

*Innovations in International Payment Systems  
and Their Implications for Banks*

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## ACRONYMS

ACH	automated clearinghouse
AFP	Association for Financial Professionals
AML	anti-money laundering
A/P	accounts payable
A/R	accounts receivable
B2B	business-to-business
BIC	Bank Identifier Code
BIS	Bank for International Settlements
CFT	combating the financing of terrorism
CHAPS	Clearing House Automated Payment System in U.K.
CHATS	Clearing House Automated Transfer System in Hong Kong
CHIPS	Clearing House Interbank Payment System in U.S.
CLS	Continuous Linked Settlement
CNS	continuous net settlement
CPSS	Committee on Payment and Settlement Systems at BIS
CUG	Closed User Group of SWIFT
DVD	delivery-versus-delivery
DVP	delivery-versus-payment
DNS	deferred net settlement
EAF	Euro Access Frankfurt
EBA	Euro Banking Association
ECB	European Central Bank
ECN	electronic communications network
EPC	European Payments Council
EDI	electronic data interchange
ELS	Euro Link System
EMU	Economic and Monetary Union of the EU
EPC	European Payments Council
ESCB	European System of Central Banks
ET	Eastern Standard Time
EU	European Union
FATF	Financial Action Task Force
FFIEC	Federal Financial Institutions Examination Council of the U.S.
FIN	Financial Information Network on the SWIFT network
FinCEN	Financial Crimes Enforcement Network of the U.S.
FIU	Financial Intelligence Unit
GDP	gross domestic product
IBAN	International Bank Account Number
IP	Internet protocol
IT	information technology
KYC	Know Your Customer
LVPS	large-value payment system
LVTS	Large Value Transfer System in Canada
NACHA	National Automated Clearinghouse Association

NCB	national central bank
NSS	National Settlement Service
OFAC	Office of Foreign Assets Control at the U.S. Treasury Department
PE-ACH	Pan-European Automated Clearinghouse
PSR	Payments System Risk
PVP	payment-versus-payment
RTGS	real-time gross settlement
SECB	Swiss Euro Clearing Bank
SEPA	Single Euro Payments Area
SIC	Swiss Interbank Clearing
STEP	Straight Through Euro Payment System
STP	straight-through processing
SWIFT	Society for Worldwide Interbank Financial Telecommunications
TARGET	Trans-European Automated Real-time Gross Settlement Express Transfer
TFFC	Office of Terrorist Financing and Financial Crimes of the U.S.
TFI	Office of Terrorism and Financial Intelligence of the U.S.
XML	Extensible Markup Language, developed to facilitate the sharing of data across different systems.

## **I. Introduction**

### **I-a: Estimates on the Size of Cross-Border Payments**

Since a payment is a transfer of value, a payment system can then be defined as any organized arrangement for transferring value between its participants. Payment systems are essential for the functioning of the financial system. They are the networks which allow market participants to settle their financial and business transactions, and their reliable and secure functioning is essential for the efficient flow of goods, services and financial assets in the economy. All these transactions are the lifeblood of market economies, and payment systems are the circulation system for these transactions, essential to the smooth functioning of modern economies.

This circulation system is as vast as it is important. The daily dollar amounts handled by the two major payment systems of Fedwire and CHIPS in the United States were \$3 trillion and \$1.5 trillion in 2005, respectively, with their combined annual dollar volume amounting to more than hundred times the U.S. annual gross domestic product (GDP). The same was true in the United Kingdom, where the total value passing through its payment systems stood at 120 times its annual GDP in 2005.<sup>1</sup> It is clear that payment and settlement systems are a core element of the financial infrastructure at the national as well as the international level.

Cross-border payments are estimated to represent approximately 8% of the total payment volume, with the remaining 92% being accounted for by domestic payments.<sup>2</sup> While many large banks are active in cross-border payments as well as trade finance, there is still room for growth. Banks must offer cross-border payment capabilities to remain competitive and meet the requirement of increased global trade. However, estimating the size of cross-border payments is very difficult due to several reasons. First, there is a blurred line of demarcation in payments flows, as many of these flows are carried out by internal networks of large global financial institutions such as Bank of America, Honkong Shanghai Banking Corporation, and Bank of Tokyo-Mitsubishi UFJ. Since their network coverage is global in scope combining both domestic and international operations, cross-border payments are mixed within their overall payment flows.

Second, most of cross-border payments are actually settled in a specific country's domestic settlement system similar to other domestic payments. For example, a British bank providing a Eurodollar loan to a Korean company actually transfers the necessary dollar amount from its American correspondent bank balance inside the United States to the Korean company's American bank account in the U.S. or, if the Korean company does not maintain an account at a bank in America, to the Korean company bank's correspondent bank in America. Finally, many payments may be part of the multiple

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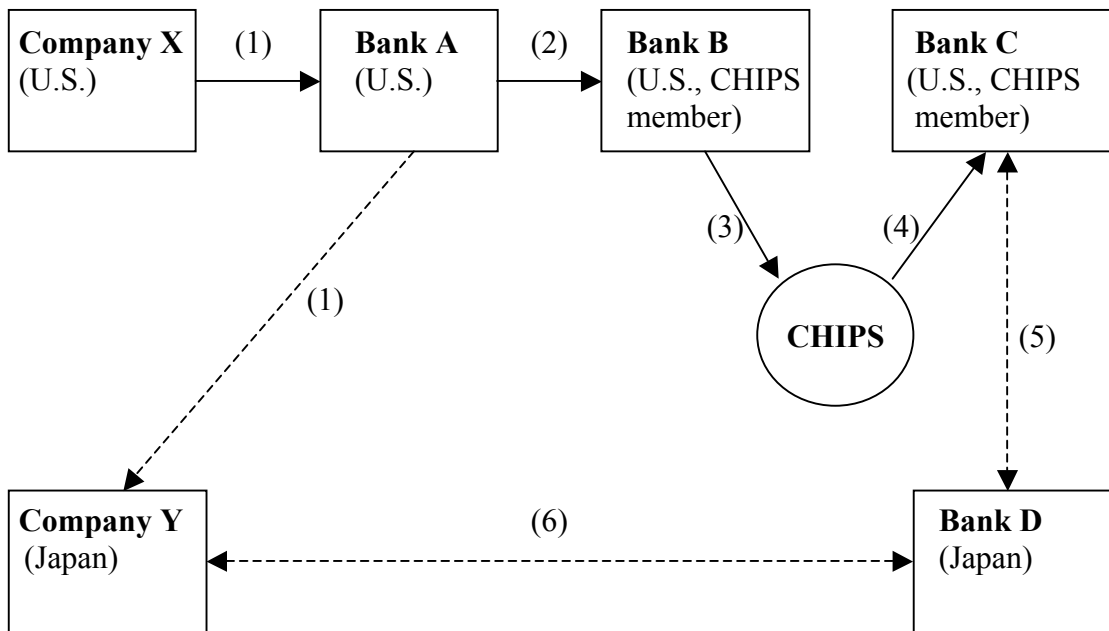
<sup>1</sup> Andrew Haldane and Edwin Litter, "The Role of Central Banks in Payment Systems Oversight," *Bank of England Quarterly Bulletin*, Spring 2005.

<sup>2</sup> Celent Communications, *Cross-Border Business-to-Business Payments: The New Frontier*, Boston, October 2004.

transactions whose components include both domestic and international payments, making it difficult to separate domestic from international.

**Figure I-1: A Typical Cross-Border Fund Flow**

A company (X) in America requests its American bank (A) to send a dollar payment to its client (Y) in Japan. Since A does not belong to CHIPS, A asks its American correspondent bank (B) who is a member of CHIPS to facilitate this transfer. B sends the wire transfer command to CHIPS, which executes the fund transfer by crediting the account of another American CHIPS member bank, C, who is the correspondent bank of the Japanese bank (D) which is Y's bank in Japan.



- (1) Company (X) in America requests its American bank (A) to send a dollar payment to its client (Y) in Japan.
- (2) Bank A asks its American correspondent bank (B) to facilitate this transfer.
- (3) Bank (B), a member of CHIPS, sends the wire transfer command to CHIPS.
- (4) CHIPS executes the fund transfer by crediting the account of another American CHIPS member bank C.
- (5) Bank (D) in Japan is bank C's correspondent bank.
- (6) Company Y has an account with Bank D.

Despite these constraints on the estimation of cross-border payments, one can indirectly estimate the *relative* magnitude of these payment flows. Some of the most important cross-border payments are caused by international trade, foreign exchange trading, international capital market operations such as international bond issues and international bank borrowings. The volume of international trade has expanded sharply over the past ten years as measured by the total imports, whose figures are more accurate than exports statistics because governments tend to pay closer attention to imports for the purpose of collecting import tariffs. During the past ten years, the world trade volume as measured

by total imports has roughly doubled in dollar value from \$5.5 trillion in 1996 to \$10.6 trillion in 2005. Correspondingly, one can surmise that the cross-border payments related to international trade must have doubled in size.

Table I-1: World Trade as Measured by Imports (in trillions of U.S. dollars)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
World	5.5	5.6	5.6	5.8	6.6	6.3	6.6	7.7	9.3	10.5
Industrial Countries (23)*	3.6	3.6	3.7	3.9	4.3	4.2	4.3	4.9	5.8	6.4
Developing Countries (164)	1.9	2.0	1.9	1.9	2.3	2.1	2.3	2.8	3.5	4.1

\*They are the United States, Canada, Japan, Australia, New Zealand, 12 euro area countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain), Denmark, Iceland, Norway, Sweden, Switzerland, and the United Kingdom.

Source: IMF, *International Financial Statistics*, various issues.

However, the volume of cross-border trade in goods is far smaller than that of foreign exchange trades. According to the latest triennial central bank survey conducted by the Bank for International Settlements, the average *daily* foreign exchange market turnover amounted to \$1.9 trillion in April 2004, a rise of 36% at constant exchange rates compared to April 2001. The growth was particularly pronounced for trading between banks and financial customers, pushing its share in total turnover up from 28% to 33%. The main reason for the decline in the FX trading volume between 1998 and 2001, reversing the usual historical upward trend, was the adoption of euro in 1999 by major European countries, thus negating the need for foreign exchange trades between these currencies such as French franc, German mark, Italian lira, etc. In any case, the total foreign exchange trading volume is far larger than the volume of international trade in goods, with one week's trading volume in foreign exchange being equivalent to that during almost one year of the world trade in goods. Most of foreign exchange trading in terms of value takes place among dealers and financial institutions, many of them located in different countries, thus resulting in enormous cross-border large-value payments.

Table I-2: Foreign Exchange Market Turnover, by counterparty<sup>1</sup>  
(Daily average in April, in billions of US dollars)

	1992	1995	1998	2001	2004
With reporting dealers	540	729	908	689	936
With other financial institutions	97	230	279	329	585
With non-financial customers	137	179	242	156	252
Estimated gaps in reporting	44	53	60	26	107
Total "traditional" turnover	818	1,190	1,490	1,200	1,880

<sup>1</sup> Adjusted for local and cross-border double-counting.

Source: Bank for International Settlements, *75<sup>th</sup> Annual Report*, p. 81, Basel, June 2005.



Another indicator of the cross-border payment activities is the amount of *external* loans and deposits of banks vis-à-vis individual countries. For example, if a bank in the United States makes a dollar loan to a borrower in Thailand, the Thai borrower may ask the American bank in New York to transfer the amount of dollars to its bank located in Singapore. Thus, international loans and deposits result in cross-border fund flows similar to that of a Thai exporter earning dollars from its exports to the United States. BIS collects the total amount of foreign loans and foreign deposits by banks located in 39 industrialized and offshore financial center countries. As of September 2005, the total amounted to \$15 trillion.

Table I-3: Outstanding Loans and Deposits of Reporting Banks  
Vis-à-vis All Sectors in the Countries  
(in billions of US dollars)

	2003	2004	2005 <sup>1</sup>
<b>All countries</b>	<b>11,869</b>	<b>13,829</b>	<b>15,075</b>
<b>Developed countries</b>	<b>9,285</b>	<b>10,755</b>	<b>11,793</b>
United States	1,994	2,116	2,669
United Kingdom	2,151	2,653	2,936
Japan	506	627	508
<b>Offshore centers</b>	<b>1,525</b>	<b>1,856</b>	<b>1,998</b>
<b>Developing countries</b>	<b>820</b>	<b>947</b>	<b>1,074</b>

<sup>1</sup> As of September 2005, instead of December 2005.

Source: Bank for International Settlements, *BIS Quarterly Review: International Banking and Financial Market Developments*, March 2006.

Another potential source of cross-border payments is the amount of international debt securities such as money market instruments, bonds and notes that are issued abroad. If the issuers of these instruments bring the proceeds of these issues to their home countries or some third countries where they are needed for working capital or investment purposes, these fund repatriations result in cross-border payments. In other words, international bonds and note issues have similar effects on cross-border payments as international loans and deposits described above.

Table I-4: Outstanding International Debt Securities by Residence of Issuer  
(in billions of US dollars)

Countries	2003	2004	2005
<b>All countries</b>	<b>11,716</b>	<b>13,964</b>	<b>14,644</b>
Developed countries	9,824	11,903	12,523
Offshore centers	750	804	834
Developing countries	635	702	742

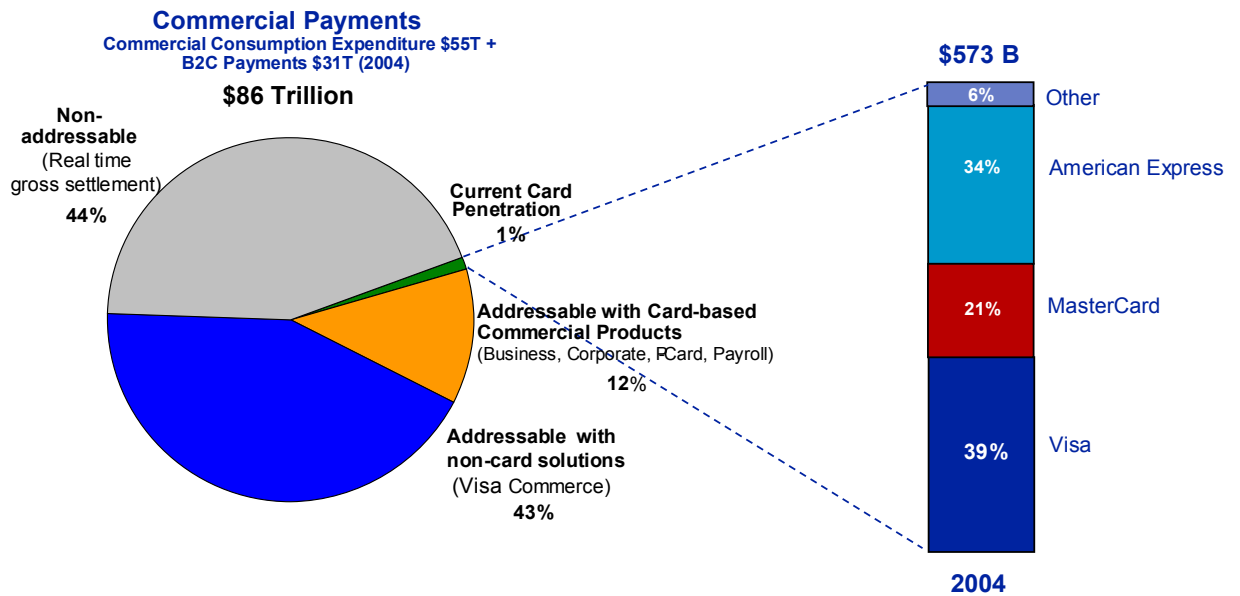
Source: Bank for International Settlements, *BIS Quarterly Review: International Banking and Financial Market Developments*, March 2006.

Also, a review of SWIFT message traffic growth is a good indicator of how the market for cross-border payments has been expanding. SWIFT is an industry-owned limited liability cooperative that supplies secure messaging services and interface software for financial transactions to more than 7,650 banks, securities brokers and investment managers in more than 200 countries worldwide. The infrastructure that SWIFT provides along with its messaging formats and standards plays a key role in the bulk of cross-border transactions taking place today. In 1996, SWIFT handled 0.69 billion messages worldwide but the volume increased to 2.5 billion in 2005, an increase of more than three times during the past ten years. This increase is indicative of the drastic rise in cross-border payment flows.

According to Visa, the total worldwide volume of commercial transactions amounts to \$86 trillion in 2004. Of this amount, about \$573 billion is accounted for by card transactions such as Visa and MasterCard. In 2006, it is estimated that Visa accounts for 44% of the total commercial card market, with 30% by American Express and 21% by MasterCard. However, the true size of commercial payments can best be estimated by considering the size of foreign exchange transactions, as these transactions represent the financial result of various domestic and international commercial and financial transactions such as international trade, foreign loans and deposits, international securities issues, etc. As the dominant financial intermediaries, banks around the world send and receive funds to accommodate a vast array of international trade deals and other financial transactions, which often require converting one currency into another at the request of traders, borrowers, depositors, bond and note issuers, and other market participants. After surveying major financial institutions around the world, BIS reports that, as of April 2004, the daily average volume of foreign exchange trades amounted to \$1.9 trillion. (See Table I-2.) Based on the total number of business days at 240 days excluding weekends and other holidays, the total annual foreign exchange turnover in 2004 was \$456 trillion. If we exclude the amount of daily foreign exchange trading among foreign exchange dealers amounting to \$936 billion, the foreign exchange transactions with other financial and non-financial (commercial) customers stood at \$944

billion per day, according to BIS, or \$227 trillion for the entire year of 2004. Thus, one may conclude that, conservatively, the annual volume of commercial payments amounted to well over \$227 trillion in 2004.

## Commercial payment space is large; Visa takes lead in card-based solutions

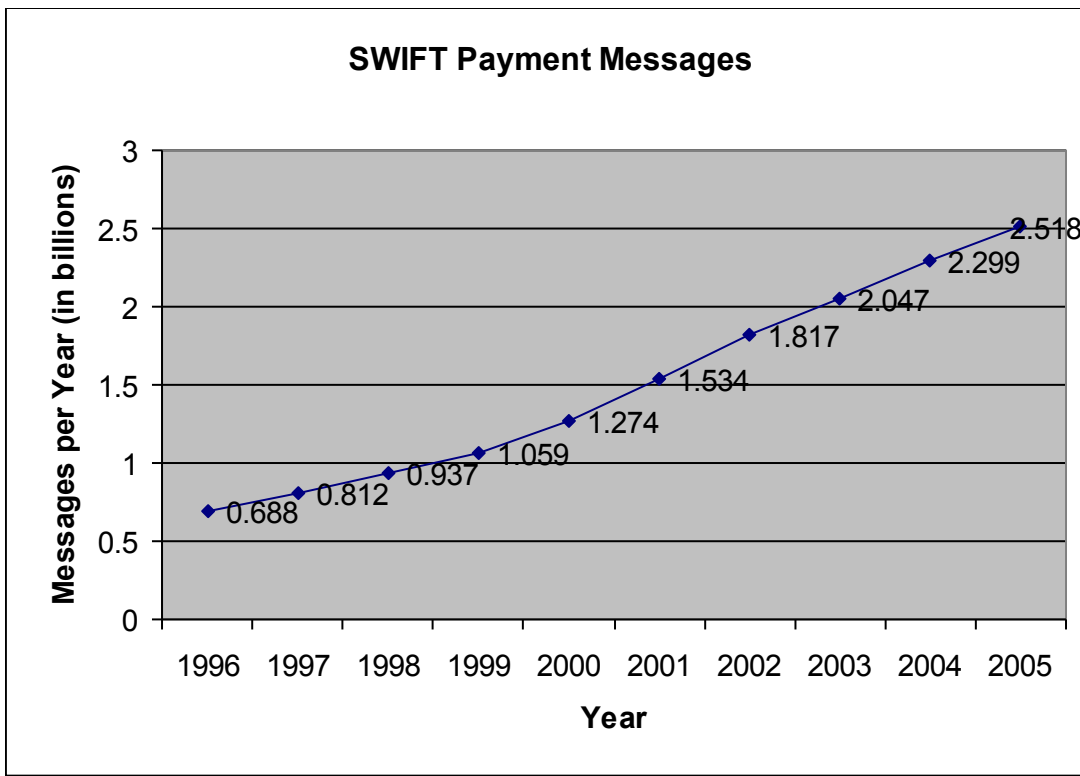


BCG and Visa analysis

Visa Commerce | 13-14 Mar 2006

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Source: Visa Commercial.



#### **I-b: Growing Importance of Cross-Border Payments**

Business-to-business (B2B) cross-border payments are not a new phenomenon. Corporates have been transferring funds both domestically and internationally for some time. However, as markets become increasingly global, there is a pressing need to fulfill the requirements of corporates participating in cross-border transactions as well as the financial institutions that serve them. In recent decades, multiple payment vehicles, networks, and standards have risen up to provide a dizzying array of options. Additionally, technological, political, geographic, regulatory, and competitive factors are transforming the cross-border payment process and landscape. These transformations are providing significant opportunities, challenges, and risks to corporates and financial institutions. For example, the goal of introducing SEPA (Single Euro Payments Area) by early 2008 will pose an enormous challenge for the banks and corporates operating in Europe. Today, there are more than 15 retail payments systems in the euro area for the clearing and settlement of credit transfers and direct debits. Most of them have their own specific operating rules and technical standards that are deeply rooted in legacy systems, national regulations, consumer behavior and even local cultures. Banks in Europe now have to invest massively to adapt their payment infrastructures in order to achieve SEPA-compliance and at the same time they have to develop a cogent strategy to take advantage of the new opportunities open to them through an integrated SEPA system throughout the euro area.

In response to its critical importance to the modern economy, the payments system is evolving toward an ever more universal and sophisticated level of operation. Payments system innovations are an integral component of the new economy characterized by the revolution in computer and telecommunications technologies in the era of Internet and globalization. In both wholesale and retail areas, new technologies and new participants

are beginning to transform the payments system landscape. One byproduct of this transformation is the blurring of the distinction between wholesale and retail activities, as when large dollar payments are made through ACH (automated clearinghouse) transactions. There also is the growing integration of domestic and international payments flows, as efforts are well under way to develop a functioning cross-border ACH.

In the area of commercial cross-border payments, however, there remain numerous inefficiencies that need to be addressed by various concerned parties. First, most of existing payment systems were originally designed to process domestic payments, and there has been a lack of well-established systems that can efficiently handle cross-border payments. Second, prices for cross-border payments are substantially higher than for domestic ones even in Europe where a common currency, euro, was introduced and used since 1999. Third, the execution time for cross-border settlements is much longer than for domestic ones due to old habits and a host of different regulatory requirements.

In recent years, however, the need for efficient cross-border payments has received an increasing attention, particularly in connection with the work towards an integrated market for payment services in Europe. Efficient cross-border payment systems are deemed to be necessary in order to realize the advantages of the EU-wide internal market and the development of such systems is a natural consequence of the establishment of the European Monetary Union. Such a move is not unique to Europe alone, however, as both governments and private sector institutions in other regions are also realizing the importance of developing more efficient cross-border payment services.

The remainder of the study is to focus first on the existing processes and infrastructure for commercial open account, cross-border payments and then discusses recent and emerging trends in cross-border payment systems, with the ultimate goal of suggesting the framework for further business interfaces between corporates and banks through more efficient cross-border payment process.

This study is composed of seven parts that respectively deal with: the estimates of the size of cross-border commercial payments and their growing importance; existing cross-border payment process; the emerging industry trend and technology in cross-border payment and settlement mechanisms; corporate issues for cross-border payments; bank issues for cross-border payments; the potential role of Visa Commerce in reducing payment inefficiencies; and action plans for banks and corporates to improve the efficiency of cross-border payment processes.

## **II. Existing Cross-border Payment and Settlement Process**

### **II-a: Inefficiencies in Cross-border Payments**

A number of studies point toward considerable growth in cross-border payments in the coming years. For example, the Boston Consulting Group estimates that the volume of cross-border payments will increase at a compound annual rate of 10.2% globally and 7.8% for the North and Latin Americas during the decade of 2000 through 2010.<sup>3</sup>

Despite this expected increase, however, many obstacles hinder the smooth functioning of payments in the international marketplace. A study by the Board of Governors of the Federal Reserve System finds that end users and financial service providers consider cross-border payments to be costly and cumbersome and that the incentives to develop faster and lower cost systems do not exist.<sup>4</sup> According to the BIS Committee on Payment and Settlement Systems, the small volume of cross-border retail payments relative to domestic payments, estimated to be only 1 to 2 percent of the total payments,<sup>5</sup> presents a significant challenge to establishing a critical mass that will lead to more efficient system infrastructure for retail cross-border payments. However, cross-border commercial payments are estimated to be much larger and growing rapidly, thus attracting an increasing attention among banks and regulatory authorities.

Resistance to the implementation of standards arises from the large costs associated with enhancing internal systems and procedures relative to the small volume of international payments. Network effects can only arise if banks join in creating a common infrastructure that will lead to critical mass and generate economies of scale. Moreover, banks need to educate their customers on the need and proper use of standards in order for them to be implemented appropriately. The smooth functioning of an integrated cross-border payments market also requires cooperation between banks in interbank standards. Banks may be reluctant to make sizeable investments to support such standards, if they are uncertain that other banks are making similar investments to upgrade their systems.

Costs associated with cross-border transactions are related to various factors. Over the past few decades, many industrialized countries have established high and low value payment systems that are based on proprietary formats and communication and security standards. As a result, there is a lack of standardization and automation in inter-bank and intra-bank networks, which adversely affects banks and corporates alike and results often in manual intervention to collect and correct data. Businesses and consumers tend to pay fees not only for international payments but also explicit or implicit fees for foreign exchange conversion. Moreover, various intermediaries are involved in the payment process, particularly through the widespread use of correspondent relationships. Consequently, the execution time for cross-border payments is substantially longer than for domestic payments.

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<sup>3</sup> Boston Consulting Group, *Global Payments 2003: The Payment Puzzle*, 2003.

<sup>4</sup> *The Future of Retail Electronic Payments Systems: Industry Interviews and Analysis*, by Federal Reserve Staff for the Payments Development Committee, Federal Reserve System, December 2002.

<sup>5</sup> Committee on Payment and Settlement Systems, *Policy Issues for Central Banks in Retail Payments*, Bank for International Settlement, March 2003.

There are several root causes of inefficiencies in cross-border payments. First, most payment systems originated in respective domestic environments based on local laws and regulations, local payment customs, and existing domestic banking and financial structures. Thus, these payment systems were not originally designed for cross-border payments. Second, cross-border payments are subject to certain extra risks not present in most domestic systems, such as significant settlement risks due to different time zones involved in cross-border payments. New innovative methods had to be designed on a multilateral basis in order to cope with such extra risks. Third, national differences in transfer costs have to be reconciled to create an effective multilateral payment system. For example, it cost 3.08 euros in Norway and just 0.27 euros in Spain to process a paper cheque, as the following table illustrates. All these and other issues take time to be addressed on an innovative and multilateral basis in order to develop efficient cross-border payment systems.

Table II-1: Bank Cost per Payment Transaction

Country	Year	Denomination	Cheque	Electronic Giro/ACH
Norway	2001	Euro	3.08	0.62-1.09
Spain	2001	Euro	0.27	0.08
U.S.	1993	Dollar	0.15-0.43	0.12-0.44

Source: European Central Bank, *E-Payments Without Frontiers*, Issue Paper for the ECB Conference on November 10, 2004, p.28.

## **II-b: Payments Landscape in the European Union**

Despite some progresses in recent years, to a large extent Europe still has a patchwork of different payment systems that have been developed according to national traditions and structures. When one considers the factors that impede or facilitate cross-border payments, the European Union (EU) serves as a useful microcosm in which to assess market structure, payment costs, incentives, standards and end user needs. The EU is the world's second largest payment market following the U.S. and faces divergent consumer and corporate payment habits. Countries like Spain and Italy predominantly use cash for transactions, while up to 30% of transactions in Germany are electronic. In terms of corporate payments, trade intensive economies such as Germany, the Netherlands and Belgium have greater business-to-business transfers than other EU countries, due to more systematic cash management and treasury transactions.

The EU is still a patchwork of different payment systems that have developed according to national traditions and structures. Even though Eurozone residents use the same currency, Euro, paying by direct debit or making large credit transfers across national borders is either impossible or prohibitively expensive. Realizing the need for improving cross-border payment efficiencies, the European Commission, the European Central Bank and national central banks have created the regulatory framework required for

financial integration. EU banks have also taken steps toward creating a Single Euro Payments Area (SEPA), agreeing to have the necessary infrastructure in place by 2008 for processing cross-border payments in parallel with national payments. By 2010, the bulk of national credit transfers, direct debits and card payments would be using SEPA processes and instruments.

Most EU countries now have their own ACH systems, which have individual operating rules, settlement times, account numbering systems and standards. The transaction volumes processed by these ACH systems also vary. Within this environment, the European Payments Council has fostered the development of a pan-European automated clearinghouse (PE-ACH). It is estimated that PE-ACH would require a critical mass of about 50% of current cross-border credit transfers to be economically viable. The final goal will be achieved, however, only when those EU countries that do not have their own national ACH systems begin to use PE-ACH. When one examines this fragmented EU payment infrastructure, it appears that regulatory mandate, rather than customer demand, is driving cross-border payments toward a single European payments area. Progress toward integrating the Eurozone into a single payments area has been slow, due to firmly entrenched rules and standards of domestic payment systems.

Cross-border transactions in Europe take an average of 3.4 days to complete compared to 1 day for domestic transactions. Straight-through processing (STP) rates are 33% for cross-border payments compared to 99% for domestic transfers, notwithstanding the introduction of international standards such as the international bank account number (IBAN), the bank identifier code (BIC), and the SWIFT classification system. Bank fees for cross-border payments within the EU varied widely. In order to address this disparity in fees, a European Commission rule, that became effective in 2003, requires banks to charge no more for cross-border retail transactions than for domestic ones. In response to this pricing rule, most banks have raised their fees for wire transfers or increased other domestic bank charges.

Efforts are underway in the EU to address standards related issues. It is hoped that the creation of a more efficient payment system through SEPA will improve the European banking and financial industry by driving the development of standardized technology platforms. In addition, the European Payments Council (EPC), which was formed to provide practical assistance in the formation of SEPA, is working toward establishing common European standards. A study by the European Parliament also finds that the inefficiencies of cross-border payments may be addressed by increasing the interoperability among payment carriers, reducing manual intervention by increasing straight-through processing (STP), and decreasing the number of intermediaries in the payment process.<sup>6</sup>

Contractual agreements and regulation, however, may not always have the desired effect. For example, the European Commission pricing rule requires bank customers to provide the receiver's IBAN and BIC in order to provide a streamlined, automated way to speed payments to the recipient. This process has been complicated by the different number of

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<sup>6</sup> Simona Amati, *Improving Cross-border Payments in the Euro Area*, European Parliament, June 2000.



digits that each European country uses for the IBAN and by the unfamiliar forms that customers use to initiate a cross-border transactions in comparison to domestic transfers. Only about one percent of customers initiating cross-border transactions in the Eurozone include the BIC and IBAN in the payment message. As a result, some banks charge fees to manually repair payment orders.<sup>7</sup>

### **II-c: Main Payment Mechanisms**

The cross-border payments process is undergoing a period of metamorphosis. Where transaction services in the past were value-added, they are now increasingly commoditized. While more banks tend to outsource their routine tasks of payment clearing, paradoxically the number of players in the payments business tends to decrease due to industry consolidation in order to take advantage of the scale economy and more complicated technology. Within financial institutions the treasury, liquidity management and risk management functions are integrated more closely by external factors and to take advantage of new knowledge management technology as part of their drive for greater efficiency in an increasingly globalized environment. The cross-border payment market represents a potential future growth market for both financial institutions and corporates.

The overall market has been made up of four main payment mechanisms: card transactions, cheques, direct debits, and credit transfers. Aside from card transactions, however, cross-border payment systems are still deficient in efficiency. To date, international payments have been to a large extent based on correspondent bank operations. And the traditional approach to processing payments was end-of-day net batch processing. Today, batch systems operate with settlement cycles as short as every 30 minutes, known as deferred net settlement systems (DNS). Thanks to real-time processing capabilities, however, payments can now be processed individually and immediately, with such a trend expanding from large-value transfers to retail payments in response to customer service requirements and the growth of e-commerce. Real-time payment systems fall into two groups: the real-time gross settlement systems (RTGS) of central banks and private continuous net settlement systems (CNS).

RTGS systems eliminate the counterparty credit risk present in DNS systems by requiring participants to settle all individual payments instantaneously on a gross basis in real time. But this credit risk reduction comes at the cost of a requirement for potentially expensive intraday liquidity. Central banks have sought to reduce liquidity costs for settlement banks, for example by providing collateralized intraday liquidity and good system design. Even so, intraday liquidity in RTGS systems is not free and unlimited.

An important determinant of the liquidity efficiency of an RTGS payment system is the extent to which the system design gives settlement banks an incentive to manage their payments in an efficient way. In an RTGS system, one bank's payments are a source of intraday liquidity for the recipient bank, which it may then subsequently use to make its own payments. With payments settled on a real-time gross basis, banks' liquidity needs

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<sup>7</sup> "Cross Border Euro transfers Remain an Arduous Process," *The Wall Street Journal*, August 27, 2003.

under RTGS are greater than those under DNS. If banks recycle liquidity sufficiently quickly, however, the aggregate requirement for intraday liquidity under RTGS can be similarly reduced.

Both the private institutions and government regulators have given the priority to the identification and reduction of risk in the systems as well as the implications of the communication revolution sparked by the Internet and the resultant blossoming of e-commerce. There have also been some notable innovations in payment system design. With the increasing importance of both liquidity and risk management for banks and their clients, the industry witnesses the introduction of continuous linked settlement (CLS) and delivery versus payment (DVP) in order to reduce risk in the settlement of financial transactions. It would be useful to evaluate and compare various important RTGS, CNS, DNS and hybrid payment and settlement systems that have been in use in major countries of the world. Some of the well-known systems are Fedwire, TARGET, CHIPS, CHAPS Euro and CHAPS sterling, Euro1, RTGS<sup>PLUS</sup>, STEPS, CLS, Eurogiro and LVTS.

**Fedwire:** Fedwire stands for Federal Reserve Wire Network. It is a high-speed electronic network through which the U.S. Federal Reserve provides the Fedwire Funds Service, the Fedwire Securities Service, and the National Settlement Service. The Fedwire Funds Service provides a RTGS system in which more than 9,500 participants initiate funds transfers that are immediate, final, and irrevocable when processed. Main participants are Federal Reserve member banks, non-member depository institutions, and other institutions such as branches and agencies of foreign banks as well as international organizations such as the World Bank. Participants that maintain a reserve or clearing account with a Federal Reserve Bank may use Fedwire to send payments to, or receive payments from, other account holders directly. Participants use Fedwire to handle large-value, time-critical payments, such as payments for the settlement of interbank purchases and sales of federal funds, the purchase, sale, and financing of securities transactions; the disbursement or repayment of loans; and the settlement of real estate transactions. In the Fedwire Funds Service, only the originating financial institution can remove funds from its Federal Reserve account. Originators provide payment instructions to the Federal Reserve either on line or off line. On-line participants send instructions through a mainframe computer or PC connection to FEDNET, Federal Reserve national communication network. The Fedwire Funds Service business day begins at 9 p.m. Eastern Standard Time (ET) on the preceding calendar day and ends at 6:30 p.m. ET Monday through Friday.

The Fedwire Securities Service consists of a safekeeping function and a transfer and settlement function. The safekeeping function involves the electronic storage of securities records in custody accounts. The transfer and settlement function involves the transfer of securities between parties. Transfers of Fedwire book-entry securities are initiated in the same manner as Fedwire funds transfers. More than 9,100 participants maintain a reserve account with a Federal Reserve Bank and use the Fedwire Securities Service to hold and transfer U.S. Treasury and U.S. government agency securities (including mortgage-backed securities), as well as securities issued by certain international organizations such as the World Bank. These securities are held and

transferred in electronic (book-entry) form; the U.S. Treasury and international organizations no longer issue physical securities, nor do most federal agencies. Most securities transfers involve the delivery of securities and the simultaneous exchange of payment for the securities, a transaction called delivery-versus-payment (DVP). The transfer of securities ownership and related funds (if any) is final at the time of transfer.

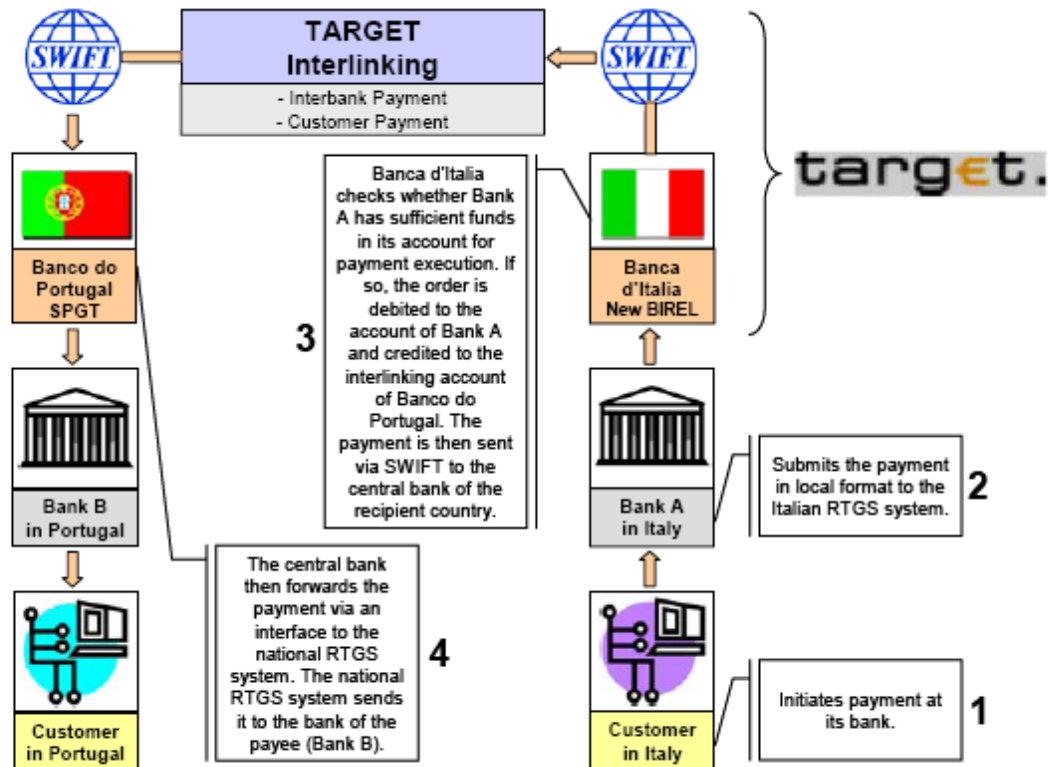
The National Settlement Service (NSS) allows participants in private-sector clearing arrangement to exchange and settle transactions on a net basis through reserve or clearing account balances. NSS is available to arrangement that settle across Federal Reserve Districts as well as to arrangements that settle entirely within a single Federal Reserve District. There are approximately 70 NSS participants including check clearinghouse associations, ACH networks, and credit card processors.

The Federal Reserve develops Fedwire to improve not only the efficiency but also the safety of the nation's settlement process. The Federal Reserve uses a number of tools to provide data security in Fedwire such as logical access controls, encryption, end-of-day balancing, user/ID/workstation match, dual verification of off-line transactions, message accountability, and change controls. Since Fedwire fund transfers are settled in central bank money (fed funds) with immediate and irrevocably final transfer, the receiving institutions are not subject to credit risks. However, the Federal Reserve is exposed to several credit risks. In order to maintain the smooth and efficient operation of Fedwire, Federal Reserve Banks provide daylight credit (daylight overdraft facilities) to most Fedwire participants. This service exposes Federal Reserve Banks to direct credit risk from the participant with daylight credit. If a participant were to fail or close before it extinguished its daylight overdraft, the Federal Reserve Bank could bear a financial loss. In order to mitigate such a risk, the Payments System Risk (PSR) policy was implemented, requiring all participating institutions incurring daylight overdrafts to set up a maximum limit on daylight overdrafts, known as "net debit cap", based on a multiple of each institution's risk-based capital. Pledging collateral to the Federal Reserve Bank is not required for participating institutions under the PSR policy. However, certain institutions are allowed to voluntarily pledge collateral in order to gain additional daylight credits beyond their net debit caps in special occasions.

**TARGET** (Trans-European Automated Real-time Gross Settlement Express Transfer): The Eurosystem, which comprises the European Central Bank (ECB) and the national central banks (NCBs) of the 12 EU member states which have adopted the euro, has created TARGET for large-value payments in euro. The TARGET system is a "system of systems" made up on the national payment systems of the 16 of 25 countries that are currently members of the EU, the ECB payment mechanism (EPM) and an interlinking mechanism that enables the processing of payments between the linked systems. It was based on the existing infrastructures, connecting 16 member RTGS payment systems through SWIFT. It provides a real-time settlement service in central bank money and processes the Eurosystem's credit operations. By using TARGET, the Eurosystem members can remotely access the RTGS system of another country without establishing a branch or subsidiary in that country. Each of the 16 central banks owns and operates its TARGET component, and the ECB has the overall oversight

responsibilities. EU members that have not yet adopted the euro, such as the U.K., Denmark, Sweden and Poland, are also connected to TARGET. In 2005, 89% of the total turnover of large-value payments in euro was executed via TARGET, which is available for all credit transfers in euro between banks located in any of the EU member states whose NCBs are linked, directly or indirectly, to TARGET. A survey conducted in 2005 revealed that as of December 31, 2004, there were 10,564 participants in TARGET.

**Figure II-1: Example of a Cross-Border TARGET Payment**



Source: Jacob Jegher, *Cross-Border Business-to-Business Payments: The New Frontier*, Celent Communications, Boston, October 2004, p. 21.

Overall, around 53,000 institutions, in particular branches of participants, can be addressed through TARGET using a Bank Identifier Code. In 2005, the daily average of payments processed by TARGET increased by 10% from 2004 both in volume and value, by processing a daily average of 296,306 payments with a total value of Euro 1,902 billion per day. In 2005 the overall availability of TARGET, i.e. the extent to which participants were able to use TARGET during its business hours without incident, reached 99.83%. On average, 95.59% of inter-Member State payments were processed within five minutes.

Within the TARGET system, the German RTGS<sup>PLUS</sup> system remains the most important component, and 28.3% of all TARGET payments were initiated through RTGS<sup>PLUS</sup> in 2005. In general, the bulk of TARGET traffic continues to be concentrated in a handful of components, i.e. national RTGS systems, three of which had a collective share of 70.1% in terms of volume and 68.1% in terms of value of all transactions sent via TARGET. As a result, a severe incident affecting these components could have a considerable impact on the TARGET system as a whole. It is therefore critical that these systems are well protected against operational risks.

In view of the recent enlargement of EMU, TARGET has to be enlarged as well with the connection of new TARGET components in the new EMU member countries. Those countries that envisage joining the euro area at the beginning of 2007 must be connected to the current TARGET system in order to ensure that their financial systems are fully integrated into the euro financial market. However, these countries are not obligated to implement their own TARGET components in order to connect to the current TARGET system. A number of options have been made available, out of which the NCBs in question can choose the one most appropriate to their specific situation.

Table II-2: Payment Traffic in TARGET

<b>Volume (number of transactions)</b>	2004	2005	Change (%)
<b>Overall</b>			
Total	69,213,486	76,150,602	9
Daily average	267,234	296,306	10
<b>Intra-member state</b>			
Total	52,368,115	58,467,492	10
Daily average	202,193	227,500	11
<b>Inter-member state</b>			
Total	16,845,371	17,683,110	5
Daily average	65,040	68,806	5
<b>Value (EUR billion)</b>			
	2004	2005	Change (%)
<b>Overall</b>			
Total	443,992	488,900	9
Daily average	1,714	1,902	10
<b>Intra-member state</b>			
Total	297,856	324,089	8
Daily average	1,150	1,261	9
<b>Inter-member state</b>			
Total	146,137	164,812	11
Daily average	564	641	12

Source: European Central Bank, *Annual Report 2005*, p. 96.

**CHAPS** (Clearing House Automated Payment System): CHAPS, established in 1984, is the United Kingdom's high-value payment system, consisting of two systems: *CHAPS Sterling* and *CHAPS Euro*, which provide settlement facilities for sterling and euro payments respectively. Over dozen large banks and building societies are "direct" or settlement members, while there are also over 400 "indirect" members – typically smaller banks and building societies – who have access to the system through a settlement member. In early 1996, the CHAPS Company in partnership with the Bank of England transformed the British sterling wholesale payment system from an end-of-day net settlement system to an RTGS system, thereby eliminating the credit risk inherent in a net settlement system. Currently, CHAPS is the largest RTGS system in Europe, and the second largest in the world after Fedwire in the U.S. In 2005, the daily average volume of CHAPS sterling was 117,657 payments with the average value of 206,514 million pounds.<sup>8</sup>

With the advent of the euro in January 1999 and the TARGET system, the **CHAPS Euro** was also launched as the British RTGS system in euros in order for CHAPS member banks to make domestic and cross-border euro payments. As with CHAPS Sterling, CHAPS Euro is a true RTGS system, with each payment settled immediately in real time at the Bank of England. Rather than using a proprietary system, CHAPS Euro is based on the SWIFT standards utilizing SWIFTNet (the secure IP-based communications solution built by SWIFT), which enable low cost connections to the service to be made from anywhere in the world. CHAPS Euro is the second largest component of TARGET by volume and value of cross-border payments made and fourth largest for all payments (cross-border and domestic euro payments). In 2005, the daily average volume of CHAPS Euro was 27,468 payments with the average value of 172,680 million pounds equivalent.<sup>9</sup>

To reduce liquidity risk, the Bank of England provides intraday liquidity to all CHAPS Sterling members, limited only by the availability of eligible collateral. For CHAPS Euro, this credit is further limited to approximately 3 billion euros each day. However, members are able to raise additional liquidity within the euro area and transfer this through TARGET to CHAPS Euro. To aid liquidity management, all banks have real-time information on balances and the status of payment messages, with additional real-time monitoring by Bank of England operators.

**RTGS<sup>PLUS</sup>**: RTGS<sup>PLUS</sup> is the German Bundesbank's new liquidity-saving RTGS, which became operational in November 2001. It combines the risk-reducing benefits of gross settlement of the former German RTGS system known as the Euro Link System (ELS) with the advantages of liquidity-saving processing of the former hybrid system known as Euro Access Frankfurt (EAF). The main performance features of these earlier settlement systems have been incorporated into RTGS<sup>PLUS</sup> and improved. One of the key factors behind the new developments was the new competitive environment partly caused

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<sup>8</sup> Bank of England, *Payment Systems Oversight Report 2005*, February 2006.

<sup>9</sup> *Ibid.*

by the introduction of the euro. This appeared to signal the need to combine the separate procedures of EAF and ELS in order to exploit synergies in terms of cost and efficiency.

RTGS<sup>PLUS</sup> provides two modes of access: direct and indirect. Direct users may be German or foreign banks. It is also intended that Clearstream and Eurex become direct users alongside the other users to ensure a liquidity-saving money settlement of securities and security deposits with the associated users. The German Bundesbank is also associated as a direct user and thus allows all its account holders that are not directly connected with RTGS<sup>PLUS</sup> to participate directly. Indirect users from all over the world can access the RTGS<sup>PLUS</sup> system via one of the above-mentioned direct users. Settlement and liquidity management will be effected by the selected partner.

All payment transfers at RTGS<sup>PLUS</sup> are executed with immediate finality, provided that the payment is adequately covered. If sufficient cover is not available, the system checks whether the submitted payment can be settled taking offsetting queued express payment(s) of the recipient into account. These offsetting payments have to be at the top of the recipient's queue. In principle, express payments are settled according to the FIFO (first in, first out) principle. A particular feature of RTGS<sup>PLUS</sup> is that, like its predecessor, EAF, it permits the extensive use of reciprocal payments as an additional cover fund. When payments are submitted, RTGS<sup>PLUS</sup> tries to use as cover the credit balances in RTGS<sup>PLUS</sup> as well as reciprocal payments that are made by other participants and specifically intended for the submitter. Queued payments are moved forward for processing as quickly as possible by continuously implementing mathematically based optimization processes (algorithms); the offsetting individual payments in the queues are posted to accounts at the same time.

RTGS<sup>PLUS</sup> participants have convenient ways of specifically managing their liquidity flow. Payments for which the total amount of the participant's liquidity may be used are submitted by participants as express payments. However, if the amount of liquidity that may be paid out is to be limited, the participant submits a limit payment. This means that account can be taken of additional limits defined by the participant when payments are executed. Participants can be flexible in their use of bilateral and multilateral limits as well as of a total limit. Limit payments are only executed immediately if there is enough liquidity and the limits have not been exhausted.

Compared with other mechanisms, the sender limits used in RTGS<sup>PLUS</sup> present many advantages in terms of liquidity management. The submitter makes the execution payments that exceed the limit dependent on the receiver making payments in his favor. This facility is backed by the extensive transparency of the queues of incoming payments. Consistent use of offsetting payment flows reduces the amount of liquidity needed. The multiple limit options, together with the opportunity to use the information and control system, allow an individually tailored approach that is invariably appropriate to the situation. Optimal liquidity management is guaranteed even if the participant structure is less homogeneous or if exceptional situations occur in the course of day. A flexible use of limits, which lies fully within the hands of the participant concerned, is certainly preferable to rigid system regulations.

**LVTS (Large Value Transfer System):** The fully electronic LVTS, Canada's real time gross settlement system, became operational in early 1999. As Canada's wire payment mechanism, it facilitates the electronic transfer of Canadian dollar payments across the country in real time. Although the benefits of LVTS are particularly relevant for large-value transactions, it can also be used for payments of any amount, especially those that are time-sensitive. Canada's national payments system has been operated by the Canadian Payments Association (CPA) since 1980. The CPA is made up of banks and other deposit-taking institutions that have deposit insurance. Together with its members, the CPA is responsible for the development of clearing and settlement rules and standards. In Canada, the LVTS settles all electronic payments while the Automated Clearing and Settlement System (ACSS) is used to settle all paper payments items such as cheques and drafts.

The Bank of Canada is legally responsible for overseeing the safety of the LVTS. The central bank holds collateral from other LVTS members, which it would use to settle the LVTS in the unlikely event that one of the institutions could not meet its obligations. As a general rule, LVPS (large-value payment system) design has ensured that the settlement asset (that is, claims on the settlement institution) is transferred at the same time as finality is achieved. Notable exceptions are the LVTS and the European EURO1. Both systems provide examples of how the transfer of funds across accounts held with the settlement institution (the Bank of Canada and the European Central Bank, respectively) may take place after the time of finality.

The LVTS employs multilateral netting by novation. Every payment that passes through the LVTS's real-time risk controls has immediate finality. This is true despite the fact that settlement of multilateral net positions across the books of the Bank of Canada does not occur until the end of the day. Thus, the LVTS can be considered to be an RTGS-equivalent system, but one that economizes on liquidity compared to a traditional RTGS system. Even if one or more LVTS participants default before the time at which the system is due to settle, the unconditional and irrevocable status of payments that had previously passed through would not be at risk, because the system provides certainty of settlement.

The LVTS has two payment streams, Tranche 1 (T1) and Tranche 2 (T2). Each participant can choose to send a payment via either stream, assuming that the payment can pass the risk controls of the selected stream. T1 payments sent must be funded, dollar for dollar, by T1 payments already received or by collateral that is pledged to the Bank of Canada by the sending institution. If a default were to occur, the Bank of Canada would be entitled to realize on the participant's collateral in exchange for supplying the liquidity necessary to bring the defaulter's position to zero. This stream is called "defaulter pays".

In the T2 stream, participants extend bilateral credit limits (BCLs) to each other. The BCL of one participant to another represents the maximum positive bilateral position that the first participant is willing to assume with respect to the second. A participant's T2



net debit cap equals the sum of the BCLs that it receives from other participants multiplied by a fraction (currently 24%) called the “system-wide percentage”. The T2 net debit cap represents the maximum allowable multilateral net debit position of a participant. There is no cap on multilateral net credit positions. In order for a payment to pass through the T2 risk controls, it must not violate the caps on bilateral positions, represented by the BCLs, or the cap on the overall multilateral net debit position.

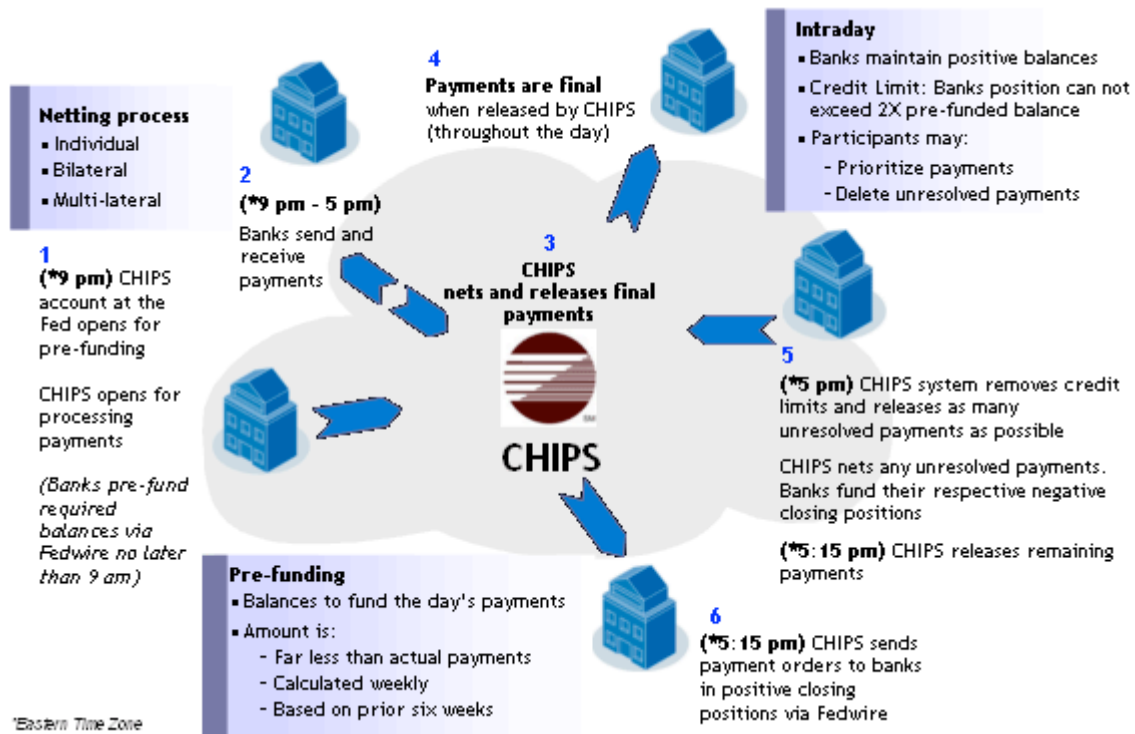
To support its T2 activity, each participant must pledge to the Bank of Canada collateral equal to the largest BCL that it extends, multiplied by the system-wide percentage. This results in sufficient collateral being pledged to the Bank of Canada to cover the single largest multilateral net debit position. The Bank of Canada is obligated to provide the liquidity necessary to settle each participant’s multilateral net T2 position. For each institution, this obligation is completely collateralized by the T2 collateral requirement described above. In the event of a single default, the Bank of Canada would realize on the collateral of the defaulter and on sufficient collateral from those surviving participants who had extended BCLs to the defaulter to cover the multilateral net debit position of the defaulter and would provide the liquidity necessary for the system to settle. Surviving participants would share in the losses in proportion to the size of the BCLs they extended to the defaulter. Thus, a participant that had extended no BCL to the defaulter would suffer no loss. This stream is called “survivors pay”. In the event of a single participant failure, the Bank’s exposure is completely collateralized.

In the extremely rare event of multiple defaults and if the collateral pledged by participants to the Bank of Canada was not sufficient to cover the net debit positions of the defaulters, the Bank of Canada would realize on the available collateral, according to the loss allocation rule described above, and become an unsecured creditor of the defaulting institution. Under the Payment Clearing and Settlement Act, the Bank of Canada provides an explicit guarantee of settlement for the LVTS. It is this certainty of settlement that permits the LVTS to provide intraday unconditional finality and irrevocability of payments that pass through its risk controls, despite the fact that settlement across the Bank’s books does not occur until the end of the day.

**CHIPS** (Clearing House Interbank Payment System): CHIPS is a bank-owned, privately operated, real-time, multilateral electronic payments system that transfers funds and settles transactions in U.S. dollars. CHIPS began operations in 1970 with 9 participating banks and, as of mid 2006, it processes about 300,000 payments a day with an average daily amount of \$1.5 trillion. It currently has 46 participants from 19 countries around the world, including large U.S. banks and U.S. branches of foreign banks. The payments transferred over CHIPS are often related to international interbank transactions, including the payments resulting from foreign currency transactions (such as spot and currency swap contracts) and Euro placements and returns. CHIPS estimates that it handles about 95 percent of all U.S. dollar payments moving between countries. 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.

Until 1981, the final settlement occurred on the morning of the next business day after a transfer. However, rapidly rising settlement volumes aroused concerns that next-day settlement exposed the recipient parties unduly to various overnight and over-weekend risks. In August 1981, the Federal Reserve agreed to provide same-day settlement to CHIPS participants through Fedwire to reduce risks. Until January 2001, however, CHIPS still remained as an end-of-day net settlement system. Following the global trend toward the RTGS system, since 2001 CHIPS has also operated as a real-time, final payments system for U.S. dollars that continuously matches, nets and settles payment orders released by CHIPS from the CHIPS queue. Thus, CHIPS is not an RTGS system in a strict sense but a real-time, continuous multilateral net payments system. Unlike Fedwire, CHIPS members do not face daylight overdraft charges, since there are no intraday overdraft facilities with CHIPS. It has reached 94% straight-through processing (STP) rate.

**Figure II-2: How CHIPS Works**



To achieve real-time finality, payment orders are settled on the books of CHIPS against participants' positive positions, simultaneously offset by incoming payments orders, or both. Under the real-time finality agreement, each CHIPS participant has a pre-established opening position requirement which is a pre-funding fund transferred via the Fedwire Funds Service to the CHIPS account at the Federal Reserve Bank. A participant cannot send or receive CHIPS payment orders until it transfers its opening position requirement to the CHIPS account. This pre-funding fund is used to settle payment

orders throughout the day. As of 2005, CHIPS only required \$2.8 billion in daily pre-funding to complete over 270,000 transactions worth \$1.4 trillion, implying that \$1 turns over 500 times a day with CHIPS. In comparison, with the Fedwire \$1 turns over 16 times a day, providing CHIPS participants with an excellent liquidity ratio.

The next step for CHIPS might be the collaboration with other payment networks. Such collaboration is to ensure that the message formats and standards can support straight-through processing (STP) and the creation of compatible operating system. In this way, CHIPS can ensure that messages are transferred seamlessly to other payment systems. Since most of the world's communications networks already use open communication known as Internet protocol (IP) technology, by shifting CHIPS payment networks to IP, CHIPS can make its system compatible with other financial services organizations that have already made a similar switch. Such a step could imply an important development in broadening the application of successful domestic payment systems on a global scale.

**SWIFT** (Society for Worldwide Interbank Financial Telecommunications): SWIFT is an industry-owned limited liability cooperative that supplies secure messaging services and interface software for financial transactions to more than 7,650 banks, securities brokers and investment managers in more than 200 countries.<sup>10</sup> In the beginning, SWIFT dealt only with bank-to-bank communications. However, as the system evolved and more players became part of the transmission process, SWIFT realized that transactions rarely begin with a bank. In the 1990s, SWIFT understood that its exclusivity to banks was a big barrier in preventing it from capturing a huge potential market share of other financial entities. Finally, in March 2000, SWIFT allowed broker-dealers and asset managers to become full members of SWIFT. Such an opening turned out to be a very smart move indeed, as about one-third of SWIFT's transmitted messages are now from this new category of members.

Established in early 1970s, SWIFT has far exceeded its initial objectives when their main goal was to simply automate the telex traffics and one day hit 300,000 messages per day without a loss. Now, SWIFT routinely handles nearly ten million messages a day with system availability approaching "five nines" (99.999%) of uptime. The value of the messages sent each day by members is estimated at \$5 trillion. SWIFT is the primary facilitator of cross-border payment information in the world; its message types, formats and technical infrastructure provide a common means of processing cross-border payments. One of SWIFT's main goals is to provide comprehensive messaging standards with high security and reliability and to promote straight-through processing (STP). STP is the seamless passing of financial information to all concerned parties without manual handling or redundant processing in real time. SWIFT, which is controlled by its member banks and financial institutions, transmits approximately ten million messages per day.

SWIFT payment messages are processed by the Financial Information Network (FIN), which operates on a secure IP network called **SWIFTNet**. Adoption by SWIFT of IP network makes its infrastructure far more flexible and versatile, since the IP standards are

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<sup>10</sup> [www.swift.com](http://www.swift.com).

the world's most popular open-system (nonproprietary) protocol suite and they can be used to communicate across any set of interconnected networks and are equally well suited for LAN and WAN communications. SWIFTNet services were introduced in 1999 with the objective of offering the financial industry an interactive standard platform for financial communication and messaging. SWIFTNet offers a suite of services including bulk payments processing, cash reporting and securities reporting.

SWIFT has implemented several strategic initiatives that can impact the cross-border payment marketplace. For example, SWIFT is implementing financial communication and messaging standards via SWIFTNet, introducing XML-based standards for bulk payments in 2002. SWIFT also provides a means (i.e., messages) for financial institutions to exchange credit transfer instructions directly or through clearinghouses. Communication and messaging standards introduced by SWIFT have the potential to drive the payments industry towards a common payment messaging standards because of the SWIFT network's broad span. SWIFT is leveraging its global network to link the growing number of fragmented market infrastructures, thereby accelerating end-user adoption of its services. SWIFT provides messaging and connectivity services to financial market infrastructures such as CLS; netting services (e.g., EURO1 and STEP1); stock exchanges (e.g., Euronext); RTGS systems of 15 central banks participating in TARGET and national RTGS systems in Belgium, Denmark, Finland, France, Greece, Ireland, Italy, Luxembourg, Spain, Sweden, United Kingdom and Germany. SWIFT is seeking to position itself to attain critical adoption mass through its broad user-base.

Finally, SWIFT is integrating into the ACH market segment as a payment service provider via its new FileAct messaging service. ACH networks such as the ClearingHouse, the EBA Clearing Company and the South African Automated Clearing Bureau are already using SWIFT's messaging platform. SWIFT is pursuing similar arrangements with approximately 15 global ACH networks.

**Eurogiro:** Eurogiro, owned by 16 banks/postal financial service companies, is an electronic payment network for postal and giro (postbank) organizations that exchange cross-border credit transfers and cash-on-delivery orders. Established in 1989, Eurogiro has more than 40 participants from 37 countries of Europe, Asia, Africa, South America and the U.S. Members act as correspondents for one another and hold reciprocal accounts with each other to execute payments. The Eurogiro network is accessible twenty-four hours a day, seven days a week and members establish bilateral agreements for the currency that will be used to exchange and settle transactions. Eurogiro provides the network (hardware and software) and the SWIFT-like message codes enabling the members to offer different cross-border payment products to their customers, for example, credit transfers and cash payments.

In October 2003, Eurogiro signed an agreement with SWIFT allowing Eurogiro to act as an administrator of a Closed User Group (CUG) within the SWIFT network. Acting as an administrator is not revolutionary in itself, but what was new was the fact that members of the Eurogiro SWIFTNet CUG are able to communicate directly and do not have to communicate via the administrator. The network communication was thereby

leveraged from the traditional one-to-many communication to a many-to-many communication setup. This type of CUG solution not only facilitates a number of benefits for the members of Eurogiro, but it is considered by some as a ground-breaking solution which potentially could be adopted by other institutions. The CUG allows Eurogiro members to exchange FileAct and potentially other types of exchanges between themselves or with non-SWIFT members of Eurogiro via the Eurogiro hub.

Those members of Eurogiro who are already using SWIFT and who have migrated to SWIFTNet will consequently be able to abolish the system currently used for connection to the Eurogiro network, and thereby have one IT platform less to maintain. Implementing the Eurogiro CUG in the Eurogiro community will not have substantial impact on non-SWIFT members of Eurogiro who remain using the system. These members can continue to exchange standard Eurogiro Envelopes with their Eurogiro partners, irrespective of whether the partner is connected through the CUG or directly via the Eurogiro System. When sending transactions via the Eurogiro hub, the non-SWIFT members of Eurogiro will also experience cost benefits through the use of pooling and compressing functionalities.

Eurogiro Network and the U.S. Federal Reserve signed a transatlantic cooperation agreement in March 2003 to facilitate cross-border ACH payments between the U.S. and Europe. Also, Eurogiro's partnership with Western Union allows participants to send urgent cash money orders via a Western Union interface. The Eurogiro SWIFTNet CUG is an innovative Eurogiro gateway strategy to enhance connectivity for members to more products and business partners via less IT platforms and costs. Such a strategy has led to new innovative connectivity. First, the postal world is now connected to the banking world. Second, banks, posts, non-financial institutions, and domestic clearing solutions can be linked across different geographical regions. Third, the card world and payment world can be linked, as illustrated by the recent agreement between Visa Europe and Eurogiro.

**STEPS** (Straight Through Euro Payment System): The STEPS program was launched by the Euro Banking Association (EBA) to offer a full range of euro payments across Europe. STEPS has evolved into two systems aimed at accommodating a broad base of processing needs within the European Union: STEP1 (a pan-European system designed to process *single* cross-border, low-value retail payments) and STEP2 (a pan-European ACH for *bulk/high volume*, low-value, cross-border and domestic interbank payments).

STEP1 creates a direct link between participants, thereby enabling them to send and receive payments from each other without recourse to third party intermediation. The STEP1/EURO1 network consists of over 200 participants and an additional 400 STEP1 sub-participants. It is based on SWIFT's Financial Information Network (FIN) messaging infrastructure and computing facilities. STEP1 services are accessible through SWIFT's IP-based messaging platform, SWIFTNet, across borders within the EU, supporting euro-denominated transactions.

STEP1 shortens the execution time for cross-border retail payment instructions between the ordering customer's bank and the beneficiary bank. It also promotes the use of industry standards for messaging in order to enhance straight-through processing (STP) at the banks. In this way, STEP1 reduces intermediation costs, execution time and pricing of cross-border payment services. Systemic payment risk from STEP1 banks is mitigated by ensuring that each bank's position (resulting from processed payment messages) is not negative. The STEP1 banks settle their daily balances via EURO1 participants functioning as "settlement banks." If a STEP1 bank has a negative position at the transmission cut-off time on the processing day, its "settlement bank" makes the necessary payment before the STEP1 bank's payments can be processed.

### **III. Emerging Trends in Cross-border Payments**

In recent years, cross-border payments have provided a fertile field of innovations and changes. Whereas the key achievements in the 1990s were speed and safety of payments, the new focus since the turn of the century has been to reduce liquidity costs and to provide users with more flexible intraday liquidity management. While once there were a large number of players, the field is now dominated by a selective group of big network banks. While once there was a single domestic payment channel in each country, we have witnessed the emergence of transnational systems such as TARGET, CLS (Continuous Linked Settlement) Bank, the Federal Reserve's International ACH Project, known as FedACH International, the pan-European automated clearinghouse known as PE-ACH, the Single Euro Payments Area (SEPA), etc.

The convergence of technological advances, globalization and the drive for efficiency has promoted the implementation of "straight through processing (STP)" standards for transfers between banks as well as between banks and customers. To ensure simultaneous and dependable deliveries, payment-versus-payment (PVP), delivery-versus-payment (DVP), and delivery-versus-delivery (DVD) processes have also been established. SWIFT developed with Eurogiro a Closed User Group (CUG) for their members to leverage their traditional one-to-many communications to a many-to-many communication setup. It has also created the SWIFTNet Trade Services Utility (TSU), which allows banks to offer more efficiently such services as outsourcing of trade data checking, finance and risk mitigation, and management information.

Globally as well as nationally, cross-border payments face challenges and also opportunities due to the recent drive towards anti-money laundering (AML) and combating financing of terrorism (CFT). The importance of cross-border payments also increased the role of such governmental agencies as the U.S. Treasury Department's Office of Foreign Assets Control (OFAC) as well as such multilateral efforts as the Financial Action Task Force (FATF), the Egmont Group of national financial intelligence units (FIUs), and the Wolfsberg Group formed by private financial institutions to combat money laundering and terrorist financing. In this section, we discuss some of the major emerging issues and salient developments in cross-border payments.

### **III-a: Controlling Settlement Risk**

Payment systems have evolved rapidly over the past 20 years, taking advantage of revolutionary advances in both computer and telecommunications technology as well as in modern risk management. Payment systems can be subject to many risks, the most important of which are the credit risk and the liquidity risk. The credit risk is the possibility that a party within the system will be unable to fully meet its financial obligations within the system currently or at any time in the future. Liquidity risk is the risk that a party within the system will have insufficient funds to meet financial obligation within the system as and when expected, although it may be able to do so at some time in the future. The design of a payment system has to be appropriately balanced so that such risks are optimally managed while the system efficiency is not compromised. Payment systems may be categorized as retail or large-value payment systems. This distinction has been important because of the different risks involved and (at least in the past) differences in service speed and efficiency. Most retail payment systems are currently settled on a net basis using very simple algorithms. In these systems, the liquidity impact and settlement risks are generally low and therefore no sophisticated liquidity and risk management tools are warranted. The opposite is true for large-value payment systems, which often contain sophisticated risk and liquidity management features.

The traditional approach to processing payments was end-of-day net batch processing, whereby payments were collected by the banks in daily batches and handed over to payment systems that cleared them over the following days. Interbank settlement for such payments typically took one to three days. Today, batch systems operate with settlement cycles as short as every 30 minutes. Such systems are called deferred net settlement systems (DNS).

Thanks to real-time processing capabilities, payments can now be processed individually and immediately. Real-time processing is mainly used for large-value transfers; the bulk of retail payments are still made in deferred batches. Real-time processing should gradually expand to all kinds of payments in response to customer service requirements and the growth of e-commerce. Real-time payment systems fall into two groups: the real-time gross settlement systems (RTGS) of central banks and private continuous net settlement systems (CNS). Interbank settlement transfers in RTGS systems are directly booked on central bank accounts through which payments and settlements are processed simultaneously. In CNS systems, payments are booked immediately, while final settlement usually with central bank money is typically delayed until the end of the day.

In true real-time processing, the liquidity need is fixed by the processed payment flow so it cannot be influenced. In fact, the liquidity need can be smoothed by deferring payments through a queue system and by netting queued payments between banks with opposing queued payment flows. This situation also gives the possibility to save interbank settlement liquidity when all payments do not require immediate processing.

This has resulted in the emergence of a third group of systems, hybrid systems, which combine features from real-time and deferred net settlement systems. Most large-value payment systems currently operated by central banks such as Fedwire and TARGET are RTGS systems, but they continually acquire an increasing number of hybrid features for preserving liquidity, optimizing the use of liquidity and resolution of gridlock situations.

Payment systems may also be categorized as public or private systems depending on the settlement institution. The settlement institution is the organization across whose books transfers between participants take place to achieve settlement within the settlement system. In most cases, the central bank is the principal settlement institution in domestic payment systems. The settlement asset in such systems is central bank money, i.e., claims against the central bank. The settlement institution can also be a private entity such as a commercial bank or a financial organization specifically created to act as a settlement institution. In such systems, the settlement asset is commercial bank money, i.e., claims against private financial institutions.

Many countries have a two-tiered settlement hierarchy, whereby a small number of large banks settle on the books of the central bank, while a large number of small and intermediary banks settle with the facilities of the larger banks. Savings and cooperative banks may also maintain an internal settlement bank as an intra-group settlement institution and as the external gateway to other banks or payment systems. A multi-tiered structure adds new risk and processing layers. Modern technology supports flat network-based structures with direct IT contacts between all parties.

Payment and settlement systems generally take on a hierarchical structure where different types of transactions are handled in different systems. Obligations arising from these systems are settled in interbank settlement systems. To reduce the liquidity need, interbank settlement can be concentrated into one settlement institution, typically the central bank and its RTGS system. The final end-of-day settlement typically occurs in public RTGS systems. This is especially the case for high-value payments, but private institutions are occasionally used. The RTGS level is generally the highest level as most other systems eventually settle on this level.

CNS systems can be considered private RTGS systems that normally settle at end of day in RTGS systems. However, these systems often use various kinds of swap or liquidity injection methods to reduce their internal risk positions. Sometimes, private systems can autonomously settle using central bank RTGS systems. In such cases, the private system transfers central bank liquidity into a separate account held by the central bank or the system itself on behalf of the clearing parties. All transactions are then booked on these accounts. Examples of CNS systems with RTGS interfaces are the CLS used for real-time settlement of foreign exchange trades and CHIPS in the U.S. and France's PNS (Paris Net Settlement System).

To ensure simultaneous and dependent settlement, PVP, DVP, and DVD (payment-versus-payment, delivery-versus-payment, and delivery-versus-delivery) processes have been established. The PVP process is used when settling currency deals where two



payment transactions in different currencies are processed only if both can be made final simultaneously. The DVP process is used for settling securities deals by requiring simultaneous settlement of the payment and asset legs. The DVD process can be used for ensuring securities credits by making the delivery of borrowed securities and their collateral dependent on each other. Most countries and most securities settlement systems require DVP-based settlement to reduce risks.

### **III-b: Liquidity Management in Settlement**

There are two main risks in payment systems, credit risk and liquidity risk. Credit risk refers to the risk of a payment transaction not being realized at full value due to the insolvency of a system participant. Liquidity risk is the risk of a settlement not being realized at the desired time but at an unspecified time in the future due to insufficient liquidity in the payment system at the time of settlement. In modern payment systems where payments are processed in real-time or in batches during the day, liquidity not only has end-of-day value but also intraday value. In both gross and net settlement systems, there is a clear relationship between liquidity usage and settlement/payment delay. The more the liquidity that is used, the speedier the final settlements. If the cost of liquidity and delay are equal, the cost-optimal level of liquidity is likely to be that for which no payments are delayed. A delay in settlement reduces the sender's liquidity costs but increases both its delay costs and the receiver's liquidity costs. Therefore, payment systems have to strike a balance between minimizing the liquidity cost and keeping settlement risk under control.

Liquidity costs for participants stem both from any fees or interest they may have to pay to obtain funds from the central bank or the market and from any requirement to post collateral in the system if there is an opportunity cost for the collateral. One aspect of operational efficiency of a payment system is measured by the liquidity needed to settle all payments and the delay that payments incur before final settlement. There are a couple of indicators measuring liquidity usage in a payment system. The *netting ratio*, or net value expressed as a percentage of gross value, traditionally gives an indication of the relative amount of liquidity needed to settle all payments over a certain amount of time. The figure ranges between 0 and 100, with gross settlement yielding a result of 100. However, as liquidity can be recycled and used for numerous payments throughout the day, the actual liquidity needs in RTGS systems appear to be much lower than the total value of all transactions. Relative liquidity needs in RTGS systems can be rendered by a *turnover ratio*, which expresses the total value of payment in relation to the total value of settlement balances. However, it does not reflect intraday fluctuations in liquidity needs and the use of intraday credit. A *liquidity usage indicator* takes balances as well as intraday credit into account. This indicator is made of the sum of liquidity available to all banks at start of day plus the sum of individual maximum intraday credit positions, divided by the total value of all payments. The higher the ratio, ranging between 0 and 1, the higher the liquidity needs. A *settlement delay indicator* is the sum of the values of queued payments divided by the total cumulative values of outgoing payments, over each minute of the day.

Under an RTGS system, both credit risk and settlement risk between settlement banks are eliminated. However, banks' liquidity needs under RTGS are greater than those under deferred net settlement (DNS). This implies a burden for the economy as a whole because it is a drain of resources but also because, in an attempt to save liquidity, banks delay payment activity in order to wait for incoming payments that can be then used as liquidity. Liquidity management means not only monitoring payments, but maintaining central bank balance (for some institutions in multiple locations), scheduling payments so as not to exceed these balances and, for sophisticated payment businesses, managing clients' liquidity. However, all the bank's liquidity management activities are interfacing with external systems – payment channels – which the bank does not control. Therefore, the bank's liquidity management strategies are carried out within the context of the design of the payment channels it uses and the demands of its client.

Liquidity management is most critical to RTGS systems but the world's two premier RTGS systems, Fedwire and TARGET, have addressed the issue quite differently. These different approaches could be due to the history of the systems or might reflect different financial structures. It is difficult to assess whether one system is better than the other or if each system is optimally designed to fit a particular country's specific needs. It is indeed possible that, despite their differences, each system provides a similar trade-off between liquidity and risk.

Starting in the mid-1980s, the Federal Reserve instituted important reforms aimed at controlling the use of Federal Reserve intraday credit by depository institutions. These reforms did influence settlement risk for Fedwire because Fedwire users need intraday credit whenever the value of a payment exceeds the reserves the user holds at Federal Reserve Banks. The Federal Reserve Board of Governors imposed quantitative limits – or caps - on account overdrafts at Federal Reserve Banks in 1986 and a small fee on intraday credit in 1994. As a general matter, the majority of account overdrafts at Federal Reserve Banks are uncollateralized. Caps protect the Federal Reserve by limiting the risk posed by any given institution.

Institutions that expect to incur large overdrafts can request a larger cap. In such cases, the size of the cap is determined largely by a self-assessment undertaken by the depository institution requesting the cap. These institutions have considerable flexibility in setting the cap, provided they can convince the Federal Reserve that their internal risk-management procedures will allow them to safely handle such a cap. Self-assessed caps are obtained mainly by heavy users of daylight overdrafts. To the extent that some institutions with self-assessed caps can demonstrate that their cap is too constraining, the Federal Reserve Banks may authorize a level of additional collateralized daylight overdraft capacity.

To have access to intraday credit, Fedwire participants must also satisfy regulatory criteria designed to ensure they are adequately capitalized. This allows only relatively safe institutions to borrow. In practice, caps have not constrained most institutions. The Federal Reserve reviewed its daylight credit policies in 2000. The review found that

approximately 97% of depository institutions use less than 50% of their daylight overdraft capacity for their average daily peak overdraft. However, a small number of healthy institutions did find themselves regularly constrained by their caps, causing them to delay sending some payment instructions.

Since 1994, the Federal Reserve has also charged a small fee on intraday overdrafts. This rate was set at 24 basis points (annual rate) and raised to 36 basis points in 1995. By making intraday credit more expensive, the Federal Reserve aimed to provide some incentive for payment system participants to reduce their credit use. A decrease in the value of overdrafts after the introduction of the fee suggests that this indeed happened, with the average overdrafts decreasing about 40% one year after the introduction of the fee. There is also some evidence that the introduction of a small fee for daylight overdrafts in the United States has led to some delay in making payments, reducing the efficiency of the payment system somewhat. On the other hand, the small fee also appears to have provided incentives for Fedwire participants to better manage their payments. Some evidence suggests that coordination between different institutions to send each other payments at roughly the same time has increased, thus reducing the potential for overdraft over long periods. Such coordination enhances the efficiency of the payment system.

On the other hand, TARGET takes a different approach to controlling settlement risk. It is a decentralized RTGS system consisting of the “interlink” of 15 national payment systems, together with the European Central Bank. TARGET is an RTGS system because the national payment systems it comprises are themselves RTGS systems. As with other RTGS systems, providing enough liquidity for the system to function smoothly was an important concern for the designers of TARGET. Some of the liquidity needs could be met with required reserves, but more was needed. The solution that was adopted allows system participants to borrow intraday funds at a zero interest rate. In the TARGET system, liquidity is provided by the individual central banks within the European System of Central Banks (ESCB). To protect the central banks from settlement risk, all intraday credit must be collateralized. This requirement raised the fear that the system would be too demanding in terms of collateral. To remedy this potential, a wide range of assets is eligible for collateral. The design of TARGET appears to work well. Access to liquidity has turned out not to be an issue and the ESCB is protected by the required collateral.

### **III-c: Technological Advances and the Search for Efficiency**

Historically, technology has played a critical role in the evolution of payment systems. Technology now allows much faster processing time, as well as cheaper dissemination of information throughout closed networks (those internal to related institutions and other closed clubs) and open networks (those that do not restrict entry and are usually compatible with multiple standards such as the internet). At the same time, the drive for efficiency is a result of technological advances and the increasingly competitive business environment.

Innovation continues in payment system design, which has evolved to meet two sometimes contradictory demands: the operational needs of their users and the risk-reduction concerns of regulators. The recent trend of system migration from netting systems such as DNS toward RTGS systems reflects the latter, while the development of hybrid systems such as CNS systems is reflective of the former. Providers of traditional net settlement systems have been reengineering their systems to offer functionality and risk reduction closer to RTGS but without an onerous liquidity demand. RTGS remains the favored design by central banks and these continue to be the main providers of large-value payment systems.

The search for operational efficiency has led to the outsourcing of payment and securities clearing to a third party, which may be a bank or a non-bank entity. Banks have increasing recourse to such entities, allowing them to specialize in the “sales function” (covering direct relations with clients, including account holding) while outsourcing “production function” such as the processing of payments and securities. In the United States, for example, many non-bank service providers such as First Data, Western Union, PayPal, Checkfree, MoneyGram, etc., account for an increasing share of the outsourcing market. By exploiting the latest Internet-based technology, these non-bank service firms are actively muscling into the payments business. Consequently, some experts worry about the regulatory vacuum in this area as these service firms, unlike banks, are not regulated or supervised by government agencies. Traditional financial institutions such as banks are expected increasingly to focus on marketing existing and new products that are in line with their core competencies rather than expending efforts on conquering the more repetitive back office tasks.

At the international level, consolidation is leading to an increasing concentration of correspondent banking custody services in a smaller number of large market players. Traditionally, correspondent banking was the method commonly used for processing cross-border credit transfers. This led to fragmentation of payment channels and to very costly interbank processing of cross-border payments. Thus, it was felt that further consolidation of the payment systems infrastructure would be desirable. In response to this demand, more customer payments have been processed in recent years via more versatile payment systems such as EURO1 and TARGET for large-value payments and STEP1 for low-value credit transfers. Most networks now use straight-through processing (STP), under which no manual intervention is needed for payment processing, and the message formats used are in most case compatible with SWIFT standards.

Correspondent and global custody institutions are normally selected by other banks according to the range of products they offer, the ease of access to their services, the payment and settlement systems in which they participate, their financial standing, and their ability to raise liquidity. The role of traditional banks is also changing with consolidation. Most international banks have reviewed and reduced the number of nostro accounts they maintain with other banks and correspondent relationships based on reciprocity are largely being replaced by commercially based relationships, joint ventures or alliances. In addition, the widespread acceptance of TARGET, EURO1 and CLS Bank

is eroding the traditional “bridging” function of international correspondents. Networks have also been established for the purpose of making low-value cross-border retail payments in Europe and other places.

There is also internal consolidation in payment functions within an individual financial institution that leads to the concentration of payment and securities-related processing and back office activities within a few processing centers. This evolution is in contrast with the traditional organization of major international banks, where payment and securities settlement business is distributed among their branches and subsidiaries abroad, each of them having responsibility for settlements in the local currencies. Large international banks now tend to concentrate most of their worldwide payments activities in one or a few processing centers. The recent establishment of the CLS mechanism in 2002 to limit foreign exchange settlement risks has accelerated this trend. A detailed discussion of CLS is provided at the end of this III-c. The following sections describe some of the recent developments in cross-border architecture.

**FedACH International Services:** This international gateway arrangement service is owned and operated by the Federal Reserve System. Currently, the Federal Reserve Banks offer a suite of FedACH International Services as part of FedACH Services and provide U.S. originating depository financial institutions with the ability to send international non-time-critical payments via the same process used to send domestic transactions for many decades. FedACH International Services offer an integrated, uncomplicated method to ensure straight-through processing (STP) of cross-border transactions, using NACHA formats that are supported by most software vendors. This service provides direct and easy access to countries representing more than 50 percent of the global gross domestic product. The FedACH International Services are currently available for the following countries: Canada, Mexico, and the European countries of Austria, Germany, the Netherlands, Switzerland and the United Kingdom. In the future, the Federal Reserve Banks plan to expand the service to other international endpoints and enhance product functionality.

**TARGET2:** The current structure of TARGET was decided on in 1994 and was based on the principles of minimum harmonization and interconnection of existing infrastructures. This was the best way of ensuring that the system would be operational from the very start of the European Economic and Monetary Union (EMU) in 1999. Since TARGET’s launch in 1999, the environment in which TARGET operates has changed and continues to change. In view of increasing financial integration within the euro area and the fact that the business needs of TARGET users are becoming even more similar, the system needs to be enhanced. In October 2002, the Governing Council of the ECB decided on the long-term strategy for TARGET (**TARGET2**). It envisaged a technical consolidation of the TARGET system, a single Eurosystem-wide pricing structure for domestic and cross-border payments, and a harmonized service level. The pooling of intraday liquidity by means of a virtual account will allow TARGET2 participants to group their RTGS accounts and to pool the available intraday liquidity for the benefit of all members of the group of accounts. This liquidity pooling feature will decrease the cost of managing several accounts with one or several central banks and will

effectively neutralize the fragmentation of intraday liquidity experienced by multi-country banks that need to maintain accounts with several central banks.

The go-live date for TARGET2 is set for November 19, 2007, with the gradual migration to the new system by the member states in four waves. All central banks participating in TARGET2, together with their national banking communities, are expected to be using the new system by May 2008. Both the central banks of England and Sweden have decided not to connect to TARGET2, even though they are connected to the current TARGET.

**STEPS2:** STEP2, a pan-European ACH solution, is a joint venture between the EBA and Italy's ACH operator SIA. STEP2 processes high-volume, commercial and retail payment orders sent to the system via files through a secure network. The system offers direct access to a wide banking community and payment instructions are distributed to any bank operating within the European Union. Banks on STEP2 network are able to reduce their costs by routing files through STEP2's central infrastructure. Whilst the initial targeted market is cross-border payments, the system is also designed to integrate domestic traffic.

Characteristics of payment orders that are processed via STEP2 are commercial and retail transfers in euro that are formatted to agreed technical standards. Accessible through SWIFTNet, STEP2 offers payment processing and settlement in euro.

**SEPA:** The Eurosystem has a vision for the SEPA: a euro area in which all payments are domestic, where the current differentiation between national and cross-border payments no longer exists. This means that the SEPA project not only aims to improve the efficiency of cross-border payments. It also aims to develop common instruments, standards, procedures and infrastructures in order to foster substantial economies of scale. Within the SEPA, customers will be able to make payments throughout the whole euro area as efficiently and safely as in the national context today. If they so wish, they will be able to do so using a single payment account and a single euro payment card, which will be accepted throughout the euro area. The SEPA is a natural consequence of the introduction of the euro. The SEPA is expected to provide the vision on how modern payment systems will look like at the end of this decade, by exploiting the new possibilities offered by the progress in information technology.

The European banking industry has taken on the responsibility of delivering the SEPA products, in particular the specifications on the new payment instruments. It is up to the banking industry to develop and maintain viable and profitable business models compatible with the SEPA. Economies of scale, increased competition and greater efficiency will not only affect the banks' revenues but also their costs. At the end of the SEPA process, it is expected that all euro area credit transfer transactions will be processed in accordance with a single set of European schemes. In addition to the scheme presently defined by the European Payments Council (EPC), the Eurosystem expects that a standard for priority payment will be developed. The EPC, comprising more than 60 banks, was created in 2002 as the decision-making and coordination body in order to deliver pan-euro payment schemes for electronic credit transfers and direct

debits plus a single market for cards by the beginning of 2008. By January 2008, the Eurosystem expect the schemes defined by the EPC to be available to customers, in parallel with the national instruments. By end-2010, the Eurosystem expects that public administrations, corporates and perhaps individuals will use exclusively the SEPA credit transfers.

The ultimate objective with regard to direct debits is that all euro area direct debit transactions be processed in accordance with the SEPA scheme. This scheme will need to be complemented by additional options in order to provide suitable solutions for different customer needs such as B2B transactions. It is expected that the basic SEPA direct debit scheme will be fully operational from January 2008. The date for finishing the migration from existing national direct debits to the SEPA scheme could be left to the discretion of the national migration plans.

**SWIFT TSU (Trade Services Utility):** While global trade volumes continue to grow, the banking community's participation, traditionally based on risk and finance instruments, has remained relatively static, mainly because corporates are increasingly using open account terms of trade. The decline in the traditional trade letters of credit usage and a transition to open account trading now represents 81% of all trade activity.<sup>11</sup> Corporates are willing either to accept greater trading risk or to mitigate it via credit insurance or other non-bank offerings. This is driven by the perception that traditional instruments do not meet changing needs and are expensive. At the same time, technology advancements and an improved economic climate support the corporates desire to automate their supply chains. This has an influence on the convergence of cash and trade, as well as on growth in outsourcing and corporate hubbing. In addition, competition is increasing, particularly from outside the traditional banking community. Banks are often involved in corporate transactions only at the end of the trade chain. Intermediation earlier in the supply chain process, for example at the purchase order stage, can provide maximum bank flexibility for service options.

As a result, banks are looking to introduce new trade services and to enhance existing ones. They are seeking to intermediate themselves in the corporate supply chain with the provision of insourcing of accounts payable and receivable services, enhanced financing and broader information services. Although banks have sought to be innovative to meet customer needs, the development and maintenance of proprietary infrastructures is costly and does not include all counterparties necessary for global trade. Therefore, many banks have not entered this space and are foregoing a potential opportunity.

The SWIFTNet TSU is a collaborative centralized matching utility, allowing banks to share the costs and increase standardization when engaging in the provision of new services such as outsourcing of trade data checking, finance and risk mitigation, and management information. In late 2002, a SWIFT task force, known as the Trade Services Advisory Group representing banks and other SWIFT members, recommended that SWIFT expand its present focus from traditional collections documentary credits to supporting banks' full range of trade services. The task force differentiated between

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<sup>11</sup> J P Morgan Chase Treasury Services, *SWIFT's Trade Services Utility InfoPack*, 2006.

collaborative and competitive spaces. The competitive space comprises bank-to-corporate offerings where banks compete with each other, while the collaborative space consists of bank-to-bank communication where common messaging services, standards and infrastructure could help control costs. In response to this recommendation, SWIFT developed the SWIFTNet TSU, which is the collaborative, centralized utility for the exclusive use by the banking community for interbank messaging and data matching. It builds on SWIFT's traditional strength in providing standards and structured messaging, and reuses SWIFT infrastructure already in banks' back offices.

The TSU is a SWIFT-owned, developed and operated service using newly developed XML (extensible markup language) messages, a central data matching and work flow engine, and SWIFTNet messaging services. The TSU will provide minimum common functionality, thus enabling the banks to differentiate their service offering. The functions that do not benefit most parties involved and would be better provided within the bank application or interface will not be provided by the TSU. Transactions are initiated in the central utility on receipt of data elements from an existing corporate document. Intermediation early in the supply chain process, for example at the purchase order stage, provides maximum bank flexibility for service options, both short and long term.

In addition to trade checking, the TSU will allow banks to offer, for example, finance against an authenticated purchase order or a portfolio of orders, similar to invoice factoring, or "lite" L/Cs and fully automated L/Cs on the basis of data elements. Banks might also use different data from trade documents to increase finance along the trade transaction cycle as perceived risk is reduced. Risk of loss for the banks due to, for example, false trade transaction advices, "over age" receivables or dual financing could be reduced if banks had more timely information and could see that trade transaction details had been agreed by both buyer and seller. This could lead to improved pricing and more availability of finance to corporates. The TSU can also serve as a valuable source of generic and specific information which banks can then offer to corporates or use for customer relationship management.

In February 2006, the pilot phase of the TSU started with 18 pilot banks. After about six months or so, the full operational phase is expected to start sometime during the latter half of 2006.

**EURO1:** EURO1 is a private sector owned high-value payment system, operated by the EBA Clearing Company, for cross-border and domestic transactions in euro between banks operating in the European Union, and it is the largest of Europe's four, large-value, net settlement systems, processing on average 170,000 payments a day with a total value of about 170 billion euro. Launched in 1998, EURO1 was developed to provide an efficient, secure and cost-effective infrastructure for large-value payments in the new single currency environment of the EU.

EURO1 is based on state-of-art messaging infrastructure and computing facilities supplied by SWIFT. Participants access the system through a workstation with client-



server capability. Payment messages can be sent five settlement days before the value date, and the system offers volume-based pricing. Participants have access to a number of information reports including current limits, queued payments, balance, clearing statements, pre-advice statements for future value messages and branch information to analyze payment traffic. Settlement occurs at the end of the day through TARGET via a settlement account at the European Central Bank. EURO1 helps the banks save cost as the system requires minimum liquidity.

In order to accommodate the differing needs of the European banking community, EBA Clearing has created additional user profiles for EURO1 in the form of Sub-Participation status and Pre-fund Participation status. While the Sub-Participation mode allows EURO1 banks to bring their subsidiaries into the system, Pre-fund Participation was introduced as an option for additional banks to settle their STEP2 obligations. Recent improvements to the EURO1 system also include the processing of debit transfers and of intra-group payments.

A new liquidity management feature is scheduled to be introduced into the EURO1 system in the second half of 2006. This feature is part of the stepwise introduction of a flexible settlement capability, and allows banks to transfer liquidity from TARGET to EURO1 throughout the business day, enabling them to adapt their processing capacity in EURO1 to their individual payment needs. At two predetermined times (14:00 and 15:00 CET), payment capacity that is no longer needed in EURO1 will automatically be retransferred back to TARGET. This flexible settlement capability aims at enabling the earlier processing of EURO1 transactions during the day, and facilitates banks' liquidity management across systems by largely eliminating the need for intersystem liquidity swaps, which can imply a certain degree of credit risk. It is also intended to make EURO1 end-of-day settlement smoother.

**CLS** (Continuous Linked Settlement): The CLS system is the private sector response to a G-10 strategy to reduce foreign exchange settlement risk. CLS was founded in 1997 to create the first global settlement system, eliminating settlement risk in the foreign exchange market. Formed in response to regulatory concern related to the temporal and systemic risks (Herstatt risk) associated with foreign exchange transactions, CLS simultaneously settles both sides of foreign exchange trades using a multi-currency payment-versus-payment (PVP) mechanism. CLS is a unique real-time process enabling simultaneous foreign exchange settlement across the globe, eliminating the settlement risk caused by delays arising from time-zone differences.

CLS settles well over \$1 trillion per day, accounting for a substantial majority of cross-currency transactions across the globe. The system settles both legs of foreign exchange transactions simultaneously, and only after sufficient positive funds are available. Fifteen currencies are currently eligible for CLS settlement, including U.S. dollar, euro, Swiss franc, Canadian dollar, Japanese yen, British pound, Singapore dollar, Hong Kong dollar, Korean won and others. CLS has two main operating companies, CLS Bank International (CLS Bank) and CLS Services. CLS Services provides technical and

operational support to CLS Bank, which is an Edge Act Corporation located in New York, supervised by the Federal Reserve Bank of New York.

CLS participants include settlement members, user members and third parties. Settlement members are shareholders in CLS Group and submit settlement instructions directly to CLS Bank, where they hold multi-currency accounts. User members do not have an account at CLS Bank. Instead, they submit settlement instructions through a settlement member, who acts on their behalf. Third parties are customers of settlement and user members that do not have direct access to CLS Bank. Settlement instructions for third parties are submitted through settlement or user members.

The CLS system provides settlement of foreign exchange transactions on a trade-by-trade basis. In order to ensure this PVP mechanism, the accounts of the counterparties to a trade are debited and credited simultaneously on the books of CLS Bank, which acts as the settlement institution. CLS Services acts as the settlement agent, crediting or debiting participants' accounts at CLS Bank. All transactions to be settled on a given date must be submitted to CLS by both counterparties before the beginning of the settlement process. Before the transaction is included in the settlement queue, its two legs are matched in terms of date, currencies, amounts and identification codes.

CLS Bank is a multi-currency bank, holding an account at each eligible currency's central bank, through which funds are received and paid. Through its multilateral netting process, CLS Bank reduces actual payments to a fraction of their gross amounts. Netting is reducing gross payment amounts by around 85%, and with the use of in-out swaps (where banks balance their CLS liquidity in a certain currency to meet payment commitments by the use of a same-day zero-price currency swap, where one leg of the swap takes place inside CLS Bank, and the other outside) by a further 10%. Under normal end-of-day circumstances, settlement members have zero balances in their accounts at CLS Bank and CLS Bank has zero balances in its respective central bank accounts. In the event that a settlement member fails to make payment on its positions, CLS has instituted a number of risk management tools including membership requirements, loss sharing agreements, back-up lines of credit and position limits.

### **III-d: Continuous Innovations in Payment Systems**

The trade-off between risks and costs can be illustrated by comparing the two classic payment system architectures, RTGS systems and DNS systems. DNS systems were the predominant form of large-value payment systems (LVPS) in the 1980s. In a DNS system, payment orders are accumulated throughout the day. Settlement of the net amount takes place typically once, at the end of the day. By reducing the number and overall value of payments between financial institutions, netting reduces the usage of central bank money. However, a well-established drawback of DNS systems is the higher risks involved. Finality of settlement is achieved only at the end of the day and thus there is no certainty that the payment will be settled until that point in time. If one participant fails to meet its payment obligation when due, all processed payment orders

could be unwound with the consequent risk of other participants defaulting in turn, thus triggering potentially a systemic crisis.

RTGS systems developed in almost every country in the course of the 1990s. In contrast to DNS systems, RTGS systems settle each payment individually on a gross basis. Provided the payer has sufficient balances or credit availability, each payment order is settled as soon as it enters the system on a real-time basis. When the payer's funds are insufficient, the order is typically queued. RTGS systems provide the advantage that payments become final in the course of the day, so those intraday exposures do not build up. The adoption of such safer systems was strongly supported, and often initiated, by central banks. A common downside of settlement in RTGS mode is the need to maintain sufficient liquidity by participants. The number of RTGS systems increased dramatically in the 1990s. This trend was driven by a growing awareness of the need for sound risk management in large-value funds transfer systems.

In the meanwhile, there has been a steady increase in LVPS design options that reduce liquidity costs and settlement exposures due to a variety of factors. On the supply side, the main driver has been technological progress in the area of information and communication technology. Features that were previously either unavailable or just too expensive to be implemented have become affordable over time. On the demand side, users ask for features which reduce their central bank money needs, as well as for sophisticated payment and liquidity flow controls and real-time information on the payment process. Central banks have generally sought a balance between their goals for more stringent risk controls and the need for systems to remain efficient.

Thus, one of the recent trends has been a serious effort to lower the amount of needed liquidity, including central bank money. To achieve this goal, many RTGS systems have incorporated design features of DNS systems. A first innovation in this regard has been the introduction of so-called "hybrid systems". These systems perform frequent netting or offsetting of payments in the course of the operating day. A typical approach is to hold payments in a central queue and to net or offset them at frequent intervals against queued payments from other participants. To the extent that resulting net debit positions are fully covered, the payments can be settled immediately. While hybrid systems reduce central bank money needs in comparison to RTGS systems by netting or offsetting, they reduce settlement risk in comparison to DNS systems by providing final settlement of the net position immediately after each round of netting. Hybrid systems may, however, require more liquidity than DNS systems and may involve more settlement delay for some payments than RTGS systems. A second innovation has been the combination of recurrent netting or offsetting with a real-time settlement functionality. These systems typically first attempt to settle a payment order on a gross basis. If immediate settlement is not possible due to insufficient settlement balances, the system checks whether simultaneous settlement of one or more bilaterally or multilaterally offsetting payments is possible. Of course, a number of different optimization routines can be used to match, offset or net queued payments. The applied algorithms vary greatly in terms of complexity. Usually, relatively simple bilateral algorithms tend to be applied in real time, while more complex multilateral algorithms are employed intermittently at short intervals.

Traditionally, the introduction of an RTGS system has been viewed as the only feasible means of achieving continuous intraday finality, thus removing the possibility that payments deemed irrevocable by the system rules will be unwound (or reversed) in the event of a participant being declared insolvent. But recent developments in LVPS design have illustrated that this is not the case. As discussed in Section II, CHIPS among others has implemented payment processes that do not employ the RTGS paradigm but nevertheless allow individual payments to become final on a continuous (or nearly continuous) basis throughout the day. CHIPS settlement is dependent upon sets of prefunding. For initial prefunding, participants use Fedwire to send a predetermined amount to the CHIPS Prefunded Balance Account at the Federal Reserve Bank of New York. In addition to settling individual payments, CHIPS seeks to identify and settle sets of payments whose value is closely offsetting on a bilateral or multilateral basis during the day. Those payments that remain unsettled at the close of the system typically approximate the non-offsetting values. If initial prefunding is not sufficient to settle all queued payment messages prior to 17:00 ET, a final end-of-day prefunding is required, also through Fedwire. In addition to the two stages of required prefunding, CHIPS participants are also permitted to provide supplemental prefunding throughout the operating day. Participants that provide supplemental funds may also be able to withdraw these funds in certain, limited circumstances.

In addition to these developments, most LVPS now provide their users with a broader range of real-time information and more flexibility to manage liquidity. Originally, settlement accounts were often prefunded at the beginning of the day with no possibility to fund or defund until shortly before the end of the processing day. Increasingly, users are able to add or withdraw settlement balances at any time during the operating day. In addition, most systems with a queue offer a variety of interactive control features that enable their user to fine-tune the settlement process. Such controls include the possibility to change the location of a payment in the queue, to prioritize the release of a payment or to set bilateral and multilateral limits to control the outflow of funds.

In parallel, new LVPS have emerged to meet an expanding demand for cross-border payments. The primary example is CLS that, as discussed in Section II, is a private sector system specializing in the settlement of foreign exchange transactions on a PVP basis. Settlement takes place in commercial bank money, on the books of CLS Bank. Another example that can be highlighted in this realm is the emergence of new large-value payment infrastructures in countries where a foreign currency plays an important role. For instance, standardized arrangements have been established that enable financial institutions in Hong Kong and Switzerland to settle foreign currency transactions through a correspondent bank while using basically the same system design as the local RTGS system.

## **IV. Corporate Issues for Cross-border Payments**

### **IV-a: Challenges and Opportunities for Corporates**

By one estimate, businesses in the United States alone send and receive more than 70 billion noncash payments each year. Business-to-consumer and consumer-to-business payments represent the greatest share of these transactions. In this area, the use of electronic payments methods has become more widespread, growing over 13% between 2000 and 2003, as both the cost and reliability of electronic processing has declined. Even though business-to-business (B2B) transactions account for only about 10% of the 70 billion annual noncash payments, they represent about \$70 trillion or approximately 55% of all noncash payments. However, only 20% of these payments are conducted electronically, while 80% of them are still handled by check despite the increased cost of handling paper check. Countries like Spain and Italy predominantly use cash for transactions, while up to 30% of transactions in Germany are electronic. In terms of corporate payments, trade intensive economies such as Germany, the Netherlands and Belgium have greater business-to-business transfers than other EU countries, due to more systematic cash management and treasury transactions.

Apparently, corporates prefer credit “push” to debit “pull” model. Somehow, businesses seem still to consider the current automated payments as less desirable despite the obvious efficiency gain that can be achieved by an electronic payment system. Business firms also rarely use ACH debits for regular B2B payments due to their fear of unauthorized debits, mistakes in the amount debited and loss of float. Float is still a major issue for many corporates. They have been very slow in migrating to electronic payments partly due to the loss of float. Thus, an incentive may be needed to encourage corporates to switch to electronic payments, such as giving a small discount for paying on time. Another incentive is for the payment system is to become more efficient in utilizing liquidity, thus lowering the overall cost. For example, by employing a super-efficient mathematical algorithm, CHIPS is able to use \$1 liquidity to turn over 500 times a day, compared to 16 times at the Fedwire.

There are several factors driving corporates to select a particular mode of cross-border payments. It is most important for corporates to find the least expensive and most efficient way to execute cross-border payments. In this connection, they have to understand and cope with often confusing and opaque fee systems practiced by banks. It is true that the cost of wire transfers has come down substantially in general over the past decade. According to the World Bank which maintains almost 1,000 accounts at various banks around the world and has to perform about 10,000 transactions and \$11 billion each month in 178 currencies, the cost of wire transfers has declined from \$8 to \$12 per transfer ten years ago to only \$0.75 to \$1 per transfer. Even though the World Bank has the word “Bank” attached to its name, it is just like a corporate in payments business, because it is not a commercial bank accepting deposits and becoming a member of CHIPS, etc. Thus, it uses a commercial bank to execute its payments just like any corporate.

*“Technological innovations and worldwide competition have sharply increased the cross-border payment efficiency in recent years, reducing the wire transfer fees.”*

*Head, Treasury Operations, World Bank*

Of course, the transfer cost is only one element in the entire payment process. Corporates also face the challenge of removing paper and manual processes by introducing straight-through processing (STP) as much as possible. This requires payment instructions to be generated electronically as part of the business process, passed securely, efficiently and cost-effectively to their banks and matched and reconciled automatically via a universal reference number within invoicing, accounts payable, accounts receivable and other systems. However, according to a recent wire transfer survey only 15% of respondents report that their wires always come with sufficient remittance information, for example, customer account number and invoice number, to apply the payment correctly.<sup>12</sup> The typical corporate must research 17% of the wires that it receives at the average cost of \$35 per wire and 30 minutes of time.

Through simplification and automation, corporates search seek both efficiencies and opportunities, which can increase their cross-border payment volumes and revenues. Here, the issue of security is critical as well. The best practices in this area include requiring a strict verification process for all manual entries or modifications, audit trail on all transactions, secure ID to control access the production system, and separation of duties strictly enforced via systems and process flow. Finally, development of new standards is a challenge for corporates aiming for continuing efficiency gains and productivity increase in cross-border payments.

#### **IV-b: Prospects for Corporate Electronic Payments**

Business use of the payments system all over the world is at a crossroads. For example, although the volume of electronic payments by consumers in America is growing rapidly nationwide, more than 80% of B2B payments continue to be made by paper check. The Association for Financial Professionals (AFP) conducted two surveys in 2000 and 2004 in order to learn more about its members' use of electronic methods to send and receive B2B payments.<sup>13</sup> Specifically, the 2004 survey was designed to learn how the situation had changed in the four years since the 2000 AFP survey. AFP asked its members about the barriers to increased use of electronic payments and solutions that would make electronic payments more efficient and cost-effective for their organizations.

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<sup>12</sup> Association for Financial Professionals, *AFP Wire Transfer Survey: Receipt of Remittance Information*, October 2005.

<sup>13</sup> Association for Financial Professionals, *Electronic Payments Initiatives and the Internet: Report of Survey Results*, August 2000, and Association for Financial Professionals, *2004 Electronic Payments Survey: Report of Survey Results*, October 2004.

According to the 2004 survey, most B2B payments continue to be made by paper check, especially by smaller organizations. The persistence of this payment method was little changed since the 2000 AFP survey. Checks play a large role in disbursements than they do in collections. Fifty-one percent of financial professionals report that their organizations make more than 80% of its payments by check. Only 43% report that they receive such a large percentage of check payments. Large organizations make significantly fewer check payments than small organizations, and receive fewer check payments as well. About 41% of large organizations with annual revenues greater than \$1 billion make the bulk of their payments (over 80%) by check, but 61% of smaller organizations do so. On the collection side, 37% of large organizations receive the vast majority of their B2B payments as checks, compared to 48% of smaller organizations.

The stronger the business relationship between trading partners, the greater the volume of electronic payments becomes. Corporates are more likely to use electronic payments for collections and disbursements to their major suppliers and customers as opposed to their other suppliers and customers. Similarly, large organizations make more electronic payments than small organizations, especially to their major suppliers. ACH credits are the most widely used electronic payment method. ACH credit usage is more prevalent among large organizations than smaller organizations. Wire transfers are the second most commonly used method of making and receiving electronic payments. Most respondent organizations have centralized their payments operations, either at corporate headquarters (65%), at shared service centers in the U.S. (9%), or at regional service centers worldwide (6%). As expected, large organizations are more likely to have established service centers than smaller organizations. Treasury is typically involved in the selection of payment methods for both disbursements and collections. Just over half of respondent agree with the statement that “Treasury’s increasing influence over payments decisions will speed the move from paper to electronic payments.” The controller is a key partner in this decision.

There is little change since AFP’s 2000 survey in the percentage of organizations using EDI to send and receive the remittance information associated with electronic payments. As in 2000, larger organizations are much more likely to send and receive EDI-formatted information. Most respondents’ organizations (more than 75%) send and receive remittance information through their banks, with third parties and web sites playing a much smaller role. Over one-third of paying organizations use fax or mail to provide remittance information for electronic payments, and almost half receive remittance information by fax or mail. Remittance information then must be manually entered into accounts payables or accounts receivable systems.

According to the 2004 survey, organizations appear to be more willing to migrate from check to electronic payments today than they were four years ago. Only 3% of organizations have already made the move to electronic systems for the majority of their B2B payments. However, 28% of respondents indicate that their organizations are very likely to convert the majority of their B2B payments from check to electronic payments in the next three years, up from only 9% in the 2000 survey. The survey indicates that conversion from check to electronic systems for the majority of payments is more likely

at large organizations. The 2000 survey showed that the most important barrier to making more electronic payments was the lack of integration between their electronic payment systems and accounting systems. Four years later, the answer remained almost the same. Large organizations are more likely to have integrated their A/P and/or A/R systems with their electronic payment systems. The primary reason for integrating accounting and electronic payment systems was to achieve more efficient posting and reconciliation. Cost savings and staff reduction were the key motivators as well. Most organizations have been satisfied with the results of integration.

The 2004 survey indicated that many barriers work together to obstruct progress toward the widespread adoption of electronic payments in B2B transactions. These barriers are created by factors internal to the organization and by the limitations of external resources. Asked to select among a list of barriers to increasing use of electronic payments, the majority of respondents give almost equal weight to four major barriers: shortage of IT resources, accounting systems that are not integrated with electronic payment systems, the lack of a single standard format for remittance information, and trading partners who cannot send or receive electronic payments with sufficient remittance information. Apparently, minimum progress has been made in overcoming the barriers to the efficient use of electronic payments identified in the 2000 survey. If the convenience and speed of credit and debit cards have transformed consumer America into a “plastic nation,” what are the equivalents that would offer win-win solutions in B2B electronic payments? Over 80% of respondents identified the following four solutions:

- \*A standard format for exchanging remittance information with electronic payments, especially in demand by organizations with annual revenues greater than \$1 billion;
- \*A/P and A/R software that integrates with electronic payments;
- \*Bank services that provide STP of electronic payments into accounting systems;
- \*Improved fraud control over ACH payments and effective solution to the vulnerability of the ACH system.

Despite many barriers working together to obstruct progress toward the wider adoption of electronic payments in B2B transactions, organizations today appear to be more willing to migrate from paper check to electronic payments than they were in 2000. In fact, another projection by Celent expects that adoption of electronic payments in B2B transactions will break out of the doldrums over the next five years.<sup>14</sup> According to the study, the economic interests of banks, third-party solution providers and corporates are likely to align, ensuring the prerequisites for adoption of electronic payments. A similar conclusion was reached in a study by The Clearing House.<sup>15</sup>

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<sup>14</sup> Jacob Jegher, *The Changing Face of Electronic Payments*, Celent, presented at SunLIVE FS 2005, September 27, 2005.

<sup>15</sup>The Clearing House, *The Remaining Barriers to ePayments and Straight-through Processing*, Research conducted in October 2001-March 2002.



#### **IV-c: Areas for Urgent Improvements**

In 2003 and 2004, the Federal Reserve Bank of New York conducted a survey of large nonfinancial U.S. businesses in order to identify the *most important* and the *least well-met* areas of payments processing.<sup>16</sup> The study asked businesses what they seek to achieve in each step of the process of making and receiving payments. The questions were intended to help corporates identify their priorities for improvements. The survey encompassed 733 U.S. nonfinancial firms with at least 10,000 employees, selected from a Dunn and Bradstreet database. The researchers then sent letters to a randomly selected sample of 200 corporate treasurers and chief financial officers from this population, requesting that the person most knowledgeable about the firm's payments needs respond to the Federal Reserve Bank's online survey. In total, 101 surveys were completed, representing a response rate of 50 percent.

The study establishes which aspects of the payments process are most important and which are the least well met by current services. In this sense, the study went beyond past work that has tended to ask one or the other question but not both. By asking about both importance and satisfaction, the study identified the top opportunities for improvement. Corporate treasurers and cash managers are concerned in connection with their payment systems over risk reduction, liquidity, processing efficiency, cost minimization, and a well-functioning payments system. About 40% of the survey respondents note that reducing the time needed to detect and resolve unauthorized debits, as well as reducing their frequency and associated financial losses, are very important and critically important to their firms and that current services are less than satisfactory. In addition, the respondents put high priority on reducing the time required to identify insufficiently funded debit transactions, receive credit for overseas payments, and obtain sufficient information to process an incoming payment. Corporates also see a strong need to improve their abilities to reconcile information received from banks on use of payment services and reduce bank fees for payment services.

*"We strive to adopt the most efficient and cost-effective practices in cross-border payments, but sometimes government regulations tend to stifle the initiatives over safety and other regulatory issues."*

*Senior Manager, Treasury Team, Samsung Corporation.*

The survey results also provide insights into the payments options that corporates rate as very important but with which they may not be sufficiently dissatisfied to invest in new products. For example, controlling fraudulent transactions generally is very important or

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<sup>16</sup> Sandy Krieger and Michele Braun, *Opportunities to Improve Payments Services: Results from a Survey of Large Corporations*, Federal Reserve Bank of New York, July 2004.

critically important to virtually all respondents. However, the percentage of respondents who are dissatisfied with the ability of current payments methods to control fraud is lower than for many other payment objectives. In a similar vein, the study identifies the payments areas where firms are dissatisfied but which relatively few firms rate as very or critically important. For example, a relatively low percentage of companies see making payments to the unbanked and various cross-border payment services as very or critically important. It is possible that the latter is due to the fact that cross-border payments occupy still a relatively minor share of their total payment flows.

The study identifies the following five goals that are considered very or critically urgent but still largely unmet by the existing payments systems.<sup>17</sup>

*\*Risk reduction:* decrease or eliminate losses due to fraud, security lapses, or unrecoverable misdirected payments;

*\*Liquidity:* collect revenues faster or time payments more precisely to increase access to funds and the amount of time a firm can use the funds;

*\*Processing efficiency:* develop improvements to reduce the amount of time required to finish a task or the number of steps needed to complete a process, such as obtaining information or responding to inquiries;

*\*Explicit costs:* minimize the out-of-pocket fees or investment expenses associated with a process; and

*\*Governance and infrastructure:* establish fundamental building blocks of a well-functioning payments system, such as legal basis and operation by trusted parties.

The study reveals that corporates are eager to enhance payment efficiency and they are also interested in reducing the risk of loss due to fraud and security lapses, improving liquidity by speedier access to funds, and minimizing the out-of-pocket fees and investment expenses. Thus, if one can develop and market an innovative electronic payment service featuring risk reduction, liquidity improvements and cost reduction, there is a large potential demand among corporates that still use paper-based checks to process almost 80% of their B2B payment transactions. There is also an urgent need to better understand why corporates are not using electronic payments and what are the main barriers for corporates to adopting electronic payment systems.

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<sup>17</sup> Sandy Krieger and Michele Braun, "Improving Business payments by Asking What Corporations Really Want," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, May 2005.

## **V. Bank Issues for Cross-border Payments**

The overall payments industry is huge. The total revenues of the U.S. payments industry alone has grown at 6% per year since 1994, topping \$207 billion in 2004.<sup>18</sup> In aggregate, the payments business throws off more revenues than do the airline, personal computing, lodging, or entertainment industries. McKinsey projects that, by the end of this decade, 85% of noncash payments will be electronic. This means more than 50 billion new transactions, or nearly twice the number processed under the Visa and MasterCard brands in 2004.<sup>19</sup> And the entire payments landscape is being redefined by consolidation, new competitors, rapid technological change, and a mounting regulatory and compliance burden. For a business that was pretty much a cottage industry served by tens of thousands of smaller banks and thrifts prior to deregulation in the 1980s, these are nothing less than seismic shocks.

### **V-a: Banking Structure and Payment Practices**

Currently, various payment systems provide settlement services to banks and other financial institutions both domestically and globally. The suitability of different system designs can therefore be influenced by the structure of the market, particularly the organization of the banking sector and other financial institutions. Individual banks generally have the option of participating in a payments system directly or indirectly (by establishing a correspondent relationship with a direct participant). A range of factors is likely to influence this decision, but there is evidence that payments system participation often reflects the structure of the banking sector in the relevant market. For example, the numbers of direct participants in the U.K.'s CHAPS Sterling and Canada's LVTS (Large Value Transfer System) are relatively low, which reflects the highly concentrated nature of these countries' banking sectors. By contrast, the number of direct participants in Fedwire is relatively high, reflecting the relatively lower concentration in the U.S. banking system. While this tendency is not universal, the structure of the banking sector can be an important factor in the choice of specific payments design features.

The method and network used by a bank to execute a cross-border payment depends upon the arrangements it already has in place, combined with the customer's requirements regarding the cost and speed of the transaction. In this regard, several methods and networks are being used. Major banks with subsidiaries, branches and associated banks in many countries may move funds to the destination country by an intra-bank transaction. The beneficiary is either credited directly where it has an account with the foreign operation or the payment is sent to the beneficiary's bank via a bilateral transfer, a national clearing and settlement system, or a national ACH. A report by the European Central Bank, however, finds this method to be the most costly and inefficient due to the use of non-standard customer interfaces, incompatible formats between domestic and

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<sup>18</sup> Jack Stephenson, "Growing Pains: Outlook for the U.S. Payments Industry," McKinsey & Company, 2005.

<sup>19</sup> *Ibid.*

foreign banks, and the low degree of automation in banks' internal system.<sup>20</sup> Other banks may utilize bilateral correspondent banking relationships, utilizing the traditional nostro and vostro accounts. Banks may also use multilateral networks with targeted membership such as Eurogiro or multilateral networks with open membership such as Euro1 and STEP.

A payments system has to establish the condition for participation/membership of the system, known as access criteria. Access criteria may feature quantitative minimum requirements on the capital base, credit rating, or payment volumes of a potential member. The basic objective is to ensure that individual members do not introduce an unacceptably large amount of financial, operational or legal risk to the system. A trade-off generally emerges between risk mitigation achieved by imposing restrictive access criteria and improved levels of efficiency potentially realized by allowing a wider range of financial institutions to become system members.

A common approach concerning access to a payments system is to allow an eligible financial institution to choose its preferred method of access. Two basic alternatives are available: join the payments system as a full member and thereby participate directly; or participate indirectly by establishing an agency (or correspondent banking) relationship with a full member of the system. If a payments system has both direct participants and also a considerable number of indirect participants, its participation structure is called "tiered". Direct participants usually hold an account with the settlement institution, across which payment obligations are settled. The range of potential indirect participants includes not only financial institutions but also corporates and individuals. However, it is standard practice to restrict the definition of indirect participants to financial institutions. Indirect participants do not hold an account with the settlement institution which can be used to settle their payment obligations. Instead, these obligations must eventually be settled by means of positions to the settlement account of a direct participant.

The trend toward consolidation in the banking sector both globally and in domestic markets exerts influence on payments systems in at least two distinct ways. First, increased concentration of payment flows may have important credit, liquidity and operational risk implications. For example, the credit exposures that arise within a payments system that does not achieve intraday finality are likely to become concentrated on a smaller number of banks. In addition, operational problems experienced by a single large bank could have significant repercussions for other participants in the system. Second, a concentration of payment flows in commercial banks has emerged to reflect the increasing role that modern commercial banks, especially large global banks, have played in the payment systems around the world. The volumes and values settling across their books are, in some countries, quite substantial. Such traffic has often been accompanied by increased formalization of the correspondent relations within as well as across national boundaries.

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<sup>20</sup> European Central Bank, *Improving Cross-Border Retail Payment Services: The Eurosystem's View*, September 1999, p. 10.

## **V-b: New Dimensions in Correspondent Banking**

Most major banks of the world maintain correspondent banking relationship with local banks in each of the important foreign cities of the world. This two-way link between banks is one of many interbank relationships in which one bank sells services to other financial institutions. The institution providing the services is the *correspondent bank* or upstream correspondent, while the institution buying the services is the *respondent bank* or downstream correspondent. As cross-border financial flows have increased in recent years, many financial institutions have become more active in foreign markets, increasing the demand for cross-border payments in multiple currencies and enhancing the importance of correspondent banking in cross-border payments through their traditional nostro and vostro accounts held at each other. At least 80% of bank-to-bank cross-border payments currently take place through traditional correspondent banking arrangements or via intra-bank transactions.<sup>21</sup>

A recent development is the emergence in Hong Kong and Germany/Switzerland of new arrangements for the settlement of local payments in foreign currency. These arrangements neither fit perfectly in the traditional category of “correspondent banking” nor in that of “payment systems”. The main common characteristic of these arrangements or systems is that they do not settle in central bank money but across accounts held with a commercial bank and that they are based on clearly defined and transparent rules for payment activities. Compared to traditional correspondent banking, these new solutions are standardized and settle payments in real time with continuous finality.

In Hong Kong, the U.S. dollar and euro clearing systems, USD CHATS (Clearing House Automated Transfer System) and Euro CHATS, were introduced in 2000 and 2003 respectively, in order to enhance the safety and efficiency of settling these foreign currencies in the local time zone. These systems are almost exact replicas of the Hong Kong dollar RTGS system (HKD CHATS). The key functions of both systems are to enable PVP settlement of foreign exchange transactions between HK dollars, US dollars and euros and DVP securities settlement in the respective currencies through a linkage with the Central Moneymarkets Unit (CMU) in Hong Kong. Both systems settle in commercial bank money. The Hong Kong Monetary Authority has appointed the Hongkong and Shanghai Banking Corporation as the settlement institution for USD CHATS and Standard Chartered Bank (Hong Kong) Limited as the settlement institution for Euro CHATS. Both institutions provide intraday liquidity to the direct participating banks by means of repos as well as overdraft facilities.

In 1999, Swiss financial institutions established a cross-border solution in order to facilitate their cash management in euros. This solution involves a fully licensed bank in Germany, Swiss Euro Clearing Bank (SECB). To process euro transactions, SECB uses the euroSIC platform in Switzerland, which is often referred to as the euro payment system of Switzerland. Some consider SECB/euroSIC to be a payment system and others

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<sup>21</sup> Retail Banking Research Ltd., *Regulation 2560/2001: Study of Competition for Cross-Border Payment Services*, Final Report prepared for the European Commission, London, September 2005.

see it as a “quasi-system” or as correspondent banking. In terms of design, euroSIC is a replication of the Swiss franc RTGS system Swiss Interbank Clearing (SIC), so that it provides to a great extent the same functionalities. SIC and euroSIC are technically operated by Swiss Interbank Clearing AG. SECB is the settlement institution and shares the role of settlement agent with the operator SIC AG. SECB is also the liquidity provider in euroSIC. It extends intraday and overnight credit to the participants of euroSIC against collateral. SECB provides a link to the euro area, as it is a direct participant in RTGS<sup>PLUS</sup>, through which access to TARGET is established.

### **V-c: Impact of SEPA on Banks**

The challenge for the European banking industry of achieving the SEPA should not be underestimated. Today there are more than 15 retail payments systems in the euro area for the clearing and settlement of credit transfers and direct debits. Most of them have their own specific operating rules and technical standards that are deeply rooted in legacy systems, national regulations, consumer behavior and even local cultures. The transition from the 12 national currencies to the euro was quite a simple change by comparison – a banknote denomination change. With the SEPA, all market participants will be required to change the way they make and manage electronic payments (less so for cards where the functionalities will remain to a large extent untouched). The successful adoption of the SEPA instruments by corporates and individuals will not come about as a result of centralized regulation. Instead, it will depend on a thorough, well-organized process on the part of the banking community. It must define simple and best-of-breed products and services that, at a minimum, will ensure that no end-user in the euro area is worse off than today. The success of the SEPA will depend on the extra value these instruments bring to end-users.

Payment infrastructures are heavy and expensive. Implementing the new SEPA will require significant investments from all stakeholders, particularly from the banking community. Industry estimates put the investment on the necessary infrastructures at more than 8 billion euros over the next six years and revenue losses from falling fees for payment services at between 13 and 29 billion euros.<sup>22</sup> Sectors other than the banking industry are expected to profit first from any reduction in the costs of the present fragmented, nationally based payment arrangements. Substantial investments coupled with plummeting revenues should encourage banks to look for the maximum economies of scale and scope that the SEPA can offer. They should particularly focus on payments highways and on leveraging any investment they have already made in open and global platforms and solutions.

This will mean rationalizing infrastructure, consolidating clearing and settlement mechanisms and re-using modern global financial messaging platforms such as SWIFTNet. Banks need to invest massively to adapt their payment infrastructures in order to achieve SEPA-compliance. This triggers the question of the speed at which

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<sup>22</sup> Peter Norman, “European Banking Reform Comes under Fire: Both Industry and Regulators Are Dissatisfied with Plans to Facilitate Cross-border Payments,” *The Financial Times*, November 28, 2005.

current payments instruments will disappear and at the speed at which corporates and administrations adapt their own systems to the new SEPA instruments. The co-existence of new and incumbent solutions will add globally to costs, and thus needs to be carefully managed in scope and time. While, in the short run, bank revenues will decline and both investment costs and operating expenses increase, in the medium to long term the SEPA has the potential for banks to expand business by bundling of products, enhancing products such as cash management, and becoming a provider of integrated financial services to corporates.

#### **V-d: Anti-Money Laundering and Combating the Financing of Terrorism**

Considering the threat that international money laundering and other forms of financial fraud and crimes pose to the security of a country and its economic and financial system, extensive efforts have been made to counter the problem through a number of international and regional efforts. Since September 11, 2001, the potential abuse of the international banking and financial system by terrorists has also intensified both national and global efforts to combat terrorism financing. Money laundering is a process in which assets obtained or generated by criminal activity are moved or concealed to obscure their link with the crime. Terrorist activities are sometimes funded from the proceeds of illegal activities, and perpetrators must find way to launder the funds in order to use them without drawing the attention of authorities.

The international community has made the fight against money laundering and terrorist financing a priority. Among the goals of this effort are: protecting the integrity of the international financial system, cutting off the resources available to terrorists, and making it harder for criminals to profit from their illicit activities. *Anti-money laundering* (AML) and *combating the financing of terrorism* (CFT) have become an increasingly important issue also for cross-border payment systems, as these systems are potential tools used by criminals and terrorists to move around their funds for illicit purposes. Both national and international efforts on AML/CFT have led to creation of many important institutions to spearhead the global drive on AML/CFT.

**FATF** (Financial Action Task Force): FATF on Money Laundering is a 33-member organization established by the G-7 Summit in Paris in 1989 with primary responsibility for developing worldwide standards for AML and CFT. It works in close cooperation with other key international organizations, including the IMF, the World Bank, the United Nations, Bank for International Settlements, and FATF-style regional bodies (FSRBs), most of which participate in its meetings as observers. FSRBs include the Asia Pacific Group on Money Laundering (APG), the Caribbean Financial Action task Force, the Offshore Group of Banking Supervisors, and the Organization of American States.

In order to identify steps that national governments should take to implement effective anti-money laundering programs, FATF devised and promulgated its *40 Recommendations*, which set out a basic universally applicable framework for legal and

regulatory systems, law-enforcement activities, and the work of supervisory and regulatory agencies. Over time, this international standard has been revised to reflect new trends and techniques in money laundering and experience, including a comprehensive overhaul of the *40 Recommendations* in 2003 and the associated assessment methodology in 2003-04.

After September 11, 2001, the FATF expanded its mission beyond money laundering and agreed to use its expertise in the worldwide effort to combat terrorist financing. An extraordinary FATF Plenary on the Financing of Terrorism, held in Washington in October 2001, issued *8 Special Recommendations on Terrorist Financing* as a new international standard to supplement the *40 Recommendations*. This standard has also been subsequently expanded and elaborated and now include nine recommendations.

According to FATF, there is little difference between terrorist and other criminal methods in the use of the financial system. Terrorist financing shares multiple characteristics with money laundering in terms of sources, techniques, adaptability, and risk implied. Both are criminal activities attempting to disguise the sources and destination of funds, change the form of funds, or move the funds to a place where they are less likely to attract attention. Although the primary motivation of terrorism is not financial gain, which stands in sharp contrast to most crime, terrorists still need to use the financial infrastructure to mobilize and channel their funds. Like money launderers, terrorists raise their funds through various moneymaking activities that may include criminal acts, such as kidnapping, extortion, large-scale smuggling, narcotics trafficking, robbery, and theft. Consequently, terrorists need to launder the illicit funds in order to move them without drawing the attention of authorities.

Terrorists use the same laundering methods as other criminal groups, including cash smuggling, structured deposits and withdrawals from bank accounts, purchases of various types of monetary instruments, use of credit or debit cards, and informal remittance networks. Like money launderers, terrorists have developed new techniques for mobilizing and using their funds, as the old ones are uncovered. Terrorist financing networks operate globally, being capable of infiltrating the financial systems of both developing and developed countries and often utilizing the legitimate cross-border payment systems such as international wire transfers conducted through correspondence accounts either by individuals or businesses. More than in other cases of financial crime, countering terrorist financing has to rely extensively on intelligence sources and requires a very close cooperation between intelligence and law enforcement agencies and other stakeholders, such as banking and financial institutions.

**Office of Terrorism and Financial Intelligence (TFI):** The United States established TFI in April 2004 as part of the U.S. Treasury Department in order to marshal the Treasury Department's intelligence and enforcement functions with the twin aims of safeguarding the financial system against illicit use and combating rogue nations, terrorist facilitators, WMD (weapons of mass destruction) proliferators, money launderers, drug kingpins, and other national security threats. TFI comprises the Office of Terrorist



Financing and Financial Crimes (TFFC), Office of Foreign Assets Control (OFAC), and Financial Crimes Enforcement Network (FinCEN), among others.

**TFFC** acts as the policy development and outreach office for TFI, and it collaborates with the other elements of TFI to develop policy and initiatives for combating money laundering, terrorist financing, WMD proliferation, and other criminal activities both at home and abroad. TFFC works across the law enforcement, regulatory and intelligence communities and with the private sector and its counterparts abroad to identify and address the threats presented by all forms of illicit finance to the international financial system. TFFC advances this mission by promoting transparency in the financial system and the global implementation of targeted financial authorities.

**OFAC** is charged with administering and enforcing U.S. economic and trade sanctions based on foreign policy and national security goals. OFAC currently administers roughly 30 programs that target terrorists, rogue countries and regimes, narcotics traffickers, WMD proliferators, and other illicit economic and national security threats. OFAC is the successor to the Office of Foreign Funds Control, which was established at the advent of World War II following the German invasion of Norway in 1940 in order to prevent Nazi use of the occupied countries' holdings of foreign exchange and securities. OFAC itself was formally created in 1950, following the entry of China into the Korean War in order to block all Chinese and North Korean assets subject to U.S. jurisdiction. OFAC's expertise in administering sanctions has made it a model for other countries throughout the world.

**FinCEN**'s mission is to safeguard the financial system from the abuses of financial crime, including terrorist financing, money laundering, and other illicit activities. It administers the Bank Secrecy Act of 1970, which authorizes the reporting and recordkeeping obligations with respect to financial transactions for law enforcement purposes. Since its creation in 1990, FinCEN has worked to maximize information sharing among law enforcement agencies and its other partners in the regulatory and financial communities to combat money laundering, terrorist financing, and other illicit finance. As the United States' financial intelligence unit (FIU), FinCEN links to a network of over a hundred similar FIUs around the world, sharing information to pursue money laundering, terrorist financing and other investigations.

### **V-e: Challenges Ahead**

While the European banks face a great challenge on the road to SEPA as discussed above, the challenge is no less for American banks. The U.S. payments system is among the least efficient in the industrialized world. The culprit most frequently cited is the nation's continued reliance on paper checks for some 40% of its noncash payments. In other countries, banks and regulators have collaborated to eliminate checks in favor of more efficient electronic payments. In Scandinavia and the Benelux countries, for example, more than 90% of noncash transactions are electronic, and transaction costs per capita are roughly half those in the United States. One study reckons that Sweden added 1.5% to its

GDP by eliminating paper transfers.<sup>23</sup> However, the main problem confronting American banks is not their dependence on paper checks, which they have learned to process relatively cheaply. Rather, it is the fragmented and convoluted design of the nation's payments infrastructure itself. The United States supports far more clearing and settlement entities than any other nation, with dozens of siloed and underutilized payment infrastructures, often competing with one another for volumes. Even after two decades of consolidation, 9,000 U.S. banks and thrifts still remain (down from more than 20,000), along with more than 60 distinct clearing and settlement entities (down from several hundred). A large U.S. bank in turn must operate dozens of largely redundant payments operations and technology platforms, each with its own dedicated applications, staffs, rules, and business processes.

The complex governance structures of these disparate clearing entities – some public, some private, some operated as industry associations – only add to the challenge. Achieving coordinated change at an industry level is near impossible, absent top-down intervention. However, intervention, when it does occur, tends to focus more on responding to crises (or preventing crises) than on promoting efficiency. The Patriot Act, Know Your Customer (KYC), Basel II, Sarbanes-Oxley, and Federal Financial Institutions Examination Council (FFIEC) rules governing credit card business practices – to name just a few recent regulations – have cost billions of dollars for banks but little, if any, incremental revenues.

Mergers and acquisitions have been the single biggest force reshaping the U.S. payments landscape over the past two decades. The most recent round of consolidations has left a disparity between large and small never before witnessed in this country. For example, we have witnessed the emergence of mega banks such as BOA combining the former Bank of America and Nations Bank, and JP Morgan Chase combining the Chase Manhattan Bank, Manufacturers Hanover Bank, Morgan Guaranty Trust and Bank One. In a scale-driven, technology-intensive business like payments, the emergence of true mega-players may lead to markedly different competitive dynamics. Furthermore, nonbanks now own and operate payments networks formerly owned by banks. Networks once considered off-limits to banks are now courting them with open arms. Time and again, nonbanks have proven more innovative, nimbler, and better at satisfying customers than banks. They have also learned to harness the payments networks built and operated by banks to beat them at their own game.

In order to cope with these challenges, banks have to confront the issue on many fronts in a holistic approach. To begin with, banks in different countries can learn from each other, especially about how to reduce the cost of payments by changing the operational mix. Most banks still have many opportunities to reduce the cost of payment operations, even without changes to the national payment landscape. Of course, banks should realize that efficiency alone does not necessarily lead to profitability. Banks will have to look beyond costs to revenues and product mix as well. This requires an integrated look at payments across the various instruments, and a special focus on the cross-subsidies that

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<sup>23</sup> Jack Stephenson, "Growing Pains: Outlook for the U.S. Payments Industry," McKinsey & Company, 2005.

characterize the current payments landscape. The cross-subsidies offer opportunities for competitors to move into the game. Banks and new players are now free to enter the most lucrative parts of the market with new or improved products, and they need not bother with loss leaders that drag down the profits of incumbent banks. Banks should also take another look at their pricing structure, increasing prices for loss-making products to limit their dependence on vulnerable profit-generators. Finally, banks need to address the organizational challenge. In most banks, the payments business is fragmented across various units, whose actions jointly determine the course and profitability of the payments business. Banks will have to come up with a way to coordinate their actions: with a 'payment czar,' payment councils, cross-functional MIS systems, etc. Whatever the mechanism, it should be based on a clear understanding of the economics and profitability of the payments business.

Fortunately, there are significant opportunities for banks in the business of cross-border payments business. Large international banks such as Citibank, Bank of America, and Hongkong Shanghai Banking Corporation operate their own internal global payments networks, through which they can route payments to destinations in different countries. Such internal networks do not necessarily differentiate between domestic and cross-border payments as these flows are all inside their own networks, eliminating the need to treat a payment as cross-border, which can lower costs and increase competitiveness. These large global banks take care of the payment outsourcing needs of smaller financial institutions, constantly taking the leadership role in developing new standards and techniques. By offering solutions that mesh trade finance with cross-border payments, banks can also increase transactions fees associated with international trade. In this way, banks consider their entire payment platforms as providing electronic financial supply chain solutions for their corporate and other bank clients.

## **VI. Conclusions**

Cross-border payments are estimated to represent approximately 8% of the total payment volume, with the remaining 92% being accounted for by domestic payments. While many large banks are active in cross-border payments as well as trade finance, there is still room for growth. Banks must offer cross-border payment capabilities to remain competitive and meet the requirement of increased global trade.

Business-to-business (B2B) cross-border payments are not a new phenomenon. Corporates have been transferring funds both domestically and internationally for some time. However, as markets become increasingly global, there is a pressing need to fulfill the requirements of corporates participating in cross-border transactions as well as the financial institutions that serve them. In recent decades, multiple payment vehicles, networks, and standards have risen up to provide a dizzying array of options. Additionally, technological, political, geographic, regulatory, and competitive factors are transforming the cross-border payment process and landscape. These transformations are providing significant opportunities, challenges, and risks to corporates and financial institutions.

In the area of commercial cross-border payments, however, there remain numerous inefficiencies that need to be addressed by various concerned parties. The main reason for this is that payment systems are normally designed to process domestic payments, and there has been a lack of well-established systems that can efficiently handle cross-border payments. Prices for cross-border payments are substantially higher than for domestic ones even in Europe where a common currency, euro, was introduced and used since 1999. Also the execution time for cross-border settlements is much longer than for domestic ones. In recent years, the need for efficient cross-border payments has received an increasing attention, particularly in connection with the work towards an integrated market for payment services in Europe. Efficient cross-border payment systems are deemed to be necessary in order to realize the advantages of the EU-wide internal market and the development of such systems is a natural consequence of the establishment of the European Monetary Union. Such a move is not unique to Europe alone, however, as both governments and private sector institutions in other regions are also realizing the importance of developing more efficient cross-border payment services.

The payments system is evolving toward an ever more universal and sophisticated level of operation. Payments system innovations are an integral component of the modern economy. In both wholesale and retail areas, new technologies, new participants, and new alliances are beginning to transform the payments system landscape. One by-product of this transformation is the blurring of the distinction between wholesale and retail activities, as when large-value payments are made also through ACH channels. There also is the growing integration of domestic and international payments flows, as efforts are well underway to develop a functioning cross-border ACH, such as SEPA.

Another critical factor in this new landscape is the emergence of nonbanks in the payments system, where they are playing a prominent role in significant new developments. In many instances, banks remain at the forefront of change, as with credit card usage on the Internet. But in other cases, nonbanks are dominant in such areas electronic bill payment and presentment (e.g., Checkfree and Paytrust). We should view the new Visa Commerce in this light, and the overall new trend in the payments landscape strongly supports such an innovative new service as Visa Commerce.

Clearly, the payments system is in a state of flux, marked by intense competition and jockeying for position. Firms with new, competing products and services are attempting to reach a critical mass of users, but eventually one will witness in the coming years the winners and losers among the new entrants in a very dynamic and rapidly changing payments landscape.

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