

Chicago Fed Letter

Payments systems— Getting ready for the 21st century

On May 6–8, 1998, the Federal Reserve Bank of Chicago held its 34th annual Conference on Bank Structure and Competition. Since the early 1960s, the conference has served as a forum for academics, regulators, and industry experts to debate current issues affecting the financial services industry. This year's conference, which we summarize below, continued that tradition.

The conference focused on recent developments in payments systems.¹ Payments systems are the infrastructure of the modern business world. All business and financial transactions involve monetary payments. A transaction that is not paid in cash (bills and coins) has to be paid by transferring funds from the buyer's account to the seller's. If the buyer and seller have accounts with the same bank, transaction settlement can be done easily by having the bank simply debit the buyer's account and credit the seller's account. If the buyer and seller use different banks, which is usually the case, settlement requires the use of an alternative array of payment mechanisms.

As noted by Alice M. Rivlin, vice chair of the Board of Governors of the Federal Reserve System, payments systems carry the essential messages without which our complex economy would break down, just as the human body would cease to function if the circulatory system did not get oxygen to the right place at the right time. Like the circulatory system, payments systems typically go unnoticed unless there is a problem that spills over and disrupts other industry sectors. Because of the sheer size of the transactions, the important role they play in other economic sectors, and their imperative role

during times of financial stress, payments systems raise numerous public policy issues. For example, what are the risks and how do they compare with alternative payments and settlement arrangements? How can these best be managed? Are there potential systemic risk concerns? What role, if any, should central banks play in overseeing payments activity? What opportunities do recent technology advances provide to improve payment mechanisms and customer convenience?

A conference theme panel discussed recent developments in payments activity, including alternative settlement mechanisms for both domestic and international transactions, the role of the central bank in payments, and recent payment initiatives. The panel comprised Alice M. Rivlin; Catherine A. Allen, chief executive officer of the Bankers Roundtable's Banking Industry Technology Secretariat (BITS); Norman Nelson, general counsel of the New York Clearing House and the Clearing House Inter-Bank Payments System (CHIPS); David Roscoe, general director at J. P. Morgan and program director at CLS Services; and Martin Mayer, visiting scholar at the Brookings Institution. Each speaker outlined essentially the same primary objectives—we should do everything necessary to allow for a payments system that supports economic growth, alleviates problems during times of financial stress, and responds to changes in financial markets, technology, and growth in the overall economy. In his keynote address, Alan Greenspan, chairman of the Board of Governors of the Federal Reserve System, emphasized that these characteristics must hold not only in domestic markets, but also in increasingly complex international clearing and settlement arrangements. He argued that it is urgent that we accelerate our

efforts to develop a sophisticated understanding of how a technology-driven global financial system works. "We need it if we are to continue to make progress in reducing settlement risk in foreign exchange markets and to ensure a sound infrastructure for payments and settlement systems generally," he stated.

Opportunities to modernize retail payments systems

According to Rivlin, breathtaking developments in computer and telecommunications technology and changes in the structure of the banking industry are providing an opportunity to modernize payments systems that have lumbered along unnoticed for a number of years. These payments fall roughly into two categories: 1) retail or small dollar payments made by individuals, businesses, and other participants in the economy; and 2) wholesale or large dollar transactions made primarily by banks, businesses, and governments. In the U.S., the Federal Reserve System regularly bolsters public confidence in both of these systems by 1) providing regulatory oversight, 2) directly providing certain payment services (e.g., check collection and automated clearinghouse transactions), 3) assuming credit risk in the course of settling interbank liabilities, and 4) acting as a lender of last resort in times of crisis. According to Rivlin, "There is a strong common interest in ensuring that the economy has a safe, reliable, accessible, and efficient payments system—both retail as well as wholesale."

Unlike other countries, in the U.S. one of the most common retail payments instruments is the paper check. "American households and businesses are still writing some 66 billion payment messages on little pieces of paper, most of which are mechanically sorted,

transported by truck and airplane, and stored in drawers and shoeboxes," stated Rivlin. Nonetheless, the transition to more efficient mechanisms is underway. New electronic products such as smart cards are now being introduced to replace the check. A smart card is a credit-card-sized device with an implanted computer chip that allows the holder to store monetary value, personal identification, or medical information, and access a variety of applications. "Do not think of smart cards as a product you are selling," said Allen. "Think of it more as an access device. It can be a payments vehicle, but probably the most important role it is going to play is to carry the encryption and authentication technology that will allow you to access the Internet or ATMs," she added.

In addition to access devices, new services such as electronic money are being tested and marketed. One form of electronic money is funds held in an on-line account that can be transferred over the Internet. Rivlin noted such electronic products offer the potential "for making retail payments systems faster, cheaper, and more convenient" for their users. Allen noted that the growth of electronic commerce—the marketing of goods and services to consumers electronically through computers and telecommunications equipment—is not something that traditional banks are driving. Rather, software and data processing companies are moving rapidly to support electronics. This increase in electronics implies slower growth in checks, which are banks' primary product. Moreover, according to Allen, "the new players to the payments system have far different motivation than banks. They do not look at payments (products and services) as the end all. In some cases, it is the means by which they collect information on customers." Mayer agreed with the notion that the future payments system will be a byproduct of computer and telecommunications equipment purchased for other purposes. "The investment costs for nonbank competitors are going to be very small. And the banks and Federal Reserve are up against the fact that far from having a protected

franchise, because of the huge investment that has been made in the existing payments system, they have a vulnerable franchise," he said. Increased competition from nonbank participants and use of new types of retail payment instruments, in which the Federal Reserve Banks are not active, could reduce their advantages in providing the dominant network for clearing and settlement of payments.

Even when checks are used for payment, greater banking concentration resulting from increases in bank merger activity has increased the proportion of transactions handled by banks as "on-us" transactions, which bypass interbank clearing and settlement channels. In addition, more and more bank holding companies have been organizing payments clearing among their affiliated banks on a regional basis, often by establishing regional processing centers. With the increased concentration of banking, a few large banking organizations can exchange large volumes of checks and other retail payment instruments directly, without relying on a processing intermediary. As noted by Rivlin, a "merger may provide an opportunity for designing a new approach to payments that would not otherwise occur."

Federal Reserve study of the payments system

In recognition of these rapid changes in retail payments, in October 1996 the Federal Reserve System created a committee, chaired by Rivlin, to examine the Federal Reserve's role in the traditional area of check and automated clearinghouse (ACH) transactions and in the newly emerging area of electronic payments. This committee "considered some quite drastic options, including [having the Fed get] out of the check and ACH processing markets altogether, or selling the operations to a private entity," said Rivlin. After extensive discussions with users and providers of payments services, the committee concluded that the Federal Reserve should 1) remain in the retail payments business and 2) play a more active role in encouraging the transition from checks to electronic payments

by working more closely with users of the payments system to enhance its overall efficiency. Mayer agreed with the latter conclusion. The Federal Reserve should announce "that the American paper-based payments system has become an extensive anachronism that will be phased out over the course of the next decade," he said.

Wholesale payments

While technological innovations are suddenly offering payments system providers options for sending retail payments faster, cheaper, and more conveniently than ever before, they have also revolutionized the processing of large-value or wholesale payments. In the U.S., wholesale payments move over two systems: the Fedwire electronic funds transfer system operated by the Federal Reserve and CHIPS operated by the New York Clearing House. Fedwire is used for domestic interbank payments, many of which are related to federal funds transactions or payments for the purchases of government securities. CHIPS is used primarily to make dollar denominated international interbank payments. On an average day, Nelson noted, CHIPS processes about \$1.4 trillion in payments, or more than 236,000 payment orders. Because of the size of these payment orders and the opportunities provided by computers and telecommunications equipment to move huge volumes of funds almost instantaneously across a completely linked financial sector, regulators are concerned about the risk of a settlement failure in large-value payments systems. Settlement risk in the payments systems is composed of *credit risk*, *unwinding risk*, and *liquidity risk*. Credit risk is the risk that a payer might lose all or part of a payment due to another bank's failure to deliver its promised payment. Unwinding risk arises because of the possibility that payments instructions released to receivers of funds during a day may ultimately be reversed. This occurs when there is a settlement failure and the payment instructions accumulated during the day are allowed to be reversed. Liquidity risk is the risk that payment instructions cannot be executed or settled due to a lack of liquidity,

even though the involved parties are fundamentally sound.

The Federal Reserve System requires the operation of private large-dollar funds transfer systems such as CHIPS to have a means to ensure settlement in the event of a default by a major participant. "Since January 6, 1997, CHIPS has had procedures in place to cover the simultaneous failure of the two largest participants at their largest net debit positions," said Nelson. Thus, even in this event, the remaining members would still be able to settle their accounts. To accomplish this, CHIPS introduced debt caps for each participating institution and recently reduced the caps "from 5% of the sum of bilateral limits that are set against each participant to 3% of that sum," noted Nelson. Such debit caps, often referred to as multilateral debit limits, specify the maximum aggregate net amount an institution can owe to all other participants of the clearing house, and are based on the sum of the maximum amount of net payment each participant would accept from every other participant of the system (bilateral credit limits). Thus, the risk of settlement failures can be reduced by prudent use of bilateral and multilateral limits. The risk of settlement failure can be controlled further if participating banks have a back-up fund to cover the position of troubled institutions, buying time to work out resolutions of the troubled banks' problems and their own potential losses. This is accomplished on CHIPS by imposing collateral requirements on members and having loss sharing agreements among members. According to Nelson, CHIPS recently raised "the loss sharing and collateral requirements from 5% of the highest bilateral credit limits to 5.1%." This change and the lower debt caps have "produced a drop in systemwide debt caps from \$72 billion to \$39 billion which led to a direct reduction of risk by more than 45%," said Nelson.

An important settlement risk in foreign exchange transactions is the risk that funds on one side of the transaction will be paid out without a corresponding receipt of funds on the other side

(often referred to as Herstatt risk). To manage this type of risk, CHIPS has allowed its member banks to submit irrevocable payments orders as early as 12:30 a.m. New York time. "These payments will overlap with payments made during part of the Asian business day and all of the European day," said Nelson, and thus, "should provide a means to reduce Herstatt risk."

Roscoe also discussed recent efforts to manage settlement risk resulting from foreign exchange transactions. He argued that the foreign exchange (FX) market is literally the only remaining major market in the world without a global industry infrastructure. Risks in FX settlements are relatively straightforward. To settle a transaction, both currencies must be exchanged on the agreed upon settlement day. If exchange of payment does not occur simultaneously, the first party initiating payment is exposed until the counterparty delivers its side of the transaction. While the probability is very low that the counterparty will fail at precisely the time when the first initiating party has initiated payment and is exposed, it is not zero. A low probability multiplied by a very large and growing dollar value could lead to systemic problems. Therefore, the problem raises clear commercial and public policy concerns.

As a result of CLS's recent acquisition of ECCO and Multi-Net, two established FX contract netting arrangements, and the development of CLS Bank, Roscoe claimed that the "industry finally has within its grasp the long desired solution to the problem of Herstatt risk." CLS Bank will be owned by settlement members who will hold accounts in each of the currencies to be settled. Similarly, CLS Bank will hold accounts directly with central banks for each settlement currency and will have committed private sector liquidity facilities. The central bank accounts will be used to move the necessary liquidity through CLS Bank, and the actual settlement of netted positions from FX transactions will take place on the books of

CLS Bank. The liquidity facilities will be activated and collateralized by settlement members' balances whenever a member misses a required payment. Settlement will occur during a five-hour period, during which all participating real-time gross settlement systems are contemporaneously operating to allow for settlement in good or "final" funds. Payments from the participating members with short positions will be initiated into CLS through local real-time gross settlement systems.

Simulations of settlement procedures using the new system have been quite impressive. Using data for over 40 of the largest FX dealing banks, settlement for over 90% of the global FX market can be accomplished within minutes of the opening of CLS Bank. Complete settlement occurs nearly two full hours before the system closes. Netting provides much of the benefits, but simultaneous settlement of both legs of the transaction during hours when real-time gross settlement systems are operating is a major aspect of the system.

Payments systems around the world

The conference also had a special session on comparing international payments arrangements. Yoshiharu Oritani, special advisor at the Bank of Japan,

Michael H. Moskow, *President*; William C. Hunter, *Senior Vice President and Director of Research*; Douglas Evanoff, *Vice President, financial studies*; Charles Evans, *Vice President, macroeconomic policy research*; Daniel Sullivan, *Vice President, microeconomic policy research*; William Testa, *Vice President, regional programs*; Vance Lancaster, *Administrative Officer*; Helen O'D. Koshy, *Editor*.

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emphasized that the recent financial crisis forced Asian countries to realize the importance of having a safe and efficient payments system and heightened the need for the accelerated development of real-time gross settlement systems and delivery versus payment systems. Charles Freedman, deputy governor of the Bank of Canada, stressed the importance of assuring that payments systems meet safety requirements from a risk management perspective, but that they also be cost effective. Recent legislation has given the Bank of Canada formal responsibility for the oversight of payments systems to insure that risk is appropriately managed. Whereas most countries have chosen a real-time gross settlement arrangement to provide intraday finality of payment, Canada has taken a different approach emphasizing a "survivors-pay" loss sharing arrangement. Freedman argued that while these markets are generally perceived as important enough to require some degree of regulatory oversight, the regulation must be smart and efficient. Otherwise interference with

the markets may cause more harm than good.

Concerning U.S. payments activity, some suggested that U.S. domestic check volume will finally start to decline in the near future. David Humphrey, Florida State University, combined evidence from statistical projections of check activity with anecdotal evidence from the check printing industry to conclude that the decline may indeed be near. Why has the movement been so slow? Brent Vale, Norges Bank, presented findings from his research suggesting that the bundling of financial service pricing has decreased incentives to move toward more efficient payment mediums. If the fees charged for check use were unbundled and more closely associated with the actual cost of production, the pace of movement to electronic alternatives would increase. For example, in the ten years that its payment medium service prices have been unbundled, Norway has moved from having over 90% of noncash payments in paper to having 60% in electronic

payments. Vale argued that this generated improved resource allocation with an expected cost savings of approximately 0.6% of annual GDP. Projected social savings for the U.S. were even higher.

The 1998 Bank Structure Conference continued the rich tradition developed over the past 34 years. Planning for the 1999 conference, scheduled for May 7-9, is currently underway.²

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¹For copies of presentations and papers from the 1998 conference, see the Federal Reserve Bank of Chicago's Web site at www.frbchi.org.

²For information on the 1999 conference, visit the Federal Reserve Bank of Chicago's Web site at www.frbchi.org, or contact Portia Jackson at (312) 322-5775 or portia.jackson@frb.chi.org.

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