. No Fed intraday credit would be required by GSCC. Apparently, this idea was never seriously considered by the Fed for at least two reasons: 1) the Fed would have had to develop or acquire all of the intricate operational capabilities developed by the clearing banks over decades, and 2) the Fed would have taken on counterparty credit risk (in other words, the risk of default by a dealer) directly.

The introduction of the GSCC Netting System had enormous implications for the government securities marketplace. Operational savings to members, particularly brokers, were quite significant. The benefits of GSCC were highlighted in an internal Chemical Bank publication called the *Data Bank*:

> Everybody wins. GSCC members were happy because netting eliminates the labor-intensive, time-consuming, and error-prone process of manual comparison. Accuracy levels have greatly improved, lowering a major risk factor. . . . Here at Chemical, Operations staff have witnessed a drop in the volume of buy and sell "deliveries," which was "particularly dramatic on our most active day," says Kyle Conselyea, who managed the GSCC project. . . . The common practice of holding onto outgoing deliveries until closing time—and the ripple effect that had on the subsequent task of "proving"—meant that overtime was a fact of life. Now his staff gets to go home at 5:00. "I don't know when I last paid overtime," Conselyea reports.

The Netting System also ensured the safety and soundness of the overall settlement process, and, for the first time, brought to the government securities market the significant risk protections that stem from multilateral netting of obligations by novation (with GSCC assuming the position of counterparty on all trades for settlement purposes) and daily margining and marking-to-market (taking into account accrued interest) of the net settlement positions of each netting member.

GSCC imposed on its members the discipline of having to meet various financial, operational, and other standards for admission to and continued participation in the system. Moreover, GSCC put in place a centralized loss allocation procedure for handling the insolvency of a member.

During the initial weeks of the netting operation, eligible securities were limited to newly issued Treasury notes, allowing participants time to acclimate to the process. The first Treasury bond—the most recent one at the time—was added in September 1989. Thereafter, product eligibility grew rapidly. By January 1990, all Treasury securities other than STRIPS (Separate Trading of Registered Interest and Principal of Securities) were eligible for the net, and there were thirty-four netting participants. In April 1990, the scope of the Netting

[19] A fail net settlement position is one that is past its scheduled settlement date and has not yet settled. A forward net settlement position is one that is scheduled to settle one or more days in the future.

[20] The three brokers were RMJ Securities Corporation, Garban Ltd., and Cantor Fitzgerald Securities Corporation. The seventeen primary dealers were Carroll, McEntee & McGinley; Daiwa Securities America; Discount Corporation of New York; Dillon, Read; First Boston Corporation; First National Bank of Chicago; Goldman Sachs; Kidder, Peabody; Kleinwort Benson Government Securities; Merrill Lynch Government Securities; Morgan Stanley; Nikko Securities; Nomura Securities International; Prudential-Bache Securities; Salomon Brothers; Smith, Barney, Harris Upham; and Yamaichi International (America).

[21] In 1992, SPNTCO's parent was merged into Bank of America National Trust and Savings Association (BOA). BOA subsequently determined, for risk reasons, to exit the clearing business. Its Security Pacific National Bank subsidiary continued to operate and provide clearance services for two years after BOA announced that it was planning to exit the business, in order to facilitate the smooth, seamless conversions of its customers to other clearing banks. Interestingly, NSCC/GSCC considered buying SPNTCO at that time, in order to allow nonbanks to have direct access to Federal Reserve services. Myriad issues prevented this, including NSCC and GSCC becoming subject to the Bank Holding Company Act, lack of sufficient capital, and intraday overdraft and overnight credit considerations.

System was expanded to encompass all forward-settling trades (those scheduled to settle within fifteen days of execution) of netting members in Treasury securities. By the following month, the securities constituting the quarterly Treasury refunding were eligible for the net for the first time, and in July 1990, agency securities became eligible for netting. On February 1, 1991, STRIPS were made eligible for netting. By the end of 1991, GSCC was processing an average of more than 20,000 sides, representing over $150 billion, in net settlements each business day.

6. Impact of the Salomon Brothers Scandal

In August 1991, Salomon Brothers Inc. admitted that it had seriously violated U.S. Treasury auction rules by submitting fraudulent bids. The firm managed to avoid an indictment but paid $290 million in fines. Investor Warren Buffett took control of the company and a number of senior executives resigned, including Chairman and CEO John Gutfreund.

The Salomon Brothers scandal had significant implications for GSCC and the government securities market. By the early 1990s, the interdealer brokers, who formed the core of this over-the-counter market, found themselves in an untenable economic position because of severe cuts in commission rates in previous years. The cuts were caused by primary dealer actions, including the formation of Liberty Brokerage, which was owned by several primary dealers and established to bring down commissions through competition. To make up for lost commission income, the interdealer brokers sought to "go national" and expand their customer base beyond primary and "aspiring primary" dealers.[22]

The scandal focused public attention on the activities and role of the primary dealers and raised questions about their integrity and that of the entire Treasury marketplace. This, in turn, constrained the ability of those dealers to continue taking actions that might be perceived as hindering the transparency and fairness of the market. As a result, in late 1991, four interdealer brokers—Fundamental Brokers, Garban, Liberty, and RMJ—announced that they were expanding access to their screens to non-primary dealers that were GSCC netting members. This action had not been tenable earlier because a primary dealer would not do business with a broker that might match it against someone other than a primary dealer on a blind basis, even if that dealer was a GSCC netting member. The interdealer brokers, taking advantage of the post-scandal climate (and the intensified scrutiny of primary dealer actions), adopted the standard of status as a GSCC netting member as an objective means of expanding their customer base beyond the primary dealer community. The first non-primary dealer to receive broker screens was the Chicago Corporation (on October 28, 1991), followed by Continental Illinois Bank.[23]

7. Growth of the Netting Process

In January 1992, the Federal Reserve, the SEC, and the Treasury Department issued the *Joint Report on the Government Securities Market*, which stated that the three agencies did not believe the government securities market was "flawed or broken in any fundamental economic sense."[24] The report said that GSCC had made the market "even more efficient," and that GSCC's netting process "substantially reduces counterparty risk" for GSCC members. The report further noted the benefits of a GSCC proposal to include Treasury auction awards in its Netting System, and it encouraged GSCC to 1) "develop efficient processing systems for market participants' repo activity," 2) "expand to a greater universe of trades the benefits of netting," and 3) accelerate its efforts to expand membership.

GSCC moved ahead quickly to provide additional enhancements. On February 21, 1992, it introduced an enhancement to the executing firm information field in the Comparison System that offered members improved comparison results through identification of the true executing parties to a trade (see Box 3). It also allowed nonmember firms that cleared through GSCC members to more readily

[22] An "aspiring primary dealer" category existed at the time. It was treated the same as primary dealer for purposes of access to broker screens.

[23] Certain primary dealers were vocal in their opposition to this development, voicing credit concerns. GSCC's position was that this was a positive development for a number of reasons, including enhanced market liquidity and transparency. GSCC also emphasized that, if a non-primary dealer with interdealer broker screen access failed, the primary dealers were far better off having that failed dealer be a netting member because GSCC would have guaranteed the transactions of, and collected appropriate margin and mark from, the insolvent member.

[24] In conjunction with the release of the *Joint Report*, the New York Fed issued a revised set of criteria for designation of a firm as a primary dealer and for the administration of its relationship with primary dealers. The Fed eliminated certain market-making requirements and replaced them with criteria including making "reasonably good markets" in trading with the Fed's trading desk, participating meaningfully in Treasury auctions, and providing the Fed's trading desk with useful market information and analysis.

Box 3

Identifying the True Executing Parties to a Trade

When participants were aware of the correspondent clearing relationships of other members and had information on the names and accounts of the nonmember parties they actually traded with, trade data could successfully be submitted for comparison against the member that was acting for the correspondents. Difficulties arose, however, when the clearing relationships were not well understood. A GSCC member, unaware that its trading partner was the correspondent of another member, very often failed to submit the matching side of such trade for GSCC processing.

For example, if Primary Dealer A traded with XYZ Small Firm, and XYZ cleared its activity through Primary Dealer B, Primary Dealer A might not have submitted the trade to GSCC because it assumed that it had traded with a nonmember and, thus, that the trade was not GSCC-eligible. In addition to causing an uncompared trade for the submitting party, this lack of awareness made it difficult for the counterparty, who got an advisory, to determine the cause of and resolve that advisory. Generally speaking, these unmatched trades pended in the system until they were deleted by GSCC.

The situation was complicated by the fact that some members guaranteed the trading activity of their correspondents but others did not (a situation that remains to this day). Trading partners that were netting members often were hesitant to submit the counterparty side of nonguaranteed correspondent trades to GSCC, because this activity was subject to netting and margin and mark-to-market requirements. To avoid these problems, GSCC provided new fields for identifying correspondents, and netting members were allowed to indicate whether the activity of a given correspondent with another netting member was eligible for netting.

access GSCC's comparison and netting services. By the end of the year, more than 250 executing firms were taking advantage of this feature.

On October 16, 1992, an automatic yield-to-price conversion feature was implemented, eliminating the two-step pricing process for when-issued trades[25] and allowing when-issued trades to be netted and novated on the trade date. As the coupon of the new issues was not determined until the auction date, members' when-issued trading activity between the announcement date and the auction date was submitted to GSCC with a yield. Those transactions then had to be resubmitted to GSCC for comparison with a dollar price during the *auction date* + 1 processing cycle. Only then were trades, if compared, eligible for GSCC's netting and novation services and the resultant credit protections. With the launch of the yield-to-price facility, GSCC automatically converted yield trades into price trades following the announcement of auction results. The service thus reduced both risk (because the guarantee of settlement occurred as soon as a yield trade compared) and costs (because of the elimination of the double submission of when-issued trades).[26]

8. Treasury Auction Takedown Process

Membership and trade data submissions continued to grow rapidly. On March 31, 1994, GSCC had its first $1 trillion netting day. More than $950 billion was eliminated from settlement.

A month before that, GSCC had filed a rule change proposal with the SEC to permit it to extend its comparison, netting, settlement, and risk management services to U.S. Treasury securities purchased at auction and issued through Federal Reserve Banks. The proposal allowed the inclusion of all proprietary (or "house") purchases of Treasury bills, notes, and bonds by GSCC netting members, whether done on a competitive or noncompetitive basis.[27]

Three years earlier, GSCC had opened discussions with the Treasury and Fed on its proposal to expand its Netting System to include auction awards, or "takedowns." The 1992 *Joint Report* encouraged the effort, noting that "the benefits of netting were greater as more trades were included in the net, because a greater number of receive and deliver obligations were reduced to as small a number as possible."

[25] Trades in securities that are about to be issued. The when-issued market allowed dealers to presell to customers ahead of the auction date and then cover the sale in the auction.

[26] Participation in the service was initially voluntary. Those members that did not participate had to submit final money on the auction date or their trades would be rejected. Also, they needed to submit final money for all trades executed between the auction date and the settlement date in order for those trades to compare (whereas GSCC would calculate final money for participating members).

[27] Auction awards resulting from bids made by netting members on behalf of customers that had been named on the bidding member's tender form were not eligible. This was a requirement imposed by the Treasury Department to ensure that customer awards would always be filled (and not netted out against short sales in the secondary market). Owing to system limitations, securities that were auctioned and issued on the same date also were (and remain) ineligible.

GSCC initiated its auction takedown process in September 1994. Prior to that time, the Treasury settled an auction award to a dealer that was a GSCC member in the same way that it settled an auction award to any other institutional investor: by delivering securities to the book-entry account of the dealer's custodian. This process was inefficient because in many cases the dealer had already sold some or all of its auction award in when-issued transactions.

The key idea of the new process was that auction awards and when-issued purchases were equivalent for purposes of netting and settlement. Additionally, if a new issue reopened an outstanding security, auction awards were also equivalent to conventional secondary market purchases of securities with the same CUSIP. Pursuant to the auction takedown process, on the issue date, the Fed delivered to GSCC securities equal to the aggregate awards of its members. GSCC then redelivered those securities, along with securities received from members with net-short positions, to members with net-long positions. Thus, the auction awards lost their separate identities and became part of a consolidated net settlement process.

On September 12, 1994, the first day that members' proprietary Treasury auction awards were encompassed within GSCC's net, three Federal Reserve Banks (New York, Chicago, and San Francisco) submitted the auction award details of the three-month and six-month bill auctions to GSCC, which in turn generated locked-in confirmations for the thirty-nine participating GSCC members. The size of each auction was $11.6 billion, nearly half of which reflected proprietary auction awards to eligible GSCC participants. Auction purchases were then netted with when-issued and other secondary market trades in the same securities submitted by GSCC netting participants. Combined, auction purchases and secondary market trades totaled more than $120 billion. However, through netting, the resulting receive and deliver obligations generated on September 15, when the securities were issued, totaled approximately $28 billion. The Treasury soon began to make the large majority of all auction deliveries to dealers indirectly through GSCC.

The implementation of auction processing enabled GSCC to 1) accept eligible auction award details from Federal Reserve Banks and generate comparison output based on those details, 2) net auction purchases with when-issued and other secondary-market trades in the same security submitted by netting members, and 3) take direct delivery of purchased securities from Federal Reserve Banks at one of GSCC's designated clearing banks for prompt redelivery to members with net-long positions through GSCC's settlement process. The prompt redelivery of auction awards to participants with long positions (within minutes of receipt of the securities from the Fed), among other things, reduced the daylight overdraft exposures associated with new issue distribution.[28]

The auction takedown service also resolved several risk management problems associated with gross settlement of auction awards. First, the unnecessary deliveries to dealers that were not ultimate buyers created risk for GSCC because of its guaranteed settlement of the redeliveries by those dealers. Second, because GSCC did not have knowledge of auction awards made to its netting members, it could not guarantee settlement of those awards (as it would for secondary market trades), thus leaving the Treasury exposed to credit risk. Finally, GSCC was unable to assess proper performance guarantees, or margin on purchasers and sellers, and it could not mark their positions to market accurately. The auction takedown service allowed GSCC to margin and mark dealer positions on a true net basis.

9. Repo Netting

In 1990, with the basic netting engine built, GSCC started to analyze the possibility of applying its comparison, netting, and risk management processes to repos—repurchase agreements and reverse repurchase agreements involving government securities as collateral. Successful application would provide the repo market with efficiencies and risk protections akin to those provided for buy-sell trades.

At the time, there were a variety of risks and inefficiencies in the government securities repo market. To begin with, repo transactions were confirmed on a nonautomated basis by telephone or fax. Also, while the bulk of repo activity was conducted through interdealer brokers, such brokered transactions were not transacted anonymously but rather were done on a "give-up" basis, meaning that the broker matched the two parties and then stepped out of the trade after revealing the identity of each party to the other. This withdrawal was done because repos, given their average size and potential time to settlement, presented more settlement risk than most dealers wanted to take on with a broker counterparty. However, the consequent lack of an intermediary resulted in a greater flow of information that exposed a dealer's trading strategies to competitors. Moreover, market participants faced the risk (which might not be sufficiently, if at all, covered by

[28] Before the implementation of auction processing by GSCC, Treasury securities delivered in settlement of auction awards would be sent to the purchasing dealer's clearing bank account in the morning, and often would sit in that account until redelivered to dealers with long positions later in the day, thus requiring the bank to provide intraday credit to the purchasing dealer.

margin) that a counterparty would fail to pay back principal plus interest owed or fail to deliver back collateral. Furthermore, repos required settlement of both their start and close legs on a trade-by-trade basis.

Key to the feasibility of including repos in the net was that, from a clearing perspective, receives and delivers generated by repos did not differ significantly from receives and delivers generated from netting outright buys and sells. In view of this, GSCC management realized that it could offer a service that would keep track of and net out offsetting securities movements, whether arising from other repos or from non-repo trading involving the same CUSIP.

Initially, there was industry resistance to the GSCC proposal for providing services for repos, primarily owing to the perception among larger primary dealers that GSCC's netting process would "level the playing field" to their disadvantage. Among the factors that helped to overcome this resistance was the focus on the government securities marketplace brought about by the Salomon Brothers scandal. In January 1992, in the wake of the scandal, the *Joint Report* stated that "GSCC could benefit the repo market by offering a system that clearly defines which stage of a transaction was occurring . . . and that automatically generates a comparison of the transaction."

9.1 Initial Repo Netting Proposal

By August 1992, GSCC had designed a repo netting proposal that would provide the following benefits to the repo market:

1. Automated comparison of the start and close legs of a repo, including the capture of all key elements of the transaction, which would help members monitor repos and maintain appropriate recordkeeping and audit trail information.[29]
2. Netting and settlement of underlying collateral movements, which would offer significant cost savings and alleviate operational burdens.
3. Pass-through of coupon interest, which would provide for coupon payment protection.
4. Guaranteed settlement of repo transactions, with GSCC assuming the role of counterparty to each side (as it did for buy-sells).
5. Centralized and standardized daily margin and mark-to-market for each repo position.
6. Favorable accounting treatment that would facilitate members' ability to offset, for balance sheet purposes, repos and reverse repos netted and guaranteed by GSCC.[30]
7. Net capital relief: Under the SEC's net capital rule, broker-dealers must deduct from their net worth certain repo agreement deficits when computing net capital. But when computing the deductions, broker-dealers may net obligations due under repo agreements entered into with the same party. Having the clearing corporation as the common counterparty to repo dealers would provide substantial net capital relief.[31]

GSCC staff then sought guidance from the Repo Committee of the Public Securities Association (PSA), which established a working group comprising dealers and repo brokers to focus on the proposal. After meeting from September through December of 1992, the working group wrote to GSCC management encouraging GSCC to provide a comparison service for repos "as expeditiously as possible," noting that comparison would have a number of benefits for the repo market, such as "helping counterparties detect errors and creating an audit trail." The working group also asked for a more detailed "blueprint" for netting repo transactions. It noted that three general principles should govern the development of the blueprint: 1) implementation should be designed so as not to require conversion costs that might exceed savings from future operational efficiencies, 2) novation through GSCC should achieve counterparty netting for accounting purposes, and 3) netting should reduce the cost to GSCC members associated with daylight overdrafts.

[29] At that time, settlement of the close leg of an overnight repo often occurred before the counterparty had the opportunity to check the information contained in its confirmation (which it received only on the morning of the close date). GSCC proposed that members be allowed to compare their repos on a same-day basis and thus be able to properly monitor overnight repo transactions and reconcile incorrect information.

[30] In this regard, an important development occurred in March 1992 when the Financial Accounting Standards Board (FASB) issued an interpretation (No. 39 – Offsetting of Amounts Related to Certain Contracts) stating that fair market amounts recognized for forward and other conditional or exchange contracts executed with the same counterparty under a master netting agreement could be offset. GSCC received an opinion on December 16, 1993, from Michael Passarella of Price Waterhouse essentially providing that GSCC repo participants would be able to satisfy all of the criteria specified in FASB Interpretation No. 39 and thus would be able to offset, for balance sheet purposes, the asset and liability amounts that arose from netted repo transactions that had the same close date.

[31] By letter dated March 13, 1996, from Michael A. Macchiaroli, associate director of the SEC's Division of Market Regulation, to the author, GSCC obtained no-action relief to the effect that a broker-dealer, for net capital computation purposes under paragraph (c)(2)(iv)(F) of Rule 15c3-1 (17 C.F.R. § 240.15c3-1(c)(2)(iv)(F)), could treat GSCC as its counterparty for repo transactions entered into GSCC's netting system.

In April 1993, GSCC established its own Repo Implementation Committee. The committee's initial focus was on the implementation of a comparison service for repos, designed to provide benefits such as the elimination of physical confirmations, more timely comparison of repo trade data, easier monitoring of the status of repos, ready ability to link and monitor the start and close legs of a repo, enhanced ability to identify and correct errors, easier recordkeeping, and improved access to audit trail information. More than a year of business specification design and technological development followed.

9.2 Repo Comparison Service

In January 1995, GSCC launched a Repo Comparison Pilot with more than twenty participants. Taking part in the pilot enabled firms to identify the system and operational changes needed to provide GSCC with accurate repo comparison data, and to identify unforeseen problems.

On May 12, 1995, GSCC went live with its repo comparison service, with twenty-six participants. Overnight and fixed-term repos on government collateral were eligible for comparison. GSCC did not make any characteristics pertaining to rights of substitution a required match item because it felt that doing so would greatly hinder the comparison rate for repos, given the difficulty firms had in submitting substitution data.

9.3 Development of the Repo Netting Service

GSCC next turned its focus to a repo netting service. It struggled with the resolution of several key issues, including whether GSCC should guarantee settlement of a forward starting repo (a repo where the start leg was scheduled to settle one or more days after the trade date) prior to the actual start of the repo. One option was to net and fully guarantee the repo at the time of its comparison, one or more days before the scheduled settlement of the start leg. The problem with this approach was that it created an unacceptable level of exposure for GSCC, obligating it to conduct two settlements when the underlying repo might never be initiated by the parties to the repo.

Another alternative was to neither net nor guarantee the repo until the start leg actually settled. GSCC management rejected this approach because it left participants with no protection during the forward start period.

GSCC ultimately chose the middle ground of providing rate protection—guaranteeing the payment of interest due but not guaranteeing actual settlement of the start and close legs of a repo that had not in fact started—during the period between trade execution and the start of the repo. This protection reflected the difference between the contract repo rate and the current rate for a repo of like term and underlying collateral. The approach made sense because no securities would have moved between the parties before the start date and there was, therefore, no risk other than interest rate risk. (Once the start leg settled, there would be full guarantee of settlement of the close leg.)

Another major issue involved guaranteeing settlement of repos of an extended length, where the daily financing mark to the parties, and the interest rate exposure to GSCC, could be quite large. In view of the risk involved, GSCC chose to limit the number of business days between the submission date and the settlement date for the close leg of an eligible repo to a half-year.[32]

Finally, because of potential operational difficulties, GSCC ultimately chose to make open repos (repos with no fixed end date) ineligible. Other eligibility requirements established for netting were as follows: The data on a repo had to be submitted by netting members that had agreed to adhere to the heightened mark payment and margin deposit requirements and other aspects of the repo service; such data had to be compared; and the underlying securities had to be Treasury or book-entry federal agency securities.

[32] The term of an eligible repo initially was limited to 180 days in order to evaluate GSCC's risk management measures. On September 23, 1996, the term was extended to 360 days. On June 2, 1997, GSCC made eligible those repos having closing leg settlement dates of up to two years after submission. In taking this action, GSCC was cognizant that the Bankruptcy Code's automatic stay exception for the liquidation of a "repurchase agreement" as defined by the Code, and for the setoff by a repo participant of a debt or claim arising in connection with such a defined "repurchase agreement," applied only to a repo transaction with a term of not more than one year. GSCC noted to its members that, "[i]n this regard, there was a comparable automatic stay exception in the Code for the liquidation of a repo transaction as a 'securities contract' (even if it has a term longer than one year) on which GSCC, as a clearing corporation, could rely in the exercise of its netting rights in respect of such transactions." The enforceability of GSCC's netting rights also were supplemented and made clear by the application of other federal legislation. (GSCC Important Notice 42.97, May 28, 1997)

9.4 Implementation of Repo Netting

On November 17, 1995, the initial phase of the repo netting service—involving the netting and settlement of the close leg of overnight and term repos (and the start leg of forward-settling repos)—began, with thirteen participants.[33] Repo transactions were netted with conventional buy-sell activity and Treasury auction purchases in the same CUSIP to arrive at a single net position in each security. As it did for cash transactions, when GSCC netted repos it interposed itself between the two parties for settlement purposes. GSCC's guarantee included the return of repo collateral to the repo participant, the return of principal (the repo start amount) to the reverse repo participant, and payment of repo interest to the full term of the repo to the reverse repo participant. The guarantee also included coupon interest protection, meaning that, once the repo started, GSCC would automatically pass a coupon payment from the reverse repo participant to the repo participant on the coupon payment date, crediting the repo participant and charging the reverse repo participant in the process.

GSCC had to significantly revise its risk protections to accommodate the greater risk arising from repo activity. Repos, on average, were much larger in size than buy-sells (averaging $38 million at the time, compared with roughly $9 million for buy-sell transactions) and many were long term and carried a financing component that buy-sells did not. With regard to its mark-to-market process for repos (also known as "forward margin"), GSCC, in addition to applying a mark to the underlying securities on forward trades, began to use a new, separate financing mark, which took into account the potential financing cost GSCC would earn or incur if it had to finance the repo position of a failed participant between the date of failure and the settlement date for the close leg of a long-term repo.

In determining the repo rate used in these calculations, GSCC decided that the rate would need to be tailored to each individual repo transaction. For general collateral repos, GSCC would use the remaining term of the repo to determine the appropriate market repo rate. For special collateral repos, GSCC would determine the special repo rate on the basis of the CUSIP and the remaining term of the special. In order to determine the various rates, GSCC was given full access to the broker's repo screens.

[33] The initial participants were Cantor Fitzgerald Securities, Deutsche Morgan Grenfell/C.J. Lawrence Inc., Dillon, Read, Eastbridge Capital, Goldman Sachs, HSBC Securities Inc., Lehman Brothers, Merrill Lynch Government Securities Inc., NatWest Bank NA, Oppenheimer & Co., Spear, Leeds & Kellogg LP, UBS Securities Inc., and Zion First National Bank. Repo transactions worth more than $6 billion went into the net on the first day.

GSCC's mark-to-market process also changed fundamentally in that GSCC had previously collected debit marks (which could be satisfied by cash or eligible collateral) but held credit marks, and it had not used a credit mark in one CUSIP to offset a debit mark in a different CUSIP. To facilitate repo netting, it shifted to offsetting credit marks against debit marks across CUSIPs (thus providing for cross-margining of the cash and repo markets) with full pass-through of collected marks. In starting to pay out credit marks, GSCC had to convert its mark-to-market process into a cash-only process.

GSCC also sought to provide its full guarantees without adversely affecting the economics of a repo. Thus, GSCC determined to pay interest on debit mark amounts collected and charge interest on credit margin amounts paid on a daily basis using an effective federal funds rate.

Meanwhile, GSCC added a new "repo volatility" component to its clearing fund to guard against risk associated with guaranteeing the payment of repo interest to the term of the repo. GSCC requires that its netting members maintain deposits in the GSCC clearing fund account to provide adequate risk protection and liquidity in the event of a participant failure. Clearing fund margin is the pool of margin collateral collected from netting members and held by the clearing corporation to help manage the risk of a netting member defaulting on its payment and delivery obligations. The need for the repo volatility aspect of the clearing fund arose from the liquidation process that GSCC would conduct in the event that a member with an outstanding term repo failed. Under that process, if the member was a funds borrower and had defaulted on its obligation to repurchase the underlying securities and pay interest at the end of the repo term, GSCC would immediately sell the same securities and reverse them in (for the same remaining term as the original repo transaction). GSCC would thus have the opportunity to earn interest income; however, this amount could be less than the interest payment that would have to be made to the funds lender on the scheduled settlement date. Conversely, if the member was a funds lender and had defaulted on its obligation to redeliver the underlying securities at the end of the repo term, GSCC would immediately buy the same securities and put them out on repo (for the same remaining term as the original repo transaction). GSCC would thus incur interest expense, which may be greater than the interest payment to be received from the funds borrower at the end of the repo. The immediate open market purchase and sale transactions were necessary to mitigate the market risk of the underlying securities. GSCC marked-to-market and required margin each day up to the firm's insolvency, and it needed to eliminate the risk that any future market moves would create.

Clearing fund margin was calculated in a manner designed to protect GSCC from fluctuations in the value of a net settlement position from the latest marking-to-market until liquidation. The repo volatility amount, which corresponds to the volatility of repo rates, was used to provide GSCC with protection from the portion of that fluctuation in value that represented interest exposure.[34]

GSCC's margining and repricing services provided, for the first time, a standardized approach for the coordinated, risk-managed movement of both the collateral underlying a repo and the interest owed on the repo. The services fundamentally changed the marketplace in that participants no longer needed to build margin (or a "haircut," typically 2 percent) into the original value of a repo, but could instead price the repo at the current market value of the collateral.

The repo netting service was a major success, and participants and volumes grew steadily.[35] Critical to this success was the Financial Accounting Standards Board's adoption, in December 1994, of Interpretation No. 41, which permitted financial entities to offset, on their financial statements, repos and reverse repos when the transactions met certain criteria, such as having the same counterparty and settlement date, being executed in accordance with a master netting agreement, involving securities in book-entry form, and settling via an appropriate securities transfer system.

The "same counterparty" requirement was critical; that was where GSCC could provide great value. By becoming the common counterparty to each side of a repo upon novation, GSCC could maximize the ability of participants to take balance sheet offset. This role was crystallized in a May 30, 1995, opinion from Price Waterhouse LLP to GSCC stating that "members would be allowed to offset, for financial statement purposes, a short and long net settlement position . . . in a particular CUSIP comprised in whole or part of repo transactions against a long or short net settlement position with the same scheduled settlement date in another CUSIP comprised in whole or part of repo transactions."[36]

10. Netting and Settlement of Brokered Repos

The establishment of the repo netting system transformed the Treasury repo market. But even more fundamental change was yet to come. GSCC's next major effort was to arrange for netting and guaranteed settlement services for *same-day start-leg brokered* repos (which represented the majority of repos and were done on a "give-up" of identity basis), including the automation of start- and close-leg processing, which are integrally related.

A critical issue in this regard was that, as noted earlier, most repos started on the day that they were executed, but GSCC was not equipped to handle same-day start legs. GSCC's Repo Implementation Committee and its broker membership proposed a solution that would have brokers assume responsibility for the movement of securities between dealers for same-day start-leg settlement. Brokers and dealers would send transaction details to GSCC for comparison, netting, and guaranteed settlement of repo close legs.

[34] The formula provided that the gross amount of margin would be calculated by multiplying the system value of the repo position by the repo volatility factor (expressed in basis points) and then by a fraction, the numerator being the number of days to the scheduled settlement date of the close leg and the denominator being 360. The repo volatility factor for general collateral repos (defined as all repos other than special repos) was set at 50 basis points. For special repos (defined as any repo with a system rate that was more than 100 basis points less than the system rate for general collateral repos), a distinction would be made between those expected to come off special on a certain date (such as an upcoming issue date) and all others. The factor for those expected to come off special would be the same as the factor for general collateral repos, while the factor for all other specials would be equal to the spread between the system rate for the repo and the system rate for general collateral repos (but in no event less than 50 basis points). Repo volatility amounts on long and short net positions were allowed to offset each other.

[35] Still, there were issues. For example, the SEC filing made by GSCC for authority to implement the repo netting service was challenged by Delta Government Options Corporation, a competitor clearing corporation at that time, which asserted that the proposed repo netting system would not afford participants adequate financial protections. The SEC ultimately rejected Delta's objections. (See SEC Release No. 34-36491, 60 S.E.C. Docket 1814, 1995 WL 704170 [November 17, 1995]; File No. SR-GSCC-95-02, Order Approving a Proposed Rule Change Relating to Netting Services for the Non-Same-Day-Settling Aspects of Next-Day and Term Repurchase and Reverse Repurchase Transactions.)

[36] In June 1996, the FASB issued Financial Accounting Standards Statement No. 125 (FAS 125), which provided accounting and reporting standards for transfers and the servicing of financial assets and extinguishment of liabilities, and established new criteria for determining whether a transfer of financial assets in exchange for cash or other consideration should be accounted for as a sale or as a pledge of collateral in a secured borrowing. After GSCC members raised questions about the impact of FAS 125 on repo netting members' relationship with GSCC and, particularly, whether a right of substitution that was included in the underlying agreement continued to exist after novation, GSCC made a filing in 1997 (1997-3) in which it amended its rules to explicitly provide that: 1) GSCC would recognize that a right of substitution exists with regard to a repo if either of the parties submitted matching data indicating such a right, or if GSCC, in its sole discretion, determined that the parties intended that such a right exist; 2) if the parties to a repo entered into the transaction with a right of substitution, that right would continue once the repo was netted by GSCC, and GSCC would facilitate the parties' ability to conduct such a substitution or termination; and 3) a right of substitution continued once the repo was netted by GSCC. The GSCC filing made clear that, if a GSCC repo netting participant provided for a right of substitution in the underlying repo agreement, there was no need for that participant to seek to enter into an additional agreement with GSCC regarding that right of substitution.

On August 5, 1996, interdealer broker netting members became eligible to participate in the new brokered repo service.[37] Starting on that date, brokers meeting GSCC's financial and operational requirements began submitting repos to GSCC in lieu of give-up (where the counterparties would reveal or "give up" their names to one another when submitting repo trades to GSCC through brokers). Settlement of same-day start legs occurred directly between the broker and the repo and reverse repo dealers, while compared close legs and forward start legs were netted, guaranteed, and settled through GSCC.

The implementation of the brokered repo service revolutionized the marketplace. As GSCC guaranteed settlement of the repo close leg, it eliminated counterparty risk. The service turned a market that was entirely give-up into a largely anonymous blind brokered market. Bringing more transactions into the net also dramatically reduced the number of total daily settlements for broker participants and made their back-office settlement process much more cost-efficient.

Using brokers as counterparties was not without controversy, since it was perceived by some market participants as introducing a new risk by allowing somewhat thinly capitalized brokers to act as principals. One means by which GSCC limited this risk was the imposition of enhanced minimum capital requirements. At the time, give-up repo brokers operated with a low level of capital, based on the principle that they did not participate in settlements or take market risk. GSCC changed that by requiring each interdealer broker netting member engaged in repo activity to have a minimum of $10 million in excess of SEC-required net or liquid capital (an increase from the then-current $4.2 million excess net or liquid capital standard). Among other things, this requirement helped to mitigate the risk of a broker failing between the time a transaction was executed and the submission of data to GSCC.

Another way that GSCC limited risk was by imposing a scope-of-business requirement. Each repo transaction submitted to GSCC by a broker was required to have an actual Netting System participant as the counterparty and had to be bound to a corresponding reverse repo transaction. This rule ensured that the broker would net out of the settlement process for the close leg.

[37] Eight brokers (Exco RMJ Securities, Liberty Brokerage, Garban, Tullett & Tokyo Securities, C.F. Kross, GFI Group, Prebon Securities, and Euro Brokers Maxcor) and twenty-six dealers participated. On the launch date, more than $5 billion in repo activity was processed. By week's end, over $31 billion was processed.

From an operational perspective, the brokers already had in place the systems needed to submit data to, and receive output from, GSCC; thus, they only had to make minor changes to their regular buy-sell input and output specifications to accommodate repos and then test with GSCC. However, additional operational requirements were imposed on the participating brokers:

1. Each broker had to establish a separate account, with a separate Fedwire address, at a clearing bank for use exclusively for repo start-leg intraday settlements. This account would be subject to review by GSCC.
2. Each eligible repo transaction had to be submitted to GSCC as soon as possible after execution and, in any event, no later than fifteen minutes thereafter.
3. If a counterparty netting member indicated that an error had been made by a broker, the broker was obligated to take steps to promptly resolve the error or dispute.
4. Brokers would be involved in collateral substitutions on long-term repos.[38]

Moreover, GSCC required that data on all "regular-way" repos (which start on the trade date), forward-starting repos, and repos in which the start leg had failed be submitted to GSCC, in order to preserve the integrity of the netting process. Finally, GSCC reserved the right, for risk management purposes, to compare repos based on data submitted by only one side.[39]

Soon after implementation of the brokered repo service, a concern arose among certain dealers that, because a dealer or broker counterparty could potentially fail to submit data, a brokered repo would not be compared and, therefore, would not enter GSCC's netting process. This issue was of particular concern for repos that started on the same day they were

[38] The repo dealer initiating the substitution would contact the broker and provide it with all relevant information regarding the substitution. The broker would then contact the reverse repo dealer to arrange for the substitution, providing it with all pertinent information. The broker would also provide GSCC with the terms of the substitution. GSCC, acting as an "honest" third party, would hold the collateral received from one dealer until it could be passed through against payment. Once GSCC had the collateral from both parties, the substitution would be made, with GSCC automatically reversing any previous mark-to-market and clearing fund amounts calculated for the old collateral.

[39] This right proved extremely beneficial on the evening of September 11, 2001, when, in order to facilitate an orderly settlement process and mitigate the potential for the enormous systemic risk associated with thousands of unmatched trades, GSCC made the decision to create and administratively compare 2,178 broker trades valued at more than $71 billion based on the presumption that the dealer counterparty submission was accurate. In taking this action, GSCC moved a massive reconciliation effort that would have been conducted between its dealer and broker members into one central location within GSCC.

entered into and closed the next day because there would be relatively little time to correct errors or omissions. To address this concern, GSCC established a policy under which it would effectively guarantee settlement of the start and close legs of every netting-eligible blind-brokered repo transaction that had been entered into in good faith by a member.[40]

Various enhancements were quickly made to the brokered repo service. In October 1996, GSCC implemented a collateral substitution facility, allowing members to submit substitution details on their comparison input and to process collateral substitutions online.[41] In November 1996, GSCC began offering repo-to-maturity processing services for repos on collateral that matured on the repo close date. In January 1997, the repo netting service was enhanced to provide services for repos on collateral that matured prior to the repo close date. These enhancements provided members with great flexibility when selecting collateral for repo transactions. A participant simply had to substitute acceptable new collateral no later than the business date prior to the maturity date of the existing collateral. Thus, a participant could substitute collateral as many times as it wanted over the term of the repo (subject to the terms of the repo), and substituted collateral could mature before the repo close date, as long as appropriate substitutions were made on a timely basis.

11. GCF Repo

In November 1998, after approval by the SEC,[42] GSCC revolutionized the financing marketplace by introducing a new product, the General Collateral Finance Repo service (GCF Repo) for Treasury securities collateral.[43] The GCF Repo service enabled GSCC's non-interdealer-broker netting members (dealers, for the purposes of this discussion) to trade general collateral repos—based on rate, term, and underlying product—throughout the day without requiring intraday, trade-for-trade settlement on a delivery-versus-payment (DVP) basis. Dealers executed GCF Repos with GSCC interdealer broker netting members (brokers, for the purposes of this discussion) on an anonymous, or blind, basis. The brokers were required to submit data on GCF Repos to GSCC shortly after trade execution.

Brokers could submit GCF Repo transactions in amounts of up to $2 billion, compared with the delivery maximum of $50 million for each non-GCF, or DVP, repo trade (although there was no limit on the number of non-GCF trades that could be submitted). In addition, brokers had the ability to submit data for both the repo and the reverse repo sides of a trade using a single screen. The dealer counterparties would automatically be locked in to the trades submitted by the brokers unless they specifically said, within set time limits, that they had not conducted the trade. Standardized, generic CUSIP numbers requested from Standard & Poor's Corporation, to be utilized by GSCC exclusively for GCF Repo processing, were used to specify the acceptable type of underlying eligible collateral. (Initially, GCF Repo service participants were limited to trading in a single generic CUSIP, encompassing only Treasury securities with not more than ten years remaining to maturity. In September 1999, GSCC added a second generic CUSIP for all Treasury securities.)

Soon after a predetermined trading cutoff, GSCC conducted an afternoon net exclusively for GCF Repo activity, combining each dealer's carryover activity and new GCF Repo activity to establish a single net receive or net deliver position in each generic CUSIP. For each such CUSIP, a dealer member was either a net securities borrower (money lender) or a net securities lender (money borrower), or it netted flat. The Bank

[40] See letter dated February 14, 1997, from the author to each repo netting participant. In a letter dated July 18, 1997, the author wrote again to each repo netting participant to make clear that GSCC's guarantee would hold even if the broker executed the transaction with one dealer counterparty but did not, by the end of the day, have a matching, offsetting transaction with another dealer netting member. In 2000, real-time trade matching for government securities transactions was introduced. After that, GSCC changed its policy to guarantee a repo transaction upon its comparison.

[41] Initially, participants were not permitted to submit repos with right of substitution. With the new facility, participants could specify rights of substitution using a new screen input facility (rather than via telephone or fax), thereby providing an automated audit trail for those rights. GSCC placed itself in the middle of all substitutions, with all collateral deliveries (of both old and replacement collateral) being due to or due from GSCC. GSCC also kept track of the final money for each repo throughout its life, regardless of the number of substitutions.

[42] See Self-Regulatory Organization, Government Securities Clearing Corporation, Securities Exchange Act Release Nos. 40057 (June 2, 1998,

Footnote 42 (continued)
notice of filing) and 40623 (October 30, 1998, approval order). In its approval order, the SEC stated its belief that "the use of the GCF Repo service should reduce exposure to counterparty default, increase payment netting, and apply advanced clearing and risk management practices to the market in general collateral repos."

[43] After GSCC filed in 1998 for approval to commence the GCF Repo service, the Chicago Board of Trade submitted a comment letter to the SEC stating that the GCF Repo service might be subject to the exclusive jurisdiction of the Commodity Futures Trading Commission (CFTC) and that if any of the repos that would be cleared through the service were futures, then the CFTC would have exclusive jurisdiction over the service even if the repos also were securities. The CFTC's Division of Trading and Markets ultimately advised the SEC that it had completed its review of the GCF Repo service and had determined that it had no further comment on the service or GCF Repo transactions.

of New York and J.P. Morgan Chase provided the mechanism for allowing a chain of simultaneous collateral and cash movements to occur between GSCC and its dealer members and for allowing those securities to be available for various purposes, including tri-party repo processing and bank loans.[44] All positions were reversed on the morning of the next business day prior to the opening of the securities Fedwire. Term repos thus were collateralized by cash between a morning reversal and an afternoon settlement.

GSCC became a counterparty for settlement purposes to each dealer that was party to a GCF Repo transaction, and guaranteed the settlement of GCF Repos upon receipt of trade data. In order to do so prudently, GSCC used the same risk management protections for the GCF Repo service that it had in place for its non-GCF activity, including the collection of margin and the receipt and pass-through of mark-to-market amounts.

[44] When the GCF Repo service was introduced in 1998, participants were limited to intrabank trading; in other words, dealers could engage in GCF Repo trading only with other dealers that used the same clearing bank. This allowed each bank to transfer collateral without the need to involve the other bank or use Fedwire. In June 1999, GSCC broadened the service to allow for the trading of GCF Repos on an interbank basis, meaning that a participating dealer could engage in GCF Repo trading with any other participating dealer, even if it used a different clearing bank. See Self-Regulatory Organizations, Government Securities Clearing Corporation, Securities Exchange Act Release Nos. 41002 (February 5, 1999, notice of filing) and 41303 (April 16, 1999, approval order).

The GCF Repo service provided important benefits to participants in the U.S. government securities market. It gave dealers an additional borrowing source (other than tri-party and DVP repo), bringing greater depth to the general collateral marketplace. It also led to increased liquidity, lower costs, more efficient collateral allocation, reduced operational costs, and improved safety—in large part because GCF Repos, like DVP repos, were guaranteed when compared (generally within minutes of a trade), thus eliminating intraday counterparty credit risk.

Unlike the quick success seen with the basic repo netting service, participation in the GCF Repo service was initially disappointing. Indeed, by 2000 GSCC began to consider closing the service. However, some market participants suggested that the service would grow once other products were made eligible. Ultimately, that is what happened. On January 24, 2000, agency securities became eligible for the GCF Repo service. On March 20, 2000, the first mortgage-backed securities (MBS)—Fannie Mae and Freddie Mac fixed-rates—were made eligible. With the introduction of these new products (particularly MBS, which were much more readily available to dealers for allocating to GCF Repo lending than Treasury securities or agencies), the service took off.

In 2002, GSCC merged with the MBS Clearing Corporation to form the Fixed Income Clearing Corporation, a subsidiary of the Depository Trust & Clearing Corporation. In the decade and a half since, the combined business has evolved into what is arguably the largest and most significant clearing corporation in the world.

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