

Remarks by

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at the

Conference on

Payment Systems Research and Public Policy:

Risk, Efficiency, and Innovation

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Good morning ladies and gentlemen On behalf of the Federal Reserve Board and the Journal of Money, Credit, and Banking, I would like to welcome you to our Payment System Research and Public Policy Conference I am particularly pleased to greet our guests from overseas I believe the international participation in this conference reflects the growing worldwide interest, not only of bankers and policy makers but also of researchers, in payment system issues

The increased attention to these issues reflects recent deep seated political changes as well as economic developments Many of the countries of Eastern Europe and the former Soviet Union, for example, are rebuilding payment systems to support market economies These countries are interested in very fundamental questions of payment system policy and design The European Union countries are also grappling with basic payment system issues as a result of the steps being taken toward monetary union At the same time, central banks in the G-10 countries have continued to emphasize the importance of controlling and reducing payment and settlement risks in global financial markets Recently there has also been extensive interest surrounding market efforts to develop new electronic banking and payment products for consumers, including efforts to introduce stored-value payment cards, potentially secure payment mechanisms for the Internet, and new versions of home banking products

In view of all this current and prospective change, I would like to make a few remarks about three topics: money, the payment system infrastructure, and payment system risk. My aim is to provide some general background for your discussions over the next two days.

Money and the Payment System As I just indicated, there has been much interest recently in the development of new payment system technologies, including so-called electronic money. Indeed, the current publicity surrounding these products is reminiscent of the intense discussions about electronic payments in the 1970s. In my judgement, some of the recent speculation about risks to monetary policy and to the payment system has been a bit alarmist. To provide a basis for assessing those risks, it is worth spending a few moments on terminology and history.

The major historical innovations in the forms of money have involved the creation of commodity monies, and later paper claims on governments or banks, that came to be used as money. The latter have taken several forms, and in the nineteenth century in the United States included circulating private bank notes. Today, of course, central banks issue the primary circulating currency in most countries, including the United States.

The other major form of private claim currently used as transactions money is the demand deposit balance at depository institutions. (Broader definitions of money include other types of deposits and a few other financial instruments.) Beyond using private claims as money, however, a key historical innovation that

allowed the development of modern payment systems was the deposit balance that is transferrable between two individuals, whether they are customers of a single bank or of two different banks

Relative to these fundamental innovations in the forms of money, recent events appear to be minor variations on basic themes. Electronic funds transfer systems, as compared to paper, have shortened the time frame for the transmission of payment instructions and reduced float, but they have not changed the fundamental structure of the payment system. Indeed, many so-called innovations in money over the past twenty years have simply been aimed at minimizing the costs of banking regulations such as reserve requirements and limits on the payment of interest on deposits.

For the purposes of discussing payment system innovation, efficiency, and risk, it is helpful to distinguish the payment system from money itself. The payment system is a mechanism -- actually many mechanisms -- which, when coupled with rules and procedures, provides an infrastructure for transferring money from one entity in the economy to another.

The payment mechanism can be as "simple" as handing currency over the counter to a merchant in exchange for goods, with institutions and procedures in the background for distributing and redeeming currency. These transactions using currency, which represent direct real-time payments between buyers and sellers in our economy, also permit the legal obligations that give rise to the payments to be discharged very rapidly once the payment process

has begun. In this respect, the process of payment and settlement by currency sets a standard of efficiency against which other payment mechanisms may be compared.

Most of the other major payment mechanisms involve the transfer of deposit money or claims. These mechanisms can involve using paper or electronic payment orders, or promises to pay, that set in motion a chain of events involving two, three, or more banks, specialized clearing houses, transportation and data communication links, and computerized accounting systems for updating the accounting records of the banks. Despite the obvious technical variations between different paper-based and electronic payment systems for transferring deposit money, the goal of all these systems is essentially the same. The monetary claim of the person making a payment is reduced and the claim of the person receiving the payment is increased.

A broad issue of payment system efficiency that is often raised by payment system innovations involves the uncompensated and inadvertent shifting of credit and liquidity risks through payment mechanisms and associated institutions. Timing gaps, for example, in the giving and carrying out of payment instructions, in the exchange of assets, including monetary claims, and in the discharge of underlying legal obligations can generate inadvertent interest free loans --float, and more generally, lead to the shifting of credit and liquidity risks. The impact of this risk shifting, particularly on the incentives to improve overall payment system efficiency, is a perennial issue.

Obviously a fully real-time electronic transaction, clearing and settlement system, for example one with no float that approximates the currency model, would represent, other things equal, the ultimate in payment system efficiency. Such a system might reduce or even eliminate the credit risks that invariably arise due to timing gaps in the payment process. But other things are rarely equal. Increases in payment system efficiency imply additional costs, particularly costs resulting from increased capital investments in computer and communications technologies. Like all capital investments, the return must exceed the cost of capital, if efficiency is in any meaningful sense to be improved. As I will point out later, the securities industry has significantly reduced the settlement cycle for equity trades. This has not been without costs, not to mention the difficulties that arise as a consequence of float having haphazardly arisen over the years, and the understandable unwillingness of the recipients of zero interest loans and other "benefits" associated with float to forego them.

Changes in the Payment System Infrastructure It is largely in the complex payment system infrastructure that many interesting and innovative developments are now taking place. Very important long-term technical changes are beginning to affect the payment system, especially the continuing decline in computing costs and in the physical size of powerful computer chips, along with the associated spread of powerful telecommunications technologies. As a result, the scope of problems that can be meaningfully formulated

and solved by the new technologies has grown enormously. The widespread availability and acceptability of computers, in one form or another, in both the home and the workplace, has accelerated the process. At the same time, reflecting the decline in computing costs as well as the gains in satellite and fiber optic technologies, the cost of communications has been falling dramatically, broadly opening up markets worldwide.

These trends are having impressive effects across the economy on the opportunities to create new products and services, to organize production, and to raise standards of living. They are also having a marked impact on the payment system, and offer potentially significant avenues for the improvement of the efficiency of existing arrangements and possibly for the creation of whole new payment mechanisms.

Before discussing the payment system arena further, however, a short digression into the past may be useful prologue. It was recognized in the 1970s that declining costs of computing could lead to the widespread development of new electronic payment systems for businesses and consumers. Indeed, in the mid-1970s the Congress established a national commission to investigate issues surrounding new electronic payment technologies. It is interesting, however, that the bolder predictions of the time did not come true. Electronic payments did not quickly replace currency and paper checks as the major means of payment for retail transactions. To this day, the United States remains heavily dependent on paper currency and checks for large numbers of these

payments. Indeed, the advent of automated teller machines may even have increased the use of currency. In contrast, electronic payments are now the norm in settling interbank money market and government securities transactions in the United States and virtually all other major industrial countries. This experience should lead us as researchers and policy makers to ask probing questions about the factors that affect the demand for, and supply of, various payment products, including new electronic technologies.

Particularly interesting today is the strong competition among payment methods, both old and new, in the retail sector. The number of automated teller machines and the value of currency dispensed from these machines have continued to grow steadily over the past five years, while checks have been maintained in widespread use. During the same period, however, the use of electronic debit and credit transfer mechanisms has grown sharply, albeit from a low base. Credit cards are now ubiquitous. And, as I mentioned earlier, there are also many new projects, at an early stage, both in the United States and abroad that are attempting to find new ways to automate small-value retail payments and to find secure methods for making payments over communication channels such as the Internet.

One interesting development that may help stimulate change is the rapid rate of installation of multi-function electronic terminals in the retailing sector, particularly at gasoline service stations and supermarkets. Different electronic technologies and



service providers, including electronic payment and credit card providers, are now able to compete vigorously with each other and with paper payment methods at the point of retail sales. History, however, cautions that changes in large-scale economic infrastructures, such as a decisive shift toward fully electronic payments, take time, even when these changes are likely to produce significant gains in efficiency.

The effects of banking deregulation are also beginning to be felt in the payment system. The prospects for interstate banking, for example, are leading some banks to review the organization of their payment processing and associated operations. Recent studies of scale economies as well as technological change in the Federal Reserve's own electronic payment systems suggest the possibility of significant gains in payment system efficiency, as a consequence of the widening of interstate banking.

Payment system competition between banking organizations may also increase at the national level, leading to further efficiency gains. In addition, traditional check and other clearing houses for handling interbank collections are beginning to feel pressure from interstate banking organizations to harmonize procedures, limit costs, and expand the geographic territories they serve.

In all this, there is a renewed sense that significant gains in efficiency in the payment system, including lower costs, greater choice, and reduced float, may be possible. Along these lines, it is important for researchers and policy makers to avoid thinking of the payment system as a single technology. Particularly when

evaluating the many ideas currently being discussed for electronic payments, we should think in terms of an environment of different technologies in a competitive market that offer consumers and businesses many choices, including choices among payment methods, among payment providers, and possibly among payment risks. This type of dynamic setting is the one that has most consistently produced gains in economic efficiency across wide areas of the economy, particularly in areas involving computer technologies.

Payment System Risks Turning to payment system risks, credit, liquidity, operational, and fraud risks are those usually associated with the payment system. Systemic risks, which are typically combinations of credit and liquidity risks, raise particular concerns for central banks. In the context of payment system analysis and policy, systemic risk includes the possibility that the failure of one bank in a clearing house, or similar private arrangement, to settle its obligations when they are due could cause others to fail as well. More general concerns about systemic risk extend to the reaction of the financial system as a whole, in which payment systems play an integral part, to various types of stressful events.

Concerns about systemic risk, along with risks to the Federal Reserve, have helped motivate the development over the past fifteen years of the Federal Reserve's payment system risk policies. In the late 1970s, it became apparent that the banking industry was regularly borrowing billions of dollars from the Federal Reserve interest free, in the form of daylight reserve account overdrafts,

as part of routine payment operations. Also, banks were lending very large and uncontrolled amounts to each other, effectively interest free, over electronic payment systems such as CHIPS. And, bank customers, in turn, including banking correspondents and other large players in the financial markets, were routinely overdrafting their accounts at the banks as part of daily "back office" processing. Thus, the daily settlement of money market and government securities transactions, for example, had become heavily dependent on a credit process involving the intraday creation, distribution, and repayment of credit, on the order of hundreds of billions of dollars, unconstrained by a market price mechanism, i.e. interest rates, which produce equilibrium in all other parts of our financial system.

In the course of addressing this issue, Federal Reserve policy has clearly recognized that the payment system and associated banking arrangements depend on credit as a normal part of financial operations. Policy has also continued to stress the need to strengthen settlement practices in key financial markets and to improve risk controls within payment systems themselves, particularly systems for processing large-value payments. As you will hear later in this conference, the Federal Reserve has had a long-running program that has helped to subject the daylight credit mechanism to normal banking controls. Within the past 18 months, the Federal Reserve has also begun charging small fees for the daylight overdraft credit it extends, resulting in a dramatic 40 percent decline in the average and peak demand for this type of

credit. Ultimately this process may be contained and balanced by the emergence of broad intraday interest rate markets. In the interim, Federal Reserve fees act as proxies for such markets.

Significant improvements have also been made in the private sector, by focussing clearly on who bears credit and liquidity risks in clearing arrangements and also by introducing new technologies. For example, the New York Clearing House has developed well defined loss allocation formulas for daylight credit extended through the CHIPS system and at the same time introduced technologies for the real-time control of associated credit and liquidity risks.

In the securities industry, electronic systems for holding securities as well as clearing and settling trades have become prevalent. Such systems allow the introduction of much more sophisticated risk control technologies into the clearing and settlement process. Systemic risk management will continue to press for convergence, where possible and cost effective, toward real-time transaction, clearing and settlement.

In this regard, as I indicated earlier, this past summer the securities industry smoothly implemented a reduction in the settlement cycle for equity trades to three days from five. This step had been recommended in 1989 at the international level by the Group of Thirty, with the goal of reducing the risks that parties would default on obligations to deliver and pay for traded securities. A question for study is whether improved technologies will eventually permit the further shortening of these settlement

cycles, and consequent reductions in risks, perhaps to same-day or even faster settlement

One of the most difficult areas in which to improve settlement practices has been the interbank foreign exchange market, where recent BIS estimates put daily turnover in excess of \$1.2 trillion. Moreover, a recent study by the New York Foreign Exchange Committee, which meets under the auspices of the Federal Reserve Bank of New York, has pointed out that settlement risks in this market involve not only daylight credit risks but also potentially significant overnight credit risks. The G-10 central banks are also actively studying these risks, and have issued a number of reports over time dealing with the subject.

The complexity of settlement practices in the foreign exchange market, involving many different banks, currencies, payment systems, and countries, is at the root of the difficulty of reducing credit, liquidity, and systemic risks. New ideas and technologies are being developed and implemented in the private sector, and these are welcome developments. Much work in this field, however, remains to be done.

Conclusion In conclusion, I would like to emphasize the need for greater research efforts involving payment systems. I hope these efforts will include the development of new ideas that reflect the broad monetary, banking, and infrastructure aspects of payment systems. A major difficulty associated with this type of work is that key insights into innovation, efficiency, and risk depend on understanding complex institutions and processes. I urge

persistence Payment systems are critical to the functioning of a modern monetary economy Payment systems also raise interesting and important issues that challenge our ability to draw on ideas from many different fields of economic research