

What Does a Clearinghouse Do?

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Clearinghouses are suddenly news — primarily because of concern over credit risk. Clearinghouses help economize on collateral and reduce credit risk. This is of obvious interest both to market participants and policymakers, especially in the over-the-counter derivatives markets. Clearinghouses are also useful as monitors of both market and credit risk. Most important, there are reasons to think that the existence of clearinghouses may have implications for the stability of the financial system.

The facilities lumped together under the term “clearinghouse” actually include many widely disparate organizations performing a varying number of “clearing” services. “Clearinghouses” may match trades, act as collateral depositories, centralize payments and receipts, revalue and mark positions to market, monitor capital adequacy, make and enforce margin or collateral rules, set rules regarding the allocation of losses in the event of default, and even in some cases guarantee performance of the contract.

In this article, we take a closer look at some of these services, relating them to existing and proposed facilities in the exchange-traded and over-the-counter markets. First, we examine some of the facilities that have been proposed to perform clearing functions for the OTC market. Then we consider some of these functions in detail.

We focus on the payment system function (how these organizations will facilitate the flow of payments between and among participants); the potential benefits of these organizations when collat-

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eral is used (especially how clearinghouses economize on collateral deposits); and the implications of different arrangements for the allocation of losses in the event of bankruptcy or default. We also examine the role of clearinghouses as monitors.

PROPOSED OTC FACILITIES

In December 1994, the Chicago Mercantile Exchange proposed the establishment of a Swaps Collateral Depository, which would provide one centralized depository for swaps collateral and allow interest rate swaps dealers to settle multiple transactions by making one payment through the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system. The facility will value and administer collateral from both sides of a swap deal, and is aimed primarily at swaps dealers, not their customers. It will also mark the positions to market, pricing the swaps with widely used SunGard software.

Although full details on the CME's system were not public at the time of this writing, it is clear that the system will be much more limited in scope than the CME's futures clearinghouse, at least initially. Contracts will not be guaranteed, participants will not be directly monitored for capital adequacy, and the service will not be tied to trade execution services.

The CME proposal is the latest in a long line of proposed over-the-counter payment, clearing, and depository systems. The Chicago Board of Trade's (CBOT) Hybrid Instrument Transactions Service (HITS), announced in January 1993, is also aimed primarily at the swaps market. It will eventually include both a screen-based trade execution service provided by the CBOT, and three levels of clearing services from the Board of Trade Clearing Corporation (BOTCC).

Under HITS Level 1, trades executed off-exchange will be eligible to use collateral management services in conjunction with an ISDA mark-to-market agreement. Deal anonymity is totally maintained, with each counterparty providing only "exposure amounts" and "collateral requirements."

Under Level 2, a broader range of clearing services will be offered. This phase of the system contemplates two-sided deal input, trade matching and confirmation, and position accounting along with a periodic mark-to-market calculated by an independent third party (i.e., BOTCC cash flow and collateral management services).

Under Level 3, the CBOT would offer an anonymous electronic market for plain vanilla swaps, and the BOTCC would guarantee these vanilla contracts. In this case, the BOTCC would set collateral and mark-to-market terms, since it would be assuming the risk (see Dinehart [1994]).

Bankers Trust's C-TRAC+ system, announced in the summer of 1993, provides collateral management services, interfacing with Bankers Trusts Custody System. Designed to accommodate a wide variety of transactions, it is primarily used for swaps. It tracks exposure on a bilateral basis, manages and revalues collateral, and marks the positions to market. It can also calculate net margin requirements and make margin calls for all deals concluded under a common master agreement. (See "C-TRAC+ Collateral..." [1994], "Supply of Collateral..." [1993], and Levingston [1994].)

More ambitious than the Bankers Trust system, Multinet International's proposed over-the-counter foreign exchange clearinghouse currently matches trades and provides bilateral netting. It plans to offer risk monitoring, as well as other settlement procedures. Pending regulatory approval, it will also provide multilateral foreign exchange netting for major currencies (see "The Clearinghouse for Multilateral Netting" [1994]).

One way to view these developments is that the futures and options exchanges are spinning off clearing services as a separate product, unbundling them into trade execution services and clearing services. It is becoming increasingly clear, however, that clearing is itself a bundle of related services. And competition to provide those services appears to be fierce.

In some ways, formal futures and options clearinghouses and over-the-counter market arrangements are moving to more similar institutional forms. Futures clearinghouses are accepting broader forms of collateral, streamlining their banking arrangements, and moving toward allowing posting of collateral in most major currencies. The OTC market, by contrast, is moving toward more formal posting of collateral, toward multilateral netting of positions for payments and collateral calculations, and toward the use of centralized depositories.

PAYMENTS SYSTEMS

A simple payments clearinghouse could consist of a central facility that allows market

participants to settle accounts periodically. The most fundamental function of a clearinghouse is to allow participants to avoid redundancies in their payments; participants can pay their net gain or loss to the clearinghouse, which consolidates and passes on the payments.

In all currently operating futures and options clearinghouses, participants' payments to or from the clearinghouse are made in net form.¹ The practice of multilateral netting is somewhat controversial from a legal and regulatory standpoint in the OTC market, particularly when contracts cross international boundaries (see "The Prudential Supervision of Netting..." [1993]).

Even a simple clearing system must deal with default risk. If a participant who owes money does not pay, some member or members will lose. Systems differ greatly as to how they allocate the losses from a default. The best loss allocation scheme depends on whether monitoring of credit risk is best carried out by individual members or by a centralized authority.

When loss allocation rules are clearly defined, the default risk from even the most simple multilateral netting scheme is less than it would be if the clearinghouse were not netting payments. Participants often have partially offsetting payments and receipts. Even if the clearinghouse does not use a central fund to make good on defaults, it can use the payments owed the defaulter to compensate creditors partially.

By requiring one net payment, the clearinghouse prevents what the banking literature refers to as "cherry picking." A potential defaulter cannot collect on contracts that show a profit while refusing to pay losses on others. There can be no selective default; the clearinghouse forces honoring all contracts or defaulting against the group as a whole.

By reducing the ability to cherry pick, a well-designed netting scheme makes it less likely that firms will choose to default. When defaults do occur, both the loss to clearinghouse participants and the uncertainty about the incidence of the loss are smaller (see Baer, France, and Moser [1994]).

Further, the clearinghouse has an advantage that an individual counterparty does not. While either a clearinghouse or an individual can refuse to deal with a defaulter in the future, loss of clearing privileges is normally a much more serious threat than loss of any one firm's business. If default means being blacklisted from the clearinghouse, a poten-

tial defaulter will honor commitments that it might not otherwise.

For all these reasons, even a simple "pay and collect" facility will make default less likely, and soften its impact if it does occur.

COLLATERAL DEPOSITORIES

Many derivative transactions, and all exchange-traded products, are collateralized to provide additional protection against default. For a futures transaction, both sides of any open position must deposit margin with the clearinghouse. In the foreign exchange over-the-counter market, a large proportion of contracts require mutually acceptable collateral. Clearinghouses frequently act as a common depository for collateral. In this function, a clearinghouse can provide substantial economies to its members. The cost advantage is greatest when settlement payments are netted as discussed above.

Transaction cost savings result from the fact that only one payment, covering net changes in collateral, need be made to cover a large number of transactions. By contrast, an over-the-counter participant would normally make collateral payments to each counterparty. All proposed OTC collateral payments systems would yield this savings.

The netting of settlement payments also reduces the need for collateral if a participant has partially offsetting positions with two or more counterparties. Most clearinghouses will take collateral on the net of the positions. Lessened credit exposure due to payments netting allows this reduction in collateral. The degree of netting allowed is not uniform among existing clearinghouses, however (see sidebar).

The risk implications of a lack of netting of collateral are highlighted by the controversy over the Basle Committee's report [1993]. Products that clear through a futures or options clearinghouse have substantially lower capital requirements than OTC products. Indeed, positions that clear through a futures clearinghouse are exempted from regulatory capital requirements, formally recognizing the risk control activities done by clearinghouses.

There is ongoing discussion in the regulatory community as to the proper treatment of clearinghouse positions. The Basle Committee's proposed rules would require banks to take capital charges to control for exposures to market risk, interest rate risk, and credit risk.

Credit risk for OTC positions has been subclassified into current exposure (also termed replacement costs) and future exposure. Standards for current exposure set at the end of 1994 permit bilateral netting for determination of required capital. Standards for future exposure are, as yet, undecided.

Procedures for determining the capital requirements of positions cleared multilaterally have not been determined. An important aspect of this procedure will be the loss-sharing arrangements of the clearing facility. As these arrangements vary across clearinghouses, exposure to loss may vary from one clearinghouse to the next. As a result, a standard

Netting Within Futures Clearinghouses

A clearinghouse's ability to net is somewhat complicated by the hierarchical structure of the markets. United States clearinghouses guarantee payments between clearing members only, and those payments are netted, as described above. In most cases, it would seem to make sense to base the collateral amount on the net payment, as that is what is being guaranteed. When the clearing firm is clearing trades for other market participants, however, conditions become more complicated.

A clearing firm may be acting for an exchange member that does not have clearing privileges, or for a non-member customer. The positions of the latter two groups are known collectively as the customer account; the clearing firm's own positions are known as the house account.

For the calculation of margin, the amount of netting allowed differs across exchanges. Under Chicago Board of Trade Clearing Corporation rules, if a clearing firm is carrying two customer positions that are partially offsetting, it is allowed to post margin at the clearinghouse on the net.² Clearing firms are allowed to post margin at the clearinghouse based on the net position in the house account and the net position in the total customer account.³

Chicago Mercantile Exchange rules take a different approach. In the same situation, margin would have to be posted on both long and short customer positions, as well as on the house position (see "The Financial Safeguard System..." [1993]). A clearing firm would not be allowed to offset one customer account against another. This is referred to as "gross" margining.

The clearinghouse has no direct concern in clearing firms' gross positions. Since the contract guarantee does not extend to the customer level, the clearinghouse's only legal obligation is to make the net payment. The exchange, however, may

elect to meet a higher standard to help avoid defaults at the customer level. By requiring gross rather than net margin from the clearing firm, which is more than the clearinghouse needs to fulfill its strict legal obligation, the clearinghouse helps to insure that member firms will be able to fulfill their legal obligations.

Edwards [1984] points out that net versus gross margining on customer positions should not directly affect the adequacy of the margining system, if customer funds are segregated and if adequate customer margins were taken in the first place. In both cases, the same amount of customer margin will be taken. Net margining means the firm passes on less margin to the clearinghouse than it took in from customers, and holds the excess. Gross margining means the clearinghouse holds the minimum margin taken from customers. In addition, most firms routinely collect more margin from customers than they are required to by exchange rules.

What the futures industry refers to as "gross" margining is already several steps ahead of the netting available to an OTC firm. Offsetting within the house account or any one customer's account is done automatically; a firm making partially offsetting trades for its own account has legally closed out part of its position.⁴ Further, the SPAN margin calculation system, which applies to positions in related futures and options contracts, grants lower margins within an account in many cases when exact offset has not occurred.

In both the swaps and the foreign exchange OTC markets, multilateral netting may be problematical from both legal and regulatory angles (see Moser [1994b]). Whether the proposed OTC clearinghouses will be able to offer their customers these sorts of benefits may depend largely on the resolution of legal and regulatory questions.

procedure for determining capital requirements will be difficult.

Formal multilateral netting would make much of this debate moot — but not fully resolve it. Different clearinghouses may offer different levels of protection because of differences in the level of margin demanded, or the rules governing the control of margin (see sidebar). And there remains the issue of how offsetting exposures to different clearinghouses should be treated — so-called cross-margining.

WHO BEARS THE LOSSES?

To use netting effectively, clearing systems must spell out exactly what will occur during a clearing firm default. Most futures and options clearinghouses will make good any defaulted payments from a central guarantee fund created by the clearing members; that is, the clearing members agree in advance on the way losses will be allocated among them.

The Options Clearing Corporation, for instance, makes payments from a guarantee fund if a member firm defaults on a payment to the clearing corporation. In addition, the membership is assessed for payments if the guarantee fund itself is exhausted, until either there are no more solvent members or the obligation is paid. Fortunately, the last clause has never come close to being tested.

Because the guarantee fund is usually raised directly or indirectly from the membership, the risk of default is really borne by the membership as a whole; such a system is sometimes referred to as “risk pooling.” Rather than facing a default on their own, clearing members share the loss from any default that occurs.

Some loss-sharing rules may concentrate the majority of losses on the defaulter’s original counterparties — the strategy proposed by Multinet International. If members can predict which counterparties may default, they may prefer such a rule to broad risk pooling. A broad risk-pooling agreement exposes a participant to the average of the group’s default risk. If a participant would otherwise deal only with the most creditworthy counterparties, its exposure to default risk might increase under risk pooling.⁵

The loss-sharing rule could be a particularly contentious issue if the creation of a clearinghouse widens the pool of participants. Currently, a significant number of swaps are made by AAA-rated enti-

ties, mainly banks and bank subsidiaries. The pooling of resources by the clearinghouse enables lower credits to transact at AAA levels. In the absence of a clearinghouse, this can be achieved only by creating a well-capitalized subsidiary, by changing the features of the parent company, or by changing the features of the deal.

The creation of a clearinghouse to net OTC derivatives under a clear loss-sharing arrangement would open the market to lower-rated entities. Thus, risk pooling might dilute the competitive advantage of the highest-rated firms.

LOSS-SHARING RULES AND THE PROBABILITY OF DEFAULT

The costs of monitoring the risks associated with a derivative instrument have a profound impact on the structure of the loss-sharing rule. The riskiness of a derivative instrument is a function of its price risk, the ability of the counterparty to make a given contractual payment, and the willingness of the counterparty to make the payment. If information on an entity’s ability and willingness to pay can be easily acquired by a large number of parties, then loss-sharing rules should be designed to concentrate losses on the originating parties. This reliance on monitoring by counterparties has been a key feature of bank clearinghouses.⁶

If information is costly, however, then loss-sharing rules will pool risk broadly, using netting and margin to reduce default risk to low levels. This is the approach generally adopted by exchange clearinghouses.

DESIGN OF THE LOSS-SHARING RULE AND SYSTEMIC RISK

Loss-sharing rules affect systemic risk in two ways.⁷ First, by clarifying the treatment of market participants following the default of a counterparty, loss-sharing rules reduce uncertainty about the creditworthiness of counterparties. This serves to reduce the systemic risk associated with a given price movement.

Second, when well-defined loss-sharing rules are in place, the clearinghouse has incentives to take collateral so as to limit default risk. In current futures clearinghouses, and in Level 3 of the proposed HITS system, collateral and marking-to-market conventions are set by the clearinghouse itself. Since the clearinghouse acts as the agent of the members, it

will set collateral levels based on the probability of default and the opportunity cost of collateral to the membership. The margin will balance the cost of incurring deadweight losses due to default against the cost of tying up funds as margin deposits (see Baer, France, and Moser [1994]).

THE CLEARINGHOUSE AND INFORMATION

In a less formal network, such as the over-the-counter market, each participant must individually monitor all potential counterparties. Under this arrangement, participants have the incentive to gather information about counterparties, as it is they who will directly bear any credit losses. With the creation of a clearinghouse, these tasks may be shifted from individual firms to the clearinghouse.

Futures and options clearinghouses monitor the capital adequacy of their members. Clearing firms are required to maintain certain minimum levels of adjusted net capital, generally based on some measure of the firm's activity such as the amount of segregated customer funds. Data on positions at other clearinghouses are made available on a daily basis. For over-the-counter positions, the clearinghouse has the legal right to access data under the umbrella of its market surveillance activities, but it does not receive or analyze these data on a routine basis.

All clearing firms are required to file monthly or quarterly financial reports with the clearinghouses, and certain firms are followed much more closely by clearinghouse staff. Firms are required to report any deficiencies in capital immediately.

The clearinghouse's superior data on clearing member positions may be more important for its task of insuring contract integrity than its information about the overall capital adequacy of the firm. The clearinghouse has full information on all trades registered with it. This information can be used to determine an appropriate level of margin. Since the clearinghouse will have more information than any single market participant, it can do a better job of setting margin in order to insure performance on the contracts. This is information that individual counterparties would have difficulty obtaining.

Access to this information may give the clearinghouse a comparative advantage in assessing capital adequacy. This advantage should not be

exaggerated, however. The clearinghouse does not have full information about transactions occurring outside the clearinghouse, and may continue to find it costly to value other parts of the firm's balance sheet.

We believe that the real contribution of the clearinghouse is to reduce risk by introducing a new contractual form rather than reducing risk by increasing monitoring of the participants' overall capital adequacy. While monitoring of credit risk may be a feature of clearinghouse activity, it is important to keep in mind that the primary outcome of monitoring of the firm's overall capital adequacy will be a reduction in the amount of margin rather than a reduction in default risk (see Baer, France, and Moser [1994]).

Nor is it clear that the formation of a clearinghouse necessarily enhances monitoring.⁸ Indeed, one of the principal impacts of a clearinghouse is to reduce the costs of controlling risk through mechanisms like margin and expulsion. Margin and expulsion are substitutes for monitoring the overall capital adequacy of counterparties.

The creation of a clearinghouse with well-defined loss allocation rules will reduce default risk even in cases where the clearinghouse itself undertakes no monitoring of the participants' capital adequacy. It is informative that futures clearinghouses rely heavily on the deposit of margin, even for well-capitalized firms. This may reflect the fact that outside knowledge of a firm's true net worth is at best imperfect.

Our discussion has some clear implications for public policy toward clearinghouses. From a regulatory standpoint, the more knowledge pooled, the better, a factor that should lead regulators to encourage the formation of clearinghouses and, possibly, to support mergers between existing ones.

Of course, the fact that clearinghouses know so much about the positions of their members can be a disadvantage, as far as the members are concerned. Most firms consider their current market position to be extremely sensitive information. Potential members may be reluctant to reveal their positions to a central clearinghouse.

As Moser [1994a] recounts in his history of early futures clearing systems, when fully multilateral clearing was proposed at the Chicago Board of Trade in the 1920s, one contentious issue that delayed its passage was the privacy of trades. This same problem is said to have hampered efforts by

banks and swaps dealers to sell proprietary systems to the rest of the industry (see Levingston [1994]). Firms may be chary about revealing their positions to an independent clearinghouse, but they would be much more nervous about a clearinghouse controlled by a rival firm.

Clearinghouses can also help firms monitor themselves. Valuing and marking collateral and positions to market can be helpful to participants as well as to regulators. Currently, gains and losses on futures positions are immediately apparent, because of the marking-to-market process. Most forms of OTC clearinghouses would provide similar benefits. While most OTC participants currently have adequate risk management systems, weaknesses in some systems have been a matter of concern to regulators.

CONCLUSION

We have explored some of the services provided by clearinghouses and clearinghouse-like organizations such as payments systems and collateral depositories. These organizations are much more complex and multifaceted than immediately apparent.

Because clearinghouses do so many different things, blanket statements about the desirability of, for instance, a "swaps clearinghouse" are hard to assess. It is not hard to agree, however, that most of the services provided by these facilities have clear and obvious benefits, both to private individuals and to the general public.

ENDNOTES

The findings, interpretations, and conclusions here are the authors' own, and should not be attributed to the World Bank, its executive Board of Directors, or any of its member countries, or to the Federal Reserve System.

¹If a futures clearing firm is carrying customer accounts, however, Commodity Futures Trading Commission regulations forbid netting payments across accounts, in order to preserve the segregation of customer funds. A single transfer of funds is still made for each account.

²Customers are individually required to meet their margin requirements, and the clearing firms are under a regulatory obligation to see this occurs. Netting means only that not all of these funds must be passed on to the clearinghouse.

³The customer account as a whole cannot by law be netted against the house account; the CFTC segregation rules forbid it.

⁴Some large firms choose, for reasons of internal accounting, to subdivide their house accounts into separate subaccounts. If a firm chooses to do this, CME rules will treat those subaccounts as belonging to separate entities, and will not allow offset across the accounts. If positions are held within the house

account on a gross basis, they may not be transferred for the purpose of liquidation.

⁵In this case, a participant might still choose to participate in the clearinghouse if the other benefits (such as benefits from reduced total collateral requirements or payments economies) more than compensate for the increased default risk. As long as membership in the clearinghouse is voluntary, participants could choose not to join the clearinghouse; they would participate in the clearinghouse only if there were some compensating benefit.

⁶The bank clearinghouse literature is largely concerned with possible effects of the loss-sharing rule on the probability and severity of default, especially with the beneficial impact of bank clearinghouses on the banking panics. See, e.g., Gorton [1985] or Calomiris and Gorton [1991].

⁷Baer, Evanoff, and Pavel [1991] define systemic risk as occurring when

A large number of parties find it so difficult to value the direct and indirect credit risks associated with the clearing and settlement of transactions that they simply abandon the market. In the market for bank deposits this is manifested in a run from deposits into currency. In a financial market it is manifested in a cessation of trading through conventional channels.

⁸If the net exposure to the entire market is less than the largest bilateral exposure, then creation of a clearinghouse will reduce the incentives to monitor financial condition, since there is less at risk.

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