

For Release on Delivery  
11:00 a.m. E.D.T  
October 22, 1990

Clearing and Settlement: Past and Future

Remarks by

Alan Greenspan

Chairman, Board of Governors of the Federal Reserve System

before the

American Bankers Association

Orlando, Florida

October 22, 1990

Good morning ladies and gentlemen. I welcome this opportunity to address the American Bankers Association once again. In my previous addresses to you, I have stressed the importance of bank capital. During the past year, as events have unfolded around the world, we have continually been reminded that capital is critical to the stability and competitiveness of the banking industry, and indeed to the stability and competitiveness of all industry.

Today, I would like to discuss another important issue which will attract our attention in the years ahead how technology is changing the banking industry through its influence on clearing and settlement arrangements. The topic of clearing and settlement often is reserved for specialists, but, in fact, it has broad implications for the safety and efficiency of our financial markets. A variety of clearing and settlement arrangements, which provide the foundation for our financial services industry, are now undergoing change. These range from traditional banking systems to all kinds of mechanisms for clearing and settling equities and other securities. I would like to review some of these developments, and place them in a broader context of analysis and history. We can usefully learn from the past as we shape the future.

### **Long-run Economic Forces**

There are a number of long-run forces that are shaping clearing and settlement arrangements across the spectrum of money and financial markets.

First, the supply and organization of clearing services have been profoundly affected by the development of electronic technologies.

The unit costs of clearing large volumes of items have fallen in many markets, as electronic alternatives to manual processing have become virtually indispensable. Since computerized processing and communications systems have grown to become the core of clearing arrangements, the costs of organizing a modern clearing system are now dominated by the price and design of electronic technology, not by the traditional costs of clerical resources and transportation. Thus, if the costs of electronic technology continue to fall, as in the past, so too will clearing costs. In turn, we might well expect the geographic scope of electronic clearings, the membership in such arrangements, and the duration of clearing cycles to be strongly influenced by these declining costs.

Second, the organization of clearing services has also been driven by efforts to economize on the use of money and credit. For example, the ancient concept of a clearing house is today a familiar part of banking arrangements, and has long been used to clear checks. The most important financial attribute of a clearing house is that members typically offset, or net, their clearing debts against one another on a multilateral basis. This multilateral netting often dramatically reduces the amount of money and credit needed by members to complete a clearing and settlement cycle.

Third, financial practices have changed in a number of ways, with major firms and institutional investors now managing their portfolios much more actively than in the past. These changes, in turn, have led to increased turnover in financial markets, and, thus, to greater demand for clearing services.

### **History of Check and Securities Clearing**

The history of the money and stock markets clearly illustrates the operation of these three economic forces, especially in New York City, though many other cities around the country also have rich and varied histories that have been shaped by these same forces.

Prior to the advent of clearing houses, checks and other payment instruments were cleared and settled bilaterally between major banks. The situation was described in the massive 1912 report of the National Monetary Commission, which investigated banking and monetary arrangements in the United States and laid the groundwork for the creation of the Federal Reserve. In the early 1800s, on each business day in New York City, for example, banks would sort checks that had been deposited, and send messengers with packages of checks to the banks on which they were drawn. Chaos would reign when five or six messengers would arrive at the same bank at the same time. Having at last presented his checks, a messenger would then move on to the next bank on his circuit, to repeat the process. Settlements between pairs of banks for the gross value of presented checks occurred once a week. This created an astounding period between settlements, during which "float," or clearing credits, would accumulate. Contemporary reports suggest that this form of bilateral clearing was extremely inefficient, and that the lengthy period of float gave rise to significant abuses.

The technological and organizational response to this inefficiency was the bankers' clearing house. The first organized clearing in New York City was conducted in October 1853. Typically,

clearings took 15 minutes in the morning, while settlements were made in the early afternoon.

Not only the physical efficiencies but also the financial efficiencies of this early clearing house system were remarkable. The period of float between the exchange of paper and settlement was reduced to a matter of hours. Moreover, for the members of the new clearing house as a group, the value of balances needed for settlement, in relation to the value of checks cleared, declined significantly

Since the 1850s, new technologies and organization have continued to reduce the marginal costs of clearing and settlement for checks and other paper instruments. The most significant qualitative change in clearing house arrangements took place in 1970 when the New York Clearing House began offering its CHIPS service. Although Fedwire had been operating for some time, CHIPS was the first private clearing house arrangement that permitted a real-time exchange of electronic payment information. Net balances were settled the next morning. In a precedent setting change-over in October 1981, CHIPS began same-day settlement through a special account at the New York Federal Reserve Bank. Again, technology and organization reduced the marginal costs of clearing and settlement. As a further consequence, overnight and weekend float were driven from the CHIPS system. Only daylight float, or daylight credit, now remains.

In securities markets, bilateral clearing methods also have largely been replaced by clearing house arrangements. In comparison with payment clearing, however, the process has been slow and incremental. The New York Stock Exchange, for example, was unable to

introduce a successful clearing house until 1892, one hundred years after the formation of the first organized stock market in New York. Until a clearing house was formed, it was necessary for Exchange members to settle each and every stock transaction bilaterally through the delivery of certificates to the office of a buyer, in exchange for payment in the form of a certified check

Settlement by this method required a veritable army of clerks and messengers. Even more important, it required large sums of bank credit. For example, a firm buying stock seldom had sufficient money balances to complete the required payments. Instead, it relied on its bank for daylight credit--a "morning loan" in the language of the day. As New York Stock Exchange volume grew rapidly in the years following the Civil War, banks and their regulators became alarmed at the amount of daylight credit being extended to support securities transactions

In the end, the 1884 failure of the Marine National Bank resulted in disclosures about abuses of the daylight credit system and the magnitude of the credit risks to the banks involved. Interestingly, it appears to have been pressure from bank regulators and the New York Clearing House Association that induced the Stock Exchange to form a clearing house and to compel its members to join.

Because a securities clearing house typically handles both money payments and many different issues of securities, its operation is inherently more complex than a check clearing house. When the clearing house of the New York Stock Exchange first began operations, it simply netted stock deliveries on a multilateral basis, issue by issue. As a

consequence, the amount of money a net buyer of stock would need to pay for the securities was also netted issue by issue, along with the stock.

In 1920, the clearing house took on quasi-banking functions, as part of a major reorganization. Deliveries of stock continued to be made to the office of the net buyer of each issue. However, messengers delivering stock were now given "delivery receipts" in exchange for securities. At the end of a day's activity, clearing house credits and debits that reflected these receipts would be subjected to a grand multilateral netting, and all of a member's trades would be settled by the delivery or receipt of a single check. The effect of this overall payment netting on the amount of money and credit necessary to complete a clearing cycle was dramatic. By 1925, the value of certified checks necessary to complete a typical daily stock settlement had declined by 80 to 90 percent

The next critical step in the evolution of clearing arrangements for stocks took place in the late 1960s. The average daily trading volume on the New York Stock Exchange doubled between 1964 and 1967, spawning a "paperwork crisis." Errors and delays in completing securities deliveries not only infuriated investors but, beginning in 1969, forced over 100 brokerage firms into liquidation. The solution involved the combination of new organization and electronic technology. Securities were immobilized in a new depository where stock ownership could be transferred through an electronic book-entry system, a process which the New York Stock Exchange had initiated in 1968, with the establishment of its Central Certificate Service. In 1973, the

Depository Trust Company, a user-owned cooperative, was created to serve as the central depository in the United States for shares of stock.

#### **Current Policy Concerns**

Overall, the development of clearing organizations has sharply reduced costs. It is important to recognize, however, that in the process, clearing houses themselves may extend significant amounts of credit, especially on an intraday basis. As these organizations have multiplied and the volume of financial transactions has grown, public concern has focused on the potential losses and liquidity pressures that could result from defaults on settlement obligations by key participants in clearing systems. The potential for default by a major participant in the settlement systems for stocks and stock index futures and options arguably posed the greatest threat to the financial system during the October 1987 crash. Earlier this year, the failure of the Drexel Burnham Lambert Group seriously disrupted settlements in some segments of the mortgage-backed securities market.

Fortunately, these concerns have been translated into concrete actions to strengthen our clearing and settlement arrangements. In the stock and stock derivatives markets, clearing organizations have strengthened their individual risk management systems in ways that have reduced the chances that a participant's default would disrupt settlements in these and other markets, or undermine general confidence in the payment system. The Group of Thirty, a private-sector group concerned with the working of the international financial system, has identified further steps to be taken in the U.S. and other countries' securities markets that would strengthen and harmonize settlement



procedures internationally. In the United States, this would involve compressing the interval between the trading and settlement of stocks to three business days, and substituting same-day funds transfers for traditional settlement payments made by certified check.

The Federal Reserve also has sought to promote improvements in risk management by clearing organizations. In June 1989, as part of a broad set of proposals aimed at further reducing risks in the payment system, the Board issued policy statements that deal with private book-entry securities clearing systems and with offshore dollar clearing arrangements. These policy statements address the minimum credit, liquidity, and operational safeguards that the Federal Reserve expects of systems that seek to settle directly or indirectly over the books of the Federal Reserve Banks. The policy statement on book-entry systems has been applied in evaluating applications for Federal Reserve settlement services from the recently established Government Securities Clearing Corporation and Participants Trust Company, a depository for Government National Mortgage Association securities. The Depository Trust Company is working with the Federal Reserve to ensure that when stocks and other instruments are settled in same-day funds, safeguards are in place that conform to the policy statement.

The policy statement on offshore dollar clearing and netting systems was developed as an interim policy, while the Federal Reserve awaited the conclusion of a thorough study of such systems by the central banks from the Group of Ten countries. The Federal Reserve's interim policy statement recognized the need for international cooperation in dealing with offshore clearing and netting systems, along

with the need for setting out principles to guide the design and operation of these arrangements. The results of the study by the G-10 central banks should be available shortly.

### **The Future**

After reviewing the history of efforts to reorganize clearing arrangements, I am intrigued by the implications for the future, as technology continues to advance and clearing costs continue to fall. One possibility is that declining costs and further efforts to reduce risk, or to economize on money and credit, will begin to encourage clearing houses of various types to shorten settlement cycles. In most cases, this would require settlements to be completed more than once per business day. Ultimately, of course, the pattern of financial trading during a day, along with the costs of reorienting financial markets, could limit such steps.

The Federal Reserve's proposed policy to price daylight overdraft credit may also have an impact on clearing cycles. In the past, daylight credit has essentially been treated as a free good, with no need to economize. In the future, clearing cycles may well be adjusted to take into account the costs of daylight credit, in relation to the urgency with which payments and securities need to be delivered. Shorter cycles may be one outcome.

Although recent attention has--rightly--focussed on clearing house arrangements, I wonder whether these organizations are the ultimate means for clearing securities and some other obligations. For example, if technology continues to advance, could real-time systems for trading securities be linked to real-time "clearing" systems for

delivering securities against payments of money? The trend in technology suggests that such arrangements may eventually become economically viable in markets other than those for U.S. government securities, in which the Fedwire system provides such a service. Indeed, part of the elegance of real-time delivery versus payment systems is that they would mimic the oldest of clearing and settlement arrangements, in which goods and securities are simultaneously exchanged for payment in legal tender, or currency.

The major questions about widespread real-time delivery versus payment operations concern the required financial and banking organization. Picture a world in which virtually all banking and securities transactions are processed, accounted for, and settled on a "flow basis," as they occur during a day; in essence, a world of real-time banking and finance. To be sure, for some categories of transactions, and for some customers, banks already operate in this fashion. However, the rigorous application of these concepts is just beginning.

Little is really known about how the economics of technology will interact, in the future, with the economics of daylight finance to shape the banking and clearing arrangements on which we will all depend. However, change will continue to occur under the pressure of technology. Thus, I also believe that in our discussions and planning, we should begin to reorient our thinking, and to take more seriously than in the past concepts like real-time banking and daylight accounting.

I also wonder about the wider effects of technology on banking. As others have noted, technology may greatly increase the competition

between banks and other industries. The creation and delivery of financial services appear to depend to a greater and greater extent on technology that will not be the exclusive preserve of any single firm or industry. Thus, although U S. banks have traditionally had strong advantages in technology, these advantages alone may not be sufficient over the long run. Instead, it may well be the condition of the capital base of the banking industry that is decisive in shaping competition. If competing industries offer technologically based financial services, business may well flow to firms that can combine these services with efficient and low cost access to credit and credit markets. This in turn will require a strong capital base.

#### **Conclusion**

My conclusion about the future of clearing arrangements is that we lack a far reaching view of the economics of ideas like real-time banking, accounting, and delivery versus payment. However, history does suggest that both technology and efforts to economize on financial resources will continue to be important forces for change. It is also striking that discussions about the uses of technology in banking, usually conducted among specialists, hold potentially broad implications for the future character and structure of the industry. Thus, beyond concerns of the moment, it may be developments in technology, in a variety of forms, that provide critical forces for change in banking and finance. With wise management--and higher levels of capital, my theme of the last two years--banks may be in a strong position to take advantage of these forces.