

**Payment systems in  
the United States**



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**List of abbreviations**

ABA	American Bankers Association
CHIPS	Clearing House Interbank Payments System
CUSIP	Committee on Uniform Securities Identification Procedures
DTC	Depository Trust Company
DTCC	Depository Trust and Clearing Corporation
ECI	Extended Custodial Inventory (programme of the Federal Reserve)
EFAA	Expedited Funds Availability Act (of 1987)
EPN	Electronic Payments Network
ET	eastern time
FDIC	Federal Deposit Insurance Corporation
FICC	Fixed Income Clearing Corporation
FOMC	Federal Open Market Committee
FRA	Federal Reserve Act (of 1913)
GSCC	Government Securities Clearing Corporation
GSE	government-sponsored enterprise
MBSCC	Mortgage-Backed Securities Clearing Corporation
Nasdaq	National Association of Securities Dealers Automated Quotations
NCUA	National Credit Union Association
NOW	negotiable order of withdrawal (account)
NSSC	National Securities Clearing Corporation
NSS	National Settlement Service (of the Federal Reserve)
OTS	Office of Thrift Supervision
PSR	Payments System Risk (policy of the Federal Reserve)
S&L	savings and loan association
SEC	Securities and Exchange Commission
UCC	Uniform Commercial Code



## Introduction

The development of the payment system in the United States has been influenced by many diverse factors. Firstly, there are numerous financial intermediaries that provide payment, clearing and settlement services. Over 20,000 deposit-taking institutions offer some type of payment service. Privately operated payment systems range from the localised interbank associations that clear cheques for their members or operate automated teller machine (ATM) or point of sale (POS) networks to the nationwide credit and debit card networks and a major “large-value” electronic funds transfer system. In addition, the central bank plays a significant role in the payment system through the provision of a wide range of interbank payment services.

Secondly, the legal framework governing payment activity as well as the regulatory structure for financial institutions that provide payment services in the United States is complex. Financial institutions are chartered at either the state or federal level, and are supervised by one or more agencies at the state or federal level, or both.

Thirdly, a variety of payment instruments and settlement mechanisms are available to discharge payment obligations between and among financial institutions and their customers. These payment instruments vary considerably in their characteristics, such as cost, technology, convenience, funds availability and finality, as well as in orientation towards consumer, commercial and interbank transactions. The large-value electronic funds transfer mechanisms are used to discharge the bulk of the dollar value of all payments in the United States. By contrast, the majority, by volume, of all payments in the United States, particularly those involving retail transactions, continues to be settled through the use of paper-based instruments, particularly cash and cheques. The use of electronic payment mechanisms, such as the Automated Clearing House (ACH) and ATM and POS networks, however, have been growing rapidly. In addition, innovation and competition have led to the use of new instruments and systems that rely increasingly on electronic payment mechanisms.

The size and complexity of financial markets in the United States have created significant payment and settlement interdependencies involving the banking system, money and capital markets, and associated derivative markets. Market participants and the Federal Reserve have for many years pursued measures to strengthen major US payment mechanisms, to increase processing efficiency, and to reduce payment system risks.

## 1. General institutional framework

### 1.1 General legal framework

State and federal statutes, regulations and case law govern the payment system in the United States. The relevant legal principles generally depend on the method of payment (paper-based or electronic) and in some cases the status of parties to a payment, for example consumer, merchant or financial institution.

Several federal laws, which are discussed further below, apply to payment activities, particularly in the consumer sector. At the state level, the Uniform Commercial Code (UCC) establishes a set of model statutes governing certain commercial and financial activities, including some banking and securities market transactions. Articles of the UCC pertinent to payment and settlement activities are the following: Article 3 (negotiable instruments), Article 4 (bank deposits and collections), Article 4A (funds transfers, including wholesale ACH credit transfers) and Article 8 (investment securities).<sup>1</sup> One of several versions of these Articles, sometimes with local variations, has been incorporated into the laws of all the states.

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<sup>1</sup> Article 4A does not address transactions that are governed by the Electronic Fund Transfer Act of 1978 (primarily consumer electronic funds transfers).

In addition, the rules and membership agreements of private clearing and settlement arrangements provide a contractual framework for payment activity within the relevant governing law. For payment services that the Federal Reserve operates, Federal Reserve regulations and operating circulars specify the terms and conditions under which the services are provided.<sup>2</sup>

### **1.1.1 Cheques**

Articles 3 and 4 of the UCC together form the legal basis of paper-based cheque transactions in the United States. In addition, Congress passed the Expedited Funds Availability Act of 1987 (EFAA), which granted the Federal Reserve Board authority to make improvements in the cheque collection and return system in the United States. In accordance with the EFAA, the Federal Reserve issued Regulation CC, which includes a number of provisions designed to improve and accelerate the collection and return of cheques among deposit-taking institutions. In addition to Regulation CC, cheques collected through the Federal Reserve are governed by subpart A of the Federal Reserve's Regulation J, which provides rules for collecting and returning items through the Federal Reserve.

### **1.1.2 Consumer electronic payments**

The rights and liabilities of both consumers and financial institutions involved in consumer electronic payment transactions, including funds transfers through the ACH, ATM or POS networks, are governed by the Electronic Fund Transfer Act of 1978 and the Federal Reserve's Regulation E. Regulation E also sets standards for financial disclosure, card issuance, access and error resolution procedures applicable to all financial institutions. Other federal laws and policies affecting consumer use of electronic funds transfers include the Comptroller of the Currency's Consumer Protection Guidelines and the Truth-in-Lending Act (and the Federal Reserve's Regulation Z issued thereunder), which provide for the disclosure of costs and terms of consumer credit.

### **1.1.3 Fedwire and CHIPS**

Payment transactions over the Federal Reserve's Fedwire funds transfer system are governed by the Federal Reserve's Regulation J, which incorporates the requirements of Article 4A of the UCC. Regulation J, in particular subpart B, defines the rights and responsibilities of financial institutions that use Fedwire, as well as the rights and responsibilities of the Federal Reserve. Federal Reserve Regulation CC also regulates the time within which a depository institution receiving a Fedwire or CHIPS funds transfer on behalf of a customer must make those funds available to their customer. In addition, Federal Reserve Operating Circular 6 covers items such as Fedwire operating hours, security, authentication, fees and certain restrictions.

Funds transfers made through the Clearing House Interbank Payments System (CHIPS) are subject to CHIPS rules and procedures. The CHIPS rules stipulate that the laws of the state of New York, which include Article 4A of the UCC, apply to CHIPS transactions.

## **1.2 Role of the Federal Reserve**

The Federal Reserve Act of 1913 (FRA) established the Federal Reserve as the central bank of the United States and prescribed the general banking powers of the Federal Reserve. The Federal Reserve has responsibilities that encompass issuing notes, providing payment services, acting as fiscal agent and depository of the United States, supervising and regulating banking institutions and conducting monetary policy. The Federal Reserve System includes the 12 regional Federal Reserve Banks, located throughout the United States, and the Board of Governors, located in Washington, DC. The Board of Governors is responsible for the general supervision and oversight of the Federal Reserve Banks, which are separately incorporated entities.

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<sup>2</sup> Federal Reserve Operating Circulars are available at [www.frb-services.org/Industry/frIndustry.cfm](http://www.frb-services.org/Industry/frIndustry.cfm).

### **1.2.1 Note issuance**

Virtually all US dollar paper currency in circulation, or notes, is in the form of Federal Reserve notes. Notes are designed and produced by the United States Department of the Treasury's (US Treasury) Bureau of Engraving and Printing and are delivered to the Federal Reserve Banks for circulation. The Federal Reserve Board pays the US Treasury for the cost of printing notes.

The 12 Federal Reserve Banks are each authorised under the FRA to issue Federal Reserve notes to the public. Federal Reserve notes are fully secured by legally authorised collateral, principally US government securities held by the Federal Reserve, before being issued by the Federal Reserve Banks. The Federal Reserve Banks provide cash services to more than 9,600 depository institutions in the United States. The remaining depository institutions obtain currency and coin from correspondent banks rather than directly from the Federal Reserve. The Federal Reserve also distributes a large amount of currency to overseas markets through its Extended Custodial Inventory (ECI) programme, which was established in 1996. ECI locations are selected overseas institutions that hold US currency in their vaults but carry the inventory on the books of the Federal Reserve Bank of New York.

### **1.2.2 Payment services to deposit-taking institutions**

The Federal Reserve Banks, including their 25 branches and 12 specialised (primarily cheque) processing facilities, compose the operational sites of the Federal Reserve. They provide a variety of payment and other services to deposit-taking institutions. Federal Reserve payment services include the distribution of currency and coin; the collection and return of cheques; the electronic transfer of funds and securities, including the processing of ACH payments; and the provision of a national settlement service. Individuals and institutions that do not take deposits are not generally permitted direct access to Federal Reserve payment services, although these entities may use these services indirectly as customers of deposit-taking institutions.

The Monetary Control Act of 1980 required the Federal Reserve to charge fees for certain payment services provided to deposit-taking institutions, including, cheque collection, ACH, Fedwire and the National Settlement Service. The Monetary Control Act also specified that the Federal Reserve was to set fees in such a way that revenues would recover the costs of providing payment services over the long run. The Federal Reserve is required to include in its calculation of costs not only its actual operating expenses, but also estimates of the taxes and cost of capital it would incur if it were a private firm, the so-called Private Sector Adjustment Factor.

### **1.2.3 Fiscal agency and depository services**

The FRA provides that the Federal Reserve Banks will act as fiscal agents and depositories of the US government when required to do so by the Secretary of the Treasury. The Federal Reserve provides services on behalf of a number of domestic and international government agencies, but the majority of the fiscal and depository services the Federal Reserve Banks provide are performed for the US Treasury. As fiscal agents, the Federal Reserve Banks support the US Treasury with services related to the federal debt. For example, the Federal Reserve Banks receive bids for auctions of US Treasury securities to finance the federal debt and issue the securities in book-entry form. The Federal Reserve Banks also maintain the US Treasury's account, accept deposits of federal taxes and other federal agency receipts, and process cheques and electronic payments drawn on the US Treasury's account.

### **1.2.4 Supervision and regulation**

As discussed further below in Section 1.3, a number of governmental bodies share the responsibility for supervising and regulating deposit-taking institutions in the United States. The Federal Reserve is the primary supervisor and regulator of all US bank holding companies, financial holding companies and state-chartered commercial banks that are members of the Federal Reserve System.<sup>3</sup> The Federal Reserve is also responsible for the supervision of Edge Act and agreement corporations as

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<sup>3</sup> All federally chartered banks are members of the Federal Reserve System. A state-chartered bank may become a member of the Federal Reserve System by applying to the Federal Reserve. Each member bank is required to subscribe to the capital stock of the Reserve Bank of its District.

well as the operations of foreign banking organisations in the United States.<sup>4</sup> To ensure the safety and soundness of the banking organisations that it supervises, the Federal Reserve conducts surveillance and on-site examinations and undertakes enforcement and other supervisory actions.

The Federal Reserve's regulatory responsibilities include the administration of laws governing the acquisition of banks, the non-banking activities of bank holding companies that are closely related to banking, mergers of both banks and bank holding companies, and certain other changes in control. The Federal Reserve is also responsible for issuing regulations to implement a number of statutes designed to ensure that consumers, including bank customers, have sufficient information and are treated fairly in credit and other financial transactions.

### **1.2.5 Monetary policy**

The Federal Reserve, through the Federal Open Market Committee (FOMC), is responsible for formulating and implementing monetary policy. Monetary policy instruments include open market operations, the discount rate and reserve requirements for deposit-taking institutions.<sup>5</sup> Open market operations are executed by the Federal Reserve Bank of New York, on behalf of the Federal Reserve System, under policy instructions from the FOMC. These operations take place through certain designated dealers in US government securities.

## **1.3 Financial intermediaries that provide payment services**

Financial intermediaries that provide payment services in the United States include more than 20,000 deposit-taking institutions.<sup>6</sup> These institutions can be classified as commercial banks or as thrift institutions, such as savings and loan associations and credit unions. These classifications determine what services financial institutions may provide and the regulatory structure to which the institutions are subject. Despite the large number of financial intermediaries, the banking system in the United States is somewhat concentrated at the national level. As of June 2001, the 10 largest commercial banking organisations held approximately 38% of the total value of insured deposits in the United States.

In 1999, Congress passed the Gramm-Leach-Bliley Financial Modernization Act of 1999 (Gramm-Leach-Bliley Act), which repealed significant restrictions enacted in the 1930s on the ability of banks to affiliate with securities and insurance firms. The Gramm-Leach-Bliley Act created a new structure called a "financial holding company", which may own subsidiaries engaged in banking and non-banking financial activities, including insurance and securities underwriting.

### **1.3.1 Commercial banks**

Commercial banks accept demand and time deposits, make commercial loans and provide other banking services, including payment services, to the public. At year-end 2000, there were 8,273 commercial banks in the United States, with assets of approximately USD 6.2 trillion.<sup>7</sup>

Commercial banks may be chartered by state or federal authorities and are supervised and regulated by either state or federal supervisors, or, in some cases, by both. Federal supervisors include the

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<sup>4</sup> Edge Act and agreement corporations engage in international banking and investment activities. Edge Act and agreement corporations are chartered by the Federal Reserve Board under Section 25 of the Federal Reserve Act.

<sup>5</sup> As of January 2003, discount window adjustment credit has been replaced with a new type of overnight or very short-term credit called "primary credit". The rate charged on this credit is known as the "primary credit rate", which will be set above the federal funds rate.

<sup>6</sup> The term "depository institution", which is defined in Section 19(b)(1)(A) of the Federal Reserve Act, is more commonly used in the United States to refer to a deposit-taking financial institution, or one that accepts deposits.

<sup>7</sup> In 1994, Congress passed the Riegle-Neal Interstate Banking and Branching Efficiency Act (Riegle-Neal Act), which generally permitted nationwide banking through bank holding companies and nationwide branching. As a result of the Riegle-Neal Act and individual state laws that eased restrictions on interstate bank branching beginning in the 1980s, a wave of mergers has occurred in the US banking market. The number of commercial banks in the United States declined by 14% from 1980 to 1990 and by more than 30% from 1990 to 2000.

Office of the Comptroller of the Currency of the US Treasury, the Federal Reserve and the Federal Deposit Insurance Corporation (FDIC). Generally, commercial bank deposits are insured by the Bank Insurance Fund administered by the FDIC. Banks pay risk-based deposit insurance premiums on uninsured as well as insured deposits.<sup>8</sup> Commercial banks, like other deposit-taking institutions, are subject to reserve requirements established by the Federal Reserve.

### **1.3.2 Thrift institutions**

At year-end 2000, there were 12,239 thrift institutions, with approximately USD 1.8 trillion in assets. Thrift institutions are savings and loan associations, credit unions and other savings institutions, such as federal mutual savings banks.

Savings and loan associations (S&Ls) accept savings and time deposits and make loans. S&Ls are federally or state-chartered and are required by law to make a certain percentage of their loans as home mortgages. They may be organised and owned by depositors, in which case they are called mutual associations, or they may be organised as stock-issuing corporations owned by shareholders. Legislation passed in 1980 and 1982 expanded the range of services S&Ls could provide to include making consumer loans, offering transaction accounts in the form of negotiable order of withdrawal (NOW) accounts, issuing credit cards and offering certain types of commercial loans. Federally chartered and some state-chartered S&Ls are insured by the Savings Association Insurance Fund, which is administered by the FDIC. S&Ls are supervised and regulated by the Office of Thrift Supervision (OTS) within the US Treasury.

Credit unions (state and federal) are cooperative organisations of individuals sharing a common affiliation, usually through employment with a particular company or organisation, or membership in a labour union or church. In 1984, credit union membership criteria were greatly relaxed, allowing credit unions to solicit more members.

Since the late 1970s, credit unions have been permitted to offer many of the same services as commercial banks. Credit unions accept deposits of members' savings in the form of share purchases and pay interest, in the form of dividends on the shares, out of earnings. Credit unions also provide loans to members and provide transaction accounts upon which share drafts can be drawn, much like NOW accounts. Federally chartered credit unions may provide and hold residential mortgages and issue credit cards. The National Credit Union Association (NCUA), an independent federal agency chartered in 1970, is the primary supervisor of federally chartered credit unions. The NCUA provides a central liquidity facility and also administers the National Share Insurance Fund, which provides deposit insurance for federal credit unions and many state credit unions.

Other savings institutions, such as federal savings banks, mutual savings banks and mutual stock banks, accept consumer deposits and invest primarily in residential mortgages and high-grade investment securities. Like S&Ls, these organisations may be owned by their depositors, in which case they are known as mutual savings banks, or they may be stock-issuing corporations owned by shareholders. Legislation passed in 1980 and 1982 gave these institutions the ability to offer NOW accounts and credit cards, to make commercial and consumer loans, to offer discount brokerage services and to invest in real estate without limitation. The OTS supervises and regulates these institutions.

### **1.3.3 Other institutions that provide payment services**

Other organisations involved in providing payment services include so-called "non-bank banks", bank card companies and the United States Postal Service. Non-bank banks (or limited-service banks) can make loans or accept deposits, but cannot do both. Because of this distinction, a non-bank bank avoids meeting the legal definition of a bank as defined by the Bank Holding Company Act of 1956. This loophole was closed in August 1987 with the passage of the Competitive Equality Banking Act; non-bank banks in existence before 1987 were permitted to continue to operate under certain restrictions.

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<sup>8</sup> If an insured bank is closed, deposits up to and including USD 100,000 per account are generally covered by the FDIC.

Bank card companies license credit and debit card trademarks to financial institutions, authorise transactions and provide certain clearing and settlement services for transactions between banks. Visa and MasterCard are the two largest bank card networks operating in the United States, but many smaller bank card networks are common throughout the United States. Other card-issuing companies include national “travel and entertainment” card issuers and a number of major retailers that issue cards to their customers.

The United States Postal Service provides payment services by selling postal money orders, which can be used to make payments. The United States Postal Service issued 230 million postal money orders during 2000.

Other entities that play a role in the US payment system include those that provide specialised payment and settlement services and those that perform standard-setting or rule-writing functions. In 2002, private organisations providing payment and settlement services in the United States included the following: The Clearing House,<sup>9</sup> several large cheque clearing houses, numerous local cheque clearing houses, three national ACH networks,<sup>10</sup> 43 ATM networks and specialised financial intermediaries such as securities clearing corporations and depositories.

The National Automated Clearing House Association formulates and promulgates rules and standards for processing ACH transactions throughout the United States. In addition, regional ACH associations provide educational and promotional services to ACH participants.

The American Bankers Association (ABA) administers the system of routing numbers that are encoded on cheques and identify the bank responsible for payment of the cheque. These nine-digit routing numbers are now used for a variety of purposes, including identification of key parties to electronic payments such as ACH and Fedwire transfers. The Committee on Uniform Securities Identification Practices (CUSIP) designed a numbering system for securities under the auspices of the ABA. Standard & Poor’s administers the CUSIP system, under the oversight of the ABA.

## **2. Payment media used by non-financial entities**

### **2.1 Cash**

Cash (currency and coin) is a widely used payment medium for many types of transactions in the United States, particularly small-value transactions. The most commonly used forms of legal tender in the United States include coin, which is issued by the US Treasury, and Federal Reserve notes, issued by the Federal Reserve. Coins are minted in denominations of 1, 5, 10, 25 and 50 cents, and USD 1; Federal Reserve notes are issued in denominations of USD 1, 2, 5, 10, 20, 50 and 100.

At year-end 2000, the value of currency and coin in circulation was USD 594 billion, of which USD 564 billion was currency. US currency is also widely used outside the United States for transactions and as a store of wealth. Estimates indicate that approximately 45% of the value of US currency in circulation at year-end 2000 was held outside the United States. The total number of cash transactions per year in the United States cannot be determined with a reasonable degree of confidence.

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<sup>9</sup> The Clearing House (formerly known as the New York Clearing House Association) provides a range of large- and small-value electronic payment services, including the Clearing House Interbank Payments System (CHIPS), the Electronic Payments Network (EPN) and cheque clearing services.

<sup>10</sup> One ACH network discontinued service in April 2002. A second ACH network announced it would be discontinuing operations in March 2003.

## 2.2 Non-cash payment media and instruments

### 2.2.1 Payment media

In the United States, the money balances used by consumers and non-financial businesses to effect transactions are generally held as transaction deposits at deposit-taking institutions. These typically take the form of demand deposits, such as chequing accounts, NOW accounts and credit union share-draft accounts. At year-end 2000, the value of transaction accounts held at depository institutions was USD 784.5 billion.

Other monetary balances that are less liquid but may nonetheless be used to fund payment activity include savings accounts, money market deposit accounts, certain small and large time deposits, money market mutual funds and liquid investment assets such as repurchase agreements and eurodollar deposits. Certain of these accounts, such as money market deposit accounts and mutual funds, may permit withdrawals of funds by cheque, often in minimum dollar amounts or in limited numbers. Savings deposits (including money market deposit accounts), retail money market mutual funds (general purpose only) and small time deposits totalled approximately USD 3.9 trillion at year-end 2000.<sup>11</sup> Large time deposits, balances in institutional money funds, repurchase liabilities issued by depository institutions and eurodollar deposits held by US residents totalled approximately USD 2.2 trillion at year-end 2000.

### 2.2.2 Payment instruments

#### (a) Paper cheques

The paper cheque is the most frequently used non-cash payment instrument in the United States. An estimated 42.5 billion cheques were written during 2000, valued at USD 39.3 trillion. Although the cheque remains the predominant type of non-cash payment instrument, the number of cheque payments and the number of cheque payments as a share of non-cash payments have declined over time. Data and statistical estimates provide strong evidence that the number of cheque payments in the United States during 2000 was lower than the number of cheque payments during 1995.<sup>12</sup> Estimates also suggest that individuals wrote about 58% of cheques during 2000, which accounted for about 22% of the total value of cheque payments. Businesses wrote about 37% of cheques, which accounted for about 72% of the value of cheque payments.

Private and public sector efforts to shift cheque payments to electronic media, such as ACH and payment cards, appear to be gaining ground. The expansion of online POS terminals and the widespread acceptance of credit and debit cards at retail establishments have presented consumers with significant payment alternatives to cheques. The Debt Collection Improvement Act of 1996 mandated that most federal government payments be made electronically starting in 1999. The US federal government made 262 million cheque payments during 2000, a 40% decline in cheque volume from the 436 million cheques the government wrote during 1996.

#### (b) ACH credits and debits

ACH transactions are a common form of electronic funds transfer used to make both recurring and non-recurring payments. Depository institutions originated 6.8 billion ACH transactions during 2000 for themselves and their customers, twice as many as were initiated during 1995. ACH payments may be either credit or debit transactions. In an ACH credit transaction, funds flow from the originator to the receiver, and in a debit transaction, funds flow from the receiver to the originator. ACH credit payments include direct deposit of payrolls, government benefit payments and corporate payments to contractors and vendors. The proportion of payroll payments made by businesses using the ACH was 50% in 2000. Debit payments include mortgage and loan payments, insurance premium payments, consumer

<sup>11</sup> Small time deposits are issued in amounts under USD 100,000. Large time deposits, which do not include eurodollar deposits, are issued in amounts of USD 100,000 or more.

<sup>12</sup> See Gerdes and Walton, "The use of checks and other non-cash payment instruments in the United States", *Federal Reserve Bulletin*, August 2002, pp 360-74.

bill payments and corporate cash concentration transactions.<sup>13</sup> In addition, businesses and individuals may use the ACH to make payments to, or receive reimbursement from, the federal government related to federal tax obligations.

(c) *Funds transfers over Fedwire and CHIPS*

Fedwire and CHIPS are electronic credit transfer systems that are generally considered large-value payment systems. Depository institutions originated 168 million transfers using Fedwire and CHIPS during 2000, valued at USD 672 trillion. These systems are used by financial institutions for settling many financial market and a wide range of other types of transactions. With a few exceptions, non-deposit-taking financial institutions, as well as non-financial organisations and individuals, access these systems and originate payments through deposit-taking institutions. A 2000 survey indicated that about 80% of Fedwire volume and about 42% of Fedwire dollar value were attributable to such third-party transfers.

(d) *Card payments*

(i) *Credit cards*

Credit cards are the most frequently used electronic payment instrument in the United States. These cards combine a payment instrument with a credit arrangement. There were 20.5 billion credit card transactions processed during 2000, valued at USD 1.5 trillion. Bank credit cards are generally issued by a bank under a licence from a national organisation, such as Visa or MasterCard, and typically involve a revolving credit agreement. There were 9.5 billion bank credit card transactions during 2000. In addition to bank-issued cards, a number of other companies offer credit cards directly to businesses and consumers. These include Discover Card; national travel and entertainment cards, such as American Express; and limited-use proprietary cards, such as those issued by retail stores and oil and telephone companies.

A 1998 survey of consumers indicated that 68% of US households have at least one general purpose credit card, a 21% increase since 1989. In 1998, limited-use cards issued by retail stores and oil companies (generally limited to in-store use) were held by 50% and 19% of US households, respectively.

(ii) *Debit cards*

Debit cards transfer funds from a cardholder's transactions account (for instance, a chequing account) at an issuing bank. There were 9.5 billion debit card transactions processed during 2000, valued at USD 419 billion. Cardholders authorise debit card transactions either by entering a personal identification number (PIN) directly into a merchant's online terminal or by a written signature. An estimated 2.8 million online debit terminals were available at US retail locations in 2000. Approximately 4 billion PIN-based transactions were effected in 2000, processed primarily by Star, Interlink, NYCE and Pulse. Approximately 5.5 billion signature-based transactions were effected in 2000. The sole processors of signature-based debit transactions in the United States during 2000 were Visa and MasterCard.

### **3. Interbank exchange and settlement circuits**

#### **3.1 General overview**

In the United States, interbank payments are processed and settled primarily through the following mechanisms: (1) cheque clearing, (2) ACH, (3) card networks, (4) same-day electronic funds transfer systems (Fedwire and CHIPS) and (5) the Federal Reserve's National Settlement Service (NSS).

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<sup>13</sup> Corporate cash concentration transactions are generally those initiated by an organisation to fund, or to consolidate funds from, its branches, franchises or agents.

Using these mechanisms, banks exchange and settle payments directly with each other, through private sector clearing houses, through correspondents, or through the Federal Reserve.

### **3.1.1 Cheque clearing systems**

Depository institutions paid an estimated 42.5 billion cheques in the United States during 2000. Approximately 30% of those cheques were deposited in the same institution on which they were drawn and, therefore, were settled via accounting entries on the books of the paying institution. The remaining 70% were cleared and settled through interbank mechanisms. Approximately 43% of the cheques cleared through these interbank mechanisms were cleared through direct exchange (presentment), local cheque clearing houses and correspondent bank networks; the remainder were cleared through the Federal Reserve Banks.

#### *(a) Operation of the cheque collection mechanism*

Typically, deposit-taking institutions located in the same geographical area exchange cheques directly or participate in local cheque clearing arrangements. In 2001, there were approximately 66 private cheque clearing arrangements in which deposit-taking institutions exchanged cheques and used the Federal Reserve's NSS to settle the net positions of participants. A significant number of additional cheque clearing houses do not currently use NSS; however, these are typically smaller, local cheque clearing houses.

Cheques drawn on deposit-taking institutions located outside the geographical area of the collecting deposit-taking institution are frequently deposited by the collecting institution with correspondent banks or Federal Reserve Banks. Correspondent banks that have established relationships with other correspondent banks present cheques drawn on each other directly. Smaller institutions generally use the cheque collection services offered by correspondent banks or those offered by the Federal Reserve. Cheques cleared by the Federal Reserve Banks and correspondent banks are processed on high-speed equipment that itemises, records and sorts cheques based on information contained in the magnetic ink character recognition (MICR) line printed along the bottom of cheques.<sup>14</sup>

Cheques are transported between collecting institutions in a variety of ways. Cheques cleared locally are usually transported by ground couriers, while cheques drawn in regions distant from the institution in which the cheque is first deposited are generally delivered via air transportation. The Federal Reserve manages an extensive air transportation network to exchange cheques among its 45 cheque clearing centres and uses local courier networks to present cheques to paying institutions.

Correspondent banks settle for the cheques they collect for other institutions through accounts on their books. Paying banks generally settle with correspondent banks using the Federal Reserve's Fedwire funds transfer system. Cheque clearing houses generally net payments. Settlement among cheque clearing house participants generally occurs through transactions directly between members, through designated settlement banks, or through NSS.

The Federal Reserve settles for the cheques it collects by posting entries to the accounts that deposit-taking institutions maintain with the Federal Reserve. The account of the collecting institution is credited, and the account of the paying institution is debited, for the value of the deposited cheques in accordance with funds availability schedules maintained by the Federal Reserve, which reflect the time normally needed for the Federal Reserve to receive settlement from the institutions on which the cheques are drawn. Collecting institutions usually receive credit on the day of deposit or the next business day.

#### *(b) Pricing policies*

Typically, cheque clearing houses are non-profit, cooperative associations that assess their members the actual costs of operating the clearing house. Correspondent banks charge for their services in a

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<sup>14</sup> In 2001 the Federal Reserve announced a single MICR detail transmission standard that conforms to the ANSI ASC X9.37 format. The standard, to be adopted by mid-2005, will allow financial institutions and other processors to move essential cheque information more efficiently.

variety of ways, and there is little public information available concerning the fees assessed for their collection services.

Federal Reserve fees for cheque collection are based on the Federal Reserve's general pricing principles of cost recovery discussed in Section 1.2.2. Fees for cheque collection services vary based on the time and location of deposit and the amount of sorting performed by the depositing institution.

### **3.1.2 Automated Clearing House**

The ACH is a nationwide electronic file transfer mechanism that processed 6.8 billion credit and debit transfers initiated by depository institutions through electronically originated batches during 2000. The Federal Reserve is the nation's largest ACH operator and processed more than 85% of the 4,253 million commercial interbank ACH transactions originated during 2000. Private sector ACH operators processed the remaining 615 million commercial interbank transactions originated during 2000. Based on announcements during the fourth quarter of 2002, The Clearing House's Electronic Payments Network (EPN) will be the sole private sector ACH operator beginning in March 2003.

#### *(a) Operation of the ACH system*

The Federal Reserve maintains centralised application software used to process ACH payments submitted to the Federal Reserve Banks. Deposit-taking institutions electronically deliver files to and receive files from the Federal Reserve Banks through a variety of electronic access options. Private sector operators and the Federal Reserve Banks rely on each other for the processing of some ACH transactions in which either the originating depository institution or the receiving depository institution is not their customer. These inter-operator transactions are settled by the Federal Reserve.

ACH transactions processed by the Federal Reserve are settled through deposit-taking institutions' accounts held at the Federal Reserve. Since June 2001, settlement for ACH credit transactions processed by the Federal Reserve Banks is final when posted to deposit-taking institutions' accounts, which is currently at 8.30 am eastern time (ET) on the settlement date. Credit for Federal Reserve ACH debit transfers is not final at settlement. Credit for debit items is available to the receiving deposit-taking institution at 11 am ET on settlement date, but is not final until the banking day following the settlement date. Federal Reserve ACH services are governed by Operating Circular 4, which incorporates the Operating Rules of the National Automated Clearing House Association. Transactions processed by EPN are settled on a net basis using NSS.

#### *(b) Pricing policies*

Federal Reserve fees for ACH are based on the Federal Reserve's general pricing principles of cost recovery discussed in Section 1.2.2. In 2003, fees charged by the Federal Reserve for ACH services offered to depository institutions for the origination of ACH transfers range from USD 0.0025 per item to USD 0.0030 per item based upon origination service provided. The Federal Reserve also charges depository institutions fees for file origination, account servicing, ACH settlement and receipt of ACH transactions, and surcharges for cross-border items. Prices may also vary for transactions that require the use of multiple networks for processing. Private sector ACH processors assess their members a variety of fees, including transaction fees, access fees and fees for non-automated services.

### **3.1.3 Card networks**

Credit card, ATM and POS associations provide communications, transaction authorisation and interbank financial settlement for their member financial institutions. Bank card networks are typically owned by a group of financial institutions that provide initial capital and establish uniform operating policies, procedures and controls. Some major networks are owned by non-bank companies. The largest credit card and signature-based debit card networks in the United States are Visa and MasterCard. American Express and Discover Card are also major credit card networks. There were 45 ATM and POS networks operating in the United States during 2000, although consolidation is occurring among existing networks. Concord EFS National Bank and First Data Merchant Services Corporation are the largest providers of ATM and debit card services based on PINs.

*(a) Operation of card networks*

Credit card, ATM and POS associations sort and route transaction data from acquiring banks to issuing banks over proprietary networks. The associations generally settle on a net basis with the acquiring and issuing banks daily, although typically with a one- or two-day lag between payment initiation and settlement. Generally, the associations use the acquiring and issuing banks' aggregated transaction information to compile each bank's net settlement position. Member banks may be required to maintain collateral with the associations' settlement banks to manage default risks. Acquiring and issuing banks may settle directly with each other, through regional settlement banks or through the Federal Reserve, or by other net settlement arrangements. The settlement process can vary significantly, depending upon the member involved.

**3.2 Major large-value funds transfer systems**

There are two major large-value payment transfer systems in the United States: (1) Fedwire, operated by the Federal Reserve, and (2) CHIPS, operated by the Clearing House Interbank Payments Company L.L.C. (CHIPCo). Generally, these payment systems are used by financial institutions and their customers to make large-dollar, time-critical transfers. In addition, financial institutions may use separate communication systems to send payment instructions to their correspondents for the transfer of correspondent balances or to initiate Fedwire or CHIPS payments.

**3.2.1 Fedwire funds transfer system**

The Fedwire funds transfer system, owned and operated by the Federal Reserve Banks, is a real-time gross settlement system that enables participants to send and receive final payments in central bank money between each other and on behalf of customers. Fedwire processes and settles payment orders individually throughout the operating day. Payment to the receiving participant over Fedwire is final and irrevocable when the amount of the payment order is credited to the receiving participant's account or when notice is sent to the receiving participant, whichever is earlier.

An institution that maintains an account with a Federal Reserve Bank is generally allowed to be a Fedwire participant. Institutions with accounts at a Federal Reserve Bank may access Fedwire subject to the conditions detailed in Operating Circular 6 and the Federal Reserve Board's Payments System Risk (PSR) policy. Under subpart B of Regulation J and Operating Circular 6, the Federal Reserve Banks can also impose conditions on an institution's use of Fedwire. In particular, each Fedwire participant is required to enter into a security procedures agreement with its Federal Reserve Bank. An institution sending payment orders to a Federal Reserve Bank is also required to have sufficient funds, either in the form of account balances held at the Federal Reserve or overdraft capacity.

Fedwire processed an average of nearly 430,000 payments per day in 2000. The total value of transfers originated during 2000 was USD 380 trillion. The distribution of the value of these payments is not uniform. The median Fedwire payment during 2000 was approximately USD 25,000, and the average payment was approximately USD 3.5 million.

*(a) Operation of the Fedwire funds transfer service*

Fedwire funds transfers are generally initiated online, via an electronic connection to the Federal Reserve's communications network, but may be initiated offline, using a telephone-based service. Participants that send and receive large numbers of messages typically use a computer interface connection with the Federal Reserve, providing the depository institution with significant automation and high levels of straight through processing.

Approximately 9,500 participants are currently able to initiate or receive funds transfers over Fedwire. Of these 9,500 participants, fewer than 350 have a computer interface connection, about 7,850 are connected through other online electronic options, and the remainder use the offline service.

The Fedwire funds transfer system operates from 12.30 am to 6.30 pm ET, Monday to Friday, excluding designated holidays. The deadline for third-party transfers, those initiated or received by a participant on behalf of a customer, is 6 pm ET. Offline transfers generally cannot be initiated before 9 am or after 6 pm ET (5.30 pm for third-party transfers). Operating Circular 6, which is noted above, contains time schedules, holidays and guidelines pertaining to the extension of Fedwire hours.

(b) *Risk management*

Intraday central bank credit in the form of daylight account overdrafts is available to holders of accounts at the Federal Reserve Banks, including participants in Fedwire, under the Federal Reserve Board's PSR policy. Many Fedwire participants use daylight credit to make payments throughout the operating day. Overall, aggregate average daylight overdrafts averaged USD 30 billion per day in 2000, and aggregate peak daylight overdrafts averaged USD 90 billion per day.

Because funds transfers over Fedwire settle in central bank money with immediate finality, credit risk to the receiving institutions is eliminated. To the extent that the Federal Reserve Banks provide daylight credit to a Fedwire participant, they expose themselves to direct credit risk from participants. The Federal Reserve Board's PSR policy controls and mitigates these exposures, while providing sufficient liquidity to account holders for making payments. The PSR policy provides for risk assessments, net debit caps, daylight overdraft fees and, in certain cases, collateralisation to limit daylight credit exposure.

(c) *Pricing policies*

Federal Reserve fees for the Fedwire service are based upon the Federal Reserve's general pricing policies of cost recovery discussed in Section 1.2.2. Since 1999, Fedwire funds transfers have been priced using a volume-based fee schedule. This policy was established to reflect more accurately the cost structure of Fedwire services. In particular, Fedwire is characterised by high fixed costs and low marginal costs. Currently, Fedwire transaction fees are charged to both the originating institution (debit side) and receiving institution (credit side). In 2003, the fees charged by Reserve Banks for an online Fedwire transaction range from USD 0.10 to USD 0.30 per transfer, per institution. A surcharge of USD 15 is required to initiate or receive an offline transfer. Electronic access fees (connection and terminal charges) are assessed separately.

### **3.2.2 Clearing House Interbank Payments System (CHIPS)**

CHIPS began operation in 1970 as an electronic replacement for an existing paper-based payments clearing arrangement. Since 1998, CHIPS has been owned and operated by CHIPCo. All CHIPS participants are members of CHIPCo. CHIPCo is governed by a 10-member board; four members are elected by CHIPS participants based on their volume, and the remaining six are appointed by The Clearing House.

Since its inception, CHIPS has undergone several changes to its payments processing structure. Most recently, CHIPCo converted CHIPS from an end-of-day, multilateral net settlement system to one that provides real-time final settlement for payment orders as they are released from the CHIPS payment queue during the operating day. As discussed below, payment instructions submitted to the CHIPS payment queue that remain unsettled at the end of the day are tallied and funded on a multilateral net basis prior to releasing the payments.

Participation in CHIPS is available to commercial banking institutions or Edge Act corporations that meet the requirements detailed in Rule 19 of CHIPS Rules.<sup>15</sup> CHIPS participants are subject to supervision by state or federal banking supervisors and CHIPS itself is examined annually by state and federal banking authorities. A non-participant wishing to send payments over CHIPS must employ a CHIPS participant to act as its correspondent or agent. At year-end 2000, the CHIPS network had 63 participants.

The payments transferred over CHIPS are often related to international interbank transactions, including the dollar payments resulting from foreign currency transactions (such as spot and currency swap contracts) and eurodollar placements and returns. Payment orders are also sent over CHIPS for the purpose of adjusting correspondent balances and making payments associated with commercial transactions, bank loans and securities transactions. Participants used CHIPS to process an average of about 236,000 payments per day during 2000. The total value of transfers originated during 2000 was USD 292 trillion.

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<sup>15</sup> CHIPS Rules are posted on the CHIPS website at [www.chips.org](http://www.chips.org).

*(a) Operation of CHIPS*

Since January 2001, CHIPS has been a real-time final settlement system that continuously matches, nets and settles payment orders. On a daily basis, the new system provides real-time finality for all payment orders released by CHIPS from the CHIPS queue. To achieve real-time finality, payment orders are settled on the books of CHIPS against positive positions, simultaneously offset by incoming payment orders, or both.

To facilitate this process, the Federal Reserve Bank of New York established a CHIPS prefunded balance account (CHIPS account). Under the real-time finality arrangement, each CHIPS participant has a pre-established opening position requirement, which, once funded via a Fedwire funds transfer to the CHIPS account, is used to settle payment orders throughout the day.<sup>16</sup> A participant cannot send or receive CHIPS payment orders until it transfers its opening position requirement to the CHIPS account. Opening position requirements can be transferred into the CHIPS account any time after the opening of CHIPS and Fedwire at 12.30 am ET; all participants must transfer their requirement no later than 9 am ET.

During the operating day, participants submit payment orders to a centralised queue maintained by CHIPS. An optimisation algorithm searches the centralised queue for payment orders to settle, subject to restrictions contained in CHIPS Rule 12. When an opportunity for settlement involving one, two or more payment orders is found, the optimisation algorithm releases the relevant payment order(s) from the central queue and simultaneously marks the CHIPS records to reflect the associated debits and credits to the relevant participants' positions. Participants may remove payment orders from the queue at any time prior to the daily cutoff time for the system (5 pm ET). Debits and credits to the current position are reflected only in CHIPS's records and are not recorded on the books of the Federal Reserve Bank of New York.<sup>17</sup> Under New York law and CHIPS Rules, payment orders are finally settled at the time of release from the central CHIPS queue.

At 5 pm ET CHIPS attempts to match, net, set off and release as many of the remaining payment orders as possible, although no participant is allowed to incur a negative position. As soon as this process is complete, any unreleased payment orders remaining in the queue are tallied on a multilateral net basis. The resulting net position for each participant is provisionally combined with that participant's current position (which is always zero or positive) to calculate the participant's final net position; if that position is negative, it is the participant's "final position requirement".

Each participant with a final position requirement must transfer, via Fedwire, its requirement to the CHIPS account. These requirements, when delivered, are credited to participants' balances. Once all of the Fedwire funds transfers have been received, CHIPS is able to release and settle all remaining payment orders. After completion of this process, CHIPS transfers to those participants who have any balances remaining the full amount of those positions, reducing the amount of funds in the CHIPS account to zero by the end of the day.

*(b) Risk management*

CHIPS requires participants to deposit a predetermined amount each day, before the start of business. During the operating day, CHIPS does not release any payment order unless it can be debited against the participant's current position, and no participant's current position is permitted to fall below zero. All payment orders are final upon release to the receiving participant. To ensure that CHIPS participants have access to sources of credit and liquidity sufficient to pay promptly each day their opening position requirements and their closing position requirements, CHIPS has credit criteria for participants. Prospective participants must be regulated by the New York State Banking Department or a federal bank regulatory authority to ensure that participants are examined on a regular basis and are operating in a sound manner, and prospective participants are subject to a credit evaluation by CHIPCo. CHIPS participants are also required to file copies of their annual financial statements with, and are subject to a periodic review by, the CHIPCo board.

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<sup>16</sup> CHIPCo, using a formula based on the latest transaction history of each participant, establishes the amount of a participant's opening position requirement.

<sup>17</sup> Once fully funded by opening position requirements, the amount of funds in the CHIPS account on the books of the Federal Reserve Bank of New York does not increase or decrease until the delivery of final position requirements after 5 pm ET.

### **3.2.3 Federal Reserve National Settlement Service**

The Federal Reserve allows participants in private clearing arrangements to settle transactions on a net basis using account balances held at the Federal Reserve. Users of the Federal Reserve's National Settlement Service (NSS) include cheque clearing houses, ACH networks and some bank card processors. In 2002, more than 70 local and national private sector clearing and settlement arrangements used NSS to settle a netted value of about USD 15 billion daily.

NSS provides operational efficiency and reduces settlement risk to participants by providing for intraday settlement finality within the limitations established in the Federal Reserve's Operating Circular 12. NSS offers finality that is similar to that of the Fedwire funds transfer service and provides an automated mechanism for submitting settlement files to the Federal Reserve. It also enables Federal Reserve Banks to manage and limit risk by incorporating risk controls on extensions of daylight credit that are as robust as those used in the Fedwire funds transfer service.

#### *(a) Operation of the NSS*

To use NSS, a settlement agent for a settlement arrangement transmits a settlement file electronically to the Federal Reserve using an electronic connection. The file contains a listing of the participants, the settlers (either the participant itself or the participant's correspondent) and the dollar amount of the debit or credit to be posted to the settler's account. If various validity checks are satisfied, the Federal Reserve accepts the file for processing and sends an acknowledgment to the agent. NSS files are accepted for processing and settlement between 8.30 am and 5.30 pm ET. Files submitted earlier than 8.30 am are queued for processing beginning at 8.30 am.

Each debit balance on the settlement file is checked against the account balance and intraday credit available to the settlers. In some instances, debit balances may be rejected if a settler does not have a sufficient balance, or sufficient intraday credit, to cover the debit. When all debit entries on the settlement file have been posted, NSS posts the credit balances. All postings are final and irrevocable when functioned. When all credits have been posted, the settlement for that file is complete and an acknowledgment message is sent to the settlement agent.

#### *(b) Pricing policies*

Federal Reserve fees for NSS are based upon the Federal Reserve's general pricing policies of cost recovery discussed in Section 1.2.2. In 2003, the Federal Reserve charges a USD 14 fee for each settlement file submitted and a USD 0.80 per-entry fee for each item on the file. Arrangements that incur total per-entry and per-settlement charges of less than USD 60 per month are charged a minimum monthly fee of USD 60.

## **4. Securities settlement systems**

### **4.1 Trading**

The major securities markets in the United States are the government securities market, the corporate equity market and the fixed income market. The commercial paper market is an important short-term funding market. These instruments are generally traded either through recognised exchanges or through over-the-counter dealer markets. The mechanisms for clearance and settlement vary by type of instrument and generally involve specialised financial intermediaries, such as clearing corporations and depositories. Participants in these markets include securities issuers, intermediaries such as brokers, dealers, and depository institutions, and investors such as insurance companies, investment companies, non-financial corporations and individuals.

#### 4.1.1 US government securities

US government securities are issued by the US Treasury. In addition, certain individual federal government agencies issue securities, as well as federal government-sponsored enterprises.<sup>18</sup> At year-end 2000, there were USD 5.7 trillion US government securities outstanding, of which USD 28 billion were issued by federal agencies other than the US Treasury.

As fiscal agents of the United States, the Federal Reserve Banks act as the issuing and paying agent for these securities. US government securities are issued in book-entry form through the Federal Reserve's Fedwire Securities Service using either an auction process or dealer syndicate mechanisms.

US Treasury securities are issued through regularly scheduled auctions. The Federal Reserve Banks serve as conduits for the auctions, with the Federal Reserve Bank of New York coordinating much of the auction activity. Individuals, corporations and financial institutions may participate in the auctions. Participation in Treasury auctions, however, is typically concentrated among a small number of dealer firms, known as primary dealers.<sup>19</sup> The primary dealers are required to participate meaningfully in both open market operations and US Treasury securities auctions.

The secondary market for government securities is an over-the-counter dealer market in which participants trade with one another on a bilateral basis rather than on an organised exchange. Trading activity takes place between primary dealers, non-primary dealers and customers of these dealers including financial institutions, non-financial institutions and individuals. The majority of transactions between primary dealers and other large market participants are conducted through inter-dealer brokers that provide both anonymity and price information to market participants. Approximately 2,000 securities brokers and dealers are registered to operate in the US government securities market.<sup>20</sup>

#### 4.1.2 Corporate securities and commercial paper

Corporate securities (equities and fixed income) are traded on various established exchanges that have specific exchange rules and regulations. The primary securities exchanges in the United States are the New York Stock Exchange, the National Association of Securities Dealers Automated Quotations (Nasdaq) and the American Stock Exchange. At year-end 2000, there was USD 18.2 trillion in outstanding securities listed on these three securities exchanges.

The Securities and Exchange Commission (SEC) oversees key participants in the corporate securities market, including stock exchanges, broker-dealers, investment advisers, mutual funds and public utility holding companies. The SEC is concerned primarily with promoting disclosure of financial information of publicly traded companies, enforcing the securities laws and protecting investors who interact with these various organisations and individuals.

Commercial paper is a debt instrument issued by prime-rated commercial and financial companies with a maturity ranging from two days to 270 days.<sup>21</sup> As of year-end 2000, there were USD 1.6 trillion commercial paper obligations outstanding. Commercial paper is issued through dealer placements or direct placements with investors. Although commercial paper is a negotiable instrument, secondary market trading is limited.

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<sup>18</sup> Government-sponsored enterprises (GSEs) are private corporations created by Congress to address public policy concerns about the ability of members of certain groups to borrow sufficient funds at affordable rates. GSEs do not receive federal funds and rely primarily on debt financing for their day-to-day operations.

<sup>19</sup> Primary dealers are designated trading counterparties for the Federal Reserve Bank of New York in its execution of market operations to carry out US monetary policy. As of December 2002, there were 22 designated primary dealers. See Federal Reserve Bank of New York, *Administration of relationships with primary dealers*, 22 January 1992, [www.ny.frb.org/bankinfo/regrept/primary.html](http://www.ny.frb.org/bankinfo/regrept/primary.html).

<sup>20</sup> These firms are registered with the SEC, as required by the Government Securities Act of 1986, which establishes a comprehensive legal framework regulating all government securities brokers and dealers.

<sup>21</sup> Provisions in the Securities Act of 1933 exempt commercial paper with a maturity not greater than 270 days from the requirement that it be registered with the SEC.

## 4.2 Clearing

### 4.2.1 US government securities

Two private sector clearing corporations facilitate the comparison and netting (clearance) process for trades of US government securities: (1) the Government Securities Clearing Corporation (GSCC) compares and nets trades of US Treasury and agency debt securities, and (2) the Mortgage-Backed Securities Clearing Corporation (MBSCC) compares and nets trades of mortgage-backed securities.<sup>22</sup> GSCC and MBSCC are wholly owned operating subsidiaries of the Depository Trust and Clearing Corporation (DTCC). DTCC is governed by a board composed of 21 directors who also serve as directors of the company's operating subsidiaries. Seventeen directors are from participants; two are designated by DTCC's preferred shareholders, the National Association of Securities Dealers and the New York Stock Exchange; and the remaining two are the chairman and chief operating officer of DTCC itself.

For trades submitted to GSCC and MBSCC for comparison, the process begins as soon as the information about the trades is received. Trades that are successfully compared result in binding and enforceable obligations to settle trades. Comparison results include compared and un-compared transactions, as well as advisories, which inform participants of trades submitted against them for which they did not make a corresponding submission. Trades can often be changed until matched. If a repurchase agreement has been compared, any change or deletion requires agreement by both trading partners.

For institutions that use GSCC's or MBSCC's netting service, all trades of eligible securities that are successfully compared are netted against an offsetting net receive or deliver obligation arising from another member's trading activity. Upon the determination of netted positions, GSCC interposes itself between the original trading parties and becomes the legal counterparty for settlement purposes to the GSCC participants. MBSCC engages in multilateral position netting and does not stand in the middle of transactions.<sup>23</sup>

### 4.2.2 Corporate securities and commercial paper

The National Securities Clearing Corporation (NSCC) clears the vast majority of corporate equity and municipal bond transactions in the United States. NSCC handles all aspects of the clearance and settlement of trades between brokers and dealers in securities traded on the New York Stock Exchange, the American Stock Exchange, certain regional exchanges and in the over-the-counter market; it also provides clearing services to issuers of mutual funds. NSCC is a wholly owned operating subsidiary of DTCC.

Trades are reported to NSCC by either the exchanges or the dealing counterparties. Trades submitted to NSCC by recognised exchanges are considered "locked-in" (irrevocable) at submission. Trade data submitted directly by the dealing counterparties are compared by NSCC. Matched trades become irrevocable, while un-compared trade data may be revised at any time until a match is obtained. NSCC guarantees the completion of matched trades.<sup>24</sup>

NSCC rules specify that all book-entry eligible funds and securities transactions submitted to NSCC for netting be given to or received from NSCC as counterparty. Between the period of NSCC's guarantee of trade settlement and final settlement of trades, the obligations of the original counterparties run to NSCC rather than to one another.

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<sup>22</sup> A significant portion of mortgage-backed securities have some kind of US government agency backing. MBSCC has merged with and into GSCC, and GSCC's name has officially changed to the Fixed Income Clearing Corporation (FICC). FICC officially began operations in January 2003.

<sup>23</sup> For further information about GSCC and MBSCC, see [www.gsc.com](http://www.gsc.com) and [www.mbscc.com](http://www.mbscc.com), respectively.

<sup>24</sup> Further information about NSCC's clearance processes can be found at [www.nsc.com](http://www.nsc.com).

## 4.3 Settlement

### 4.3.1 *US government securities*

As fiscal agents, the Federal Reserve Banks act as the securities depository for all marketable US Treasury securities, many federal agency securities and certain mortgage-backed securities issued by GSEs.<sup>25</sup> These securities generally exist in book-entry form only. Depository institutions may maintain book-entry securities accounts at the Federal Reserve, in which they hold their own securities and those of customers. Issuances of these securities and secondary market trades are settled over the Federal Reserve's Fedwire Securities Service or on the books of a depository institution.

The Federal Reserve's Fedwire Securities Service is a real-time, DVP gross settlement system which allows for immediate, final and simultaneous transfer of securities against funds. Transfers are initiated by the sender of the securities and result in a simultaneous debit and credit to the sender's securities and funds accounts, respectively, maintained at the Federal Reserve. The depository institution designated as the recipient in a securities transfer receives a simultaneous credit and debit to its securities and funds accounts, respectively, maintained at the Federal Reserve. The Fedwire Securities Service generally operates between 8.30 am and 3.30 pm ET. There are more than 9,000 participants in the system. In 2000, participants transferred 13.6 million securities valued at USD 188.1 trillion.

### 4.3.2 *Corporate securities and commercial paper*

Most corporate securities, as well as commercial paper, are immobilised at the Depository Trust Company (DTC). DTC is a wholly owned subsidiary of DTCC and is organised as a limited purpose trust company under New York banking law. DTC is a member of the Federal Reserve System and a registered clearing agency with the SEC.

DTC is the world's largest securities depository, holding about USD 20 trillion in securities for its participants and their customers at year-end 2000. DTC's network links more than 11,000 broker-dealers, custodian banks and institutional investors, as well as transfer agents, paying agents and exchange and redemption agents for securities issuers. In 2000, DTC processed over 230 million book-entry deliveries valued at more than USD 116.4 trillion.

A small volume of instruments in the United States still settle by the physical exchange of securities and funds. These securities are often not easily converted to a book-entry or depository system as a result of unique characteristics. Settlement occurs directly between counterparties or, at times, through physical presentment in a clearing house arrangement.

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<sup>25</sup> The Federal Reserve also acts as agent and depository for the securities of certain international organisations, such as the World Bank.

