

THE ROLE OF THE FEDERAL RESERVE IN THE PAYMENTS SYSTEM

Paul M. Connolly and Robert W. Eisenmenger*

Unlike central banks in most other countries, the Federal Reserve System has always played a major role in developing and operating the check and ACH retail payments mechanisms in the United States. About 25 percent of all employees in the Federal Reserve Banks are currently engaged in processing such payments.

The Federal Reserve does have other payment responsibilities: 1) the issuing, redeeming, and destroying of currency and coin; 2) Fedwire, the wire transfer system, which handles about 60 percent of all wire transfer transactions in the United States;¹ and 3) the U.S. government book-entry securities system, which handles ownership and the associated payment transfers between banks in the United States. Each of these systems is important but is similar to those operated by central banks or other public entities in most other countries. For this reason, we will not discuss them here.

In this paper, we will describe the role of the Federal Reserve over the years in developing the retail payments system in the United States.² In particular, we will focus on the role the Federal Reserve played in influencing the evolution of the system. In our view, an ideal retail payments system should be unified and national, and it should have the following characteristics:

*First Vice President and Chief Operating Officer and Retired First Vice President and Chief Operating Officer, respectively, Federal Reserve Bank of Boston. The authors acknowledge with appreciation the assistance of Joanna Stavins, Economist, and Joshua Congdon-Martin, Senior Research Assistant, at the Bank.

¹ Based on 1998 figures from the Bank for International Settlements, February 2000.

² In most European countries, the postal service or other government agency plays the major role in integrating the payments system.

1. Be accessible at a reasonable cost to all consumers, businesses, and collecting and paying depository institutions including small, remote, and newly chartered institutions.
2. Maintain uniform standards for processing payments and passing them from one institution to another.
3. Enable any institution to exchange items with other banks, participate in local clearing houses, and send items to correspondents of its choosing. If a bank can clear items faster or at less cost through channels other than the legal entity or entities providing a “unified national service” it should be able to do so. Moreover, no institution or group of institutions offering interbank payments services should be able to earn extraordinary profits because of its market power. Finally, no institution should subsidize any of its services to the disadvantage of competing participants.
4. Embrace new technologies as soon as they become cost-effective. Past examples include high-speed air transportation, high-speed check sorting equipment, and electronic methods of payment, as opposed to paper checks. These technologies combined with regulation have reduced the gap between the times a payor initiates a transaction and the recipient obtains good usable funds. Reducing this time gap brings down the business risk for all persons and businesses participating in the payments system.

The following history will describe the overall progress of the Federal Reserve in fostering an ideal retail payments system consistent with the criteria outlined above.

THE ROLE OF THE FEDERAL RESERVE IN THE PAYMENTS SYSTEM IN THE EARLY YEARS

When the Congress created the Federal Reserve System in 1913, more than 25,000 independently chartered banks were operating in the United States. Although a significant number were large institutions in big cities, most banks were small and were limited by their charters to operations in a single community. No bank entity was permitted to operate across state lines. Furthermore, 40 percent of all banks were “nonpar” institutions, which meant that they imposed an “exchange charge” on the payment for each check submitted to them for collection by banks outside their local trading area, effectively making the check worth less than its face value.

To avoid these charges, collecting banks generally tried to send each nonpar check to a correspondent bank that had a reciprocal check-clearing arrangement with the nonpar institution on which the check was drawn. The practical result, unfortunately, was substantial circuitous routing of checks, which added time and confusion to the check collection process. By the time a check finally arrived at a paying nonpar institution,

days or even weeks might have elapsed. By then, the balance in the check writer's account had sometimes disappeared.

The Congress was aware of the banking industry's failed check collection system, and this was one of the reasons it passed the Federal Reserve Act in 1913. The Act authorized the Reserve Banks to collect for member banks all par checks drawn on all payor institutions throughout the country. The Congress may also have wished to encourage national banks to support the passage of the Federal Reserve Act. Their support was more likely if national banks received a valuable service such as check collection.³

When the Federal Reserve Banks began operating a nationwide check collection system in 1915, one of their first goals was to eliminate nonpar checks. They wanted to create a unified national system, within which all banks would be required to abide by uniform standards and procedures for check collection. One of the means they used to enforce par checking was to hire Federal Reserve agents to present checks directly over the counter to nonpar institutions and demand immediate payment at face value.

This aggressive action antagonized nonpar institutions and they, in turn, brought suit against the Federal Reserve System. In some states they also appealed to their state legislators. The result was that the Federal Reserve lost on two counts: 1) the Supreme Court ruled in 1923 that the Reserve Banks had no authority to enforce par banking, and 2) a number of state legislatures passed laws that specifically authorized nonpar institutions to operate in their states. Although the number of nonpar banks gradually declined, it was not until 1980 that the last of these banks converted to par status.⁴

Thus, in its early years, the Federal Reserve suffered major setbacks in its attempt to develop a unified national payments system. How important were these setbacks? Did the System fail entirely or was it partly successful in increasing the efficiency of the nation's check collection system? In a recent paper, Alton Gilbert has attempted to answer these questions.⁵

Gilbert compiled the data shown on Table 1, which indicate that the Federal Reserve Banks played only a minor role in the check collection system in 1915 and 1916, when member banks were not required to pay

³ Edward J. Stevens, 1996, "The Founders' Intentions, Sources of the Payment Services Franchise of the Federal Reserve Banks." Financial Services Working Paper Series #03-96, Federal Reserve Bank of Cleveland.

⁴ Edward J. Stevens, 1998, "Non-Par Banking: Competition and Monopoly in Markets for Payments Services." Working Paper 9817, Federal Reserve Bank of Cleveland.

⁵ R. Alton Gilbert, "Effects of Federal Reserve Services on the Efficiency of the System for Collecting Checks in the United States, 1915-1930." Working Paper 99-014A, Federal Reserve Bank of St. Louis.

Table 1
Volume of Checks Processed by the Reserve Banks

Year	Millions of Checks	Dollar Value of Checks (billions)	Value of Checks Processed by the Reserve Banks as a Percentage of Checks Cleared Through Clearing Houses
1915	8.8	\$ 4.7	2.9
1916	25.8	10.9	4.5
1917	75.7	44.9	14.7
1918	154.4	105.7	32.0
1919	305.2	136.5	35.2
1920	452.1	156.5	35.6
1921	522.7	119.2	34.1
1922	584.9	150.5	39.1
1923	639.2	196.6	48.6
1924	684.0	209.1	46.9
1925	716.5	247.2	49.4
1926	758.5	161.4	51.0
1927	794.8	266.7	49.0
1928	818.5	289.0	46.4
1929	852.1	351.7	49.1

Source: R. Alton Gilbert, 1999, "Effects of Federal Reserve Services on the Efficiency of the System for Collecting Checks in the United States, 1915 to 1930." Working Paper 99-014A, Federal Reserve Bank of St. Louis.

at par for checks sent to them through the mail by Reserve Banks. By 1917, however, the Federal Reserve Board had mandated that all member banks pay at par for such checks. Moreover, in the period running from April 1916 to July 1918, the Reserve Banks were charging their full costs to member banks that submitted their checks for collection. Despite this cost burden, the value of checks processed by the Reserve Banks rose sharply in 1917 and 1918. Gilbert asserts that this is *prima facie* evidence that the Reserve Banks increased the efficiency of the nation's check collection in this short period.

A different situation prevailed in 1919 and in the 1920s. In this period, membership in the Reserve System surged because a 1917 amendment to the Federal Reserve Act had invalidated legislation in many states that had rendered Federal Reserve membership illegal or very expensive. As a result, by 1920, member banks held 70 percent of all bank deposits in the United States. Moreover, in July 1918, the Reserve Banks had stopped charging member banks for check collection services. Finally, by 1920, the Federal Reserve had established 34 offices at strategic locations throughout the United States. For all these reasons, the value of checks collected by the Reserve Banks consistently amounted to almost 50 percent of the value of checks handled through clearing houses throughout the 1920s (Table 1).

Gilbert used a variety of techniques to evaluate the overall impact of the Federal Reserve Banks on the nation's check collection system in the 1920s. He first calculated, through simulation analysis, that the number of banks that handled the typical check was significantly reduced if it was cleared through the Federal Reserve System rather than the correspondent banking system. He also determined, through regression analysis, that banks were able to operate with substantially lower ratios of cash assets when they used the Reserve Banks to collect checks. The obvious explanation for these cost savings was the reduction in clearing balances maintained at multiple correspondent banks. Gilbert concluded that all this evidence "is consistent with the view that the Fed's services improved the efficiency of the system for collecting checks relative to the efficiency of that system prior to the formation of the Fed."

THE FEDERAL RESERVE'S ROLE IN INTRODUCING AUTOMATION AND ELECTRONIC PAYMENTS IN THE POST-WORLD WAR II PERIOD

Early in the twentieth century, check writing was the prerogative of high-income people. After World War II, however, the steady rise in per capita income enabled an increasing number of people to afford the convenience of paying bills with checks. The result was a steady and rapid growth in the numbers of checks being processed. Nevertheless, checks continued to be sorted by hand and the totals tabulated using calculators. As a result, the Federal Reserve and various banking organizations joined together to work to standardize and automate the entire check collection process.

Magnetic Ink Character Recognition: MICR

In 1954, the American Bankers Association (ABA) established a subcommittee to review all possible machine-readable languages that could be printed on check or check carrier documents so that they could be sorted and tabulated by high-speed equipment. The subcommittee worked with all parties affected by the potential change, including the Federal Reserve, large and small banks, check printers, and business and consumer interests. They reviewed all possible technical solutions with the "high tech" companies that served the banking industry in that era, including the Burroughs Corporation, the Todd Company, the Addressograph-Multigraph Company, Pitney Bowes, IBM, the International Telemeter Company, Standard Register, Sperry Rand, and General Electric. The Federal Reserve provided advice and assistance to the ABA throughout the process.

After studying all the available technologies, in 1956 the subcommittee chose Magnetic Ink Character Recognition (MICR) for preprinting

routing numbers and account numbers on all checks and for subsequently encoding the dollar amount on checks sent for collection. This was the preferred technology, based on such criteria as consumer acceptance, the ability of clerks to verify information, and the cost to printers and the banking industry. Most important, the ABA subcommittee found that “magnetic inks were the least subject to mutilation and obliteration through ordinary handling and exposure which checks might be expected to receive. Magnetic inks can also be read mechanically through over-stamping, pencil and ink marking, oils, greases, carbon smudges and Scotch and opaque tape as well as most other foreign substances. The inks used are as durable as any presently used in printing and typing operations. In fact, magnetic inks may be obliterated as far as the human eye is concerned and yet be readable accurately by mechanical equipment. . . .”⁶ This excerpt illuminates the many mundane yet formidable obstacles to establishment of a standard that would advance the overall payments system.

Thus, the banking industry chose one of the crucial ingredients for automation—a common machine-readable method for printing bank routing numbers, customer account numbers, and the dollar amount on each check. The next task was to develop equipment that could automate check sorting and processing of checks with this type of imprinting.

The Federal Reserve’s Role in Developing High-Speed Check Sorting Equipment

When the ABA Technical Subcommittee talked to possible manufacturers of check automation equipment in 1955, it determined that thirteen firms might have the potential for building and servicing this specialized type of equipment. To provide operational and financial support for this key initiative, the Federal Reserve worked with and partially subsidized five firms that submitted acceptable proposals: the Burroughs Corporation, IBM, National Data Processing Corporation, the National Cash Register Company, and Ferranti-Packard. The latter two firms assembled systems using their own computers and check sorters made by Pitney Bowes. Five Reserve Banks—New York, Chicago, Philadelphia, Boston, and San Francisco—participated. Each experimented with the equipment from one of these companies.

In each case the Reserve Banks paid the full lease cost, even though the equipment was constantly being adjusted and modified. Thus, the Federal Reserve provided a financial incentive for five different manufacturers to participate. In addition, the Reserve Banks devoted staff time

⁶ Final Report of the ABA’s “Technical Subcommittee on Mechanization of Check Handling,” July 1956.

and used portions of their daily incoming check volumes to help the manufacturers test their new equipment. The System hoped that, in the long run, multiple firms would succeed. This would encourage competition among manufacturers and help create a network with common standards, benefiting all banks.

The Federal Reserve started this pilot project in 1960. By 1965, most of its offices and branches were running high-speed check-sorting equipment supplied by Burroughs and IBM. Other manufacturers that participated in the Reserve Bank tests developed lower-speed equipment that many smaller commercial banks adopted.

During the entire experimental period, the accumulated knowledge of the System was made available to the banking industry. Thus, the industry enjoyed the fruits of this technical research as well as the benefits of competition among the suppliers of check automation equipment.

Federal Reserve Support for the ACH

As mentioned above, during the 1950s and 1960s the volume of checks written by American consumers and businesses increased rapidly. In response to the growing volumes and to take advantage of developing computer technology, banking industry leaders sought to develop an electronic payments mechanism to displace some of these paper checks. The automated clearing house, or ACH, was conceived of as “the electronic check.” Essentially, an electronic ACH record would carry the same payment information carried by the paper check document, and banks would send and receive these electronic records in much the same way as they exchanged checks among themselves.

The banking industry developed the concept and began to lay the groundwork for the U.S. ACH during the late 1960s and early 1970s. The Clearing House Associations in Los Angeles and San Francisco organized a Special Committee on Paperless Entries in 1968 and shortly thereafter the ABA formed a national committee, which in 1971 recommended the establishment of national automated clearing mechanisms. As these and other banks developed the concept in more detail, they identified the need for regional entities to serve as clearing houses, or “switches,” to enable the efficient interchange of electronic ACH records among large numbers of banking entities.

The New York Clearing House provided a private sector solution for its region. The Clearing House built and implemented an electronic switching capability and settlement facilities for ACH payments that continue today. In most areas of the country, however, it proved more difficult to find private sector solutions. The Chicago Clearing House provided ACH operational services in its region during the 1970s but discontinued this role after several years.

While conceptually the ACH would be the electronic check, ACH

transactions had to be delivered on magnetic tapes rather than transmitted electronically, since most banks did not have systems to originate or receive these transactions electronically. Most significantly, U.S. businesses and consumers had little experience with electronic payments and little incentive to change their ways of originating payments. Commercial ACH volumes during the 1970s were very low and did not justify significant investments.

In this environment, the bankers who had organized regional ACH associations around the country began to discuss with the Federal Reserve the possibility of Reserve Banks providing the needed payment processing capabilities. At the national level, the Federal Reserve Board, and Governor George Mitchell in particular, saw that the Reserve Banks, with their established network for clearing checks, might be particularly well positioned to provide such services and thereby help this nascent electronic payments mechanism to develop. Federal Reserve support for the ACH also was fostered by the United States Treasury, which, earlier than most businesses, embraced the electronic ACH as a potentially more efficient mechanism for many of the government's payments, particularly payrolls for military and civilian workers and benefit payments such as Social Security. The Reserve Banks could process commercial ACH payments at a lower cost if they were combined with the larger volumes of government ACH payments.

Under Governor Mitchell's leadership, the Federal Reserve committed its resources to provide operational support for the ACH. This support extended well beyond computer processing. Most of these "electronic" payments were delivered on tapes over the road, often on the same trucks used to deliver paper checks. Moreover, some of these payments actually had to be printed onto paper by Federal Reserve offices for delivery to smaller banks. During the first decade or more of life for the ACH, it might not have survived without the support of the Federal Reserve, which had a mission to act in the public interest and support an innovation such as the ACH, with a poor short-term business case but the potential to improve the overall payments system in the longer run.

By the early 1980s, when the Monetary Control Act of 1980 (MCA) required that the Federal Reserve fully price its payments services, volumes still had not grown to a level at which full-cost pricing might not stunt the growth of the ACH mechanism. Accordingly, the Board of Governors determined that it would serve the public interest for the Federal Reserve to subsidize its ACH services and phase in full-cost pricing over a multiyear period. This subsidy declined over time until full-cost pricing began in 1985.

During the late 1980s and the 1990s, ACH volumes grew at impressive rates, frequently 20 percent or more annually, and they have continued to increase at double-digit rates even in more recent years. Banks now send and receive ACH payments via electronic transmission,

with even the smallest institutions participating electronically, either directly or through correspondent banks or service bureaus. Additional private-sector service providers have entered the ACH processing business and compete with the Reserve Banks. About one-half of U.S. workers now receive their wages and salaries through ACH "direct deposit." Only a small percentage of consumer and business bill payments are made via ACH, but many businesses and utilities just began to offer this service during the past five years or so.

THE NATIONAL COMMISSION ON ELECTRONIC FUND TRANSFERS

In 1974 the Congress established the National Commission on Electronic Fund Transfers to evaluate all the legal, regulatory, competitive, and consumer protection issues that needed to be resolved if consumers were to rely predominantly on electronic means of payment. The Commission was chaired by William A. Widnall, a former ranking member of the House Banking Committee, and the twenty-five other members represented almost every group that had an interest in electronic funds transfers (EFT). These groups included the Federal Reserve, other federal and state bank regulatory agencies, credit unions, mutual savings banks, credit card associations, the U.S. Postal Service, the U.S. Treasury, the Justice Department, the Federal Communications Commission, the Federal Trade Commission, the Office of Technology Assessment, a major retailer, and five public representatives.

One of the major players on the Commission was George Mitchell, a consultant for the Board of Governors, former Vice Chairman of the Board, and former Director of Research at the Federal Reserve Bank of Chicago. He worked with staff at the Board of Governors to help the Commission in its deliberations.

Despite its membership representing a diversified set of specialized interests, the Commission was almost unanimous in most of its recommendations, which included the following:

1. *The Federal Reserve should continue to provide ACH services to all depository institutions.*

However, the Commission asserted that the System should charge for its services so that, in the long run, private sector providers could compete. (This recommendation was made in 1977, before the Monetary Control Act of 1980 mandated Federal Reserve pricing.)

The Commission also concluded that the Federal Reserve's operational role was important to ensure that all depository institutions would have access to the ACH. (Some regional ACH

associations initially had excluded thrift institutions from membership.)

2. *The Federal Reserve should not, at this time (1977), operate point-of-sale (POS) systems for groups of depository institutions.*

The Commission concluded that a variety of technologies and services should be tried out in different localities and metropolitan areas before any attempt was made to enforce a uniform standard.

The Commission qualified this forceful recommendation by stating that the Federal Reserve might “appropriately” play a role if “POS were a major part of the nation’s payment system and some portions of the country were unable to support POS switches, to the detriment of their economies” or if “POS systems develop such economies of scale as to render them natural monopolies. If this were to occur . . . government operation might be the appropriate choice.”

3. *Consumer Protection and Regulation E*

The Commission reviewed a complex of consumer protection concerns such as privacy, disclosure of terms and conditions of an EFT account, the sending of unsolicited debit cards, account statements, records, proof of payment, stop payments, and reversibility. Not only did it make detailed recommendations on each of these issues, but it also asked the Congress to enact legislation that would convert the recommendations into law.

The Congress subsequently passed the Electronic Fund Transfers Act of 1978. This Act, in turn, specified that the Board of Governors of the Federal Reserve System should promulgate detailed regulations that would specify the rights and responsibilities of both consumers and institutions when they operated in the new EFT environment. The regulations were subsequently issued in the form of Regulation E, Electronic Fund Transfers.

Thus, the Congress specified that the Federal Reserve System should have not only operating responsibility but also regulatory authority for the rapidly growing electronic payments system.

THE MONETARY CONTROL ACT OF 1980

When Frank Morris first came to the Federal Reserve Bank of Boston as president in 1968, he suggested that the Bank organize economic conferences on topics of broad public interest. He thought presenters should be academicians, scholars in specialized think tanks, government policymakers, bankers, and other businessmen. He had the additional idea that these meetings should be held at attractive locations (off-peak to save on costs), so that the speakers and guests would have an extra incentive to attend and mingle informally. The first conference was held

in 1969, and today's is the forty-fifth. The conferences have always been challenging, particularly because of the criticism—frequently useful—from responsible professionals outside the Federal Reserve.

New Ideas

In October 1974, at our thirteenth conference, the topic was “The Economics of a National Electronic Funds Transfer System.” Three economists at the Boston Federal Reserve Bank—Eisenmenger, Munnell, and Weiss—presented a paper on the Federal Reserve's role in payments processing. In essence, they proposed a combination of two old ideas—long favored by economists—along with two new ones. The old ones were a reduction in Federal Reserve reserve requirements and the imposition of a uniform national set of reserve requirements on all depository institutions. The new ideas were imposing full-cost pricing for all Federal Reserve services and making Federal Reserve payment services directly available to all depository institutions—member and nonmember alike.⁷

The proposals outlined in the paper had little immediate impact. But in the 1970s, with high inflation and high interest rates, the Federal Reserve System suffered a drop in membership and foresaw a substantial future decline. The System's high reserve requirements combined with high interest rates began to impose a severe competitive burden on many commercial banks. In many cases, the value of the free services obtained by member banks was much more than offset by the cost burden of sterile required reserves. For some of the largest correspondent banks, however, the net burden of membership was minimal. Not only did they receive free services for themselves, but they were permitted by the Reserve Banks to submit the work of their “downstream” respondents for free processing, even though the correspondents charged these respondents for this work.

In essence, the Federal Reserve System operated with an extreme version of “country club” pricing. In return for a stiff annual fee, based on size—the reserve requirement burden—each correspondent bank received an array of financial services, free of charge, and could charge its respondent banks for access to these free services. In a country club setting, this would be equivalent to free use of the golf course, the tennis courts, and the pool as well as free meals for both the member and all his guests, even though the member could charge his guests full price for

⁷ These “new” ideas were not entirely new. Between April 1916 and July 1918, the Federal Reserve charged its full costs to member banks that submitted checks for collection. Moreover, for a period starting in 1917, nonmember institutions could have their checks collected by the Federal Reserve Banks if they maintained adequate clearing balances.

each of these services. Thus, the value of free services could more than offset the burden of reserve requirements for some of the largest correspondent banks, while many smaller banks found membership a financial burden.

In the 1970s, the Federal Reserve also had a budgetary problem. During this period of high inflation, the System took the public stance of favoring federal budgetary restraint. At the same time, the Federal Reserve had a substantial need to invest in technology to improve its payments operations. If the investments were not forthcoming, the overall efficiency of the payments system could deteriorate. However, it was difficult for the Federal Reserve to explain the rapid growth in the cost of its services when it was advocating severe restraint in other government budgets. Those advocating full-cost pricing argued that pricing would eliminate the need to include priced services in the Federal Reserve's budget, because increased expenses would automatically be offset with additional revenue.

In January 1971, Frank Morris recruited William Miller, Chairman of Textron Company, to serve on the Board of Directors of the Federal Reserve Bank of Boston. At a Directors' meeting, he heard an explanation of all the conceptual benefits of lower reserve requirements, universal reserves, and full-cost pricing in a competitive environment. Miller was concerned about the System's eroding membership and he believed in a competitive business environment, so he immediately became an advocate of the concept. Then, in 1978, he was named Chairman of the Federal Reserve Board, giving him authority to have his ideas seriously considered.

In his new role, Miller urged federal legislation similar to what would be the Monetary Control Act of 1980. He appointed Eisenmenger to chair a System committee responsible for translating the overall concept of full-cost pricing into the complex reality of different services, priced at national, district, or local levels, with both fixed and variable components. Moreover, with full-cost pricing, the System would be free to consider "enhanced" services rather than the "bare bones" services it had historically provided.

Chairman Miller left the Board of Governors to become Secretary of the Treasury in the summer of 1979, before his version of the Monetary Control Act could be passed. However, his successor Paul Volcker had similar views and was able to secure passage of the Monetary Control Act in March 1980. The Act changed the way the Federal Reserve provided payments services.

Becoming a Service Provider in a Competitive Environment

With the Monetary Control Act, the environment in which the Federal Reserve operated changed dramatically. The "club" arrangement,

with free services restricted to members, gave way to a market-oriented regime in which the Reserve Banks' largest customers now were their competitors. The MCA required the Reserve Banks to learn how to be effective service providers in a competitive marketplace. The Reserve Banks had much to learn about how to price payment services. In addition, they had to broaden their focus from a purely operational one to that of a market player. The market was going to decide whether its services were viable or it should exit the business.

The MCA forced the Federal Reserve to move along a steep learning curve. Despite almost seventy years of experience in collecting checks nationwide, the Federal Reserve knew relatively little about the nuances of the check business. When pricing of check collection services began in the fall of 1981, the Reserve Banks adopted a relatively simple approach: per-item, average-cost pricing, differentiated only by location and by type of deposit.⁸ This approach lent itself to "skimming," whereby banks only deposited with the Reserve Banks the checks that were costly to collect, using newly emerged, private clearing alternatives for the rest. Given the decline in volume that occurred after the MCA⁹ and the considerable fixed costs the Reserve Banks incurred handling checks, revenues from check processing proved inadequate to recover all costs.

Within their first year of experience with check pricing, the Reserve Banks moved to a more flexible pricing system. They introduced a more complex array of fixed and variable fees that reflected not just the overall costs of check collection but also the relative demand for individual check services, to take into account market forces.¹⁰ The Reserve Banks have tried to strike a balance between precision and simplicity in their prices but over time they have brought more complexity, as well as more choices for their customers, into their pricing approaches, both to reflect real economic differences and to maintain competitiveness.

Regarding depository institutions as "customers" was new for the Federal Reserve in the early 1980s. Prior to the MCA, its services were either central bank, monopoly-like services such as Fedwire funds transfer, or services that the Reserve Banks were providing more as a public service than as a response to market demand. In this environment, the Reserve Banks felt little pressure to respond to market preferences. Internal efficiency and cost control generally were higher priorities than product innovation and responsiveness to market demand.

⁸ "Fee Schedule for Check Clearing and Collection," *Federal Reserve Bulletin*, April 1981, pp. 305–309.

⁹ Between the time that check pricing began in 1981 and through the first quarter of 1982, the volume of checks processed by the Federal Reserve Banks dropped by 22 percent. See E. Gerald Corrigan, "Federal Reserve System Pricing: An Overview," *Federal Reserve Bulletin*, August 1982, pp. 467–475.

¹⁰ See reference in footnote 9.

Despite the fast entry of private-market alternatives to its check-clearing services and the subsequent drop in check volume, the Federal Reserve not only survived as a provider but exceeded the full-cost-recovery requirement in 1984, the first full year in which it sought to recover all costs related to its check service. Since then, the Federal Reserve has recovered its costs with revenues, it has phased out the subsidy for the Automated Clearing House, and it has eliminated some services for which demand was inadequate or Reserve Bank prices were not competitive. The process of responding to market forces continues to this day.

The most comprehensive assessment of the Federal Reserve role in the payments system was undertaken by the Rivlin Commission in 1996 and 1997. Its January 1998 report will be discussed below.

DEVELOPMENT OF CHECK IMAGE TECHNOLOGY

In 1984, the Federal Reserve Bank of Boston launched what would become a fourteen-year effort to advance, from basic concept to actual production, the application of digital image technology to the processing of paper checks, a technology that is substantially improving the way checks are processed. In this undertaking, the System benefited from the confluence of three forces: a technology with theoretical potential that had not yet been tested, a specific business need on the part of the U.S. Treasury, and the public purposes undergirding the Federal Reserve's role in the payments system.

Digitized images are electronic pictures. Essentially, image technology enables a business to convert paper documents into computer-readable form—into bits—and then store them electronically, look at them on computer monitors, transmit them electronically from place to place, and handle them as the business handles all other electronic data. Systems employing this technology are in widespread use today. Even in the early 1980s, the technology was not new. Conceptually it offered promise to improve efficiency in the check collection system, which depended entirely upon the repetitive handling, processing, and transportation of the physical paper document for the transfer of value between check-writer and recipient.

However, while the concept had been discussed for some time, actual application of image technology to check processing was quite limited in 1984. Some banks used the technology in their "lockbox" operations for corporate customers. Even there, check images generally were captured at relatively low speeds and in low volumes, and they were used mostly as a means to produce paper copies of the checks for record-keeping purposes. Technology to capture high-quality images of checks, both front and back, at high speeds, and to store and retrieve those images, had not been developed. Therefore, most of the potential

for the application for this technology to the check system had not been explored.

Virtually all banks and many corporations relied upon microfilm to keep permanent records of the checks paid against their accounts or the accounts of their customers. The U.S. Treasury's Financial Management Service (FMS) maintained microfilm records of U.S. government checks, which accumulated at a rate of more than 600 million annually. When these government checks entered the banking system for payment, banks deposited them with their local Reserve Banks, which paid the checks, produced microfilm copies, and sent the microfilm to the FMS. The delays in the microfilming process, the persistent quality problems with microfilm images of checks, which passed through high-speed sorters at rates of thirty to forty per second, and the labor-intensive processes needed whenever the FMS had to retrieve a microfilm copy on behalf of a federal agency or a member of the public, all gave the FMS impetus to seek a "better mousetrap"—specifically, to find out whether digital image technology could improve upon this microfilm-based system.

The perceived high costs of conducting basic research into the applicability of image technology to check processing and the uncertainty about that applicability had discouraged commercial banks and check equipment manufacturers from pursuing the technology. The Federal Reserve saw both the specific business need of the Treasury and the potential of image technology to reduce the payments system's reliance on paper-based processing in the long run. Near the end of 1984 the Federal Reserve reached agreement with the FMS to pursue a research and development program focused on image technology and the government check application.

The Reserve Banks and the FMS worked through the remainder of the 1980s and much of the 1990s on this program, using competitive procurement to engage the best thinking and specific proposals from multiple hardware and software vendors and a multiphased progression from basic research toward the specific application. At one early stage of the research, an equipment manufacturer simulated high-speed check image capture by taping one check to a cylinder, spinning the cylinder so that the check passed a particular point forty or more times per second, and taking a digital photograph of the check with a freestanding camera. The required research was at that basic a level!

Finally, in 1998, a nationwide government check image capture, storage, and retrieval system went into full production, and it remains in production today. Image has proved to be the better mousetrap to serve the FMS and its constituents. Just as important, as the Federal Reserve's R&D program progressed and demonstrated that high-speed, high-quality image capture was feasible, equipment manufacturers and large banks, here and abroad, moved ahead with numerous applications for the technology. The Reserve Banks now also deploy image technology to

provide a variety of value-added features in their commercial check collection services for U.S. depository institutions. Looking ahead, image technology may help banks to accelerate payments and reduce risk, as discussed later in this paper.

THE EXPEDITED FUNDS AVAILABILITY ACT OF 1987

While the U.S. check collection process works surprisingly well for a paper-based system, its soft underbelly is the process for returning dishonored or “bounced” checks. Fewer than 1 percent of checks written are dishonored and returned to the check-writers. However, the return item process always has taken longer and cost considerably more than the collection of a check payment. Today the return process remains costly, and the delays inherent within it expose banks and their customers to risks of loss and to check fraud schemes. Nonetheless, the process is considerably more efficient today than it was just a dozen years ago. A combination of federal legislation enacted in 1987 and ensuing Federal Reserve regulation and new Reserve Bank services has provided U.S. consumers with more rapid access to their funds and considerably reduced the time required for the return of dishonored checks.

During the 1980s, the Congress repeatedly held hearings to explore the issue of “hold times” imposed by banks on checks deposited by customers. Many banks required that their customers wait a few days before using the funds represented by checks they had deposited. Some depository institutions imposed lengthy hold periods of ten days or even more, particularly for checks drawn on banks outside an institution’s immediate area. Since the banks needed at least one or two business days to collect the checks and receive funds from the check-writers’ banks, and any checks that might be returned unpaid usually would take several additional days to be returned, banks considered check hold periods to be a reasonable business practice. However, in the eyes of many customers, these hold periods could seem excessive, particularly since only one in 100 checks would be returned. While bank trade associations provided testimony that lengthy hold periods were exceptional rather than commonplace, consumer groups and letters from individual citizens provided testimony that people experienced inconvenience and even hardship because of check hold practices throughout the country.

In 1987, Congress responded to years of complaints about check holds by passing the Expedited Funds Availability Act, or EFA. This Act had three major provisions. First, it specified in detail the maximum hold periods that depository institutions could impose on most checks deposited by consumers. Second, it prescribed specific requirements for disclosure of check hold policies and notice to customers about hold periods under a variety of circumstances. Third, the Act granted new regulatory authority to the Federal Reserve, extending that authority to the collec-

tion process for all checks, not just those collected through the Reserve Banks, as had been the case prior to the EFA. Now the Federal Reserve had authority, for instance, to require a bank to return a dishonored check to the depositor's institution, known as the "bank of first deposit," within specified times, to accelerate the return process; that would reduce the exposure of the bank of first deposit to loss when the bank made funds available as required by the EFA without knowing whether or when the check might be returned. By the time the EFA became effective in September 1988, the Federal Reserve Board had proposed for public comment, and subsequently adopted, regulations to accelerate the return process. A working group of banking industry and Federal Reserve officials contributed operational expertise that supported the development of practical and effective regulatory change.

The Board also used its new regulatory authority to propose and adopt an essential new standard that previously had eluded the banking industry. To accelerate the check return process, all participants in the check system needed a ready means to identify the bank of first deposit. To support this requirement, all depository institutions needed to follow standard practices in applying their endorsements on the reverse side of checks. As a bank of first deposit, each institution needed to identify itself clearly and conspicuously. A bank handling a check received from a bank of first deposit—for instance, a correspondent bank collecting the check on behalf of the bank of first deposit—would have to apply its endorsement in a different format and in a different area of the reverse side of the check, so as not to obscure the endorsement of any other bank. Even the consumer depositing the check for collection would have to endorse the check within a specified space.

The endorsement standard in place prior to the enactment of the Expedited Funds Availability Act had proved inadequate to support the clear identification of each bank involved in the collection of a check. The banking industry, through the American National Standards Institute, or ANSI, had made substantial progress during the 1980s on a more comprehensive standard. However, the banks, equipment manufacturers, and check printers had not reached closure on an adequate new standard, in part because of the competitive concerns of particular firms. To support the EFA, the Federal Reserve officials who had participated in the ANSI process took all that had been accomplished with ANSI and, with Board of Governors staff, added the new features needed for an effective standard. After public comment, the new endorsement standard, promulgated by the Board, was widely adopted and has contributed significantly to the acceleration of the check return process.

Another very important Federal Reserve response to the EFA was the introduction of new Reserve Bank services to accelerate the return of checks. The EFA did not require any new operational activity on the part of Reserve Banks. Therefore, the Federal Reserve could have imposed

new regulatory requirements for banks to return checks within specified times and left the banking industry to find its own ways of doing so. Instead, the Federal Reserve committed itself to adding resources and accelerating its own processing schedules so that an institution returning a check could rely upon the Reserve Banks as a means to satisfy the new requirements.

In effect, the Reserve Banks offered a “safe harbor” for institutions seeking a means to comply with the new requirements. As with the collection of checks, no U.S. depository institution was required to use Reserve Bank services. They could choose to do so, or to use other means. The banking industry could rely on Reserve Bank services until such time as it seemed economically feasible for private entities to offer competing services, as had been the case generally with the Automated Clearing House. And in fact, in the twelve years since the implementation of EFA, new private check return services and clearing arrangements have evolved. During the first few years after EFA, however, and to an appreciable extent even today, the readiness of the Federal Reserve to complement its regulatory requirements with enabling services has been essential to the successful implementation of the intentions of the Congress.

THE RIVLIN REPORT¹¹

The evaluation of the Federal Reserve’s role is a continuing process. In October 1996, Chairman Alan Greenspan appointed “The Committee on the Federal Reserve in the Payments Mechanism” and asked that it undertake a review of the role of the Federal Reserve in the retail payments system since the enactment of the Monetary Control Act of 1980. The Committee was chaired by Board Vice Chair Alice M. Rivlin and also included Board member Edward W. Kelley, Jr., President William J. McDonough of the Federal Reserve Bank of New York, and President Thomas C. Melzer of the Federal Reserve Bank of St. Louis.

The Committee considered a range of options:

Liquidation—The Federal Reserve would announce its intention to withdraw from the provision of check collection and ACH services and attempt to arrange a smooth transition.

Privatization—The Federal Reserve would transfer all its check and ACH operations to a newly chartered, special-purpose “Clearing Bank.” The Clearing Bank would become a commercial entity which, in the long run, would have no privileged ties to the Federal Reserve.

¹¹ This section draws heavily on the Rivlin Committee’s January 1998 report, “The Federal Reserve in the Payments Mechanism,” in many parts using the precise language of the document itself.

Continuity and Access—The Federal Reserve would continue to provide check collection and ACH services, with the limited goal of universal access for depository institutions. Commercial providers would have the primary responsibility for developing new payments systems.

Promotion of Efficiency—The Federal Reserve would use its operational presence and influence in the check collection system and ACH market to enhance the efficiency of the interbank retail payments system. It would also take steps to foster innovation by commercial providers.

Promotion of Electronic Payments—The Federal Reserve would expedite the movement to an electronic-based retail payments system, replicating the universal acceptance and access that characterize the current paper-based system. The Federal Reserve would accomplish this objective through an active operational presence and by creating incentives for commercial providers to enhance electronic payment methods.

In preparing its report, the Committee drew on the expertise of a wide range of Federal Reserve personnel, including economists, operations specialists, and regulatory staff. The staff analyzed each of the options listed above and the likely impact of each option on 1) the efficiency of the overall payments system, 2) the access of depository institutions of various sizes to the system, and 3) accelerating or retarding the movement to a more electronic payments system.

The Committee also turned to private participants to gain their insights. To accomplish this, they conducted “forums” throughout the country, which were attended by a broad group of payments system participants, third-party providers, clearing house officials, consumer groups, academics, and consultants. The Committee itself held ten half-day “national forums” in St. Louis, New York City, Atlanta, San Francisco, and Washington, DC, in May and June of 1997. In addition, the Reserve Banks held a total of 52 “regional forums” in the same time period.

The Committee then developed a long series of “findings” about the check and ACH payment systems. A selected group of these findings follows.

1. The Federal Reserve plays a major role in the market for check collection services. As shown in Table 2, the Federal Reserve accounts for about 35 to 37 percent of the interbank check collection market. Though its market share has declined slightly in recent years, it is by far the single largest provider.
2. The Federal Reserve’s role tends to be low in densely populated areas where depository institutions are located in close proximity to each other and are likely to rely on direct presentment or clearing houses. On the other hand, the Federal Reserve tends to be the dominant supplier in sparsely populated areas and for small depository institutions. As shown in Table 3, nearly half (46

Table 2
1996 Interbank Check Collection Market

Check Collection Channel	Volume (billions of checks)	Market Share (percent)
Clearing House	10–11	23–24
Direct Presentment	6	14
Correspondent Banks	10–11	24–25
Bankers' Banks	less than 1	1
Third Party Service Providers	less than 1	1
Federal Reserve Banks	16	35–37
Total	42–45	100

Source: The Rivlin Report.

percent) of the checks processed by the Federal Reserve Banks in 1996 were deposited by subsidiaries of the 100 largest holding companies, while the remainder were deposited by smaller depository institutions. By contrast, less than one-third of the checks collected by the Federal Reserve were presented to subsidiaries of the 100 largest bank holding companies, while more than two-thirds of these checks were presented to smaller paying institutions. Thus, banks of all sizes continue to rely on the Federal Reserve for presenting checks to remote and small institutions.

- Under the Monetary Control Act, the Federal Reserve is required to recover all its costs for each major service plus a "private sector adjustment factor." The Federal Reserve has been totally compliant with this requirement. Moreover, there is no evidence that the Reserve Banks subsidize any particular class of depository institutions, such as small or remote ones. Since many collecting banks use the Reserve Banks to present checks to small institutions and remote ones, the Reserve Banks can do so cost-effectively, because a large portion of such checks are handled by the Reserve System.

Table 3
Checks Collected by the Federal Reserve in 1996:
Distribution by Collecting Bank and Paying Bank Asset Size

Subsidiary of	Collecting Bank (Deposited by)	Paying Bank (Presented to)
10 Largest Bank Holding Companies	16 percent	11 percent
Next 90 Largest Bank Holding Companies	30 percent	20 percent
All Other Depository Institutions	54 percent	69 percent

Source: The Rivlin Report.

4. Ongoing consolidation in the banking industry could lead to the creation of nationwide banking organizations. This could leave community banks with fewer choices of check service providers in the future. The trend may accelerate because a number of correspondent banks are now considering dropping their check collection service. For these reasons, small depository institutions feel strongly that the Federal Reserve should continue to be an active provider of check collection services. In fact, there is little support from depository institutions of any size category for the idea that the Federal Reserve should liquidate or privatize its check collection activities, at least in the short run.
5. A withdrawal by the Federal Reserve from providing interbank payments system services could result in a more heavily regulated payments system. Concerns about equal access to the check collection system for all depository institutions, about the potential for market power by the remaining private providers, and about the safety and efficiency of the check collection system could lead to new regulations concerning pricing and service availability.

Large banks and payments service providers view this prospect with concern, while small institutions would regard such regulations as necessary to ensure their continued viability. Institutions of all sizes are concerned, however, that such regulation would place depository institutions at a disadvantage relative to nondepositories in the provision of payments services. In particular, depository institutions are concerned about the prospect that check and other payments services offered primarily by depository institutions would be subject to regulations not imposed on payments services offered by nondepositories.

6. During the past ten years, the overall volume of ACH transactions has increased at an average rate of 15 percent per year, reaching approximately 4 billion payments with a value of \$12 trillion during 1996. Despite this rapid growth, ACH payments continue to represent only a small fraction—less than 5 percent—of non-cash transactions. (Note: ACH transactions in 1999 amounted to 6.25 billion.)

Currently, four ACH operators process and transmit ACH transactions between depository institutions—the Federal Reserve and three commercial providers. Of these, the Federal Reserve is by far the largest processor, accounting for nearly 80 percent of commercial interbank ACH transactions in 1996. The Federal Reserve also processes all government ACH transactions (about 20 percent of total interbank ACH transactions).

The origination of commercial ACH transactions is highly concentrated (see Table 4). In 1996, affiliates of the 100 largest holding companies originated 75 percent of the commercial ACH

Table 4
 Commercial ACH Transactions Processed by the Federal Reserve: Origination and Receipt Volumes, by Asset Size
 Millions of Transactions, 1996

Subsidiary of	Originations	Percent of Total	Receipts	Percent of Total
10 Largest Bank Holding Companies	723	30	274	12
Next 90 Largest Holding Companies	1,070	45	477	20
All Other Depository Institutions	584	25	1,622	68
Total	2,377	100	2,373	100

Note: Volumes of Originations and Receipts differ slightly because of treatment of rejected items, among other factors.

Source: The Rivlin Report.

transactions processed by the Federal Reserve. In contrast, the receipt of ACH transactions is much more dispersed. In 1996, affiliates of the 100 largest bank holding companies received just 32 percent of the transactions.

These figures show that, as in the check collection market, depository institutions of all asset sizes use the Federal Reserve to transmit ACH transactions to smaller depository institutions around the country. The Federal Reserve delivers ACH transactions to nearly every depository institution in the United States, often through third-party service providers and correspondent banks. In contrast, the commercial ACH providers serve a much smaller set of institutions and rely on the Federal Reserve to deliver transactions to those depositories not served by their networks.

7. The ACH system is characterized by high fixed costs, including the need for powerful computers to process high transaction volumes and the need for data communications facilities to exchange transactions among participants and operators. The marginal cost of sending an additional ACH transaction is low (less than one cent) and there are evident economies of scale at current volume levels. Hence, with or without the Federal Reserve, the industry is likely to be dominated by one or two large players, much like the market for credit card processing.

A single provider might be the most efficient processing configuration, because a single provider could take most advantage of economies of scale and supply the market at the lower cost. On the other hand, the existence of competitors encourages each provider to meet the needs of customers and may lead to greater innovation and cost control in the long run. For example, the Federal Reserve began offering four daily deposit cycles for ACH transactions after a competitor entered the market.

The Committee's Conclusions

The Committee, after developing these (and many other) findings, came to two general conclusions:

1. The Federal Reserve should remain a provider of both check collection and ACH services, with the explicit goal of enhancing the efficiency, effectiveness, and convenience of both systems while ensuring access for all depository institutions.
2. The Federal Reserve should play a more active role, working closely and collaboratively with providers and users of the payments system, both to enhance the efficiency of check and ACH services and to help evolve strategies for moving to the next generation of payment instruments.

The Committee also suggested numerous initiatives the Reserve Banks might undertake to make the check system more "electronic," thereby speeding up check collection and enhancing the attractiveness of the ACH system. The Reserve Banks and the Board of Governors have been responding to the Rivlin Report and have already undertaken the initiatives described in the following sections.

Acting on the Rivlin Report

The Rivlin Report suggested that the System should reemphasize its public responsibility through cooperative engagement with other stakeholders in the payments system, as the Federal Reserve had done historically with the automation of check processing, the development of the ACH, and other initiatives. In fact, during the mid 1990s the Reserve Banks had reviewed their experience since the implementation of the Monetary Control Act. Their self-assessment showed that while they had learned to compete effectively, they needed to increase attention to longer-term improvements for the overall payments system. In late 1994 the Reserve Banks implemented a new national management structure for financial services, in part to address this need. Since the Rivlin Report, the Federal Reserve has increasingly used its operational presence, its regulatory role, and collaborative efforts to actively seek improvements in the retail payments system.

Organizationally, a new Payments System Development Committee (PSDC) has succeeded the Rivlin Committee. Federal Reserve Board Vice Chairman Roger W. Ferguson, Jr. and Boston Reserve Bank President Cathy E. Minehan co-chair the PSDC, which includes Governor Edward W. Kelley, Jr., and Jamie B. Stewart, Jr., First Vice President of the New York Reserve Bank. The PSDC takes initiatives on its own and also works through the Federal Reserve's national management structure for financial services (chaired by President Minehan) to address the agenda developed by the Rivlin study.

Initiatives to Explore Electronic Check Presentment

In its public forums and in its report, the Rivlin Committee devoted extensive attention to the potential benefits of electronic check presentment (ECP). Conceptually, ECP would permit the collection of check payments without collection of the paper checks themselves. At some point in the collection process, such as at the bank of first deposit, the payment information—the identification number of the check-writer's bank, the account number of the check-writer, the serial number of the check, and the amount—would be captured in electronic form from the MICR line on the check. From that point forward, the information would be processed and communicated electronically, to the paying bank and subsequently into the account statement sent to the check-writer.

The potential benefits of ECP include faster collection of many checks, because electronic communication is faster than paper delivery and not subject to delay because of bad weather or transportation problems; earlier availability of funds for consumers and businesses when the payments are collected faster; a reduction in check float, which can be an incentive for the continued use of paper checks instead of electronic payments; reduced losses due to check fraud, since payments could be collected, and "bounced" payments returned, more rapidly; and reduced costs, when most payments can be collected without the repetitive handling and transport of the physical checks.

Practically, ECP requires an enormous amount of change in bank check processing operations and changes in consumer and business behavior. Banks would have to reengineer their operations to convert the payment information from the checks into electronic form, develop processing and communications capacity to send and receive the electronic data among many collecting and paying banks, and pay for and manage dual systems during the lengthy transition from the current paper check collection system to ECP. Consumers and businesses would have to develop record-keeping approaches that no longer relied on the receipt of their canceled checks. (This is already the case for customers of credit unions and some banks.) Banks would need new technologies, such as image systems, to respond quickly to customer requests for copies of particular checks, and in many cases would depend upon each other to satisfy such requests. While ECP would reduce some fraud risk, it could also introduce new opportunities for fraud that would require new preventive measures: for instance, a paying bank would have a reduced opportunity to authenticate signatures on check payments it received electronically.

The ECP question is complex. Given the dominant role of the paper check in the U.S. retail payments system, the Rivlin Committee and the PSDC as well as industry groups have advocated further exploration and experimentation. In June of 2000 the Federal Reserve organized a first-

of-its-kind workshop in Boston on electronic check presentment, with participation by all members of the PSDC and senior Federal Reserve staff, along with executive-level participants from a cross-section of the banking industry. This workshop engendered a detailed sharing of experiences with ECP efforts, including lessons learned and at least tentative conclusions about some of the essential next steps to enable ECP to progress. The participants agreed on cooperative efforts to address important questions and barriers and to include more stakeholders in these efforts.

In addition, two Reserve Banks are experimenting in different ways with their operations to help the Federal Reserve and the banking industry learn more about the costs and benefits of a more electronic check collection process. The Helena Branch of the Federal Reserve Bank of Minneapolis has organized an extensive test of electronic check presentment in the state of Montana, with the participation of about forty depository institutions. The participants have agreed to send or receive check payment information among themselves electronically, reducing their reliance on physical delivery of paper and testing the practicality of using check images in place of paper for some functions. Meanwhile, the New York Reserve Bank has “image-enabled” its Utica office to use image technology extensively in its “backroom” operations. Utica’s experience will provide data to support an assessment of the cost-effectiveness of further opportunities to use image technology.

Also, for more than a year, the Federal Reserve has been leading a work group with senior officials from large and small banks to explore the potential of image technology to reduce risk in the check return process. A bank deciding to “bounce” a check can often deliver an image of that check electronically to the bank of first deposit faster than it can return the check itself. In turn, the bank of first deposit may be able to notify the depositing customer of this potential loss more swiftly via electronic transmission of an image. This theoretical advantage for image technology must be tested against current law and practice, and the work group is addressing these complex issues. The group aims to develop a set of guidelines to facilitate voluntary use of image technology in the return process, while it continues to identify legal and operational changes that might facilitate broader use of the technology.

And in an intriguing nexus between law and technology, the Federal Reserve has been exploring with others the possibility of legislation to allow banks to convert paper checks to electronic images and back to paper again, if needed, with the “substitute check” created from the image having all the legal attributes of the original check. Such a change might result in savings in transportation costs and speed the collection of some payments, while protecting checkwriters from any reduction in their rights.

Initiatives to Address Competitive Issues

Competitive concerns about the Federal Reserve's role in retail payments have existed since the implementation of the Monetary Control Act of 1980 (MCA). The Rivlin Committee heard about such concerns during their national forums, and subsequently the Board of Governors sought public comment on two competitive issues.

In March 1998, the Board requested comment on the subject of legal "disparities" between the rights and obligations of the Reserve Banks and those of private providers of check collection services. In December 1998, the Board concluded, along with most who offered comments, that while apparent disparities existed, with some favoring Reserve Banks and others favoring private entities, regulatory changes to address them would not be in the public interest.

Private ACH operators have been concerned for some time about the terms, including deadlines and fees, under which they are able to exchange ACH transactions with the Reserve Banks—for instance, when a bank uses the Federal Reserve's ACH service to originate a payment destined for a bank using a private operator's service. The private operators consider the Reserve Banks' terms for exchange to be anticompetitive and have asked the Board to change them. During 1999 the Board requested public comment on this issue. Then, in May 2000, the Board issued for comment a proposal to modify the ACH deadlines and fees. The comments received were split between those supporting and opposing the proposal, reflecting the difficulties and conflicting interests inherent in these issues. In October the Board adopted its new approach for ACH transactions that Reserve Banks exchange with private ACH operators. Under this approach, which will be implemented during 2001, the Reserve Banks will negotiate with the private operators to set deadlines and fees for those transactions they exchange.

Additional Initiatives to Facilitate Beneficial Innovations

Banks and businesses are seeking new ways to initiate and collect payments more swiftly and less expensively. Some retailers have started to convert consumers' checks into electronic transactions at the "point of sale." This innovation could be generally beneficial, but it raises questions about the differences in law between check and electronic payments. To clarify some of these issues, in June 2000 the Board of Governors published for public comment proposed revisions to the Official Staff Commentary to Regulation E that provided guidance on such "electronic check conversion" transactions. Most commenters supported the proposed revisions as needed and helpful. The Board incorporated some recommended modifications and adopted the revisions in March 2001.

The success of the "collaborative workshop" on ECP has led the

Federal Reserve to plan for another workshop in 2001 on the subject of retail payments standards. As new electronic retail payments options emerge, offered by banking and nonbanking organizations alike, all payments system participants have an interest in determining whether certain standards will be essential to ensure broad access to these options and the ability to move transactions efficiently from one mechanism to another.

Since 1998 the Federal Reserve has expended far greater resources in joint efforts to promote the use of the ACH than at any time since the seminal initiatives of the 1970s. Working with the National Automated Clearing House Association (NACHA) and the regional ACH associations, the Reserve Banks have committed considerable funding and human resources to educational efforts about the benefits of electronic payments, and to promotional campaigns in support of "direct deposit" of payroll and "direct payment" of bills.

Recently the ACH has gained new interest as the possible "infrastructure" to support Internet banking services and Internet-based bill payment services. With its near-universal electronic connections to U.S. depository institutions, its established rules and procedures for settling payments and handling exceptions, and its very low transaction costs, the ACH offers much of the "plumbing" needed to make the more glamorous new electronic payment options work effectively. As the Federal Reserve works with others to explore new retail payment options, it will also be working with NACHA and the regional associations to support broader use of the ACH by the entities bringing Internet services to the market.

Efforts to influence beneficial future directions for the retail payments system require better information about how U.S. businesses and consumers use today's system. To address this need, the Federal Reserve has undertaken a multiyear market research project to increase understanding of the varied uses of checks and of why different electronic options might work effectively or less effectively for different types of payments and different groups of check users. The results of this research will be published for the benefit of all, and this knowledge will help the Federal Reserve, the banking industry, and others to understand better the current and future needs of the users of the retail payments system.

LOOKING FORWARD

Through all of its history the Federal Reserve has been a major participant in the U.S. retail payments system in order to serve public purposes. For the past twenty years, it has had the additional responsibilities for offering its services to all depository institutions and for competing with private service providers. The Federal Reserve is required to serve all U.S. depository institutions equitably; to recover all of its costs with revenues, avoiding underrecovery and overrecovery and not subsidizing

Table 5
Number of Depository Institutions in the United States, 1970–1999

Year	Commercial Banks ^a	Thrift Institutions ^b	Credit Unions Offering Share Drafts ^c	Total
1970	13,511	4,694		18,258
1975	14,384	4,407		18,783 ^d
1980	14,434	4,319	3,434	23,049
1985	14,417	3,626	5,473	24,528
1990	12,347	2,815	6,111	21,969
1995	9,942	2,030	6,482	19,352
1999	8,581	1,640	6,720	17,134

^a FDIC-insured commercial banks.

^b Office of Thrift Supervision, 1999 *FACT Book* data for savings and loan associations and savings banks.

^c Credit Union National Association. Data calculated by multiplying total number of credit unions by the reported percentage offering share drafts.

^d These data do not include the few credit unions offering share drafts between 1974 and 1977. The final regulation on share draft programs was issued on December 8, 1977, with an effective date of March 6, 1978.

any particular group of customers; to compete effectively; to make its services available to its competitors; to protect the payments system in times of stress; and to work toward longer-term improvements that serve the public interest. After twenty years under the Monetary Control Act, the Federal Reserve has an impressive record of accomplishment with respect to all these goals.

The future may bring substantial problems, however. As shown in Table 5, during the past fifteen years a dramatic consolidation has taken place in the commercial banking industry, and the thrift industry has essentially collapsed. (On the other hand, the use of share drafts has expanded substantially in the credit union industry.)

If the total number of depository institutions continues to shrink as it has in the past fifteen years, it is very likely that the Federal Reserve's share of the retail payments business will decline significantly and it may be very difficult for the System to recover all its costs. This should not be considered a measure of failure, however. The Federal Reserve's key roles are 1) to tie all depository institutions into one unified system, and 2) to encourage the use of innovative technology so as to reduce the cost and the risk associated with payments. Some entity must enable a payment initiated at one bank to go to any other depository institution in the United States. The Federal Reserve System must also collaborate successfully with all other correspondent banks to introduce cost-effective new technologies. If the Federal Reserve can accomplish these goals, it will have been successful.

SUMMARY AND CONCLUSIONS

We have described some examples of the Federal Reserve undertaking important initiatives in the U.S. retail payments system, including the following:

- Fostering the development of new computer-driven check sorting equipment to help to bring automation to the check-clearing process forty years ago;
- Stepping forward to provide operational support for the automated clearing house, or ACH, the first U.S. retail electronic payment mechanism, during the 1970s when hardly anyone was familiar with the “direct deposit” and “direct payment” products of the ACH;
- Using regulatory authority and operational services to implement the Expedited Funds Availability Act of 1987 so that consumers who deposited checks could enjoy the use of their money earlier, while at the same time risks in the banking system were reduced; and
- Undertaking a lengthy research and development program during the 1980s and 1990s to test the application of digitized image technology to check processing.

These examples help to illuminate the essence of the Federal Reserve’s roles, as participant and as regulator, in the national payments system. The System has continuously improved the way the payments system works for U.S. consumers and businesses, making it more efficient, more reliable, and safer.

We can take a number of lessons from the examples in our paper. These lessons can help us to understand better the significance of those past undertakings and may help us to think about the roles the Federal Reserve might play in the evolving retail payments system of the future.

One lesson is that, at least occasionally, innovations with potential benefits for the overall payments system, and indeed for society, will languish unless the Federal Reserve or some other entity with broad-based, longer-term benefits in mind pursues them. Some of us here at the Federal Reserve Bank of Boston saw this vividly when we started to explore digitized image technology in 1984. Nobody knew whether it would work. It would be expensive to find out, and the money spent to find out might be spent for nothing. So, nobody had acted on this possibility until the Federal Reserve did. Once our research had shown that the technology would work, the manufacturers and the banks moved ahead with their applications for it. The Reserve Banks also applied it in the check services they provide to depository institutions. The same understandable reluctance or inability of most private entities to step

forward without a clear business case led to the Federal Reserve's operational role in the Automated Clearing House, or ACH.

A second, related lesson is that the Federal Reserve can be effective as a collaborative partner to implement ideas initiated by others. The idea for the ACH, for instance, was developed by the clearing houses in California and other banking industry leaders in the United States and in Europe. The U.S. bankers needed operational support to bring the idea to life as a national electronic payments mechanism. The Federal Reserve helped the banking industry to move its own good idea ahead.

Similarly, the banking industry, through a project of the American Bankers Association in the 1950s, invented the "MICR line"—the black numbers printed on the bottom of paper checks in magnetic ink. The MICR line standard was prepared for the automation of check-sorting, which into the 1960s still was done by hand. Five Reserve Banks subsidized the testing of prototype automated solutions from five firms, for the benefit of all participants in the check system.

A third lesson is that the Federal Reserve's operational role in processing payment transactions adds to its capacity to improve the payments system. In the development of equipment to sort checks, the Federal Reserve did not just provide a financial subsidy. The Reserve Banks contributed the time and expertise of their check managers and staff and used portions of their "live work" to test the prototypes.

In the late 1980s, after the Congress passed the Expedited Funds Availability Act to give consumers faster access to their deposited funds, the Federal Reserve Board was obliged to implement the Act with regulations. Solid operational knowledge allowed the Federal Reserve to propose and subsequently adopt regulatory change that was both ambitious and practical and brought about important improvements in the check system.

And as a final lesson, standards are essential for a unified national payments mechanism accessible to all participants. Support from an entity with a concern for the broad payments system, more than for its own individual interests, sometimes is needed to put a standard in place.

The Federal Reserve has played three distinguishable roles in standards-setting. One has been to see the need for a standard, earlier than others, and to take the lead in bringing parties together to develop a standard. In the work on check image technology, the Federal Reserve joined with the American Bankers Association to organize a standards work group and led the work group that brought forward the current standard for the exchange of images produced by different systems.

Another role of the Federal Reserve has been to complement the standards work of the private sector and use regulatory authority to bring a standard into common practice. As part of the effort to implement the Expedited Funds Availability Act in 1987 and 1988, the Board of Governors proposed a check endorsement standard that settled the few

remaining issues that competing firms had not been able to settle among themselves. Then, after a public comment process, the Board's regulatory authority ensured that the standard would be adopted widely and swiftly.

A third role has been to help the private sector put its standards into use. Over a ten-year period in the 1950s and 1960s, the Reserve Banks worked with large and small depository institutions to persuade them to put the new magnetic ink onto the checks they provided to their customers. Then, in 1967, to support the industry further, the Reserve Banks announced that checks that did not comply with the standard would not be accepted for normal collection. This measure put the industry's own standard "over the top."

Our paper shows that the Federal Reserve has advanced the payments system and served the public interest in a variety of ways. What about the future? The U.S. retail payments system will become more electronic. In its operational role, the Federal Reserve can help this trend along by leading and supporting efforts to make check collection more electronic and efforts to enhance the ACH and promote its use.

New electronic payment mechanisms may not include much of an operational role for the Federal Reserve. Indeed, some of them may not even be operated by banks, although they may interface with bank-based mechanisms such as the ACH to settle the transactions done through nonbank channels. The Federal Reserve does not have to have a hands-on, operational involvement in all payment mechanisms to foster improvements in the payments system. However, such hands-on involvement has proved beneficial in the past, and if the System finds that a new operational role will serve public purposes in the future, it should be prepared to assume that role.

In addition, the history we have reviewed demonstrates that the Federal Reserve can help to advance the payments system in other ways as well: as a collaborative partner; as a judicious, informed regulator; as a researcher; as an educator; as a developer and advocate for essential standards; and as a stakeholder with a unique combination of operational savvy and a commitment to continuous improvement of the overall payments system for the benefit of the public.