

Clearing and Settlement in Major Market Countries¹

Clearing and Settlement in the United States

Three clearinghouses and three depositories serve the Nation's 7 stock exchanges, NASDAQ, and other over-the-counter dealers; 9 clearinghouses serve the 14 futures exchanges; and 1 clearinghouse serves all the equities options markets.² The major clearing members, who also clear for non-clearing members of a clearinghouse, tend to be highly automated for lower costs and greater operating efficiency. For safety purposes, U.S. clearinghouses also tend to be financially structured such that a failing clearing member can be isolated quickly and its problems resolved without a ripple effect.

While arrangements between clearinghouses and their clearing firms vary, the general goal is that the clearinghouse maintain adequate resources and commitments to assure settlement if a clearing firm or its non-clearing firm customer defaults. These include capital requirements for members, claims on items in process, if any, as well as claims on the defaulting member's remaining assets on deposit with the clearinghouse (e.g., cash, letters of credit, Treasuries, or securities posted as collateral for margin). The clearinghouse also has claims on other assets of the failed clearing member. The clearinghouse's guarantee fired is another resource. Finally, the clearinghouse can make assessments against other clearing member firms. This succession of fallbacks is a buffer against shocks ranging from sudden large drops in the prices of securities and futures to defaults by members. As a result, there have been few cases of a failure of a clearing member in the United States, and no instances of a failure of a clearinghouse.³

Equities Clearing Organizations

The National Securities Clearing Corp.--NSCC processes 95 percent of all equities trades in the United States. It is jointly owned by the principal equities markets: the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and National Association of Securities Dealers (NASD). It serves 1,800 brokers, dealers,

banks, and other financial institutions, through about 400 direct participants.

NSCCsS clearance and settlement process normally requires five business days. Trade information is received either in the form of locked-in trades already matched by the computer systems of the exchange or market; or, as buy and sell data reported by market participants. The latter still must be compared and buy and sell orders matched. Locked-in trades are entered directly in the NSCC computer system on the same day as the trade. This sharply reduces the need for the matching of buy and sell orders at the clearinghouse level. On a typical day, about 75 percent of the trades on the NYSE are locked-in (a smaller proportion by dollar value).⁴ Figures A-1 and A-2 illustrate the steps in the NSCC's clearing and settlement of retail and institutional customers' trades, respectively.

Securities which are held for NSCC members by The Depository Trust Co. (DTC), and whose ownership can therefore be transferred within DTC via its computer book-entry system, are also eligible for settlement through the Continuous Net Settlement (CNS) computer system. This includes the preponderance of trades settled through the NSCC. NSCC becomes the counterpart to each trade; it guarantees that the settlement obligations of the trade will be met—both the obligation to deliver securities and the obligation to make payment. For locked-in trades, NSCC's guarantee takes effect at midnight on the day (T+1) that the counterparties to the trade have been notified that the trades matched.

Trades that do not match begin a reconciliation process that is being shortened and by the end of 1990 will occur on the day following the trade (T+1). Those that remain unmatched by T+3 are returned to their originating marketplace for face-to-face negotiation. With the increasing number of trades locked-in at the marketplaces, and with the availability of on-line reconciliation systems at these marketplaces, the need for this process is being eliminated.

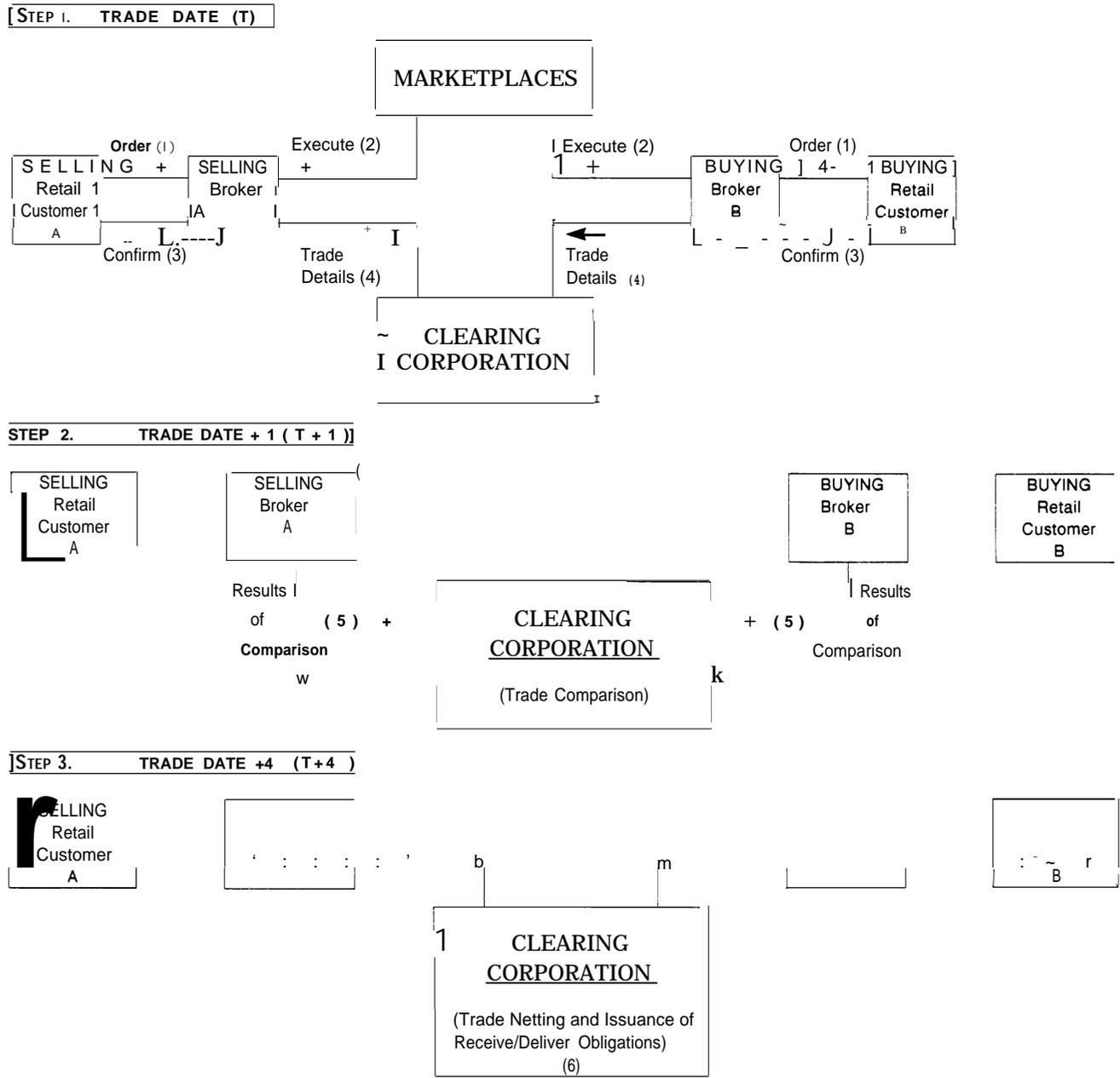
¹In preparing this appendix, OTA has relied heavily on a contractor report by Bankers Trust Co., "Study of International Clearing and Settlement" vols. I-V, contractor report prepared for the Office of Technology Assessment, October 1989, to which many dozens of institutions and individuals around the world contributed expert papers and/or served on the Bankers Trust advisory panel. OTA has also used the discussions of an expert workshop held at OTA on Aug. 22, 1989.

²For information on the clearing and settlement of U.S. Treasury and government agency securities, mortgage-backed securities, and municipal securities, see Bankers Trust Report, op. cit., footnote 1.

³One expert notes that the only situation he can envision in which the the National Securities Clearing Corp. (which clears the vast majority of equities trades in the United States) could fail, would require a major external triggering event, such as the collapse of one or more major U.S. banks causing the failure of one or more NSCC clearing banks or major clearing members. (Robert Woldow, NSCC, at a meeting of experts on clearing and settlement, OTA, Aug. 22, 1989.) The events of October 1987 in the United States—when the payment system began to become clogged—were perceived as potentially disastrous.

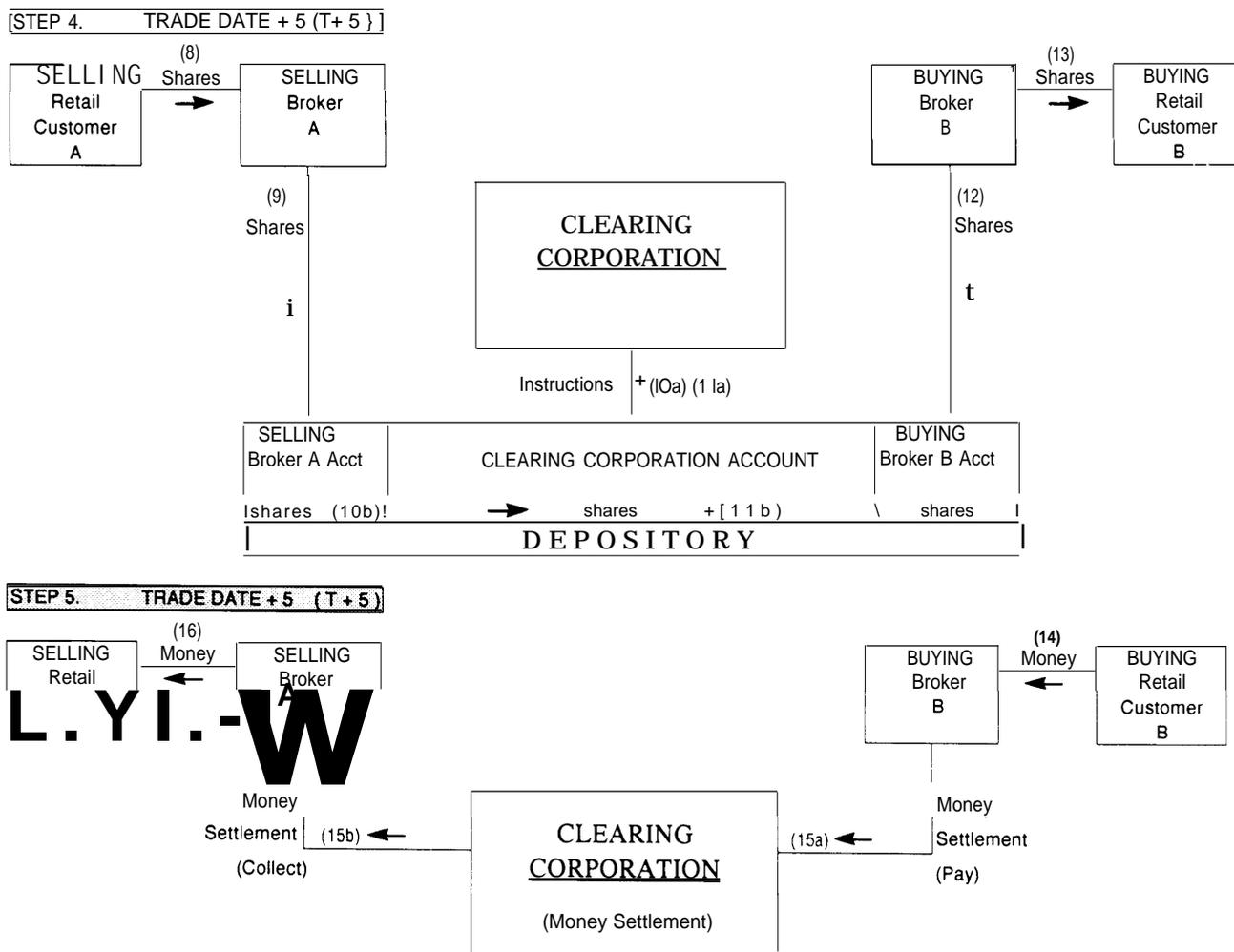
⁴Since August 1989, the NSCC began comparing trades that are not locked-in during the early morning hours of T+1.

Figure A-I-Clearance and Settlement of Retail Customer Trades



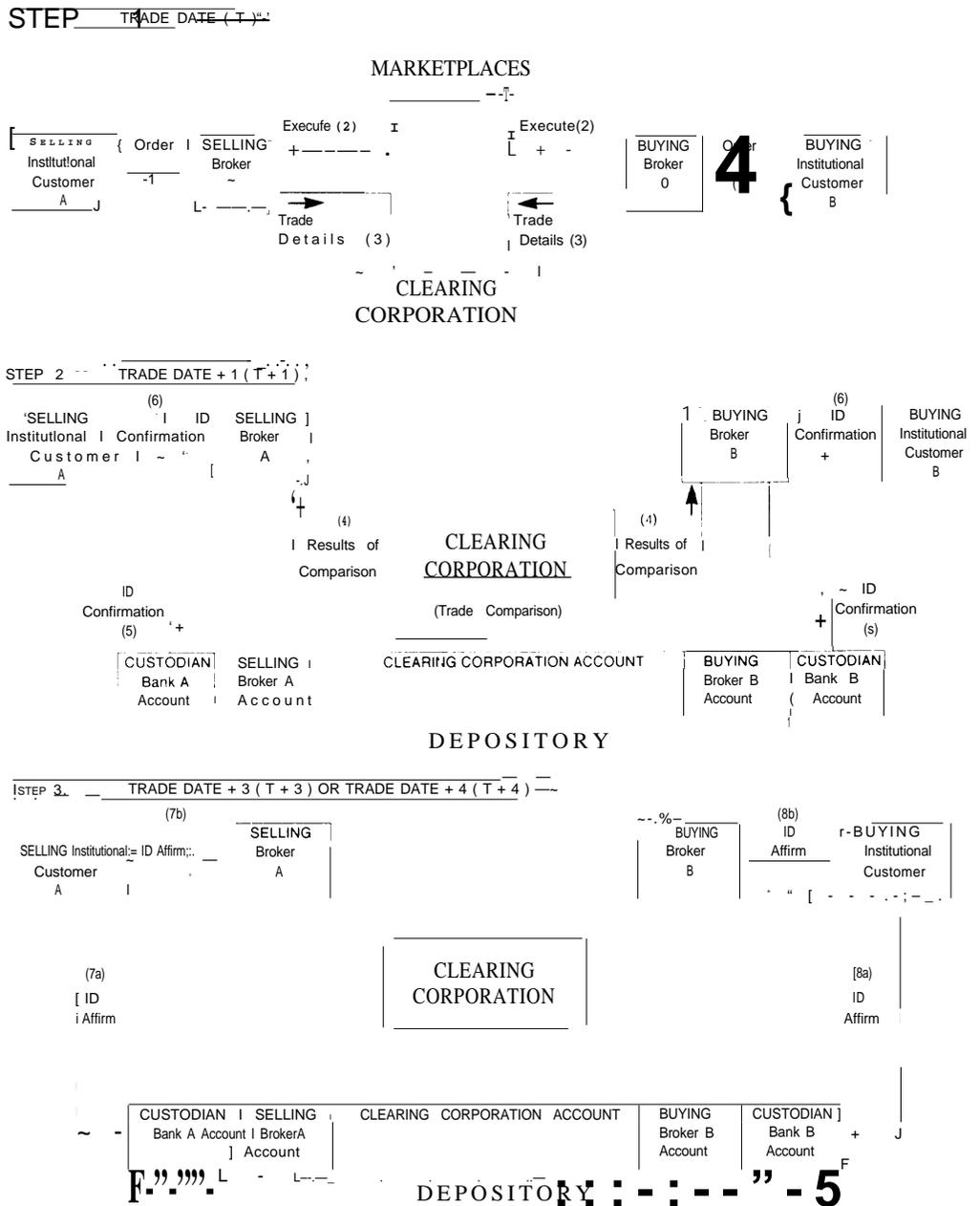
- (1) Retail Customers give orders to buy and sell stock to their respective Brokers,
- (2) Brokers execute Retail Customers orders in the Marketplaces.
- (3) Brokers confirm back to their respective Retail Customers that the trades were executed.
- (4) Brokers submit details of trades executed in the Marketplaces to the Clearing Corporation.
- (5) Clearing Corporation generates reports back to the Brokers indicating the results of comparison.
- (6) Clearing Corporation nets the trades.
- (7) Clearing Corporation issues projection reports indicating net receive/deliver obligations to the buying and selling Brokers,

Figure A-I-Clearance and Settlement of Retail Customer Trades-Continued



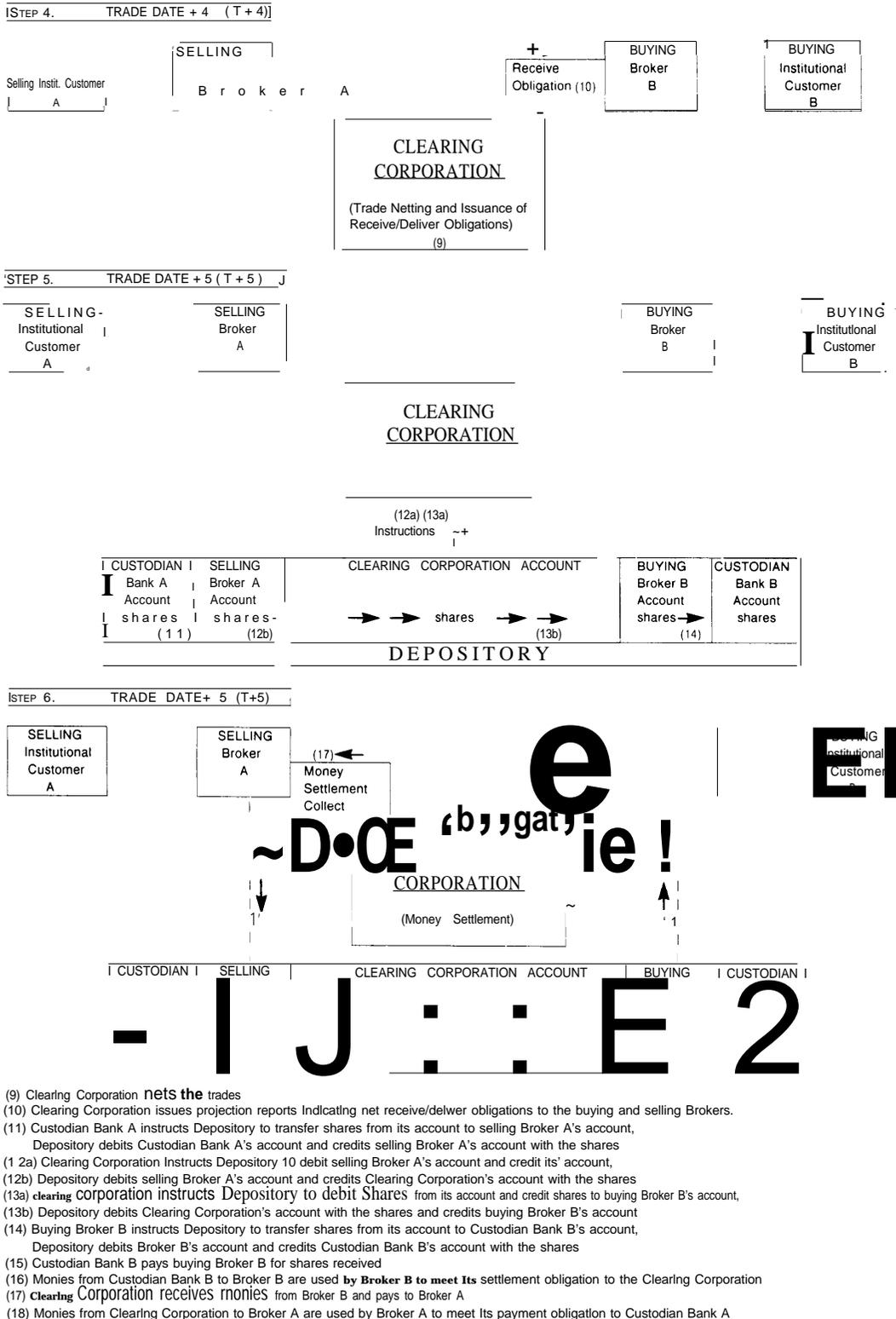
- (8) Selling Retail Customer A gives shares to selling Broker A to satisfy delivery obligation.
- (9) Selling Broker A deposits selling Customer A's shares in its account at the Depository.
- (10a) Clearing Corporation instructs Depository to debit selling Broker A's account and credit Clearing Corporation's account with the shares;
- (10b) Depository debits selling Broker A's account with the shares and credits Clearing Corporation's account.
- (11a) Clearing Corporation instructs Depository to debit Clearing Corporation's account and credit buying Broker B's account with the shares;
- (11b) Depository debits the Clearing Corporation's account with the shares and credits buying Broker B's account.
- (12) Buying Broker B requests withdrawal of shares from its account at the Depository in order to deliver to Retail Customer B,
- (13) Buying Broker B delivers the shares to its buying Retail Customer B.
- (14) Buying Retail Customer B pays buying Broker B for shares received.
- (15a) Clearing Corporation advises buying Broker B of net pay amount for shares received;
Buying Broker B delivers a check to Clearing Corporation for the requested amount,
- (15b) Clearing Corporation advises selling Broker A of net collect amount for shares delivered;
Clearing Corporation issues check to selling Broker A for the specified amount.
- (16) Selling Broker A pays selling Retail Customer A for shares delivered.

Figure A-2-Clearance and Settlement of Institutional Customer Trades



- (1) Institutional Customers give orders to buy and sell stock to their respective Brokers
- (2) Brokers execute Institutional Customers orders in the Marketplaces
- (3) Brokers submit details of trades executed in the Marketplaces to the Clearing Corporation
- (4) Clearing Corporation generates reports back to the Brokers indicating the results of comparison
- (5) Brokers send ID confirmation to the Custodian Banks of their Customers
- (6) Brokers send ID confirmation to their respective Institutional Customers
- (7a) Selling Institutional Customer A sends ID affirmation to Custodian Bank A to deliver securities on settlement day (T+5) to its Broker (A)
- (7b) Selling Institutional Customer A sends ID affirmation to selling Broker A indicating that Custodian Bank A will deliver the securities to it on settlement day
- (8a) Buying Institutional Customer B sends ID affirmation to Custodian Bank B, notifying it to receive securities on settlement day from its Broker (B)
- (8b) Buying Institutional Customer B sends ID affirmation to Broker B, instructing it to deliver securities to its Custodian Bank (B) on settlement day

Figure A-2-Clearance and Settlement of Institutional Customer Trades-Continued



Using the CNS system, the NSCC calculates each day a net long or short securities position for each CNS-eligible security that was traded by the clearing member on that day. The number of settlement transactions and the gross amount of the clearing member's obligation either to deliver securities or to make payment is adjusted by the amount of any securities or payments that it would receive as a result of other trades of the same security. This type of calculation process is known as netting. It reduces the total number of securities to be delivered or received, and the number and size of aggregate cash payments. As a result of this process of offsetting obligations, the NSCC estimates that movement of about five-sixths of the total daily transactional volume of owed securities and cash payments otherwise required on the settlement date is eliminated. Netting may indirectly increase market liquidity by reducing the gross amount of funds necessary to meet settlement obligations. After netting through CNS, the NSCC then informs the DTC of the net amount that each counterpart owes in securities on the settlement date, T+5. The DTC, using its book entry system, records the transfer of ownership by debiting the securities account of the delivering counterpart and crediting the account of the receiving counterparty.⁶ Payment on the settlement date is in the form of a certified check, payable to the NSCC. When settlement cannot be made on the settlement date—e. g., when the securities are not available in the participant's DTC account—these obligations remain in the CNS system and are carried forward and netted with the next day's obligations.

Securities that are not eligible for the CNS system may be settled either through balance order accounting or on a trade-for-trade basis. These other forms of settlement comprise a very small percentage of trades settled through NSCC.

In 1989, the fail rate—the percentage of trades which do not settle on the settlement date—in trades cleared through CNS was 8.13 percent of the total net dollar value of cash and securities due on the settlement date. Since the NSCC takes the counterpart position and guarantees the settlement of all CNS-matched trades, NSCC is exposed to various credit, market, and non-market risks.⁷ The ways in which clearinghouses protect themselves against such risks are critically important.

NSCC protects against credit risk, first of all, by retaining a lien over securities which the receiving participant has not paid for. For trades not settled by T+5, NSCC uses a mark-to-market procedure to limit its market risk until settlement does occur. Market risk is kept to 1-day's market movement by adjusting members' settlement obligations to current market prices. Members pay or are paid at settlement based on the current value of their open positions on and after T+5, rather than their value when they made the trade. In the interim, until the position settles, members pay or receive the net difference in market price movement. NSCC's guarantee fund for CNS takes account of potentially adverse movements on trades which have not settled before T+5. It is based on the total size of all positions open. These include those pending (before settlement); trades settling on T+5; and trades for which T+5 has passed and settlement has not occurred. In addition, a percentage of the market value of securities for next-day (T+1) delivery must be deposited in order to protect the NSCC in the event the member defaults. This calculation is done daily for all members and can be collected more frequently than the monthly norm. All NSCC clearing members are required to contribute to the guarantee fund. NSCC's total funds on deposit, not including lines of credit, totaled over \$400 million in 1989 and 1990.

The NSCC also maintains a full compliance-monitoring system to ensure its continuing ability to judge the creditworthiness of its participants.⁸ It shares risk information with other SEC-registered clearinghouses, both through the SEC's Monitoring Coordination Group and the Securities Clearing Group. NSCC and a number of futures clearinghouses are now discussing proposals for increasing the sharing of risk information; e.g., data on market participants' holdings on various exchanges.

The NSCC is linked to its clearing members by means of the Securities Industry Automation Corp. (SIAC), which operates NSCC's technology base. Most participants now have direct computer links; only about 1 percent of the full-service members continue to report trades via computer tape.

All payments to NSCC are on a net basis; i.e., the NSCC calculates each clearing member's total credit and

⁵This appendix discusses interdealer and institutional (street-side) settlement only. Concerning depository functions, a broker can make settlement with his institutional customer through DTC's ID program. A description of customer (retail) settlement is provided by the Securities and Exchange Commission in vol. II of the OTA contractor report: Bankers Trust, op. cit., footnote 1.

⁶Stock held by DTC is in nominee name and appears on the books of the transfer agent of the issuing company. In a typical reaction, the transfer agent would not be involved in the change of ownership. The change in ownership between the parties to the transaction would occur solely on the books of DTC. If, however, a broker or his customer wishes to have the shares registered in his own name, he instructs DTC to send the appropriate quantities of stock, currently in street name, to the transfer agent, who would then send the reregistered shares directly to the broker.

⁷Credit risk refers to the possibility that a participant might not pay for or deliver securities. Market risk refers to the price changes of the security. Non-market risks include loss of data, human error, systems failure, or any breakdown caused by any factor other than creditor market factors.

⁸NSCC's STARS system monitors projected settlement exposures from the time trades are matched until they are ultimately settled. NSCC also employs a series of exception reporting mechanisms to detect security concentration, settlement pattern changes, and security price changes.

debit positions and nets to a single figure that is either owed to NSCC or is owed by NSCC. Payment to NSCC is by certified check. Funds are concentrated in one central clearing bank. If a certified check is not received on the settlement date, then payment via FedWire is required the next morning. NSCC pays selling members with regular bank checks, but intends to move towards the increased use of electronic payments as one way to improve the settlement process.

The International Securities Clearing Corp.—ISCC is a subsidiary of the NSCC and is an SEC-registered clearinghouse. It was founded in 1985 to assist in clearing and settlement and to provide custody services for securities traded among American brokers and banks and their counterparties across national borders. It has links with clearinghouses and depositories in foreign markets,⁹ including:

- the International Stock Exchange (ISE), in London;
- the Centrale de Livraison de Valeurs Mobilieres (CEDEL), in Luxembourg;
- 20 depositories and custodians in Europe and Asia, indirectly linked by means of a conduit provided by CEDEL;
- the Japan Securities Clearing Corp. (JSCC), the Tokyo Stock Exchange's clearing and custody organization;
- the Central Depository subsidiary of the Stock Exchange of Singapore; and
- the Canadian Depository for Securities (CDS), in Toronto, linked through NSCC.

ISCC also serves as the clearing system for the NASD's PORTAL market for foreign private placements exempt from SEC registration by virtue of Rule 144A. (See ch. 3.)

Futures Clearing Organizations¹⁰

The Board of Trade Clearing Corp.—The Chicago Board of Trade (CBOT), which handles the greatest volume of futures contracts trades in the United States, has its own separately incorporated clearinghouse, the Board of Trade Clearing Corp. (BOTCC). With approximately 139 clearing members, the BOTCC is by far the largest clearing organization serving the futures markets.

The Chicago Mercantile Exchange (CME) is the largest U.S. futures exchange when measured by another yardstick, the average total value of open futures and options

on futures contracts. CME has a Clearinghouse Division. This system and other U.S. futures clearinghouses, are similar (although not identical) to that at the BOTCC.¹¹

BOTCC has an on-line trade entry/trade capture system that allows it to receive over 75 percent of its trade information through on-line terminals (with the user keying in data). The remaining 25 percent of trade information is reported by means of computer-to-computer transmissions. In addition, members of the BOTCC that are also members of the CME may use the BOTCC's on-line trade entry/trade capture technology to send trade information to the CME. About 20 percent of the CME's trade information arrives at the CME clearinghouse through the BOTCC trade entry/trade capture technology.

Once a trade has been captured, BOTCC employs a two-sided matching system in which both the buy and sell sides of a trade are submitted to the trade comparison system for matching. This capability provides the benefits of comparisons on the day of the trade, and a match by broker and by counterbroker as well as a match within the clearinghouse. This is the standard for futures markets in the United States, except for the New York Mercantile Exchange (NYMEX), which uses a one-sided trade matching system, in which "sell" information is put into the system and the clearing member with the "buy" information must confirm the data at a later time.

BOTCC's guarantee to clearing members that the settlement obligations of the trade will be met begins at the moment a trade has been matched and registered. At that time, typically about 1 hour after the final trade submission, the clearinghouse becomes counterpart and guarantor to every trade.

In all U.S. futures markets, both buyer and seller make a good faith deposit to the clearing member firm; this is "original margin."¹² The amount required per contract is determined by the exchange, and is due from both parties to the trade on the morning of the day after the trade (T+1). Most clearing members maintain substantial excess original margin deposits in their clearing account at the BOTCC. The amount of margin a clearing member owes is calculated by the clearinghouse based on the value of his open contracts and an assessment of the amount of risk those contracts involve. The BOTCC uses its risk assessment computer system SAFE [Simulated Analysis

⁹The ISCC is also discussing the possibility of setting up another link, with the Societe Interprofessionnelle pour la Compensation des Valeurs Mobilieres (SICOVAM), the French central depository, and with Societe des Bourses Francais, the broker clearing system at the Paris Bourse.

¹⁰Much of the information in this section is based on Roger D. Rutz, "Clearance, Payment, and Settlement Systems, in the Futures, Options, and Stock Markets," Feb. 24, 1989, a contributed paper in the OTA contractor report: Bankers Trust, op. cit., footnote 1.

¹¹For details on the clearing and settlement processes at the other U.S. futures clearinghouses, see OTA contractor report by Bankers Trust, Op. Cit., footnote 1.

¹²This @MI margin deposit is a performance bond to protect the financial integrity of the clearinghouse in the event that the clearing firm is unable to meet a margin call or to make or take delivery. Original margin refers to deposit of funds in the form of cash, government securities, or letters of credit. There are two levels of margin: the first is from the customer to the firm; the second is from the firm to the clearinghouse.

of Financial Exposure] to evaluate clearing member firms' credit, and uses the CME's SPAN to determine the amount of margin owed.¹³

There are two methods of calculating original margin: gross margining and net margining. Gross margining requires a clearing member to post original margin on all the long and short positions in these accounts; they cannot be used to offset each other in case of a deficiency. By contrast, with net margining the margin owed by each clearing member is calculated on the difference between all the long and short positions, calculated separately for proprietary accounts and customer accounts. The BOTCC figures original margin on a net basis, as do most U.S. futures clearinghouses; the exceptions are the CME Clearinghouse Division and NYMEX, which figure original margin on a gross basis.

The BOTCC's trade-matching process, from the time it guarantees settlement obligations to the posting of original margin by clearing members, may take 7 hours.¹⁴ During this timelag, the BOTCC carries the full risk. Clearing members demand that trades become guaranteed as quickly as possible, since this is the point at which counterpart risk should be eliminated.

Besides original margin, futures clearinghouses also calculate and collect variation margin.¹⁵ The amount reflects the changes in the value of a clearing member's open contracts. Variation margin may be collected daily, or more often. The BOTCC routinely issues one morning call and supplemental intra-day variation margin calls (usually around 2 p.m. c.s.t.).¹⁶ One purpose of routine intra-day variation margin calls (and payments to clearing members with profitable trades) is to reduce the magnitude of the following morning margin call, which is always made at 6:40 a.m. c.s.t. on the day following the trade date (T+ 1). As a result of this system, the BOTCC typically collects (and pays out) by about 2:30 p.m. c.s.t. on the date of the trade between 60 and 95 percent of the final settlement calls that would otherwise have been made at 6:40 a.m. c.s.t. on the following day. This reduces the clearinghouse's risk because the shorter the period of time between trade execution and settlement, the more certain it is that a clearing member will be able to meet its obligations. In general, the more frequently a clearinghouse settles (marks to market) trades each day, and

requires its clearing members to post margin, the greater is the financial integrity of the clearing system.

Lines of Defense—In the futures markets, the maximum potential default liability represents at most only one business day's market movement. This is the first line of defense for the clearinghouse. The BOTCC segregates and nets proprietary and customer open positions of each clearing member across commodity futures and options contracts to calculate the amount of both the original and variation margin of each clearing member. The BOTCC's SAFE system calculates each clearing firm's potential exposure to an adverse move in prices.

Margin deposits are the second most important line of defense in protecting the clearinghouse from a default by a clearing firm which could affect other clearing members. The Commodity Futures Trading Commission (CFTC) requires that all clearing members maintain two bank accounts for settlement and two safekeeping accounts for original margin. One set of bank and safekeeping accounts is for original and variation margin for customer positions, while the other set is for original and variation margin for proprietary and non-customer (affiliated firm) positions.¹⁷

Another line of defense for the clearinghouse is its net capital requirements for clearing members. In addition, all U.S. futures clearinghouses share certain types of "risk information"—data on amounts paid and collected by clearing members in the form of both original and variation margin, reflecting their overall exposure, and amounts paid by clearinghouses to clearing members, representing reductions in the amount of risk faced by a clearing member.

Still another line of defense in protecting the clearinghouse from default by a clearing firm is its authority to issue a 'super' margin call if the BOTCC determines that a customer or proprietary position represents a clear and immediate danger (i.e., a particular market condition could cause a substantial amount of a clearing firm's capital to be depleted because of customer defaults). The clearing member would then be required to deposit the additional "super" margin (in the form of cash, U.S. Treasury securities, or letters of credit) within one hour of receiving the call. Finally, the segregation of customer funds, clearing member net capital requirements, and

¹³The CME has its own risk management computer system-SPAN (Standard Portfolio Analysis of Risk)--for determining the amount of margin. The futures industry (with the exception of the Intermarket Clearing Corp. (ICC), which uses the system known as TIMS) is moving towards adopting SPAN as the standard for calculating margin.

¹⁴Payment of margin must be in same-day funds—e.g., those provided by the Federal Reserve's Fed* electronic payment system.

¹⁵Variation margins are the cash flow required to mark positions to market. They flow through the clearing organization to the clearing member on the other side of the trade.

¹⁶Of the U.S. futures clearinghouses, the CME Clearinghouse Division, the COMEX Clearing Association, and the Coffee, Sugar and Cocoa Clearing Corp. also issue routine daily intra-day variation margin calls. The others have the capability of doing so on an as-needed basis; e.g., in times of severe market volatility.

¹⁷The segregation of customer and proprietary funds is a requirement of Section 4d(2) the Commodity Exchange Act.

ongoing financial surveillance, each contribute to bolstering the integrity of these markets.

If, despite margin calls, a clearing member nevertheless defaults on the settlement obligations of the trade, the clearinghouse has several protections against liability for the default. The clearinghouse may liquidate the clearing member's positions and original margin, sell his exchange membership, use his contributions to the clearinghouse guarantee fund, use the clearinghouse guarantee fund and its committed lines of credit, assess all clearing members, where permissible, and finally, use the clearinghouse's capital.

All U.S. futures clearinghouses have funds available to protect themselves against default by their members; these are primarily made up of mandatory contributions from clearing members.¹⁸ They fluctuate in size. Most U.S. futures clearinghouses, but not the BOTCC¹⁹ or Kansas City Board of Trade Clearing Corp., also have the power to assess their members, if the amount of a clearing member default cannot be covered by capital funds and the guarantee fund.

The BOTCC uses four settlement banks, all based in Chicago. The BOTCC's morning payment process (6:40 a.m. c.s.t.) precedes the opening of the FedWire system and hence requires the settlement bank to extend credit on behalf of some clearing members. At times, this credit extension may not be fully collateralized, and thus is a risk for those settlement banks.

Clearing members must maintain accounts at settlement banks for the payment of original and variation margin, including final settlement payment. When the clearinghouse determines the amount of margin owed, the clearinghouse notifies the clearing member's bank of this amount. The bank then examines the clearing member's assets (cash, government securities, lines of credit), gathers incoming payments from the clearing member (via FedWire, if it is available at the time the bank is making the decision), and makes a commitment to the clearinghouse as to whether it will honor the margin call by forwarding the funds to the clearinghouse.

If the clearing member does not have sufficient assets to meet its margin obligations, the bank's decision is whether to extend credit to the clearing member. When a

settlement bank decides that it cannot meet the financial obligations of a market participant, the participant will ask his credit banks for credit. This process generally works well, but it depends on two assumptions: first, that the market participant will be able to reach the account officers at the credit banks within the permitted time; and second, that the credit banks (which do not always coordinate a market participant's various lines of credit) will not extend more credit than a clearing member is worth. Generally, these assumptions are sound, as firms usually have a predetermined credit line. But, if a firm is having difficulty, if the firm's needs come during a period of market stress, a settlement bank may decide not to honor a margin call, and this could result in the clearinghouse liquidating the clearing member's customer positions, after attempting to transfer these positions to another clearing member.²⁰

Clearinghouses, in respect to intra-day margin payments batch process trades rather than processing each trade as it is executed. Thus, a clearinghouse may not be able to eliminate their risk instantaneously by shifting it to clearing members. One reason the clearinghouses are forced to do batch processing is that the banking system moves too slowly to accommodate any other method. For instance, Chicago banks generally use paper-based processes to move money among clearing members.

The working interface between the clearinghouses and the banks survived with difficulty under immense strain in October 1987.²¹ In further improving this interface, there are cost-benefit trade-offs. The existence of a Clearing Organization and Banking Roundtable that provides settlement bankers, clearing organizations, and regulators with a forum for regular discussion of these tradeoff issues, is some evidence that the system is moving towards a more secure, less volatile, but still competitive, state.

Options Clearing Organizations

The Options Clearing Corp.--OCC is the common entity serving all securities options exchanges in the United States²² The OCC clears and settles options trades for the Chicago Board Options Exchange (CBOE); the American Stock Exchange (AMEX); the Philadelphia Stock Exchange (PHLX); the New York Stock Exchange

¹⁸The BOTCC does not have a guarantee, or clearing fund, but does require clearing members to purchase its capital stock when they are admitted to membership, which is similar to a guarantee or clearing fund. The relative number of shares of stock that a BOTCC clearing member must purchase is adjusted semi-annually to reflect its open positions and trading volume. Other futures clearinghouses have guarantee funds based on capital, trading volume, or open positions. Rutz, op. cit., footnote 10, pp. 23-27.

¹⁹In mid-1989, the BOTCC estimated as \$325 million the total value of its available trustfund, lines of credit, and clearinghouse capital.

²⁰For additional information, see Andrea M. Corcoran and Susan C. Ervin, "Maintenance of Market Strategies in Futures Broker Insolvencies: Futures Position Transfers From Troubled Firms," *Washington and Lee Law Review* 44:849, 1987, pp. 849-915.

²¹There is disagreement among participants themselves as to whether these systems "survived with difficulty," "barely managed," or performed otherwise. Nevertheless, many improvements have been, and are, being implemented to strengthen the clearing and settlement process.

²²The OCC clears all exchange-traded securities options. For details on clearing and settlement of options on futures contracts, see Bankers Trust Co., op. cit., footnote 1.

(NYSE); the Pacific 'Stock Exchange (PSE); and the National Association of Securities Dealers (NASD).

Unlike the clearinghouses already discussed, the OCC does not do trade comparison, since it receives locked-in data on compared trades from each of the exchanges. The exchanges have chosen to keep their own trade-matching systems as a means of competitive differentiation. The data on matched trades is sent to the OCC by computer on the day of the trade. The OCC then must calculate the amounts of money that are owed and due the next day (T+1) by the buyer and the seller. In the case of the buyer, the entire amount of money owed to the OCC is called the "premium obligation," or "premium," and is paid in cash. The premium, while paid to the OCC, is passed on to the writer of the option. To the buyer of the option, the premium is the amount he pays to lock in the possibility of an advantageous movement in the price of the underlying security. To the writer of the option, the premium is the maximum amount of profit he can expect. If the market moves against the writer, the premium might, at best, offset only a small portion of the option writer's losses.

The writer of the option always owes margin to the OCC each day that the option contract is in effect but has not been exercised by the holder. This margin²³ is similar to the margin owed by the buyer or seller of a futures contract, essentially 'good faith' money which serves as an assurance to the OCC that the writer of the option has the financial ability to meet the potential obligations of the option that he has sold. The amount of margin owed reflects changes in the market price of the option as well as a portion of the total amount that he would have to pay if the option were exercised.

On the day after the trade (T+1), the OCC notifies the buyer of the amount of cash premium which is owed; at the same time, the writer of the option is notified by the OCC of the amount of margin that is owed. Both amounts are due on T+1. On the next day (T+2), and each day thereafter until expiration, exercise, or closeout²⁴ of the option contract, the OCC calculates and then collects margin from the writer of the option.

Margin thus reflects the adjusted daily value of the option writer's open positions (the total amount of money which he could be forced to pay if the options he sold were to be exercised by the holders). The OCC marks to market (determines the adjusted value and liability of each

member's open positions) at the end of each trading session. If the options contract loses value, the OCC reduces the amount of margin required. When the holder of an option contract decides to exercise it and actually buy or sell the underlying product of the option, the person who originally sold the option is not necessarily the same person that OCC will require to fulfill its terms. Instead, the OCC randomly assigns a clearing member to honor the delivery or purchase obligations of the option, from the pool of all clearing members who sold options with identical contract terms.

For example, when an IBM option is exercised, the OCC assigns a clearing member with a short position and then sends delivery instructions to an equities clearinghouse such as the NSCC, which incorporates instructions to deliver or receive into its Continuous Net Settlement (CNS) system. Any obligations not netted out through normal CNS procedures are settled by instructions to a depository (e.g., the DTC). Delivery of the IBM stock is then made by transferring it from the seller's account into the buyer's account at the depository, subject to the CNS system.²⁵

When a foreign currency option is exercised, the foreign currency underlying the option contract is delivered to the OCC's cash account at a designated overseas bank, and then transferred to the account of the market participant who is buying the foreign currency. The designated foreign exchange delivery bank may be any bank designated by the parties involved in the transaction, not necessarily one of the OCC's settlement banks.

The OCC provides its clearing members with a guarantee on the morning of the day following the trade (T+1), after the buyer of the option has paid the premium obligation.²⁶ The OCC guarantee protects the holder of an option against the possibility that the option writer might default on the payment or delivery obligations of the option.

Lines of Defense—The OCC's first line of defense against the potential for clearing member default is its continuing monitoring of the creditworthiness of its clearing members. The options exchanges have limits on the aggregate amount of open positions that any one market participant may carry at any one time. These are net limits—i. e., the market participant's short positions are offset by his long positions. The clearing members'

²³For margin payments, the OCC accepts cash and collateral including: bank letters of credit, U.S. Treasury obligations, the actual equities underlying particular option contracts, and various other stocks. Additionally, margin obligations can be reduced through corresponding long positions in other options which have the effect of reducing net exposure.

²⁴The "closeout" is when a writer or holder of an option contract enters into another option contract, creating an offsetting position.

²⁵When NSCC incorporates delivery instructions into its CNS system, NSCC rather than OCC assumes responsibility for, and guarantees, deliveries and payments.

²⁶OCC has filed a rule change with the SEC, currently pending approval, which would provide OCC clearing members with an unconditional guarantee on the morning of T+1.

positions are monitored daily by the exchanges in respect to these position limits.

The Securities and Exchange Commission (SEC), the exchanges, and the OCC also monitor market participants in respect to capital adequacy and other financial requirements. The OCC is a part of the information-sharing arrangement among all seven SEC-registered clearing entities, as well as a participant in the pay-collect risk information system operated by BOTCC.²⁷ The OCC uses a monitoring system to quantify the potential risk of each clearing member under different market scenarios, including large price movements. The system evaluates the risk in participant's stock, options, and futures positions.

The OCC's second line of defense against clearing member default is the margin that the clearing members have on deposit. If this is insufficient to cover the default, the OCC can turn to its guarantee fund, made up of cash and government securities.²⁸ In the event of a default by a clearing member, after closing out the defaulting clearing member's positions, the OCC follows five steps to cover any residual liability from a default:

- First, any margin that the defaulting clearing member has on deposit with the OCC is applied towards the liability of the default.
- Second, if that amount is insufficient, the OCC takes the defaulting clearing member's contribution to the guarantee fund and applies it towards the liability of the default.
- Third, if that amount is still insufficient, the OCC may use its guarantee fund to cover-whatever portion of the liability is outstanding.²⁹
- Fourth, if that still isn't enough to cover the full liability, the OCC has the right to assess its members for the remaining amount of the liability.³⁰
- Finally, the OCC, like the NSCC and futures clearing organizations, may also take legal action as a creditor to recover any sums that are owed by the defaulting clearing member. The amount that can be recovered in this way is limited by bankruptcy law.

At the end of each trading day, the OCC has an overnight processing cycle during which it calculates the net amount which each member either owes or is owed.

The net figure reflects, among other things: a) the cash premium obligation due on each new long position; and b) the margin due for each new short position. The OCC then sends payment instructions to the settlement bank. The netting is done on a multilateral basis; i.e., the status of all of a clearing member's holdings in the options market is taken into consideration in arriving at the daily net payment obligation to the OCC.

The OCC has two different methods for calculating margin—one for options on equities and another for all other types of options (foreign currency, government securities, or stock indexes). In both cases, the margin required from the writer of an option is equal to the current market price of the option, plus a cushion to cover the risk of a change in the current market price. But for all non-equity options, as well as all options and futures contracts cleared by the Intermarket Clearing Corp., the OCC uses the Theoretical Intermarket Margin System (TIMS). TIMS evaluates each clearing member's overall risk profile and then sets the total margin owed. The OCC was the first clearing organization in derivative markets to change from a fixed or flat rate of margining (per contract) to highly sophisticated computational methods. Rules have been submitted to the SEC to expand the use of TIMS to include setting the margin on equity options.

The CFTC and the SEC have approved applications from the OCC and the CME to allow cross-margining of stock index options, futures, and options on futures for proprietary trading accounts of clearing members. Cross-margining between the CME and OCC started in October 1989.³¹ OCC also offers cross-margining through an agreement with its affiliate, the Intermarket Clearing Corp. (ICC). The ICC clears trades for the New York Futures Exchange, the Philadelphia Board of Trade, Amex Commodities Corp., and the Pacific Futures Exchange; therefore, OCC members can use their holdings on those exchanges to offset the status of their open positions at the OCC.

The extent to which OCC and ICC offer cross-margining is however limited. The CFTC, concerned about safety, market stability, and liquidity, has not

²⁷Robert Woldow, "Clearance and Settlement in the U.S. Securities Markets," February 1989, expert paper contributed to OTA's contractor report, Bankers Trust Co. report, op. cit., footnote 1.

²⁸The total amount required in the guaranteed fund is recalculated monthly. As of December 1989, the guarantee, or clearing fund, plus a 100 percent minimal additional assessment for which OCC clearing members are unconditionally liable, was about \$450 million. The amount of the fund varies in proportion to the amount of clearing members' liability. It is always equal to 7 percent of the average daily aggregated margin requirements of all clearing members in the previous month. Each clearing member must contribute an amount equal to his pro-rata share of outstanding contracts in the previous month.

²⁹The OCC has recently amended its rules to include using its own retained earnings at the discretion of its Board of Directors.

³⁰Not all U.S. clearinghouses, however, have these assessment powers. See Bankers Trust Co., op. cit., footnote 1, vol. 1, p. 137.

³¹See John Hiatt and James M. Kustus, "Clearance and Settlement of Derivative Financial Instruments," April 1989; and John P. Behof, "Issue Summary: Intermarket Cross-Margins, for Futures and Options," The Federal Reserve Bank of Chicago, May 1989. Both are expert papers included in the OTA contractor report by Bankers Trust Co., op. cit., footnote 1.

approved expansion of cross-margining beyond proprietary accounts of major market-makers.³²

The OCC has approximately 190 clearing members. The clearing member brokerage firms transact business for their proprietary accounts, other brokers who are not clearing members, and institutional and retail customers. The link between OCC and its clearing members is automated: OCC requires that all members submit post-trade information through OCC's on-line Clearing Management and Control System (C/MACS).³³

The OCC allows its members to choose from a selection of designated settlement banks. There are currently 16, but the OCC is flexible and may designate a member's primary banking institution (concentration bank) as an approved settlement bank. The OCC maintains accounts at each of these settlement banks, and instructs the banks on each trading day as to the debits and credits that are to be made to the OCC's accounts and those of the clearing members.

There are controversial proposals to institute futures-style margining for options, which seem to have support recently. These are discussed in a forthcoming OTA report on domestic securities markets.

*Clearing and Settlement in the United Kingdom*³⁴

The International Stock Exchange

The International Stock Exchange of the United Kingdom and the Republic of Ireland Limited (ISE) in London, also operates exchanges in Belfast, Birmingham, Dublin, Glasgow, and Manchester/Leeds. It trades U.K. equities, gilt-edged securities,³⁵ and other fixed-income instruments, international equities, and options. The average daily trading volume from January to September 1988 was 31,213 trades. (See ch. 3 for a detailed description.)

The ISE settlement system is undergoing a transition. Today it is still primarily paper-based, but there are plans for an electronic depository to eliminate the need for

certificates by permitting paperless transfer of title. This system, TAURUS, is scheduled to be introduced in phases beginning in 1991 and to be fully operational in 1993.

The clearing and settlement process is managed by the ISE for all of its member firms. It is a two-part process consisting of a trade-matching system (called the Checking System) and a computerized settlement system, TALISMAN (Transfer Accounting and Lodgement for Investors, Stock Management for Principals), introduced in 1979. TALISMAN settles securities trades between ISE members, including centralized routing of the securities to the registrars for transfer of title.

Trade settlement in the U.K. equities market usually is scheduled for the sixth business day after the end of each 2-week dealing/trading period (also known as the account period); all trades done during the 2-week account period are scheduled to settle on the same day. Trading firms have the option of settling their trades on a schedule other than the account period, if this is agreed upon by the trading parties. This can occur any time after the second day following the trade (T+2), but this is rare.

At the end of the trading day, member firms enter the day's trade data into the ISE's Checking System either directly through a PC data transmission to the Exchange's computer, or by delivering a computer magnetic tape to the nearest Stock Exchange Centre. The Stock Exchange computer validates and compares all trades. Unmatched trades then have to be resolved, amended or canceled. For TALISMAN eligible securities,³⁶ the selling broker must obtain from its customer, or its own inventory, the actual share certificates and a signed TALISMAN Sold Transfer (TST) form, which authorizes the transfer of the security title from the current beneficial owner to SEPON (the ISE's nominee name).³⁷ The paperwork which includes the certificate, the TST, and a control document called the Sale Docket, after being properly signed, is then deposited at the nearest ISE TAMS MAN Centre.

ISE staff verify the documents and record the deposit on the computer. The security certificates and other documents must then be sent to the company registrar to

³²Based on interview by OTA staff with senior CFTC officials, October 1989.

³³Hiatt and Kustus, op. cit., footnote 31.

³⁴Much of the material in this section is based on an expetpaperwrittenby the ISE for the OTAcontractorreport: Bankers Trust CO., op. cit., footnote 1.

³⁵Gilt-edged securities are debt instruments issued by the U.K. Government. These stocks pay a fixed, variable or index-linked rate Of interest, and are considered risk-free since their interest and capital are guaranteed by the government.

³⁶Some other, non-TALISMAN settlements can also occur at the ISE through physical delivery and payment. Since the Checking System operates independently from TALISMAN, even securities which are not TALISMAN-eligible can be validated and matched by the Checking System. But after securities trades are matched, the ISE offers a central physical delivery area that allows such settlement among brokers to occur in one central place. The Stock Exchange's Central Stock Payment Department takes in securities from sellers and delivers them to the buyers. At the same time, it takes the payment from the buyer and gives it to the seller. This is a manual, labor-intensive process.

³⁷A nominee is a person or company in whose name securities are held or graded, on behalf of another person or company who is the true owner. SEPON stands for Stock Exchange Pool Nominee. This is the ISE's limited liability nominee company in whose name TALIS W-eligible securities are held prior to settlement.

transfer the share registration from the customer's name into the name of SEPON. The ISE's broker/dealers and market-makers who maintain trading accounts within TALISMAN can, through this SEPON-nominee account, legally hold stock in uncertificated form. The recording into SEPON must occur before any stock exchange TALISMAN settlement can take place.

When broker/dealers and market-makers trade for their own accounts, or act as principals, TALISMAN effects a simple book-entry transfer of title without any need for transfer forms or certificates. Approximately 7,000 securities issues can be settled through TALISMAN, most of the securities registered in the United Kingdom and Ireland.

This clearing and settlement process does not apply to all of the financial instruments traded on the ISE. Options are cleared and matched by ISE, but are settled through the International Commodities Clearing House in London. U.K. Government gilt-edged stocks, also traded on the exchange, are validated and matched through the ISE's checking system, but settled through the Central Gilts Office.³⁸ Foreign equity trades are matched through an on-line comparison system called SEQUAL,³⁹ then settled by the broker independently of the ISE, in the security's home market.

The ISE does not take counterpart positions to trades. Market participants are not given a guarantee that the trade will settle, only that if securities are delivered, then either payment will follow, or the securities will be returned. The ISE's services traditionally have facilitated the post-trading processes for its members only. However, through the recent development of Institutional Net Settlement (INS), the ISE has begun to coordinate institutional customer settlements as well.

Payment on the settlement date may be through TALISMAN, outside TALISMAN, through cash settlement, or through the Central Gilts Office, depending on the type of security and the preference of the TALISMAN participants. "Through TALISMAN" means that the

TALISMAN computer system keeps track of each member's payment obligations. These payments are netted each day so that each member need only make or receive one payment a day at the nearest TALISMAN Center. "Outside TALISMAN" means that trading parties maintain their own payment records and either pay the counterpart directly or deliver a check to the Stock Exchange's Central Stock Payment Department, to be passed on to the selling party. Cash settlement occurs when the trading parties agree to settle their trade on a different schedule from the official account period, the day after the trade for Gilts and on the second day after the trade for equities.

Generally, payments for stock exchange trades are made by check in British pounds, Irish pounds, or U.S. dollars. Approximately half of the brokers make sterling payments through CHAPS, London's interbank electronic payment system. The rest use London's Town Clearing bank checks.

The ISE still has a fragmented and largely paper-based settlement system. TALISMAN capability alone is inadequate to support a major financial center. There are plans to establish a paperless settlement system, called TAURUS, an electronic depository service, to enable members to keep their securities in dematerialized⁴⁰ form with book-entry transfer of title on settlement.⁴¹ The ISE also plans to move towards a rolling settlement cycle to replace the existing 2-week trading account period with a further 6-day settlement period.⁴² One issue that remains under discussion is how the ISE would be able to assure listed companies that they would still be able to quickly identify and communicate with their shareholders.

The International Commodities Clearing House (ICCH)

ICCH⁴³ is an independent clearinghouse which provides matching, clearing, settlement, delivery management, and trade guarantee services for five futures and options

³⁸The Central Gilts Office is a service jointly developed and funded by the Bank of England and the ISE for the settlement of U.K. Government obligations.

³⁹Also provided by the ISE, but different from the Checking system.

⁴⁰Dematerialized certificates of ownership are those that no longer have paper certificates and exist only as computer entries.

⁴¹TAURUS will, in its initial stages, cover U.K. equities. The Central Gilts office already in operation is a fully dematerialized electronic depository for U.K. Government Issues or Gilts.

⁴²Documentation is planned to be issued by September 1990 specifying TAURUS requirements, and enabling participants to begin their implementation work for the introduction of TAURUS. "The ISE Announces Detailed Plans for the Future of Settlement in the United Kingdom," ISE News Release, Mar. 9, 1990. These plans are described in "A Prospectus for Settlement in the 1990s," ISE, March 1990, and project a date of March 1991 for the completion of the infrastructure, which includes: the use of the Institutional Net Settlement service, and the phased replacement of magnetic tape and paper transfer systems; the phase-in of book entry transfer, i.e., dematerialization of certificates, between October 1991 and December 1993; and the introduction of an initial 5-day rolling settlement (to be shortened to 3 days later) and a full delivery v. payment system by October 1992. These steps are projected to save over £200 over a 10-year period and are consistent with the Group of Thirty's recommendations.

⁴³The term "rolling settlement" means that the settlement date is always the trade date plus a specific number of days. For example: T+3.

⁴⁴Summary of expert paper by the ICCH for the Bankers Trust Report, "Study of International Clearing and Settlement," op. cit., footnote 1.

exchanges in London.⁴⁵ The ICCH also provides clearing and settlement services to exchanges in New Zealand, Australia, Hong Kong, Kuala Lumpur, and Paris. It provides electronic screen trading systems for three exchanges; the New Zealand Futures Exchange, the Irish Futures and Options Exchange, and the London FOX.

ICCH is organized into two divisions: the Recognized Clearing House, which handles the London-based operations; and the ICCH International Financial Markets, which is responsible for international operations and computer systems. The clearinghouse is owned by a group of six shareholder banks,⁴⁶ who are the ultimate guarantors of the clearinghouse's obligations. Ownership status has implications primarily in the case of default by a clearing member. In a clearinghouse owned and operated by one exchange, all of the clearing members are ultimately liable for the obligations of a member who fails to perform. In the case of an independent clearinghouse, such as ICCH, the ultimate liability of meeting a failed member's obligations rests with the shareholders, not with the clearing members. This raises the question of potential conflict of interest among shareholders, clearing members, and customers of clearing members.⁴⁷

ICCH has approximately 200 clearing members in London who trade at the five exchanges. These members act as clearing agents for their own in-house trades, customers' transactions and non-clearing members trades. While trading is primarily by means of open outcry on exchange floors, once a trade is struck, both the buying and the selling party are required by the exchanges to enter the trade data into the exchange's computer matching system within a specified time. The exchange system matches the trade data and makes the matches available on-line to the floor brokers for confirmation. A matched and confirmed order is sent immediately by data transmission feeds to the ICCH's system for settlement.⁴⁸

Trade data is processed by the clearinghouse on a continuous basis rather than in a batch cycle at the end of the day. Members can monitor their settlement positions through the management information system at any time during the day. At the end of a trading day, members can look at a terminal to see what their initial and variation margin calls will be on the following morning.

ICCH becomes the counterpart to every trade. ICCH further decreases risks to clearing members because it performs this function across multiple exchanges, netting members' positions out into a single margin and settlement figure. This process is called multilateral netting by novation. Usually the clearinghouse makes one margin call every day before the start of the day's trading, but in periods of high market volatility, it reserves the right to make more frequent intra-day variation margin calls. For example, on October 19, 1987, ICCH made four intra-day margin calls.

ICCH accepts approximately 30 banks as settlement banks, including some foreign banks' branches within the City of London. Each clearing member typically has at least two sterling-denominated accounts at his settlement bank; one for segregated funds (e.g., those of individual investors) and one for non-segregated funds (in-house, non-clearing members, and non-segregated customer funds). In addition, each member may hold foreign currency denominated accounts at the settlement bank to cover margin and settlement payments in Deutsche marks, yen and U.S. dollars. The clearinghouse also keeps accounts at each settlement bank, multiple accounts if different currencies are involved.

Every morning at 8 a.m., messengers deliver printouts to each clearing member's settlement bank detailing daily margin payments and credits. The banks have until 10 a.m. to credit or to debit the accounts of members. The banks use ICCH's "Protected Payment System," which functions in the same way as third party debit authority in the United States.⁴⁹ If a bank has any problems in meeting a margin call for a member, the bank must notify the clearing house by 10 a.m. One of the risks of the margin settlement is that banks do not have to commit payments to the clearinghouse on behalf of a member until after trading begins in the morning. The opening hours vary at each exchange, but the London International Financial Futures Exchange for instance, starts trading at 8:15 am. This could result in a member accumulating adverse trading positions before yesterday's margins have been committed to by the settlement banks. It could become a problem during periods of high-market volatility.

⁴⁵They are the **Baltic Futures Exchange** (which trades contracts for cattle, pigs, soybean meal, potatoes, and freight indexes); the **International Petroleum Exchange** (which trades contracts for gas oil, crude oil, heavy fuel oil, and leaded gasoline); the **London Futures and Options Exchange (FOX)** (which trades contracts in coffee, cocoa, and sugar); the **London International Financial Futures Exchange (LIFFE)** (which trades a range of contracts including currencies, interest rates, bonds and indexes); and the **London Metal Exchange** (which trades contracts for aluminum, lead, copper, nickel, zinc and silver).

⁴⁶National Westminster, Barclays Bank, Lloyds Bank, Midland Bank, Royal Bank Of Scotland, and Standard Chartered Bank.

⁴⁷In 1989, a clearing member default occurred on the New Zealand Futures Exchange. Customers of the other clearing members were subjected to an invoicing-back procedure which, in some instances, created losses for them.

⁴⁸With the exception of the agricultural exchanges (the **Baltic Futures Exchange** and **FOX**), each of the exchanges operates its own matching and confirmation systems. The agricultural exchanges depend on ICCH for both trade matching and confirmation.

⁴⁹The clearinghouse can tell the settlement bank to move money from a member's account at the bank to the clearinghouse's account at the settlement bank without a new authorization from the member.

Since ICCH is a net margin clearinghouse, each morning it submits one number to the appropriate settlement bank for either payment or credit of non-segregated accounts and segregated accounts. Collateral, such as a letter of credit, can be pledged to the clearinghouse as a guarantee against trading on multiple exchanges. If the ICCH did not net margin requirements across these exchanges, this practice would increase settlement risk. As it is, the member has the benefit of incurring reduced payment risk and cost. ICCH accepts letters of credit (also known as bank guarantees), cash and U.K. Treasuries as collateral for margin payments. It is moving towards accepting U.K. Gilts and U.S. Treasury Notes as collateral but there are some legal issues that must be worked out; both of these instruments are held in decertified form in depositories and can therefore not be physically delivered as collateral to the clearinghouse. The possibility of pledging these securities on behalf of the clearing house is being investigated.

Clearing and Settlement in Japan

In many ways securities markets in Japan and the United States are similar, in other ways they are very different. Both countries have multiple equity exchanges, and in both, one or two of these exchanges handle most of the total trading volume in securities. In Japan, this is the Tokyo Stock Exchange.⁵⁰ However, Japan's over-the-counter market is minuscule compared to that in the United States. In contrast with the well-established national depository system in the United States, there is no national, central depository in Japan, but one is now being established.

In Japan, as in the United States, the clearing and settlement process varies according to the type of financial instrument traded (i.e., futures, equities, options).⁵¹ To a greater extent in Japan, different financial instruments are traded on the same exchanges, and the clearing of both securities and derivative products are

handled by the same organization, but the different instruments are cleared separately. In the United States, by contrast, equities, futures and options generally are traded on separate exchanges as well as processed by different clearinghouses.

The Japanese futures market adheres to the mark-to-market principle in requiring payment of margin, but payment is not due until the third day after the trade. Japan and the United States differ in the types of collateral which are acceptable as margin payments; Japanese clearing houses do not accept bank letters of credit as collateral, but they do accept listed securities. The reverse is true in the United States.⁵²

In Japan, there are many unwritten rules or protocols that must be followed in the clearing and settlement process.⁵³ The Japanese Government, especially the Ministry of Finance (MOF), has a much stronger influence on the day-to-day management of the brokerage business than do regulatory agencies in the United States. But more importantly, the Japanese cultural emphasis on the importance of honor and conformity, concepts which relate to the reputation and behavior of companies and their employees, help to explain the punctual settlement practices in Japan. Trades do not fail in Japan, generally speaking, because it is dishonorable not to meet one's obligations. Further, those who do not meet their obligations risk being put out of business.⁵⁴

Although there is not a widespread concern in Japan as to the possible volume-induced stress on the clearing and settlement system, Japan's financial services industry would like to see some improvements in it. Issues which are currently under discussion include:

- . The reduction of physical movement of securities: in addition to Japan's setting up a central depository for securities, the Bank of Japan is creating an on-line depository for Japanese government bonds.⁵⁵

~&x ch. 4 for detailed description of the Tokyo Stock Exchange.

⁵¹The options market in Japan had until recently been a private, off-exchange, large volume market. In June 1989, options on the Nikkei 225 index began trading on the Osaka Stock Exchange.

⁵²In the United States, however, futures clearinghouses have begun to view letters of credit as a less desirable form of collateral. Securities (with the exception of U.S. Treasury obligations) are not accepted as collateral by U.S. futures clearinghouses. They are, however, accepted by the Options Clearing Corp., which handles the clearing for all exchange-traded options in the United States.

⁵³For example, protocol dictates that delivering an institutional trade and collection of payment be done by prearrangement only.

⁵⁴"If shares are not available for delivery in Tokyo, a broker issues a letter of guaranty, essentially a promise to deliver later, to its clients. The client then pays the broker, with the knowledge that they own the stock and it will be delivered shortly. A safekeeping receipt is delivered on trade date, with the shares following when available. The Japanese allow the use of letters of guaranty with domestic counterparties, but acceptance for foreign participants varies from one custodian to the next." Quoted from Daiwa Securities America Inc., "Viewpoint: Perception and Opinions of a Non-United States Parented Firm Doing Business in the United States and World Securities Markets," Summer 1989, p. 4, contributed paper in OTA contractor report, Bankers Trust Co., op. cit., footnote 1.

⁵⁵Nomura Securities, "The Securities Clearing and Settlement System in Japan," February 1989, contributed paper in OTA contractor report by Bankers Trust Co., op. cit., footnote 1; Toshitsugu Shimizu, "Settlement System of Tokyo Stock Exchange," Oct. 5, 1988, *ibid.*; interviews with Masayoshi Hamana and Toshitsugu Shimizu of the Tokyo Stock Exchange, Mar. 8, 1989, Bankers Trust Co., op. cit. footnote 1; and IBM, "Study of Clearance and Settlement for the U.S. Congress-OTA," Aug. 1, 1989, also part of the OTA contractor report by Bankers Trust Co., op. cit., footnote 1.

- Same-day funds: except for Japanese government bonds, the settlement of all stock exchange trades in Japan is through checks, which do not clear until the next day. Some risk could be removed from the settlement process if payment were to be made in same day funds, via an electronic funds transfer system.⁵⁶

The Japanese securities industry is also discussing ways to facilitate cross-national border trading for both Japanese investors and foreign investors. Some possible improvements include:

- **Immobilization of securities in their home market:** the Japanese securities industry supports this, as well as the creation of bilateral and possibly multilateral linkages among depositories and clearinghouses.⁵⁷
- **Elimination of Depository Receipts (DRs):** the Tokyo Stock Exchange advocates this as part of immobilizing securities.⁵⁸
- **International harmonization of settlement times;** as noted, equity settlement in Japan takes 3 days, and in the United States 5 days.

The Tokyo Stock Exchange (TSE)

Japan Securities Clearing Corp. (JSCC)—The TSE has a division known as the Clearing Administration Department, which is the planning and rule-making body for all matters concerning clearing and settlement.⁵⁹ It supervises the overall process, but the bulk of the day-to-day clearing and settlement process is entrusted to the Japan Securities Clearing Corp. (JSCC), a wholly owned subsidiary of the TSE. All of the approximately 120 members of the TSE are regular members of JSCC, so there are no exchange members who are not also clearing members. All must maintain a clearing office in Tokyo and a banking relationship with each of the 13 approved clearing banks.⁶⁰

JSCC settles cash-market equity trades (both domestic and foreign), a variety of bond trades, and futures contracts (TOPIX)⁶¹ and U.S. government bonds traded on the TSE. For equities trades, cash settlement and the transfer of shares from seller to buyer occurs on the same

day (3 days after the trade date), but the payment and securities delivery processes are separate. JSCC is not involved in the payment process, which is handled by the TSE's Clearing Administration Department; JSCC takes care of the securities delivery. The transfer of title to securities is handled through JSCC's computer Book Entry Clearing System and through physical delivery of paper securities certificates.

Neither JSCC nor the Clearing Administration Department take the counterparty position to trades. Nor are any other formal guarantees made by either organization to assure that the payment and securities delivery obligations of settlement will be met.⁶²

All equities are processed by JSCC's computerized Book Entry Clearing System and are settled in one of four ways:

1. **"Regular way settlement":** normally, on the 3rd day following the date of the trade; 99 percent of the TSE's stock transactions are settled in this way.
2. **Cash transactions:** settlement is on the day of the trade (T+0); however, if both parties agree, settlement can be on the day after the trade.
3. **Special agreement:** settlement is scheduled at the seller's option, for a specified day within 15 days of the trade date. This method is primarily used when the counterparties to the trade are geographically separated from each other by a considerable distance.
4. **When issued:** this method of settlement is used for purchases of securities which either have not yet been issued, or, for some other reason are not yet available for delivery to the buyer. Contracts for these types of securities trades are settled on the 4th business day after the trade. After the shares have been issued the stock exchange determines a date after which "when issued" transactions may no longer be performed.

Less than 1 percent of the transactions at the TSE end in a failure to deliver shares on settlement day. If, however, there is a default on either payment or delivery

⁵⁶See IBM, Aug. 1, 1989, op. cit., footnote 55.

⁵⁷The Japan Securities Clearing Corp. (JSCC), which clears transactions for the Tokyo Stock Exchange (TSE), currently maintains linkages with depositories and/or clearing houses in nine countries. See interview with Masayoshi Hamana and paper by Toshitsugu Shimizu, op. cit., footnote 55.

⁵⁸Depository Receipts are domestic receipts for the shares of a foreign-based corporation which are on deposit in a bank vault, or a central depository, in that corporation's domestic market. A DR for a foreign stock can be purchased in a domestic market which does not list the underlying stock itself. Ibid.

⁵⁹Stocks on the Tokyo Stock Exchange are traded by two different methods. The 150 most active stocks are traded manually on the trading floor. The TSE recently announced that it is developing an electronic order book for these 150 issues which may be in use in late 1990. All other domestic and foreign stocks are traded through CORES, the Computer-Assisted Order Routing and Execution System. See Ch. 4: Americans Competitors in Securities Trading. Also see Hamana and Shimizu, op. cit., footnote 55; and IBM report, op. cit., footnote 55.

⁶⁰The TSE rotates among these banks on a month-to-month cycle.

⁶¹"TOPIX" are Tokyo Stock Price Index futures contracts, Japan's equivalent of the Standard and Poor's 500 index futures contracts on U.S. stocks.

⁶²The TSE does provide for interest and penalties on those occasional trades that fail.

of securities, the TSE requires that the trade be cleared or canceled within four additional business days.⁶³

For "regular way" settlement, procedures differ according to whether the trade was done on the floor or through the CORES (automated execution) system. For floor trades, specifics of the transaction are written on trade slips which are transmitted via optical character reader and computer terminals to the member firms which are counterpart to the trade. As for electronic trades, the trade data is automatically transmitted to the counterparties. Trade data is compiled overnight by computer and transmitted to the JSCC before the exchange re-opens the next morning. If either counterpart finds an error, corrections must be made by contacting the TSE by the afternoon of T+1.

Settlement is always on a net basis, in respect to both the payment and securities. Accordingly, by the morning T+2, JSCC advises the counterparties on their net settlement obligations. By 4 p.m. on T+2, each net seller firm advises JSCC as to how it intends to provide shares for settlement (i.e., book entry or physical delivery), and each buyer firm advises JSCC as to how it wants to receive the shares due to it. The seller delivers securities by means of either the JSCC's computer book entry system or through the physical delivery of certificates by mid-day on the third day following the trade. Payment is also made on T+3, but is by bank check (next day funds) rather than electronic funds transfer.

Since finality of settlement is thus delayed on the payment side, this settlement cannot be said to offer true delivery versus payment (simultaneous settlement of the delivery and payment obligations of a trade). On the morning of the fourth day following the trade, the payment obligation for settlement is netted into a single

Most TSE transactions do not involve physical delivery of certificates. In only 15 percent of all TSE transactions do both buyer and seller request that the actual certificates be part of the settlement. In 41 percent of TSE trades, both counterparties request settlement through JSCC's book entry system. The result is that book entry is used for

either receipt or delivery of securities in about four-fifths of all transactions.⁶⁴

Depository Functions-Although currently clearing and settlement is done in Japan without a central depository, this is expected to change in October 1991, in respect to domestic stocks. The central depository to be set up by financial services industry and the government regulatory agencies is to be called the Japan Securities Depository Center (JASDEC).⁶⁵ All the details have not yet been worked out, but the plan is for JASDEC's relationship with the JSCC to be similar to that between the National Securities Clearing Corp. (NSCC) and the Depository Trust Co. (DTC) in the United States. Alternative ways to streamline the custodial and depository aspects of clearing and settlement for foreign stocks are being discussed. JSCC has recommended that it increase the number of its linkages with foreign clearing houses and depositories.

Currently, JSCC's book entry clearing system transfers TSE-listed stocks directly between accounts, but a major problem is that this is done on the basis of stock exchange rules, not on the basis of law. In order for re-registration to occur before each record date, JSCC returns the deposited share certificates to the shareholders (it will also do so at any time its members request it). JASDEC's Central Securities Depository System will immobilize physical certificates, providing for book entry share transfer facilities, and tracking real ownership.⁶⁶ The securities that will be eligible for such processing are listed share certificates, OTC share certificates of the Japan Securities Dealers Association (which is developing a new electronic market, JASDAQ, modeled on NASDAQ), and warrants listed on stock exchanges. Participants in the central depository will be required to obtain written permission from their clients in order to immobilize share certificates, and then will be responsible for opening and maintaining deposit accounts for the client. Share certificates will be transferred to the name of the central depository and kept in joint custody. Every Japanese exchange and clearing house will open a share account at JASDEC. JASDEC will also handle book-entry deliveries of over-the-counter securities.

⁶³If there is a default on the securities delivery, the seller may issue a "due bill" to the TSE (an IOU, actually a bank check for the money amount of the failed trade). The due bill is deposited with the TSE until the seller's obligation has been met. If the seller should default on the delivery, the TSE will turn the due bill over to the buyer. The due bill is a contractual agreement between the seller and the TSE, and is covered by exchange rules and regulations and defaulting sellers are subject to TSE penalties.

⁶⁴Shimizu, *op. cit.*, footnote 56.

⁶⁵The "Law Concerning Central Depository and Book-Entry Deliveries for Share Certificates and Other Securities" which authorized the creation of JASDEC was passed in May 1984. Development work on JASDEC began in December 1984; the target date for implementation is October 1991.

⁶⁶In this way, the services provided at JASDEC will be similar to those provided by the TAURUS (Transfer and Automated Registration of Uncertified Stock) book-entry computer system used by the International Stock Exchange in London.

The Osaka Securities Exchange (OSE)⁶⁷

OSE has 94 exchange members and an additional four non-member special participants, admitted in order to trade in futures contracts. Unlike the TSE, the OSE trades options as well as securities and futures. The options are based on the Nikkei 225 index; trading began in June, 1989.

Clearing and settlement of options contracts is handled by the OSE's own clearing department. All members of the OSE are also clearing members. The process at the OSE is similar to that at the TSE, with a few notable differences. First, all trade data comes in via trade slips and optical character recognition (OCR) reader the OSE does not yet have electronic trading, although it will begin sometime in 1990. Secondly, all equities are settled through physical delivery instead of by book-entry transfer of title. The OSE does, however, plan to make use of the JASDEC depository and custodial capabilities, when it opens, but will retain its own clearing department.

Special Features of Japan's Markets

Japanese Banks and Settlement-Japan does not now offer "delivery versus payment" service, because stock exchange payment is generally made through checks which do not clear until the next day. This poses a risk for the seller, since there is always the possibility that a check may bounce.

The exchanges decide which banks are clearing banks (TSE has 13 clearing banks, OSE has 8). Clearing members must maintain an account with each of those banks, but do not give their banks third-party debit authority (i.e., blanket authorization to debit a clearing member's account at the instruction of the clearinghouse). The exchanges receive payments from members and deposit them into an exchange account at one of the approved banks,⁶⁸ collecting all monies owed to it for that day before disbursing money from the same bank account to members who are net sellers. Both the TSE and the OSE set and annually review individual payment limits for each of their members; within these limits the member may present uncertified checks for settlement obligations.

*Futures Contracts*⁶⁹--*TOPIX* and Japan and U.S. government bond futures contracts are traded on the Tokyo Stock Exchange. Osaka Securities Exchange Stock Futures (OSF50)⁷⁰ and Nikkei 225 futures contracts are

traded on the Osaka exchange. Eurodollars, yen, and Euro-yen contracts are traded on the newly created Tokyo International Financial Futures Exchange (TIFFE). Trading for both the latter contracts has been computerized since it began, in October 1988. TOPIX futures contracts are traded through the TSE's CORES-F system.

Whereas open positions in the Nikkei 225 Stock Average are settled in cash on the last trading day of the contract, open positions on the last trading day of the OSF50 contracts are settled by physical delivery of shares of the 50 underlying stocks. The OSE's clearing department requires both the buyer and the seller of an OSF50 or Nikkei 225 futures contract to deposit as initial margin a minimum of 9 percent⁷¹ of the sales/contract value (with a minimum of 6 million yen). One third of the initial margin payment must be paid in cash. After the first day of the contract, additional margin is owed depending on price fluctuations in the market, after daily marking to market. Additional margin is due when a loss due to adverse market price fluctuations exceeds 3 percent of the sales or total contract value.

TOPIX futures are settled in the months of March, June, September, and December. Customer margin requirements are similar to those at the OSE for OSF50 contracts, an initial margin of either 9 percent of the value of the transaction or 6 million yen. Members must also pay margin of 6 percent or more of the price of the contract.

Government bond futures are settled on the 20th of March, June, September and December. Banks and non-TSE member securities companies may use accounts at JSCC to clear Japanese Government futures contracts.

The TSE and the OSE accept as collateral to meet margin requirements for futures any of the following: cash, any securities listed on any Japanese exchange, stocks registered with the Japan Securities Dealers Association, or beneficiary certificates of the securities investment trusts. Bank letters of credit are not accepted as collateral. Payments are due from clearing members for the netted position of each type of futures contract. The Osaka Securities Exchange maintains a Settlement Fund and a Default Compensation Reserve Fund System which cover participants against the default of other exchange members. These funds are for the trading of all instruments on the Exchange, including futures contracts. The TSE also has a guarantee fund, which totals 5 billion yen.

⁶⁷Information in this section is based on the IBM report, op. cit., footnote 56, on the response to questions posed to Mr. Yoshioka of the Osaka Stool Exchange by OTA contractor, Bankers Trust Co., op. cit., footnote 1, and an interview by OTA contractor, Bankers Trust Co., with Messrs. Yoshiharu Oritani, Eiji Hirano, and Iwao Kuroda, Bank of Japan, March 1989.

⁶⁸The exchanges maintain accounts at each of the clearing banks, although only one is used at any one time. The exchanges rotate which of the clearing banks they use according to a defined schedule (i.e., the OSE rotates every 10 days; the TSE, once each month).

⁶⁹Information supplied by the TSE and the OSE, in OTA contractor report by Bankers Trust Co., op. cit. footnote 1.

⁷⁰The OSF50 is almost a dormant market.

⁷¹U.S. futures margins are generally 3 to 5 percent.

*International Trading*⁷²—The TSE currently lists 120 foreign stocks. JSCC advocates building and maintaining custodian relationships in the country where these securities were issued. Clearing and settlement communications can then be handled through business linkages (i.e., dedicated communication lines) between depositories and clearing houses. Trades in foreign securities listed on the TSE are cleared through JSCC's book entry system. They are held by JSCC in the issuer's home country, either through a link to that country's depository, or in a custody account through a bank in that home country. JSCC has linkages for this purpose with Australia, Canada, the Netherlands, Germany, France, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

Both the TSE and the JSCC feel that there are significant advantages to the book entry approach, combined with overseas custody linkages, because the efficiency of equity clearing is based on the ability of investors to fulfill the delivery obligation by either book-entry receive or delivery on the settlement date (T+3). Settlement of transactions on behalf of non-residents is usually more complicated than settlement for

domestic clients, because information must pass through a series of intermediaries. So, at least with linkages, it is easier for the nonresident to deposit securities locally in the home country, where most custody is. This eliminates a risk for the TSE-member broker, who remains obligated to settle on T+3, and otherwise might have difficulty receiving the physical shares from clients in time for settlement.

U.S. securities comprise 70 percent of the foreign securities traded on the TSE. The TSE has a special arrangement with the International Securities Clearing Corp. (ISCC) in the United States, through which U.S. shares traded in Japan are kept for JSCC by ISSC on deposit at The Depository Trust Co. (DTC) in New York City. In the same way, JSCC acts as a custodian for Japanese securities which are being traded on some exchanges outside Japan. Currently, it provides this service to depositories in the Netherlands and France and is discussing with ISCC the possibility of acting as a depository for Japanese stocks being traded by ISCC participants in the United States.

⁷²Information in this section is based on a paper by Nomura Securities, in the OTA contractor report by Bankers Trust CO., op. cit., footnote 1.