GLOBAL ELECTRONIC PAYMENTS

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Introduction

A number of studies point toward considerable growth in cross border payments in the upcoming years. Despite this expected increase, many obstacles hinder the smooth transference of payments in the international marketplace. A recent study by the Board of Governors 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. Moreover, the small volume of cross border payments relative to domestic payments, 1 to 2 percent, presents a significant challenge to establishing a critical mass that will lead to declining marginal costs for the service.

Costs associated with cross border transactions are related to various factors. Over the past few decades, many developed 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 multinational corporations alike and results in manual intervention to collect and correct data. In addition, businesses and consumers pay a fee for international payments as well as explicit or implicit fees for foreign exchange conversion. Moreover, various intermediaries are generally involved in the payment process, particularly through the widespread use of correspondent relationships. The execution time for international payments is also substantially longer than for domestic payments.

This paper explores in detail the global electronic payments marketplace, with the exclusion of securities transactions. Section I provides an overview of two types of cross border payment models, a unique and important case study, the European Union, factors that facilitate and hinder global payments, and various players in the cross border payments marketplace. Section II examines market interest in making inexpensive, reliable cross border payments. One of several, possibly complementary, ways of doing this is to formalize linkages between U.S. ACH operators and ACH operators in other countries. To that end, Section II also includes detailed information on the retail payment systems of countries that have considerable ACH volume. Section III provides a synopsis of the March 2003 Bank for International Settlements report, *Policy Issues for Central banks in Retail Payments*, including issues related to cross border payments. Finally, future considerations for providers of cross border services are outlined in Section IV.

Section I: Cross Border Payments Marketplace

Operational Details

Cross border payments involve moving account balances from one jurisdiction to another and generally follow one of two models: correspondent/network relationships and tiered relationships. In the correspondent/network relationship model, account balances move from one country to another through the use of bilateral account arrangements. Typically, a cross border correspondent payment involves an exchange of value from one currency to another, but transfers sometimes occur in a single currency. For example, many countries permit residents to hold accounts in U.S. dollars. Transfers

between the U.S. and these countries, or among these countries, can also be made in a single currency.

The tiered relationship model differs from the correspondent/network model in that a supra-national agency is at the apex of the structure. For example, the European Central Bank (ECB) acts as a supra-national agency to facilitate single currency, euro transfers across national borders within the EU via TARGET. Similarly, CLS acts as a supra-national agency to facilitate multi-currency transfers.

Payment Landscape in the European Union

When considering factors that impede or facilitate cross border payments, the European Union (EU) serves as a useful microcosm in which to view market structure, incentives, and standards. The EU is the world's second largest payment market following the U.S. and faces divergent consumer and corporate payment habits. Most countries 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. Moreover, some major investments have been made to update national ACH systems, like the 120 million euro in the United Kingdom's BACS. Within this environment, the European Payments Council has fostered the development of a pan-European automated clearinghouse (PE-ACH). On April 28, 2003, STEP2 became the first service provider for PE-ACH and currently processes cross border credit transfers

Incentive Structure

One view within this fragmented payment infrastructure is that regulatory mandate, rather than customer demand, is driving cross border payments toward a single European payments area. Put succinctly, this outlook is that "The European Union (EU) approach to large-scale change is often carried forward more by vision, supported by political will, than by a purely financial and technical business case."

Another viewpoint relates the low volume of cross border payments to high transaction costs. It had been envisioned that the a single, homogeneous market would emerge from the European and Monetary Union on January 1, 1999, and that this infrastructure would enable the movement of currency within the Eurozone as easily, freely, and cheaply as it had within previous national borders. Despite this objective, bank fees for cross border payments within the EU varied widely. In order to address this disparity, a European Commission rule, that became effective in July 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.

Network Effects and Standards

The smooth functioning of an integrated cross border payments market also requires cooperation between banks on interbank standards. Banks may be reluctant to make sizeable investments to support such standards, if they are uncertain that other banks and bank customers are making similar investments.

Private organizations and financial institution associations have generally developed domestic payment standards. However, central banks often play a role in the development of standards either through an oversight role for the payments system or through their

own interest as a participant. For central banks that operate clearing and settlement systems, standards may be enforced through contractual agreements with participants and through regulation.

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. Only about 1 percent of customers initiating cross border transactions in the Eurozone includes the BIC and IBAN in the payment message. As a result, some banks charge fees to manually repair payment orders.

If progress is not made on harmonizing payments system infrastructures and standards within the EU, the European Union and the European Central Bank have signaled that additional regulatory measures may be taken.

Liquidity

Increased globalization has also had an impact on intraday liquidity and shaped the needs of end users. In terms of liquidity, the international payments environment has been significantly altered over the past decade as global and domestic financial markets as well as capital and currency markets have become more integrated. At the same time, central banks in the G-10 countries outside the U.S. have established RTGS systems, which have led to a dramatic increase in the need for intraday liquidity. The liquidity demands associated with such RTGS systems has increased as banks and end users seek to make timed payments for large value payments in both domestic and foreign markets.

Moreover, RTGS systems are also used to settle the balances of other domestic net settlement, securities and ACH systems, the collateral and margin requirements for derivatives and securities clearinghouses, the daily cycles for international securities depositories, the cross border payments on TARGET and the balances on CLS. Providing cross border payment services requires financial strength, substantial investments in technology platforms and access to sufficient liquidity pools, which has limited the number of financial institutions that participate in this market.[1]

End User Needs

The needs of end users also affect the choice between timed, large-value and retail transfers. Some corporate clients are requiring global cash management services from large, international banks, which contrasts starkly with an immigrant's desire to transfer small value funds, which are not as time critical, to his or her country of origin. However, the bright line between large and small value transfers as well as the need for timed payments is becoming blurred. For example, some global corporate treasurers have voiced a preference for accessing the most cost effective payment system, such as ACH.

Remittance Payments

In the U.S., policy makers and banks have focused attention on the money management practices of Latino immigrants as a result of the doubling of remittance flows to Latin American countries during the later half of the 1990's. In 2002, the Pew Hispanic Center and the Multilateral Investment Fund conducted a study of remittance senders. The interviews were designed to determine the respondents' understanding of the costs

involved in remittance payments and their willingness to use new payment methods, like the electronic transfer products that U.S. banks are putting on the market.

Respondents were most concerned with the high costs of sending payments. However, they were passive, brand conscious consumers that selected their payment method by proximity and speed in which the money arrived in the home country. Rather than an effective cost comparison, convenience and force of habit guided their selection. For those who had bank accounts, less than a quarter understood that banks could send remittances.

Although interviewees were anxious to switch to cheaper payment methods in principle, other factors restricted their access to the banking system. They were unwilling to open bank accounts if fees were high and if they had to maintain large minimum balances, and many feared the failure to produce valid papers to open a bank account would jeopardize their stay in the U.S.

Respondents had low levels of financial literacy. The study suggests that banks moving into this marketplace must meet or surpass the pricing and services on both ends of the transaction. In summary,

> "This study and others show that most remittance senders and receivers do not currently have bank accounts of any sort and probably never have. Banks, therefore, must successfully convince two populations – Latino immigrants in the United States and their families in Latin America – to trust their money to institutions that are unknown at best and might actually be viewed with some suspicion."[2]

Corporate Payments

With regard to the needs of corporate end users, the Association of Financial Professionals (AFP) conducted telephone interviews with treasury managers from 25 corporations headquartered in Europe and the U.S. in 1999. Following these interviews, the AFP spoke with commercial banks that were primary providers of cross border services in Europe.[3]

Tensions between the interests of bankers and corporate treasurers surfaced. Bankers expressed concern that the common currency would ultimately reduce bank charges, that revenues from foreign exchange activities had significantly declined as a result of the introduction of the single currency and that they had borne much of the euro's development expenses. Treasury managers, however, voiced disappointment that the euro had not yet put downward pressure on bank charges.

Respondents concluded that the lack of cross border payment standards and the consistent implementation of those standards were the single impediment to a successful single currency pan-European payment mechanism. They also agreed on the need for a standardized, risk-managed Pan-European low value payments mechanism. Finally, the need to rationalize European payment systems to reduce liquidity drain, settlement delays, and operating costs and to increase the flow of financial information was highlighted.

Cross Border Payment Arrangements

Section I includes detailed information on various cross border payment providers and messaging services including correspondent banking, network banking, payment cards,

Western Union, Eurogiro, STEP1, STEP2, International Direct Deposit, FedACH International Services, other gateway arrangements, WATCH, EURO1, TARGET, CLS, SIC, euroSIC, and SWIFT.

Section II: Country Reports

Section II reviews the expected increase in cross border payments at the same time that consumers and businesses are searching for low cost, efficient payment mechanisms. One of several, possibly complementary, ways of providing such services is to formalize linkages between U.S. ACH operators and ACH operators in other countries. In reviewing ACH markets worldwide, it is clear that several countries' ACH systems are highly developed, essential components of the payment systems while other countries have yet to fully integrate ACH into their payment system. Rather than amass data on the full spectrum of countries that use ACH, this section focuses on several countries with a significant ACH presence. The team selected the following 16 noteworthy countries for detailed review: Australia, Japan, Korea, New Zealand, Switzerland, Austria, Denmark, France, Germany, Italy, Netherlands, Spain, United Kingdom, Canada, Mexico and Brazil.

Section III: Policy Issues for Central Banks in Retail Payments

Section III reviews the Bank for International Settlements report on "Policy Issues for Central Banks in Retail Payments," which finds that the objectives of the efficiency and safety of retail payments systems are important to all central banks. Their three roles in payments markets (as operators, overseers, and catalysts or facilitators) give them various avenues through which to pursue these objectives. There is significant institutional variation across central banks, and in the weight they place on each of these roles. In many cases, these roles are not mutually exclusive, but rather are mutually reinforcing.

Trends in retail payment systems are moving the market both toward and away from greater integration. The trend toward greater integration is being driven by advances in technology, the realization of economies of scale and scope, and other trends such as the increasing internationalism of economic activity and consolidation in the banking industry and its infrastructure. However, the emergence of many innovative niche products offsets this trend somewhat, and has increased the number of providers in payments markets.

In some areas, banks' control over payment infrastructure, such as ATM and POS networks, has widened and has increasingly begun to overlap across systems and countries. Many of these institutions also participate in foreign clearing systems, and may be able to specialize increasingly in the provision of multicurrency correspondent banking services. Consolidation can also allow banks to process a larger portion of payments in-house rather than through traditional clearing systems. This could eventually lead to pricing changes that could further increase the dominance of large institutions in payments processing. Retail clearing systems, too, have experienced consolidation. In some countries, decentralized systems have evolved into a single centralized system, while in others specialized systems have evolved to process a wider range of instruments. Within the Euro area, some national ACHs are now participating in the cross-border market alongside the recently introduced cross-border retail clearing system.

The interconnectivity and interoperability among national networks have allowed other methods of payment, particularly card-based payments, to be used in an increasing number of cross-border contexts. This cooperation has been formalized either by bilateral or multilateral agreements between domestic network operators, or by the development of transnational networks and clearing operations, such as those of the major credit card companies. These arrangements have also brought about the development of new services and delivery channels.

The factors to consider in evaluating the impact of innovation on the safety and efficiency of retail payment systems also apply to cross-border markets, though cross-border markets may also have some specific characteristics relevant to efficiency and safety, such as:

- Cross-border markets may face additional legal impediments.
- Standards and practices may vary more widely in cross-border markets than in domestic markets.
- The small size of the market may mean high unit costs relative to domestic markets.
- Recent mergers may have significantly concentrated the market for cross-border credit transfer services in some areas.

These four factors may have implications for the efficiency and/or safety of current and potential retail payment solutions in cross-border markets.

Section IV: Future Considerations

A survey of the global payments marketplace indicates that the cross border payment business is concentrated among a few players, including financial institutions that have adequate financial strength, substantial investments in technology platforms and access to sufficient liquidity pools to support the business; non-bank participants (e.g. Western Union, credit card companies) and central bank or privately owned payment systems (e.g. EURO 1, TARGET, Eurogiro, CLS, Step2, etc.). Moreover, the infrastructure costs related to supporting cross border payments may drive further consolidation in the European Union. For example, the ECB has announced that TARGET2 will be based on the EU's most efficient RTGS systems. Any domestic payment system that does not meet cost recovery requirements in four years will be closed.

The projected growth in global payments may entice new entrants into this market, which requires establishing direct or indirect access to the world's major payment systems or partnering with entities that operate such a network. Those that choose the former option face challenges related to developing a critical mass that will result in an economically viable, cross border service. Moreover, new entrants to the cross border marketplace as well as current providers of these services face challenges related to meeting end user needs, maintaining profitability in a shifting marketplace, educating corporates and consumers, and implementing common standards.

The Business Case/End User Needs

Developing the critical mass for a new, economically viable, cross border payment service will require an estimation of market interest. Such an exercise will help to prevent the outcome experienced in Europe during the mid 1990's, when gateway arrangements that linked national ACH systems, were discontinued because banks preferred to use

existing business relationships. Feedback should be sought from banks, corporates and consumers to identify unmet needs and gaps in existing cross border arrangements.

A review of available literature, however, found few studies related to corporate cross border payment needs. The individual country reports included in Section II include major import/export industries between the U.S. and the 16 specified countries, which may facilitate further research to identify the largest corporations involved in these industries. Once identified, these corporations can be targeted for market research to ascertain unmet cross border payment needs.

For cross border payment providers that desire to establish a service that will be widely used by consumers for remittance payments, the challenges related to establishing a banking relationship with communities that may be currently unbanked should be assessed.

Incentives

Tensions exist between corporate customers and consumers who are seeking low cost cross border transfer methods and cross border payment providers desiring to maintain profits in this marketplace. This tension can result in behaviors such as the reaction to the July 2003 European Commission rule, requiring banks to charge no more for cross border retail transactions than for domestic ones. In response to this pricing rule, most banks raised their fees for wire transfers or increased other domestic bank charges to subsidize cross border transfers, because they are more costly to process. Providers will face the challenge of meeting end user needs at a reasonable cost in order to drive the adoption of cross border payments while seeking alternative sources of revenue.

Bank, Corporate, and Consumer Education

After developing a business case, cultivating a critical mass for cross border payments requires an intensive education and marketing campaign targeted to banks, global corporations and consumers.

Standards

A review of current participants in the cross border marketplace indicates that cross border payment providers are migrating toward SWIFT standards while some of the 16 domestic ACH systems surveyed utilize SWIFT standards and others support proprietary standards. It is recommended that cross border payment providers keep abreast of developments in the international standards community that may facilitate a wider adoption of cross border standards such as:

- the European Committee for Banking Standards and SWIFT
- the introduction of XML-based standards on SWIFTNet
- the NACHA Cross Border Payments Council
- the EPC's end-to-end STP Working Group, whose task is to promote end-to-end STP for each SEPA instrument,
- and TWIST,[4] among others.

DETAILED FINDINGS

A number of studies point toward considerable growth in cross border payments in the upcoming years. The Boston Consulting Group estimates that the volume of retail, cross border payments will increase at a compound annual growth rate of 10.2 percent globally and 7.8 percent for the Americas[5] from 2000 to 2010.[6] Another study, based on interviews with the top 20 banks in the U.S. in late 2002 and early 2003, estimates that cross border payments may double in the next 36 months due to population growth in the immigrant community.[7] Despite this expected increase, many obstacles hinder the smooth transference of payments in the international marketplace. A recent study by the Board of Governors 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.[8] Moreover, the small volume of cross border payments relative to domestic payments, 1 to 2 percent,[9] presents a significant challenge to establishing a critical mass that will lead to declining marginal costs for the service.

Costs associated with cross border transactions are related to various factors. Over the past few decades, many developed 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 multinational corporations alike and results in manual intervention to collect and correct data.[10] In addition, businesses and consumers pay a fee for international payments as well as explicit or implicit fees for foreign exchange conversion. Moreover, various intermediaries are generally involved in the payment process, particularly through the widespread use of correspondent relationships. Finally, the execution time for cross border payments is substantially longer than for domestic payments.[11]

This paper will explore in detail the global electronic payments marketplace, excluding securities transactions. Section I outlines: two types of cross border payment models; a unique and important case study, the European Union; factors that facilitate and impede global payments; and various players in the cross border payments marketplace. Section II examines market interest in making inexpensive, reliable cross border payments. One of several, possibly complementary, ways of doing this is to formalize linkages between U.S. ACH operators and ACH operators in other countries. To that end, Section II also includes detailed information on the retail payment systems of countries that have considerable ACH volume. Section III provides a synopsis of the March 2003 Bank for International Settlements report, *Policy Issues for Central Banks in Retail Payments*, including issues related to cross border payments. Finally, future considerations for providers of cross border services are outlined in Section IV. The views expressed are those of the authors and do not represent the views of the Federal Reserve Bank of Chicago or the Board of Governors of the Federal Reserve System.

Section I: Cross Border Payments Marketplace

Operational Details

To set the framework for the discussion, cross border payments generally involve moving account balances from one jurisdiction to another through one of two methods: the correspondent/network relationship model and the tiered relationship model. Both models employ the use of electronic accounting entries to reflect the transfer of value.

In the correspondent/network relationship model, account balances move from one country to another through the use of bilateral account arrangements. Typically, a cross border payment involves an exchange of value from one currency to another, but transfers sometimes occur in a single currency. For example, many countries permit residents to hold accounts in U.S. dollars. Transfers between the U.S. and these countries, or among these countries, can also be made in a single currency.

Diagram I depicts the correspondent/network relationship model and the transfer of value from one currency to another. Bank A located in Country A and Bank B located in country B hold account balances with each other. Bank A and Bank B are separate legal entities in the correspondent model, but may be the same legal entity in the network model. A customer at Bank A located in Country A desires to make a payment to a customer of Bank B located in Country B. In doing so, the appropriate accounting entries will be made to Bank A and B's accounts with each other and to the customer accounts held at Bank A and Bank B. Bank B will also perform a currency conversion from Country A's currency to Country B's currency.

As diagram II depicts, the tiered relationship model differs from the correspondent/network model in that a supranational intermediary is at the apex of the structure. For example, the European Central Bank (ECB) acts as a supra-national agency to facilitate single currency, euro transfers across national borders within the EU via TARGET. Similarly, CLS acts as a supra-national agency to facilitate multi-currency transfers.

Diagram I – Correspondent/Network Relationship Model

Jurisdiction A	**Jurisdiction B**
No Supranational Intermediary Send value USD 20,000 to Receiver in Germany, to be drawn in EUR Bank A (a New York bank) debits Customer (a)'s account $20,000 (plus fees) and credits correspondent Bank B's account in dollars	Bank B (a Frankfurt bank) credits Customer (b)'s account for EUR equivalent of USD 20,000 (at prevailing exchange rates)

Diagram II – Tiered Relationship Model

Jurisdiction A	Jurisdiction B
Supranational Intermediary (ECB) Send EUR 20,000 to Receiver in Germany, to be drawn in EUR Bank A (a Paris bank) debits Customer (a)'s account EUR 20,000 (plus fees) and transmits funds to receiver's Bank B via TARGET across the books of the ECB, the common intermediary	Bank B (a Frankfurt bank) credits Customer (b)'s account for EUR 20,000

Payments Landscape in the European Union

When considering factors that impede or facilitate cross border payments, the European Union (EU) serves as a useful microcosm in which to view 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 15 – 30 percent of transactions in Germany are electronic. In terms of corporate payments, trade intensive economies like Germany, Netherlands, and Belgium have greater business to business transfers than other EU counties, due to cash management and treasury transactions.[12]

Most countries have their own ACH systems, which have individual operating rules, settlement times, account numbering systems and standards.[13] The transaction volumes processed by these ACH systems also vary. For examples, the French ACH system SIT processed nearly 6 billion transactions in 1999 while Belgium's CEC and Portugal's SICOI processed around 1 billion transactions. Moreover, some major investments have been made to update national ACH systems, like the 120 million euro in the United Kingdom's BACS.

Within this environment, the European Payments Council has fostered the development of a pan-European automated clearinghouse (PE-ACH). On April 28, 2003, STEP 2, which will be discussed in more detail later, became the first service provider for PE-ACH and currently processes cross border credit transfers. Cross border debit transfers are scheduled to begin processing by mid 2005.

Estimates are that PE-ACH requires a critical mass of about 50 percent of current cross border credit transfers to be economically viable. It is anticipated that this number of transfers will be reached by mid-2004 by channeling transactions to PE-ACH that are currently processed by correspondent banking relationships. Real critical mass, however, will only be achieved when those countries that do not have a national ACH system begin to use PE-ACH.[14]

Incentive Structure

When examining this fragmented payment infrastructure, one view is that regulatory mandate, rather than customer demand, is driving cross border payments toward a single European payments area. Put succinctly, this outlook is that "The European Union (EU) approach to large-scale change is often carried forward more by vision, supported by political will, than by a purely financial and technical business case."[15]

Although one might surmise that this regulatory pressure has led to a large number of cross border payments, the opposite appears to be true. Progress toward integrating the Eurozone into a single payments area has been slow, due to firmly entrenched rules and standards of domestic payment systems.[16] McKinsey & Company, Brussels, estimates that only 800 million of the 63 billion EU transactions are cross border and that 80 percent of these involve cards. Furthermore, 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 percent for cross border payments compared to 99 percent for domestic transfers, notwithstanding the introduction of international standards such as the international bank account number (IBAN), the bank identifier code (BIC), and SWIFT MT103+. McKinsey also finds that the movement to a single European infrastructure will be costly, between 1-2 billion euros, with banks bearing the majority of the costs.[17]

Another viewpoint relates the low volume of cross border payments to high transaction costs. It had been envisioned that the a single, homogeneous market would emerge from the European and Monetary Union on January 1, 1999, and that this infrastructure would enable the movement of currency within the Eurozone as easily, freely, and cheaply as it had within previous national borders.[18] Despite this objective, bank fees for cross border payments within the EU varied widely. In order to address this disparity, a European Commission rule, that became effective in July 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.[19]

Network Effects and Standards

The smooth functioning of an integrated cross border payments market also requires cooperation between banks on 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.

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.

There are a diverse number of payments standards that can be broadly categorized as:

- Technical standards which establish common rules for the exchange of payment information, such as common protocols and message formats.

- Business standards which are agreements or legal contracts between payments providers that stipulate the guidelines for interbank clearing and settlement.

- Interoperability agreements which allow for the reciprocal use of payment instruments and can vary from performing part of the payment processing for a financial institution to acting as a remote mailbox whereby all instruments and payments are sent to the issuing financial institution.

The adoption of standards can have a number of beneficial effects on efficiency and competition. Lower processing and operational costs may arise from technical standards that specify how payments information will be transmitted and received and from business practices between payment providers. For example, standardizing the payment initiation and processing features of an ATM terminal allows suppliers of these machines to manufacture more standardized equipment, which may result in a larger market with lower prices. Moreover, customer convenience may be enhanced from interoperability agreements among payments processors, which can also lead to an enlarged market.

Technology may reach an optimal path of development when compatibility and standards enable consumers and providers to choose the best technology available. And, when there is full compatibility between different operators' standards, a large installed base for that technology may arise.

This may lead to three potential problems.

- If standards are prematurely adopted, the existing technology may become locked in due to the high switching costs of moving to a new, more efficient technology.

- Alternative producers may vie to develop a market-leading standard, which may cause users to be reluctant to choose one standard over another.

- In some markets, agreements on standards can be used to limit competition.

Private organizations and financial institution associations have generally developed domestic payment standards. Typically, these standards come into effect through contractual agreement between the financial institutions participating on a specific clearing and settlement system, and the terms are usually incorporated into agreements between the financial institutions and their customers.

However, central banks often play a role in the development of standards either through an oversight role for the payments system or through their own interest as a participant. For central banks that operate clearing and settlement systems, standards may be enforced through contractual agreements with participants and through regulation.[20]

Efforts are underway, particularly in the European Union (EU), to address standards related issues. It is hoped that the creation of a more efficient payment system through a Single European Payments Area (SEPA) will improve the European and banking 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 SEPA, is working toward establishing common European standards, including those for direct debits.[21] 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 (e.g. by the substitution/extension of the SWIFT network), reducing manual intervention by increasing straight-through processing (STP) and decreasing the number of intermediaries in the payment process.[22] The success of these efforts is still uncertain.

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 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 1 percent of customers initiating cross border transactions in the Eurozone includes the BIC and IBAN in the payment message.[23] As a result, some banks charge fees to manually repair payment orders.[24]

If progress is not made on harmonizing payments system infrastructures and standards within the EU, the European Union and the European Central Bank have signaled that additional regulatory measures may be taken.

Liquidity

Over the past decade, the international payments environment has been significantly altered as global and domestic financial markets as well as capital and currency markets have become more integrated. At the same time, central banks in the G-10 countries have established RTGS systems, which have led to a dramatic increase in the need for intraday liquidity. The liquidity demands associated with such RTGS systems has increased as banks and end users seek to make timed payments for large value payments in both domestic and foreign markets.

Moreover, RTGS systems are also used to settle the balances of other domestic net settlement, securities and ACH systems, the collateral and margin requirements for derivatives and securities clearinghouses, the daily cycles for international securities depositories, the cross border payments on TARGET and the balances on CLS. Therefore it is of particular concern that, "Given these increasing market infrastructure linkages, technical failures on one system can very quickly affect many other systems globally, by transmitting liquidity deficiencies."[25]

Providing cross border payment services requires financial strength, substantial investments in technology platforms and access to sufficient liquidity pools, which has limited the number of financial institutions that participate in this market.[26]

End User Needs

The needs of end users also affect the choice between timed, large-value and retail transfers. Some corporate clients are requiring global cash management services from large, international banks which contrasts starkly with an immigrant's desire to transfer small value funds, which are not as time critical, to his or her country of origin. However, the bright line between large and small value transfers as well as the need for

timed payments is becoming blurred. For example, some global corporate treasurers have voiced a preference for accessing the most cost effective payment system, such as ACH.

Remittance Payments

In terms of immigrant payments, the IMF estimates that nearly seventy percent of global remittance payments are originated from five countries - the United States (28.4%), Saudi Arabia (15.1%), Germany (8.2%), Belgium (8.1%) and Switzerland (8.1%), while three countries receive a quarter of the world's remittance payments – India (10%), Mexico (9.9%) and the Philippines (6.4%).[27]

In the U.S., policy makers and banks have begun to focus attention on the money management practices of Latino immigrants as a result of the doubling of remittance flows to Latin American countries during the later half of the 1990's. The Pew Hispanic Center predicts that remittance payments to those Latin American nations that receive most of their money from the U.S. – Mexico, El Salvador, Guatemala, Honduras, and Nicaragua - will increase from $10.2 billion in 2000 to $18 billion in 2005. Among the South American countries, Brazil is the largest recipient of workers' remittances. However, these payments come from expatriates in surrounding countries, Europe and Asia, not just the United States.

In addition to Western Union, which dominated the market in the 1990's, remittance services are now being offered by other institutions, such as credit unions. Some of these products enable a payment to be deposited in an ATM in the United States and retrieved in an ATM in Latin America. Moreover, some U.S. banks have acquired stakes in or established cooperative arrangements with Mexican banks to facilitate remittance flows.

In 2002, the Pew Hispanic Center and the Multilateral Investment Fund conducted a study that included extensive interviews with 302 remittance senders. The interviews were designed to determine the respondents' understanding of the costs involved in remittance payments and their willingness to use new payment methods, like the electronic transfer products that U.S. banks are putting on the market. Respondents were most concerned with the high costs of sending payments. A substantial number, however, were unaware of costs beyond the flat fees they were charged and had no idea why the sums their relatives received were less than expected. Only a small number identified exchange rate conversion as the source of these additional costs.

Respondents were passive, brand conscious consumers who selected their payment method by proximity and speed in which the money arrived in the home country. About two-thirds said that they had never used another firm to send payments. Rather than effective cost comparison, convenience and force of habit guided their selection. For those who had bank accounts, less than a quarter understood that banks could send remittances.

Most of the respondents did not have a first hand knowledge of personal banking technology, but they did have a passing familiarity with ATMs, credit cards and other electronic transfer methods. However, they were not aware that these technologies could be used to send remittances. Participants were informed of a hypothetical banking product model that, through the use of ATMs, could allow a deposit to a financial

institution in the U.S. and a withdrawal in the home country. An overwhelming majority said they would use the service, if ATMs or a similar mechanism were available for withdrawal in the home country. Many noted that this infrastructure did not exist in their home communities.

Although interviewees were anxious to switch to cheaper payment methods in principle, other factors restricted their access to the banking system. They were unwilling to open bank accounts if fees were high and if they had to maintain large minimum balances, and many feared the failure to produce valid papers to open a bank account would jeopardize their stay in the U.S. In terms of legal status, the growing acceptance of the Mexican consular ID card by U.S. banks is rapidly alleviating immigrants' undocumented predicament and several Central American countries are also considering offering a similar service to their nationals.

Respondents had low levels of financial literacy. Fifty eight percent did not have bank accounts and used cash rather than checks, credit or debit cards to pay bills. When cash could not be used, many purchased a money order or used a friend's checking account. For those that had bank accounts, few used them to send remittances.

The study suggests that banks moving into this marketplace must meet or surpass the pricing and services on both ends of the transaction. In summary,

> "This study and others show that most remittance senders and receivers do not currently have bank accounts of any sort and probably never have. Banks, therefore, must successfully convince two populations – Latino immigrants in the United States and their families in Latin America – to trust their money to institutions that are unknown at best and might actually be viewed with some suspicion."[28]

Corporate Payments

With regard to the needs of corporate end users, the Association of Financial Professionals (AFP) conducted telephone interviews with treasury managers from 25 corporations headquartered in Europe and the U.S. in 1999. The study identified problems with cross border payments (particularly the euro) short and intermediate action steps for treasury managers and longer-term problems and issues. Following these interviews, the AFP spoke with commercial banks that were primary providers of cross border services in Europe.[29]

Tensions between the interests of bankers and corporate treasurers surfaced in the study. The most serious problem mentioned by commercial banks was the multiplicity of payment systems in Europe with incompatible transaction formats and conflicting objectives. Bankers also expressed concern that the common currency would ultimately reduce bank charges, that revenues from foreign exchange activities had significantly declined as a result of the introduction of the single currency and that they had borne much of the euro's development expenses. Treasury managers, however, voiced disappointment that the euro had not yet put downward pressure on bank charges. Those from financial services firms were concerned about transaction finality and liquidity and looked for banks that provide intraday credit access, adequate branch networks, cash concentration services, and superior customer service. Reconcilement problems and inconsistent intra and interbank communication standards were also mentioned. Some treasury managers were required to use different country specific message formats, even when they used a single bank.

Respondents concluded that the lack of cross border payment standards and the consistent implementation of those standards were the single impediment to a successful single currency pan-European payment mechanism. They also agreed on the need for a standardized, risk-managed Pan-European low value payments mechanism. Finally, the need to rationalize European payment systems to reduce liquidity drain, settlement delays, and operating costs and to increase the flow of financial information was highlighted.

In the global payments marketplace, various arrangements exist that support the transfer of large value (wholesale) and small value (retail) funds or both. These are discussed in more detail below along with the messaging system, SWIFT, which facilitates cross border transfers.

Wholesale/Retail Payment Arrangements

Correspondent Banking

Traditionally, banks have transacted single and batch cross border electronic payments via a corespondent network.[30] Many intermediaries may be involved in this process since bilateral relationships with a large number of financial institutions are required in order to provide adequate geographic coverage in the desired currencies.

Moreover, correspondent banking can be slow and expensive due to the need to manually process nation-specific, non-standardized and sometimes inaccurate data.[31] Within recent years, however, there has been a trend among large banks to rationalize the number of correspondent relationships, particularly within the European Union since the introduction of the euro.

Because correspondent banking services are technology intensive, the choice of correspondent bank is influenced by the quality of services offered. Significant IT investment is necessary, which means that only those institutions that can obtain a critical mass of payments can bear these costs. In a single credit institution, correspondent-banking business can reach 40 billion euros per day.[32]

Network Banking

Large banks that have offices in other countries often use their proprietary network to send cross border payments. A report by the European Central Bank (ECB), 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 foreign banks, and the low degree of automation in banks' internal systems.[33]

Retail Payment Arrangements

Payment Cards

Payments for cross border retail POS transactions are made by currency obtained from international ATM networks, credit cards and debit cards. While credit cards are predominately used for cross border POS transactions and for remote cross border payments (made by mail, phone or the Internet) debit cards are increasingly being used for these purposes.[34]

Debit Cards

Successful debit card systems require widespread acceptance by merchants and consumers, adequate participation by issuing and acquiring banks, quick authorization, and compensation for various participants. In some countries, debit card systems that link different banks were built on existing ATM or credit card networks, while in other countries debit card systems were created separately from preexisting networks.

Debit card systems involve the transfer of transaction information between merchants and the card-issuing bank, which is communicated via telecommunication lines that are linked by computers. Third party processors rather than financial institutions often provide these computers, called switches.

The boundaries for domestic debit card networks are defined by two extremes. On one end of the spectrum, merchants are connected to a single institution's network and can only accept cards issued by that financial institution. On the other end of the spectrum, a single switch connects a merchant to each domestic financial institution, which provides greater interconnectivity between participants.

In some countries, multiple debit card systems exist, and participants on these different networks do not have access to one another unless links are involved. Links can be established through bilateral or multilateral agreements between the switches or through merchants, cardholders and banks participating on more than one network.

Authorization, clearing and settlement are key components of debit card transactions. Authorization relies on telephone communication and computer routing information between the merchant and the cardholder's bank. Clearing may be done by the same participants that provide authorization or separate participants. For example, some centralized network switches function as clearing houses. Following authorization, transaction information is resubmitted to the network switch, which often batches the information on a daily basis for delivery to participating banks and merchants. Other systems do not have centralized clearing and "on-us" and "on-other" transactions are separated and cleared on a bilateral basis. In some countries, bilateral positions are combined with other payment streams and settled on a multilateral basis while in others, POS payments are submitted as direct debits and are distinguishable by a special tag.

Three general methods are used for settlement: 1) participants' positions are submitted to a common bank, which makes debits and credits on its books, 2) participants' positions are submitted to a central counterparty, which debits and credits participants' accounts using a secondary payment instrument, 3) participants' positions are settled through bilateral payments. [35]

International debit card networks are operated by credit card companies and allow cardholders to access deposit funds in countries outside the one in which the account is held.[36] The MasterCard/Cirrus/Maestro and Visa/PLUS brands provide global debit services.

Credit Cards

Credit card transactions are generally viewed as less problematic than other decentralized payment models, such as correspondent banking, because they rely on centralized networks and more automated channels.[37] Visa International and MasterCard International manage the predominant credit card networks in the world.

Visa International

Visa International is a private, for profit, membership association owned by 21,000 financial institutions; Visa processed transactions valued at $2.4 trillion in 2002.[38]

Visa offers centralized computer and telecommunications networks (VisaNet) to link member financial institutions and enable them to process cross-border payments. Some noteworthy strategic decisions by Visa, that impact the international payment marketplace, include:

- Introduction of cross-border mobile payment[39] standards. Visa is pursuing efforts to establish cross-border mobile payment standards (which are currently lacking). In November 2001, Visa launched a non-profit making cross-industry organization called the Mobile Payment Forum with the aim of creating a framework for standardized, secure and authenticated mobile payments.[40] The Forum is comprised of approximately 100 member-organizations from the banking, telecommunications and mobile industries.
- Increase Network Usage by Improving Efficiency and Effectiveness of Network. Visa has leveraged web-based technology to increase efficiency and effectiveness of its network (and consequently cross-border payment settlement). VisaNet has been enhanced to operate on a globally accessible IP-based network. These enhancements will allow faster expansion of transaction authorization capacity and capitalize on streamlined clearing and settlement of payments.[41]

The VisaNet computer and telecommunications network links Visa's member-institutions with four Visa Interchange Centers worldwide. VisaNet is comprised of two applications: the Base I authorization service and the Base II clearing and settlement service.

MasterCard International

MasterCard International is a private, for profit, association owned by 25,000 members; MasterCard processed transactions valued at $1.1 trillion in 2002.[42]

MasterCard International operates BankNet, the telecommunications network that links members and processing centers. In 2001, MasterCard International consolidated four separate operations facilities into one central processing center known as the Global Technology and Operations Facility. MasterCard International, like Visa, is also seeking to develop cross-border mobile payment standards. MasterCard recently launched a cross-industry group known as the Global Mobile Commerce Team. This group is similar to Visa's Mobile Payment Forum.

The clearing and settlement of MasterCard transactions occur via its Global Clearing Management System. Net Settlements are generally conducted daily among the members of MasterCard International by wire transfer. However, some transactions may not settle

until one to four calendar days after the transaction occurs. MasterCard International requires some members to post collateral to mitigate settlement risk.[43]

Western Union

Western Union, a subsidiary of First Data Corporation, offers retail consumers and businesses a means of making domestic or international funds transfers and payments and is one of the leading providers of non-bank money transfer services in the world. With a global network of approximately 165,000 agents in 195 countries and territories,[44] Western Union is striving to grow to 200,000 agents by 2004. Western Union processed $700 billion in money transfers, official checks, money orders and other payment instruments in 2002.[45] It primarily serves "unbanked" consumers who need to send or receive cash quickly for emergencies, send funds to family-members in dispersed geographic locations, or use non-bank financial services to pay bills and meet other financial obligations.

Some noteworthy strategic decisions implemented by Western Union, that impact the cross-border payment market, include:

- Entry into ACH payment segment: Western Union is diversifying its portfolio of services beyond consumer-to-consumer money transfers (which accounted for 80 percent of total money transfer revenues in 2002).[46] Western Union now offers ACH payment services to businesses. Western Union's PhonePay service enables businesses such as utility companies to receive payments from their customers over the telephone, verify the authenticity of the bank account information, batch and transmit the transactions to Western Union for processing and archiving. Western Union sends the ACH information to the Federal Reserve Bank daily. The CorporatePayments service enables businesses to make domestic and cross-border payments online via instruments such as ACH, checks, wire transfers and foreign currency drafts.
- Cross-border Direct Deposits: Western Union has recently launched a pilot service that enables consumers to make money transfers, via selected Western Union agents in the U.S., and deposit the funds directly into the recipients' bank accounts abroad. This service is currently limited to a few banks in Poland.[47]
- Expansion of Service Delivery Channels: Western Union has strengthened its presence in the e-commerce arena by expanding its delivery channels via some strategic acquisitions and alliances. In April 2002, Western Union acquired Paymap Inc., a financial services company that develops and markets innovative electronic payment services such as mortgage payment accelerators. In June 2002, Western Union acquired E-Commerce Group Products Inc., a provider of a comprehensive suite of e-commerce offerings including Speedpay, a proprietary technology that enables companies to receive electronic bill payments from their customers. Western Union has forged an alliance with Eurogiro to further expand its delivery channels.

Western Union uses a proprietary network, which is accessible across borders, to process payment transactions. The network connects Western Union agents, a few banks and postal services across the world. Western Union agents access the network via stand-alone PCs or by dialing into a Western Union call-center. The network operates on Windows and DOS based platforms.

Western Union's retail consumers can perform transactions in-person at agent-stations, over the Internet, via ATMs and over the telephone. Corporate consumers can access Western Union's network through a PC-based application or a secure IP network. Corporate Payments services are encrypted with Secure Sockets Layer (SSL) technology and 128-bit encryption. The integrity of the channel is maintained via digital certificates and three level authentication.

Western Union supports and conducts transactions in the currencies of the 195 countries and territories where its agents are located. Information pertaining to Western Union's clearing and settlement process is proprietary.

Eurogiro

Eurogiro is an electronic payment network for postal and giro organizations that exchange cross border credit transfers and cash-on-delivery orders. Operated by Eurogiro Network A/S, Denmark, Eurogiro is owned by 16 banks/postal financial services companies.[48] Eurogiro Network A/S is a public limited company under the supervision of the Danish Commerce and Companies Agency. Eurogiro members are supervised by local regulatory authorities.[49]

As of July 2002, participants included 39 members from 37 countries including each EU country, 7 EU accession countries, 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.[50]

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. In addition, settlement times for transactions are bilaterally agreed between the members and may vary from country to country.[51] Euro payments are currently settled by Deutsche Postbank, which holds accounts for all the members.[52] Non-euro payments are settled on a bilateral gross basis between members once a day.

In the first half of 2003, Eurogiro processed nearly 10 million transactions, a 17 percent increase over the first half of 2002.[53] The average daily transaction volume in 2000 was 48,824, and the average transaction size was EUR 2,375. Payments are executed using SWIFT message formats including MT 100, MT 100-20, MT 00-50/60, and interbank transactions achieve a high STP rate.[54]

Eurogiro has made a number of strategic alliances. At present each member accesses Eurogiro through the Eurogiro System (ELS). In a future solution that will be implemented in the first half of 2004, connection can also be established through a closed user group on SWIFTNet.[55] Eurogiro's partnership with Western Union allows participants to send urgent cash money orders via a Western Union interface. Finally, Eurogiro Network A/S and the Federal Reserve signed a transatlantic co-operation agreement in March 2003 to facilitate cross border ACH payments between the U.S. and Europe. Five banks will pilot the service starting in November 2003: Bawag PSK, Deutsche Postbank, Postbank/ING, PostFinance/Swiss Post and UK Girobank. Eurogiro is developing a converter to translate the U.S. formatted messages to the international SWIFT format.[56]

STEPS

The Straight Through Euro Payment System (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 inter-bank payments).

STEP1

STEP1 creates a direct link between participants, therefore 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 FIN messaging infrastructure and computing facilities. The average daily value of transactions on the EURO1 / STEP1 network in July 2003 was €174 billion.

STEP1's primary benefits are that it reduces intermediate costs, execution time and pricing of cross-border payment services by:[57]

- Shortening the execution time for cross-border retail payment instructions between the ordering customer's bank and the beneficiary bank.
- Promoting the use of industry standards for messaging in order to enhance straight-through processing at the banks.
- Developing and encouraging the adoption of European business practices in the execution of cross-border retail payments instructions.

STEP1 processes retail payment orders with the following characteristics:[58]

- payments resulting from commercial transactions (i.e. banks-to-customer transactions), or bank-to-bank transfers related to such commercial transactions;
- credit and (if authorized specifically by the addressee) debit transfers, compatible with a sending cut-off at 14:00 on the value date and delivery at the very latest by 16:00, depending on the provision of liquidity;
- Payment messages formatted according to internationally recognized protocols.
- Amounts which do not create the need for systemic settlement risk protection. NOTE: if STEP1 messages exceed the sending capacity of the sending bank or the receiving capacity of the receiving bank, the messages are rejected by the system. The minimum capacity ranges from €1 million to €10 million. Any message for an amount in excess of €1 million must only be sent after making prior arrangements with the receiving bank.

STEP1 services are accessible through SWIFT's IP-based messaging platform, SWIFTNet, across borders within the European Union. STEP1 supports euro denominated transactions.

STEP1 participating-banks send payment messages to other participants, banks operating within the EU, and settlement banks throughout the 5 days proceeding the processing day. 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 (and their position brought to zero).

STEP2

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 the STEP2 network are able to reduce their costs (related to processing customer payments) 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.[59] STEP2 operates based on SWIFT communication and messaging protocols.

The benefits of STEP2 lie in its:

- ability to integrate into existing banking systems; and
- facilitation of liquidity management through reconciliation of a single liquidity position for all euro payments.

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 SWIFT's IP-based messaging platform (SWIFTNet), STEP2 offers payment processing and settlement in euro and has one clearing cycle which allows participants to send files up to 22:00 CET on day D-1 for overnight processing. Settlement occurs at 7:30 CET at the start-up of EURO 1 on day D; incoming payment files must be received by 8:30 CET on day D.

Payment instructions sent by STEP2 participants are sorted into bilateral sub-files (per participant). STEP2 establishes the amount of the bilateral payment obligation between the sending bank and the receiving bank. This amount represents the total value of the payment instructions contained in each sub-file. STEP2 generates for each bilateral payment obligation a settlement payment message for processing in EURO1. Upon processing of the settlement payment in EURO1, a confirmation message is sent by EURO1 to STEP2. [60]

International Direct Deposit (IDD)

The Federal Reserve Bank of New York provides a cross border fiscal agent service, International Direct Deposit (IDD) for the Treasury. IDD assists the Treasury with its efforts to convert government issued checks to electronic delivery. Currently, IDD is making payments on behalf of the Treasury to individuals in 40 countries entitled to social security benefits. IDD also processes Office of Personnel Management (OPM) payments for recipients in Canada and Italy. These payments are in a modified ACH format and are processed by the low-value payment system in the respective countries. Typically deposited to the beneficiary's account on the third of each month, IDD payments are routed and settled through central bank or service provider relationships. The New York Markets Group negotiates wholesale foreign exchange conversion rates

for transfers that are sent to central banks. For service providers, the Federal Reserve Bank of New York negotiates bilateral contracts that specify the interbank foreign exchange rate and delineate time frames for processing files. IDD processes 2 million transactions with a value of $900 million annually, with an average payment size of $400. IDD is continuing to expand to other countries where the Treasury has a high volume of check recipients. In addition, IDD expects to begin payments processing for the Veterans Administration and the Department of Defense in early 2004.

Gateway Arrangements

FedACH International Services

FedACH International Services, which is owned and operated by the Federal Reserve System, currently supports ACH payments from the U.S. to Canada. The Federal Reserve Bank of Minneapolis and Toronto Dominion Bank serve as conduits to the U.S. and Canadian payment systems, respectively, and each country is governed by its own domestic clearing rules and practices. The Federal Reserve Bank of Minneapolis acts as the Originating Gateway Operator (OGO) for these U.S. to Canada transactions, and Toronto-Dominion Bank acts as the Receiving Gateway Operator (RGO). Service for ACH payments from Canada to the U.S. may be added at a later date, if there is sufficient market demand.[61]

U.S. originating depository institutions (ODFIs), that wish to send forward ACH debit and credit items to receiving depository institutions (RDFIs) in Canada, submit a NACHA formatted file to FedACH anytime between 4:30 p.m. Sunday and 10:00 p.m. Friday.[62] While all transactions are originated in U.S. dollars, the ODFI indicates if the payment will be made in U.S. dollars at a fixed-to-fixed rate (FF) or in Canadian dollars at a fixed-to-variable (FV) rate, when it is received in Canada. As a dual currency country, Canada allows customers to establish bank accounts in either currency. For FV payments, the RGO receives the Canadian items in the file and converts the U.S. dollar amounts into Canadian dollars, using a daily exchange rate no more than 100 basis points above or below the noonday Bank of Canada rate. Payments are either posted to receiving accounts at the RGO, or the RGO distributes the payments to RDFIs in Canada.[63]

Settlement varies based on whether the payment is in U.S. or Canadian dollars. The Canadian receiver's account is credited or debited on the U.S. settlement day for FV payments and 1 day after the U.S. settlement day for FF payments. All settlements with U.S. participants are made in U.S. dollars on the settlement date.[64]

The Federal Reserve has announced the future expansion of the FedACH International services to Mexico,[65] Europe,[66] and other countries.[67]

Other Gateway Arrangements

A report by the ECB notes that a number of pilot projects were undertaken in the mid 1990's to link the ACH systems of several European countries including Belgium, German, Italy, the Netherlands and the United Kingdom. "This was in response to pressure from the European Commission. Although they worked relatively well at the technical level, only a small number of links were implemented and, finally, the projects were stopped because most banks were not prepared to use them, since they preferred to maintain existing business relationships."[68]

WATCH (Worldwide Automated Transaction Clearing House)
Although never implemented, the WATCH project is a noteworthy initiative that intended to facilitate the exchange, clearing and settlement of batch oriented cross-border payment instruction files between financial institutions. It was envisioned that WATCH would receive a cross border payment file from a sending bank in the domestic format, or in an accepted international format, translate the file to the format of the receiving country and distribute the payment through the local clearing system. Member financial institutions would send batch files in the same currency and destined for the same country to WATCH, which would advise originating members at a prescribed cutoff time of the aggregate amount they must cover for payments to that country and in that currency. Originating members would then notify their Nostro Agent to pay the WATCH settlement agent in that country in central bank money through the local RTGS system in the relevant currency. Once it was confirmed that obligations were funded, WATCH would convert and process payments to the destination country either directly or indirectly through the local ACH system or similar payment streams.[69]

WATCH planned to provide benefits to all stakeholders in the payments chain by: providing a bridge between proprietary country formats; mitigating cross border settlement risk; offering corporate originators single formats in all currencies; extending the reach of international payments to smaller institutions; lowering transaction costs, and improving the ability to compete with new entrants in the cross border payments marketplace.

The ostensible reason for why the WATCH project was put on hold was its shareholders reluctance to provide an additional $2.5 million of capital. Such reluctance with respect to a comparatively small, incremental investment raises some question about the strength of the project's underlying business case.

Wholesale Payment Arrangements

EURO 1
EURO 1 is the largest of Europe's four, existing, large-value, net settlement systems and is operated by the EBA Clearing Company.[70] To access EURO 1, banks must meet a number of criteria, including having: a registered office or branch in the EU, direct access to TARGET, a registered address in an Organization for Economic Cooperation and Development (OECD) country, membership in the European Banking Association, funds of at least EUR 1.25 billion, and a short-term credit rating of at least P2 or A2 or equivalent.[71] Payment messages are final and irrevocable when processed, and the ECB holds a $1 billion liquidity pool that would be activated in the event that a member bank could not settle its position.

As of December 2001, 73 clearing[72] banks participate on EURO 1. These include participants from the EU member states and from 5 non-member countries including Australia, Japan, Norway, U.S. and Switzerland.[73] Each of these clearing banks is either incorporated in the EU or has branches in the EU.

EURO 1 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 (ECB).

In November 2001, The Clearing House and the EBA entered into a strategic payment alliance by announcing a Memorandum of Understanding that allows the organizations to work together toward a global, electronic infrastructure. The goal is to develop an Internet-based end-to-end platform that will provide e-commerce solutions for the EBA's Euro 1 and the Clearing House's bank members (which are almost synonymous) and their customers.[74] In 2002, it was reported that the two organizations were in discussions regarding the development of common, SWIFT-based message standards to facilitate cross-border currency exchanges.[75]

TARGET (Trans-European Automated Real-Time Gross Settlement Express Transfer) TARGET is a decentralized real time gross settlement (RTGS) system for large value, euro payments that connects the European Economic Area's (EEA) 15 RTGS payment systems through SWIFT. By using TARGET, EEA members can remotely access the RTGS system of another country within the EEA without establishing a branch or subsidiary in that country. Each of the EEA's 15 central banks owns and operates its TARGET component, and the European Central Bank (ECB) has oversight responsibilities for the European Payment Mechanism (EPM). EU members that have not yet adopted the euro - UK, Denmark and Sweden - are also connected to TARGET.

In 2002, TARGET held 85 percent of the EEA's high-value payments market share in terms of value and 59 percent of the volume.[76] Notably, cross border payment volumes in TARGET expanded 19 percent 2002 over 2001 due to an increase in commercial customer payments, which have migrated from correspondent banks to interbank networks. However, the share of cross border payments relative to domestic payments declined from 39 percent to 31.3 percent 2002 over 2001, due to faster growth in domestic payments. TARGET's support of straight-through processing (STP) standards has resulted in very low rejection rates for cross border transactions (.26 percent in 2002) All CLS euro payments, which amounted to 25 percent of the total volume and value of foreign exchange trades in 2002, are settled through TARGET.[77]

Rules governing the operation and access to TARGET are included in the Guideline of the European Central Bank on a Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET Guideline). According to these rules, only supervised credit institutions can be direct participants. However, subject to approval of the relevant national central bank, the following entities may also access TARGET: treasury departments of regional governments, public sector bodies of member states, investment firms established in the EEA that are supervised by a recognized authority, and organizations that provide clearing and settlement services that are supervised by a recognized authority. Among other provisions, the TARGET Guideline also establish minimum features with which national RTGS systems must comply and designations on when transactions are irrevocable.[78] Cross border payments are processed by the RTGS

system of each national central bank and then exchanged directly or bilaterally between the central banks via the interlinking system, which converts the payment message from the national standard to the interlinking standard and vice versa.

In October 2002, the ECB announced the development of the next generation of TARGET, TARGET2, which will be based on the EU's most efficient RTGS systems. Any system that does not meet TARGET2's cost recovery requirements in four years will be closed. TARGET2 will better meet customer needs by offering core service levels, which will be defined in close cooperation with the user community, and cost efficiencies that will arise from a less fragmented IT infrastructure. Individual central banks will be able to offer specific, national services in addition to the core service levels. TARGET2 will consist of national components and a shared IT platform component that central banks can use on a voluntary basis. Although plans are for a single price structure for euro payments, volume based pricing or pricing based on timing of payments may be also offered. It is estimated that TARGET2 will be operational in the second half of this decade.[79] A number of user groups meet regularly and discuss the requirements for the current and future TARGET system.[80]

CLS (Continuous Linked Settlement)
Formed in response to regulatory concerns 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 mechanism. Currently, CLS settles trades for 11 currencies including the U.S., Canadian, Australian and Singapore dollar, the Danish and Norwegian Krone, the Swedish Krona, the pound sterling, the euro, the Swiss Franc and the Japanese yen. The daily average transaction volume is 90,000 and the daily average value is $1 trillion./

CLS Bank and its affiliate, CLS Services, carry out daily operations. CLS Bank is an Edge Act Corporation located in New York, supervised by the Federal Reserve Bank of New York, and a wholly owned subsidiary of CLS UK Intermediate Holdings, Ltd. CLS Bank holds accounts at the central bank for each currency settled and receives and pays funds from these accounts.

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.

Settlement members can submit settlement instructions to CLS Bank until 6:30 a.m. CET, at which time they receive a final pay in and pay out schedule for the day. Execution and funding takes place between 7:00 and 12:00 p.m. CET, when the RTGS systems for each of the currencies is open to send and receive funds. From 7:00 and 9:00 CET, settlement members send and receive payments from their multicurrency accounts at CLS Bank. Debits and credits to these accounts are final upon execution. CLS checks that settlement members have a net positive balance across all currencies. If a trade

cannot be immediately settled, it is put back into a queue and reviewed until it is settled. Final pay ins and payouts are completed between 9:00 and 12:00 p.m. CET. [81]

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 position, CLS has instituted a number of risk management tools including membership requirements, loss sharing agreements, back up lines of credit and position limits.

SIC (Swiss Interbank Clearing)
The role of SIC is to execute interbank payments in Swiss Francs with immediate finality 24 hours a day with funds held at the Swiss National Bank (SNB). Originally, participation in SIC was limited to banks domiciled in Switzerland. However, remote access to SIC was granted to international joint ventures and clearing organizations in 1998, as well as banks associated with these entities, provided they make a sizeable contribution to the reduction of systemic risk. Remote SIC members must be domiciled in countries that have at least the same standards as Switzerland with respect to banking supervision, anti money laundering controls and telecommunications infrastructure. In December 2000, 64 of the 306 SIC participants were remote members.

SIC is a large value payment system that also provides final settlement for DTA and LSV, Switzerland's two ACH systems. There are four categories of payments handled in SIC:

- Customer-related payments (payments between non-banks) – these are primarily retail payments and account for 86 percent of total SIC transaction volume.
- Cover payments (payments between SIC participants) – e.g., money market and foreign exchange transactions.
- Bank-to-bank payments (payments in which one of the parties involved is not a SIC member) – stem primarily from correspondent banking business.
- Service payments – related to the cash-leg of securities transactions and the settlement of obligations stemming from interbank payment services.

SIC operates for 24 hours per day; settlement is carried out for approximately 22 hours. The cycle begins at 6 p.m. on the Day T-1 with the transfer of giro balances from the master accounts at the SNB to SIC accounts. Payments submitted for same day settlement based on Day T's value must be received before 3 p.m. on Day T. Payments received after the 3 p.m. deadline will be based on Day T+1's value (except provision for cover transactions, which are accepted for same day settlement until 4 p.m.). End of day processing begins at 4:15 p.m. At the end of the day, the totals of debit and credit transactions are transferred from the SIC accounts to the master accounts at the SNB.[82]

euroSIC (euro Swiss Interbank Clearing)
euroSIC is Switzerland's RTGS system, which provides financial institutions with remote access and settlement in euros for 24 hours per day. Swiss Interbank Clearing AG established the Swiss Euro Clearing Bank (SECB), based in Frankfurt, to operate euroSIC. Launched in January 1999, euroSIC was developed based on the SIC system and provides Switzerland, as a non-member of the European Union, with a direct link to the national euro-clearing systems within the EU through an interface with Germany's

RTGSplus (which in turn interfaces with TARGET). More than 120 financial institutions in Switzerland have direct online access to euroSIC.[83]

euroSIC also settles payments via real-time processing. Each participant has a settlement account with euroSIC that is balanced daily with a corresponding sight deposit account at the Swiss Euro Clearing Bank (SECB). At the same time, SECB as the monitoring authority is able to verify cover funds for any and all financial institutions and, if deemed necessary, provide a participant with funds or credit. SECB was created, at the request of the Swiss Bankers' Association (SBA), to facilitate cross-border clearing of euro-denominated payments from Switzerland. SEBC was established in 1998 and is owned by Telekurs Holding AG (40 percent), Credit Suisse Group (30 percent) and UBS AG (30 percent).

Recent Developments
Swiss Interbank Clearing is introducing a multi-currency RTGS system that can be customized and used by central banks (that lack RTGS systems of their own) or financial institutions for transaction clearing within their own branch network. The service, known as multiSIC, was launched in 2002 and it not being used by any noteworthy institutions.[84]

Messaging Systems

SWIFT (Society of 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 7,400 banks, securities brokers and investment managers in 198 countries.[85] SWIFT is the primary facilitator of cross-border payment information in the world; its message types, formats and technical infrastructure provides a common means of processing cross-border payments. SWIFT, which is controlled by its member banks and financial institutions, transmits approximately seven million messages per day.

SWIFT payment messages are processed by the Financial Information Network (FIN), which operates on a secure IP network called SWIFTNet. SWIFTNet services were introduced in 1999 with the objective of offering the financial industry an interactive standard platform for financial communication and messaging. SWIFT reported FIN-message traffic of 1.8 billion messages in 2002.[86] SWIFTNet offers a suite of services including bulk payments processing, cash reporting and securities reporting.

FIN is accessible across boarders via the SWIFTNet secure IP network. SWIFTNet offers end-to-end authentication, message integrity, and non-repudiation and data confidentiality at the messaging, network and application layer.

SWIFT has implemented the following strategic initiatives that impact the cross-border payment marketplace:

- Investment in a standard platform for financial communication and messaging. SWIFT is implementing financial communication and messaging standards via SWIFTNet. For instance, in 2002, SWIFT introduced XML-based standards for bulk payments.[87]

- 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 payment messaging standard because of the SWIFT network's broad span.

- Rapid expansions of end-user access to cross-border payments network. SWIFT is leveraging its global network (that spans across 198 countries) 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. Euro 1 and STEP 1); stock exchanges (e.g. Euronext); Real Time Gross Settlement (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.[88] SWIFT is seeking to position itself to attain critical adoption mass through its broad user-base.
- Entry into ACH market segment: 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.

More than 7,400 financial institutions across 198 countries are connected to SWIFT's network, thereby enabling SWIFT member-institutions to effectively process multi-currency inter-bank payments.

DATA ON RETAIL PAYMENT ARRANGEMENTS

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
Credit Cards Systems: ▪ VisaNet (Visa) ▪ BankNet (MasterCard)	24 hours per day; 7 days per week	▪ Visa International ▪ MasterCard International (Private, for profit, membership associations)	The credit card industry is regulated by domestic entities (often by central banks). However, regulation varies across countries.	Yes, via Secure IP networks and proprietary computer interface systems.	Visa: 99 million worldwide[89] MasterCard: 37 million worldwide[90]	Visa: $7.37 billion worldwide MasterCard: $3.13 billion worldwide	Proprietary. In addition, Visa and MasterCard are independently seeking to establish standards for cross-border mobile payments.
Western Union	N/A	First Data	Department of Treasury and a variety of State entities	No	660,000[91]	$1.92 billion[92]	Proprietary.
Eurogiro	Network is accessible 24x7 Settlement times are bilaterally agreed between members	Owned by 16 bank/postal financial services companies Operated by Eurogiro Network A/S	Members supervised by local regulatory authorities Eurogiro Network A/S supervised by Danish Commerce and Companies Agency	No	48,824[93]	€11,595,700[1]	SWIFT message formats including MT 100, MT 100-20, MT 00-50/60
STEP1	Processing of payment messages 7:30 a.m. to 4 p.m. CET. Final settlement is between 14:10 and 16:00 CETon Euro I	EBA Clearing Company	ECB	Yes – via Secure IP network.	173,313[94]	€174 billion[95]	SWIFT platform and message standards

[1] Average daily transaction figures are unavailable. This estimate is based on average daily transaction volumes multiplied by average daily transaction size of €2,375.

DATA ON RETAIL PAYMENT ARRANGEMENTS

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
STEP2	Processing: Files are accepted until 10 p.m. CET on Day 1. Settlement: 7:30 – 8:30 a.m. CET on Day2	EBA Clearing Company	ECB	Yes – via Secure IP network.	71,029[2]	*STEP2 was formally launched in June 2003. Avg daily transaction value data is not publicly available.*	SWIFT platform and message standards
FedACH International Services	Sunday 5:30 p.m. until Friday 11:00 p.m. ET Settlement for FF payments occurs at the end of day 1 day after the U.S. settlement day Settlement for FV payments occurs at end of day on U.S. settlement day	Federal Reserve	Federal Reserve	No	30[96]	$1.3 million[97]	Proprietary

[2] Statistics for Feburary 2004 from www.abe.org

DATA ON WHOLESALE PAYMENT ARRANGEMENTS

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
EURO 1	7:30 to 6:00 p.m. CET After 4:00 p.m., clearing banks in debit positions pay EBA settlement account at ECB through TARGET. After all debits received, EBA instructs ECB to pay clearing banks in credit position.	EBA Clearing Company	ECB	N/A	113,000[98]	€205.2 billion[99]	SWIFT platform and message standards

DATA ON WHOLESALE PAYMENT ARRANGEMENTS

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
TARGET (cross border)	7:00 a.m. to 6:00 p.m. local time at the location of the ECB DI sends payment order to NCB through local RTGS system. NCB irrevocably debits sending DI's RTGS account and credits the interlinking account of receiving NCB. Receiving NCB debits interlinking account of sending NCB and credits beneficiary's RTGS account and sends payment to receiving bank through RTGS system.	Each EEA central bank owns and operates its TARGET component. The ECB has oversight responsibilities for the ECB Payment Mechanism (EPM)	Each EEA central bank owns and operates its TARGET component. The ECB has oversight responsibilities for the ECB Payment Mechanism (EPM)	Yes, within EEA	53,858[100]	€485 billion[101]	SWIFT MT103 MT103+ MT202
CLS	Settlement is RTGS and occurs between 7:00 a.m. and 12:00 p.m. CET, when the RTGS systems for each currency is open	CLS is owned by 70 of the world's largest financial groups	Federal Reserve Bank of NY	N/A	100,000[102]	$1 trillion[103]	Trade information sent via SWIFT to external matching service

DATA ON WHOLESALE PAYMENT ARRANGEMENTS

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
SIC	24 x 7 At the end of the day, the totals of debit and credit transactions are transferred from the SIC accounts to the master accounts at the SNB	Swiss Interbank Clearing	Swiss National Bank	Yes – via Secure IP network.	434,993[104]	CHF167.52 billion[105]	SWIFT platform and message standards
EuroSIC	24 x 7 RTGS	Swiss Interbank Clearing	Swiss Euro Clearing Bank GmbH (SECB)	Yes – via Secure IP network.	5,985[106]	€ 1.63 billion[107]	SWIFT platform and message standards

DATA ON MESSAGING SYSTEM

PAYMENT SYSTEM	OPERATING HOURS / SET-TELMENT	OWNER/ OPERATOR	REGUATION OVERSIGHT	REMOTE ACCESS	AVG DAILY TRANSACTION VOLUME	AVG DAILY TRANSACTION VALUE	STANDARDS SUPPORTED
SWIFT <u>Systems:</u> ▪ FIN ▪ SWIFTNet	N/A –SWIFT is a messaging system and does not settle payments.	SWIFT – commercially operated non-profit organization comprised of financial institutions (including central banks).	National Bank of Belgium[108] (lead regulator) supported by the G10 central banks.	N/A	7 million messages	€6 trillion	SWIFT platform and message standards

Section II: Country Reports

International payments are expected to increase in the upcoming years, due in large part to increased globalization. At the same time, consumers and businesses are searching for low cost, efficient payment mechanisms. One of several, possibly complementary, ways of providing such services is to formalize linkages between U.S. ACH operators and ACH operators in other countries.

In reviewing ACH markets worldwide, it is clear that several countries' ACH systems are highly developed, essential components of the payment systems while other countries have yet to fully integrate ACH into their payment system. Rather than amass data on the full spectrum of countries that use ACH, this paper focuses on several countries with a significant ACH presence. In selecting these countries, the team considered both total ACH transactions per year as well as total transactions per inhabitant to mitigate any potential volume distortions due to population differences between countries. In several cases, a country's total transaction volume appeared low in comparison to other countries with sizeable ACH volume, but the per capita average for ACH use was substantial. In other cases, the opposite was true. Based on these criteria, the team selected the following 15 noteworthy countries for detailed review: Australia, Japan, Korea, New Zealand, Switzerland, Austria, Denmark, France, Germany, Italy, Netherlands, Spain, United Kingdom, Canada, and Brazil. Mexico is also included because of its extraordinarily close ties to the U.S. economy and the importance of having a seamless cross border payment mechanism. The chart below provides an overview of key features and volume data for each of the selected countries.

Asia/Pacific

Australia

ACH Basics[109]

Australia's Bulk Electronic Clearing System (BECS) processes domestic low-value bulk electronic debit and credit payment instructions. BECS offers two levels of membership: Tier 1 membership for organizations that wish to clear directly with one another and settle obligations through Exchange Settlement accounts held at the Reserve Bank, and Tier 2 membership for organizations that choose to work through appointed Tier 1 members to clear and settle on their behalf. Tier 1 and Tier 2 members include the Reserve Bank of Australia, banks, credit unions, and building societies, which are comparable to savings and loan associations in the U.S.

BECS is operated by the Australian Payments Clearing Association Limited (APCA), a member-owned trade association responsible for all five major Australian payment systems, and managed by a committee of BECS participants with input from an Advisory Council appointed by the APCA Board. APCA Board members include technology providers, commercial users, government users, message standards organizations and processors. All BECS rules and procedures are established by the APCA and approved by the Australian Competition and Consumer Commission (ACCC).

ACH payments are widely used in Australia, where direct credits and debits account for approximately 26% and 10% respectively of all retail non-cash transactions by volume nand 38% and 29% respectively by value. Government departments and companies are the primary users of direct credits for recurring payments such as social security benefits, salary payments, and dividends. Direct debits are most commonly used by insurance and utility companies for collecting policy premiums and utility payments. They are also frequently used by financial institutions to collect loan payments.

Operational Details

As the BECS membership structure implies, BECS processes ACH transactions through bilateral electronic arrangements between participants rather than through a centralized automated clearinghouse. Tier 1 members exchange batches of electronic transactions via direct computer-to-computer linkages and reconcile them daily. The file formats for electronic transactions must adhere to BECS proprietary standards, but standards for the bilateral exchange of files between Tier 1 members are determined by the individual pairs of Tier 1 members. Their bilateral positions against other Tier 1 members are reported to the Reserve Bank explain and settled on a multilateral net basis at 9:00 AM Sydney time on the following business day through RITS, Australia's real time gross settlement system.

Tier 1 members are also responsible for the positions of their Tier 2 members. As of June 2001, BECS had 14 Tier 1 members and 43 Tier 2 members. In most cases, the Tier 1 members participate directly in the electronic exchange of files with other Tier 1 members, but a few have designated a non-member third-party processors to exchange items on their behalf. Such arrangements must be approved in advance by the APCA.

Although there are no restrictions to prevent BECS members from electronically exchanging files from a remote location outside of Australia's borders, BECS members generally exchange files using their local communication systems to minimize expenses.[110] Finally, only Australian dollar-denominated transactions for exchange within Australia can be processed through BECS.[111]

Infrastructure[112]

Technology

Australia is the one of the largest per-capita users of both PCs and the Internet worldwide, which is driven by both private-sector and government initiatives to promote e-commerce. Although individual estimates vary, the e-commerce market in Australia is expected to increase from A$ 7.9 billion (US$ 4.2 billion) in 2000 too as much as A$ 135 billion in 2005, mostly in the B2B market. Given this outstanding growth potential, Australia is ranked second behind the US in terms of providing a conducive environment for e-business opportunities.

Payment Opportunities

The U.S. is one of Australia's most significant trading partners, with the U.S. supplying $13.5 billion in imports in 2001 alone, more than any other nation. The U.S. is also Australia's second largest importer, with $8.0 billion in Australian goods and services

exported to the U.S. in 2001. In addition, U.S. companies are Australia's largest source of investment, with a cumulative U.S. investment in Australia totaling over $100 billion through 2000.

Banking

The Australian Prudential Regulation Authority (APRA) regulates banks, credit unions, building societies, and other financial institutions in Australia. Unlike the U.S. banking system, Australian banks have always offered almost all forms of financial services, including underwriting, leasing, domestic and international debt and equity issues, as well as more traditional banking services. In addition, many non-bank institutions provide financial services to businesses. Finally, all major Australian banks have correspondent relationships with U.S. banks.

Japan[113]

ACH Basics

Japan's Zengin Data Telecommunications System processes domestic ACH debit and credit payment transfers. Large banks and branches of foreign banks participate directly in the Zengin System. Small banks and other types of financial institutions, however, can indirectly access the Zengin System through their respective clearing systems.[114] That is, small banks form groups with a central organization that manages a joint online system that directly participates in the Zengin System.[115]

The Zengin System is operated by the Tokyo Bankers Association (TBA), which is an incorporated entity and the largest of Japan's 72 regional bankers' associations. The Organization for the Management of Domestic Fund Transfers, established by TBA, sets rules that govern the clearing procedures of the Zengin System. The Organization is required to consult with the Bank of Japan if any revisions are needed to the rules that are related to settlement or membership criteria of the Zengin System.

Although individuals primarily use cash for small-value retail payments, direct debits and direct credits are widely used by individuals and firms for the payment of utility bills and payrolls. In 2002, the system handled an average daily volume of 5 million, while the daily clearing value averaged JPY9 trillion (USD76 billion); over the year 1.2 billion transfers were processed, valuing JPY2, 444.4 trillion.[116] More specifically, the number of payroll transfers amounted to 202.5 million with a value of JPY41.9 trillion in 2002.[117]

Operational Details

Participants in the Zengin System exchange payment instructions electronically via relay computers (RC), which are installed either by participants or by the central organizations for certain groups of financial institutions. The Zengin System uses proprietary standards for its message format. Remote access is not available to participants outside of Japan and there are no multi-currency processing capabilities available in the Zengin System. The Zengin Center, which is the operational center for the Zengin System located in Tokyo and Osaka, and the Bank of Japan are linked through the network of the Zengin System.

The transaction flow takes place in the following manner:

1) The payer requests the sending bank to make an ACH transfer.
2) The sending bank sends a payment instruction to the Zengin Center, which, in turn, sends the instruction to the receiving bank between 8:30 and 15:30 local time. At the same time, the obligation between the sending bank and receiving bank is replaced with an obligation between the sending bank and TBA and another between the receiving bank and TBA on a transaction-by-transaction basis.
3) The sending bank debits the payer's account. Upon receiving the instruction, the receiving bank credits the payee's account.
4) Net debit or credit positions between each bank and TBA are calculated within the Zengin System.
5) The Zengin Center sends information on the net positions to the Bank of Japan using the Zengin System network.

Settlement:
The final positions of participants of the Zengin System are settled through the BOJ-NET Funds Transfer System, which operates on a RTGS basis, at 16:15 local time. Funds are first transferred from the accounts of participants with net debit positions to the account of the TBA and, after completion of such transfers, the funds are then transferred from the account of TBA to the accounts of participants with net credit positions.

Interbank settlement is final once the net positions of participants are settled through the BOJ-NET Funds Transfer System. Funds may become available to payees before interbank settlement takes place, because a receiving bank usually credits a payee's account upon receipt of a payment instruction from the Zengin Center.

There are no multi-currency processing capabilities in the Zengin System.

Participants in the Zengin System

(As of end-2001)

	Number of Direct Participants	Number of Indirect Participants
City Banks	8	-
Regional Banks	64	-
Trust Banks	11	-
Long-Term Credit Banks	3	-
Member Banks of the Second Association of Regional Banks	56	-

Foreign Banks	4	-
Shinkin Central Bank and Shinkin Banks	1*	364
National Federation of Credit Cooperatives and Credit Cooperatives	1*	253
Rokinren Bank and Labor Banks	1*	21
Norinchukin Bank, Credit Federatinos of Agricultural Cooperatives, Credit Federation of Fishery Cooperatives, and Agricultural Cooperatives	1*	1229
Others	4	-
Total	154	1867

* Central organizations of respective banking groups (ie Shinkin Central Bank, National Federation of Credit Cooperatives, Rokinren Bank, Norinchukin Bank) manage their joint online systems for their group banks. Those group banks indirectly participate in the Zengin System through their respective joint online systems. For a list of names of the participants, see http://www.zenginkyo.or.jp/en/abstract/member /index0600.html.

Source: Kenji Hayashi, Bank of Japan

Infrastructure

Technology

Japan has the world's second largest market share for information technology equipment and services, which includes telecommunications, computers, peripherals, software and multimedia. Current investment in telecommunications by the Japanese government is $35 billion annually with the government's IT Strategy Council's goal for Japan to become the world leader in IT by 2005. They have had recent exponential growth in many markets such as personal computers, networking, Internet applications, and wireless and satellite communications.[118]

Payment Opportunities

Japan holds the largest overseas market for U.S. goods and services, specifically for U.S. computers, machinery and services. As Japan continues to work on its banking problems, U.S. firms will find the financial services sector has many opportunities. Other leading sectors in Japan for imports from the U.S. include electronic components, computer software, travel and tourism, computers and computer peripherals, telecommunications equipment, emergency preparedness products and automobiles. Major exports are motor vehicles, office machinery, chemicals, scientific, optical, and audio equipment, and iron and steel products. Japanese firms are looking to foreigners for investment capital where long-standing barriers have been relaxed.[118]

Banking

The relations between corporate finance, banking institutions and non-financial corporations are much closer in Japan than in the United States. However, their close relationship has also caused Japan's banks to be relatively unstable especially as the Japanese banking system was put under considerable strain when the asset price "bubble" collapsed in the early 90s.[119] Japanese banks are frequently shareholders in companies that conduct banking business with them, and take an active role in maintaining financial security for their clients.[118]

Other Considerations

Japan has reformed its foreign trade standards to coincide with prevailing international standards.[120]

Korea

ACH Basics[121]

Korea's Bank Giro System processes bulk electronic debit and credit payment transactions. The Bank Giro System, which was introduced in 1977, is owned and operated by the Korea Financial Telecommunications Clearing Institute (KFTC), a member-owned, non-profit organization, which handles all interbank obligations resulting from retail payments. The General Meeting of the KFTC, a central body composed of all general members, acts as the supreme decision-making body for all retail payment systems including the Bank Giro System. It establishes basic policies on access, pricing, budget, and appointment of KFTC executives. Every member has one vote, and in the case of a tie the chairman, the Governor of the Bank of Korea (BOK), casts the deciding vote. The Bank Giro System places restrictions on non-bank access; only general and associate members of the KFTC are entitled to participate in the Bank Giro System. This means that non-bank institutions and banks other than general and associate members must obtain the prior permission of the KFTC's General Meeting to participate directly in the Bank Giro System. As of December 2001, there were 25 participants in the system, including the Post Office.

Through its credit and debit transfer services, the Bank Giro System allows any individuals or companies to make use of all bank branches as their paying or receiving windows. The Bank Giro System accounts for about 20% of all non-cash retail payments in Korea. Direct (electronic) credit transfers are used for making payments to large numbers of recipients, such as the payment of salaries, dividends, and pensions. Direct debits allow payees, such as public utilities, insurance, and credit card companies to collect pre-authorized payments automatically from payers' bank accounts at regular intervals. In 2002, the Bank Giro System processed a total of 102 million transfers, with a total value of 8,434.3 billion won. Of the total transfers, 4.8 million were direct-debit transfers and 3.4 million were direct credit transfers, with a total value of 259 billion won and 1,958 billion won, respectively.[122]

Furthermore, the KFTC also provides an Internet giro service, or electronic bill presentation and payment service, which is an electronic method of credit transfer for

payments of public utilities and tax bills. This service is usually used by large organizations such as insurance and utilities companies, which send out substantial volumes of regularly recurring paper bills. Under the Internet giro scheme, a payee sends the KFTC the details of the bills on a magnetic tape or online, and the KFTC then posts the bills on its Internet giro web site without mailing paper giro bills to individual payers. Payers confirm the bills on the web site and the amounts involved are then automatically debited from their accounts. The KFTC verifies the payments and requests the Bank of Korea to settle interbank net obligations.

Operational Details

For direct credits, direct credit notices are first sent by the payer to the KFTC on a magnetic tape or a floppy disk at least two days before the due date (T-2). After classifying and grouping all such notices by payees' banks, the KFTC sends credit details to the payee's bank on day T-1. Settlement obligations are calculated on a multilateral basis and notified to the BOK for final settlement on day T.

In the case of direct debits, pre-authorized debit details, recorded on a magnetic tape or a floppy disk, are delivered to the KFTC by the payee three days before the due date (T-3). On the due date, the debit is posted to the payer's account in accordance with the advice of the KFTC. Final net settlement between banks and credit to the payee's account are completed on day T+3.

The Bank of Korea posts the multilateral net settlement amount to each bank's account at 11:30 on the settlement date: day T for direct credits and day T+3 for direct debits.

In order to contain systemic risk caused by a participant's possible settlement failure, each participant is required to pledge government bonds or BOK MSBs equal to 30% of its daily average obligation as collateral.[123] The collateral is under the control of the Bank of Korea. In the event of a participant's default, the BOK can first sell the participant's bonds or can use them as collateral against the BOK's lending facilities. If the value of the bonds is not sufficient to cover the amount involved, loss sharing among all participants takes place.

Infrastructure

Technology

e-commerce is expected to double annually for the next five years. Korea also has one of the highest per capita usage statistics for the Internet and mobile telephones, with as much as 14 million Internet users (out of a population of 45 million) in 2000. It ranks 7th worldwide, ahead of the U.S. and the U.K. in the number of mobile telecom service providers.

Payment Opportunities

Korea is the sixth largest U.S. export market, the world's second fastest growing market for information technology, and holds the fifth largest share in the United States' high technology market. Total U.S. exports to Korea reached a record $27.9 billion in 2000, making a 21.5% increase from 1999.[124] Korea's main exports are found in

semiconductors, telecom equipment, steel, passenger cars and shipbuilding. Similarly, its main imports include crude petroleum, semiconductors and parts, chemicals and products, iron and steel products, machinery and equipment, electric and electronic machinery as well as cereals. Although the U.S. is Korea's single largest investor, the EU group is Korea's largest regional source of foreign investment. Japan is also a competition.

Banking

Due to unresolved loans, company collapses and loss of investor confidence, Korea's financial services and banking industries lag behind the rest of its economy, growing only 4.7% in 2000 and 4.4% in Q1 2001[124]. Its financial system consists of banking and non-bank financial institutions with the Financial Supervisory Commission and the Financial Supervisory Service supervising all banks. Although financial restructuring is improving (the Korean government put $119 billion into its financial system in 2001 and plans to spend $22 billion more), they still need more time to meet international standards specifically with respect to audit regulations. According to the Korean Industrial Standardization Act, the Korean government is required to notify the WTO's Committee on Technical Barriers to Trade before making a change of standards. (see Appendix for a list of U.S. banks in Korea)

New Zealand

ACH Basics

Domestic ACH payments are processed by the Interchange and Settlement Limited (ISL); ISL payments are settled on a net end-of-day basis via the Reserve Bank of New Zealand's Real Time Gross Settlement System known as the Exchange Settlement Account System (ESAS).[125]

ISL is the major retail payment-processing switch in New Zealand and it has been in operation since the 1960s. ISL processes all domestic inter-bank retail payment transactions, except debit card and credit card transactions. Specifically, the system is used to interchange direct debits, direct credits, automatic payments (a.k.a. standing orders), checks, ATM transactions, telephone banking and Internet banking.[126] ISL is not a conventional clearinghouse. ISL does not bear any financial risk for, or due to, the transactions. The risk remains with the member banks, which are also responsible for settling the bilateral positions incurred. ISL simply provides for the interchange/clearance of the transaction details among members.[127] If an ISL participant-bank fails, and is consequently unable to meet its settlement obligations, ISL will 'wind-back' the related transactions by returning and reversing the transactions to-and-from the failed bank. New Zealand has not had any bank-failures in recent history therefore the ISL wind-back policy has not been utilized to date.[128]

Eight settlement banks collectively own ISL (via a limited liability company). The ISL owners set the rules that govern the operation of the system, including transaction pricing and the contractual arrangements. The ISL system has nine direct participants and some none-bank financial institutions, which have agency arrangements in place with the participant banks. ISL processes two million payment transactions per day.[129]

Direct participation in ISL is open to registered banks that are members of the New Zealand Bankers' Association (NZBA) and have Exchange Settlement Account System (ESAS) accounts at the Reserve Bank of New Zealand. The NZBA is a professional industry organization that represents banking industry interests in the public arena.[130]

Despite having a relatively small population (3.98 million in 2002), New Zealand has a high per capita usage rate of cashless payment instruments. 78.7 electronic credit transactions per inhabitant and 18.8 direct debit transactions per inhabitant were made in 2002.

Common uses of direct debits in New Zealand include rent or mortgage payments, utility bill payments and tax payments. A total of 80,007,498 direct debit transactions (5 percent of domestic non-cash payments) were made in New Zealand in 2002.[131]

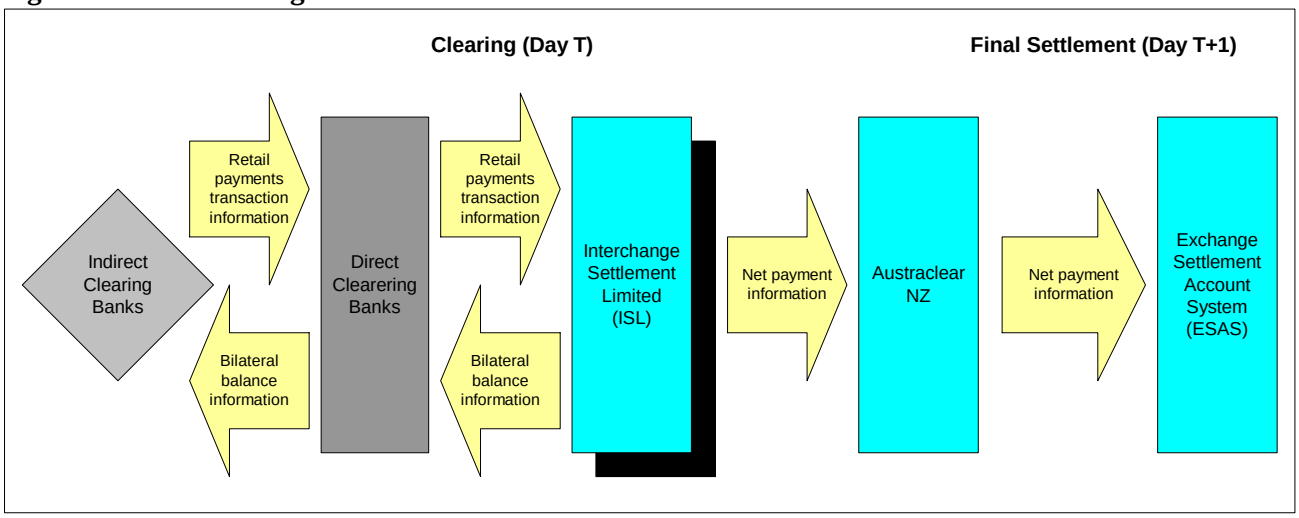
A total of 289,824,200 direct credit transactions (18 percent of domestic non-cash payments) were made in New Zealand in 2002. Examples include private and public payroll payments and government benefits payments.

There are not any specific legislative or regulatory requirements governing payment systems in New Zealand. General commercial and consumer law and the contractual conditions (agreed between the participants in the respective systems) govern the daily operations of payment instruments and systems. The New Zealand Bankers' Association (NZBA) establishes industry standards and policies in some instances, but the payment services entities have their own governance arrangements, business strategies and rules. Legislation has been drafted, but not yet enacted, to formalize the oversight arrangements and responsibilities in the payment system in New Zealand by the Reserve Bank of New Zealand.[132] Currently, the primary interest that is taken by the central bank is in aspects that may affect systemic stability of the New Zealand payment system.

Operational Details

Electronic credits and debits, in addition to other retail payments (such as checks, other MICR items, internet and telephone banking transactions), are interchanged among member banks via the ISL switch in a daily batch process (Day T). Member banks submit inward files of their inter-bank debits and credits to ISL. ISL sorts the transactions into outward files for each member and forwards these to the banks concerned. The respective banks then update their customer records and arrange settlement of their end of day bilateral positions.[133]

Figure 1: ACH Clearing and Settlement Process in New Zealand



Other than providing member banks with details of the bilateral (and multilateral) net positions based on the transactions interchanged, ISL has no direct role in the settlement of inter-bank positions. Member banks settle their bilateral positions directly across their exchange settlement (ESAS) accounts at the Reserve Bank of New Zealand. The Austraclear New Zealand (AustraclearNZ) system is used by member banks as a conduit to pass the payment instruction to ESAS.[134] AustraclearNZ is a central bank operated securities settlement system and central depository that interfaces with ESAS

Settlement occurs on Day T+1. The banks transmit their net bilateral payments to the ESAS real-time gross settlement system. Settlement begins at 9 a.m. (New Zealand time).

New Zealand does not have a general payment switch that supports cross-border ACH (forward items) processing. However, the New Zealand payments system supports cross-border retail inter-bank payments processed via a variety of methods and systems as follows:[135]

- Cross-border Inter-bank Transactions (with Intermediary): Cross border inter-bank transactions that occur between banks that are not members of the same banking group must be facilitated by an intermediary bank. The domestic leg of cross-border transfers involving an intermediary bank (i.e. if the end-customer does not have a relationship with the New Zealand bank receiving the cross border payment instruction) may be cleared / settled via ISL or SCP (a New Zealand real time gross settlement system that is linked to ESAS). ISL, as the primary retail payments switch, is presently widely used for the domestic leg of these inter-bank payments; SCP is a faster and more expensive alternative and is designed for time-critical or high value payments. Consequently, SCP tends not to be used for retail payments. However, SCP is expected to be used increasingly in the future (in lieu of ISL) for the domestic leg of cross-border transfers because SCP supports full originator information (which is required for anti-money laundering controls). SWIFT is typically used for the cross-border leg (between correspondent banks) for inter-bank cross-border transactions. New Zealand banks are adopting the SWIFT MT103 message format.

The "overseas" leg of the cross-border retail payment transaction is processed via the respective retail payments switch in that country.

- Cross-border Inter-bank Transactions (without Intermediary): Cross-border payments within the same banking group (e.g. a customer of Citibank-Australia makes a payment to a customer of Citibank-New Zealand) do not require an intermediary. The manner in which the transaction is processed depends on the nature of the inter-group arrangements in place. Some banks use standard SWIFT messages for the cross border leg; others process the payment via internal inward / outward files within the group. In either case, the retail payment does *not* need to go through a domestic switch such as ISL or SCP for clearing and settlement because there is no domestic inter-bank leg to the payment.

ISL is a telecommunications-based system that handles only New Zealand Dollar (NZD) denominated items; ISL does not support multi-currency transactions. Direct access to ISL is restricted to the New Zealand operations of the nine members of the New Zealand Bankers' Association (NZBA). Cross-border access to ISL is not permitted.

Infrastructure

Technology

In 2002, New Zealand had 18.37 Internet users per 100 people and by 2003, there were 34.27 Internet users per 100 people, an 87% increase. The country's telecommunications companies are currently exporting world class products and services to more than 100 countries internationally[136]. In addition, they provide niche products and sophisticated networking as well as PBX and switching technologies, which have helped solve problems faced by many international telecommunication networks. However, New Zealand's e-business growth has been relatively slow compared to its major trading partners, including the U.S., because of perceived high costs of the new technology and a lack of awareness of its benefits.[137]

Payment Opportunities

New Zealand and the U.S. have worked closely to promote free trade in the WTO and the APEC group. U.S. exports to New Zealand in 2002 were USD 1.8 billion, a decrease of 14 percent from the previous year, while U.S. imports were USD 2.3 billion, an increase of 3.8 percent. In 2002, the top 3 categories of U.S. imports from New Zealand were meat products, poultry and edible animals (USD 606 million); dairy products and eggs (USD 202 million); and lumber and wood in the rough (USD 166 million). In 2002, the top 3 categories of U.S. exports to New Zealand were: civilian aircraft (USD 141 million); minimum value shipments (USD 136 million); and civilian aircraft parts (USD 125 million).[138] The U.S. trade deficit with New Zealand was USD 468 million in 2002, an increase of USD 380 million since 2001. U.S. foreign direct investment in New Zealand is concentrated around finance, manufacturing, and wholesale sectors.[139]

Banking

New Zealand's economic environment and strong risk management by banks have helped shelter the banking industry from the recent international economic downturn. In 2001, the New Zealand banking industry performed considerably well with after-tax profits

increasing and the industry remaining in a strong financial position in terms of asset quality, credit rating and management of exposures to key banking risks. As in recent years, 2002 saw significant development and consumer adoption of non-cash / electronic payment methods. In 2002, the usage of these instruments (as a percentage of total usage of non-cash instruments in New Zealand) was as follows: EFTPOS (35 percent), electronic credits (18 percent), credit cards (17 percent), check and paper deposits (13 percent), ATM (12 percent) and direct debits (5 percent).[140] Although publicly available information does not support the existence of multi-currency demand deposits in New Zealand, it is highly likely that commercial banks permit customers to maintain multi-currency demand deposits (as is the case in other countries with comparable financial markets to New Zealand).

Europe

Switzerland[141]

ACH Basics

Swiss Interbank Clearing AG, a subsidiary of the Telekurs Holding, operates DTA (data media exchange) and LSV (direct debit), the electronic retail payment systems in Switzerland. Telekurs Holding is a service organization owned by Swiss banks. Data media exchange facility (DTA) and direct debit procedure (LSV) are systems that enable payment instructions from customers to be processed electronically. Both systems are integrated into Swiss Interbank Clearing (SIC), the RTGS system of Switzerland. In this way, the aggregate gross positions resulting from these systems are settled in the SIC. The Swiss National Bank (SNB) oversees the DTA and LSV systems.

Postfinance, the Postal Administration in Switzerland, also provides retail payment services, including credit transfers and direct debits through its own network. These transactions are also settled on SIC.

The overwhelming majority of cashless payments in Switzerland are in the form of credit transfers. In 2000 a total of more than 545 million credit transfers were processed by the Swiss banking industry and Postfinance. Direct debits are mainly used for recurring payments, such as collection of premiums by insurance companies. The total number of direct debit transfers processed by the banking industry and Postfinance amounted to 46 million in 2000.

There are various working groups involved with retail payment systems in Switzerland, the two most important being the PAP (Project and IT-Process Steering Committee) and PAM (Product and Marketing Committee). PAP and PAM are composed of members of the major Swiss commercial banks. PostFinance and the Swiss National Bank also initiate new developments in the retail payments area. The Swiss Payments Council, which was founded very recently, coordinates the various working groups.

In the near future, there will be some changes concerning the DTA/LSV systems. DTA's operations will be closed at the end of 2005. The current LSV system will be replaced by a new LSV system in autumn 2005.

Operational Details

ACH transactions are processed through two centralized automated clearinghouse systems in Switzerland. The transaction flows of both DTA and LSV systems are the same. Banks have computer systems that are connected to the DTA and LSV computer centers. Through DTA/LSV, the payment instructions are submitted by banks on diskettes, cassettes, or magnetic tapes or via file transfer to the computer center of Swiss Interbank Clearing AG. At the same time, the issuer of the payment instruction sends his/her bank a payment order (data media exchange) or a collection order (direct debit). The bank then authorizes the computer center of Swiss Interbank Clearing AG to process the data. The deadline for accepting electronically transmitted data is 2:00 p.m., Central European time (CET) for payments to be settled in SIC on the next bank business day. Then, the payment instructions are processed, with calculation of the total credits and debits for each bank and delivery of the payment records to each bank. The totals are then transmitted to SIC for settlement. The settlement for both systems takes place between 5:00 p.m. and 8:00 p.m., CET. Additionally, for DTA there is a second settlement cycle between 1:00 p.m. and 4:15 p.m. CET, the next day.

The file transmission can be undertaken 24 hours a day, 7 days a week. Exceptions are extraordinary system interruptions or maintenance activities, which usually takes place at the weekends.

Since the settlement of DTA and LSV transactions takes place at SIC, the prerequisite for participation in DTA and LSV systems is participation on SIC. The prerequisite for participation on SIC is a sight deposit account (reserve account) at the SNB. SIC access is possible for each of the following types of sight deposit account holders: national and international clearing and settlement organizations, national providers in the financial sector and cash service providers, and foreign financial institutions with adequate supervision through the national approval or monitoring authorities. Every bank is connected to the SIC system via the network run by Swiss Interbank Clearing AG.

DTA and LSV systems have remote access capabilities. A foreign or a Swiss bank can access the DTA and LSV systems remotely, only if it participates on SIC. At the end of 2002, there were 314 SIC participants, of which 155 were also DTA and LSV participants.

DTA and LSV systems use proprietary standards that are similar to SWIFT standards. Moreover, DTA transactions are processed both in Swiss Francs and in foreign currencies, whereas LSV transactions are processed only in Swiss Francs.

Infrastructure

Technology

Switzerland spent $20.3 billion on information and communication technology in 2000. Viewed as having a highly developed and competitive market, Switzerland is one of the most computerized countries in the world. Telecom services within the country have allowed 600 U.S. companies to maintain international European headquarters or subsidiaries in Switzerland. Telecommunication has been changing since its liberalization in 1998. Now 130 carriers compete with Swisscom in all areas of telecom services. In addition, the e-commerce business is becoming a more competitive field in Switzerland's market, as Switzerland's geographical location, good telecommunication links and sophisticated business infrastructure add to its great environment for e-commerce. Switzerland's banking sector is making progress in offering e-commerce to its customers by launching online business portals which bring together the expertise and advice of over 40 partners providing products with a wide range of services.[142]

Payment Opportunities

Switzerland's prosperity depends on its trade. Switzerland has liberal trade and investment policies combined with a conservative fiscal policy. The Swiss legal system is advanced, commercial law is explicit, and investments are protected. The Swiss are very open to foreign investment. Exports to the U.S. were $8.72 billion in 2000 and imports were $5.16 billion.[143] The major sectors of the Swiss economy are manufacturing, mostly high technology goods and services, chiefly financial ones. Furthermore, leading sectors in Switzerland for imports from the U.S. include computer software, computers and peripherals, travel and tourism services, aircraft and parts, and telecommunication services.

Banking

The Swiss franc is known for its stability and the country is renown for its secure and advanced banking and finance sectors. Its banks are among the world's leaders, specifically in asset management and private banking. The Bank Council, which the federal government forms by appointing 25 of the National Bank's 40 council members, regulates the National Bank. By the end of 2000, foreign banks made up 40 percent of total banking institutions in Switzerland, with American banks accounting for 20 percent of the foreign bank population. (See Appendix for a list of U.S.-owned banks in Switzerland)[144] There are no restrictions to open foreign currency accounts in Swiss commercial banks.

European Union

Austria[145]

ACH Basics

Along with Ireland, Austria is one of the two countries in the European Union with no ACH system. Retail transactions in Austria are processed and settled through what's termed as the "correspondent banking system."

OeNB, the Austrian National Central Bank, regulates retail payments. OeNB is currently conducting a feasibility study with its commercial banks to determine if an ACH system is needed in Austria.

Credit transfers are widely used in Austria and constitute 55.8% of total non-cash transactions 2000, whereas direct debits constitute 30%.

Retail transactions are processed through the Austrian postal savings bank, major Austrian banks or banks organized in multi-tier sectors with central institutions [savings banks, rural credit cooperatives (Raiffeisen), and industrial credit cooperatives (Volksbanken)].

Operational Details

The OeNB has no operational role in retail payments in Austria. The bulk of retail payments are processed on a bilateral basis between credit institutions. SWIFT, EBK or dedicated lines may be used as the infrastructure. EBK is the electronic banking communication system that offers electronic communication between Austrian banks, OeNB, and commercial customers. It uses standard data formats via the LOGICA protocol and a pre-defined selection of basic network protocols such as SNA LU2, SNA LU6.2.

Banks hold bilateral accounts with each other or third-party banks in Austria. If there are two banks namely, Bank A and Bank B, that want to do a retail transaction on behalf of their customers, there are two different scenarios for how this can be handled. The first scenario is that Bank A and Bank B hold accounts with each other. In this case, if Bank A needs to make a payment to Bank B, a credit entry is created for Bank A's at Bank B and a debit entry is created for Bank B's account at Bank A.

The second scenario is when the two banks don't hold accounts with each other, but they hold accounts with a third-party bank. This usually takes place when the two banks that would like to conduct the transaction are smaller banks. In this case, there is a third-party bank, which is typically a larger bank, in this Case Bank C. For the same transaction described above, Bank C makes a credit entry for Bank A's account and a debit entry for Bank B's account.

Banks outside of Austria conduct transactions using third-party banks. In this case, transactions are sometimes processed through several third-party banks. Multi-currency

processing in every currency is possible in Austria, although typically major currencies are processed.

Infrastructure

Technology

Austria has a modern communications infrastructure with a telecommunications network that is advanced and reliable, though expensive by U.S. standards. Internet access is becoming increasingly important among businesses with 75% of all firms and companies currently online - 60% with their own homepage. Government initiative in this direction is growing, as there is strong development expected in e-commerce and Austrian companies are beginning to develop e-commerce sites. Some of the most significant opportunities for U.S. businesses include communications software, financial services, and electronic banking.[146]

Payment Opportunities

The U.S. is Austria's third largest foreign supplier of imports and its largest trading partner outside of Europe, with U.S. exports to Austria rising 18% in 1999 and another 17% in 2000. Total trade with the United States in 2001 reached $7.7 billion, with U.S. imports to Austria amounting to $4.0 billion, making U.S. market share of Austrian imports 5.5%.[147] Leading sectors for imports from the U.S. include automotive parts and equipment, computer software and services, aircraft and parts, advertising services, drugs and pharmaceuticals, telecommunication services, computers and peripherals, and telecommunications equipment. Some 400 U.S. companies have invested in Austria, and most have expanded their original investment over time.

Banking

The Austrian banking system is highly developed, offering a wide range of credit and financial instruments. It has a number of major banks with correspondent U.S. banking arrangements as well as branches and subsidiaries of many U.S. banks. The total assets of Austria's five largest banks amounted to USD $307 billion in 2000. In addition, there are no restrictions on converting or transferring funds associated with foreign investment as the Austria's National Bank has fully liberalized all foreign capital transactions for non-residents and residents, including the acquisition of Austrian securities, debt service, and the repatriation of profits, interest payments, dividends, and proceeds from the sale of an investment. There are no restrictions to open foreign currency accounts in Austrian commercial banks.

Denmark[148]

ACH Basics

Sumclearing is Denmark's retail clearing system and is operated by the Danish Payment Systems Ltd. (PBS) and jointly owned by the Danish Bankers Association, which is comprised of almost all Danish banks, and by Denmark's Central Bank (Danmarks Nationalbank). Sumclearing is a multilateral netting system. According to an assessment conducted by a project group that included employees of the Danmarks Nationalbank and

the Danish Bankers Association, Sumclearing has been identified as a systematically important payment system (SIPS).

Sumclearing clears all types of non-cash retail transactions, including direct credit transfers, direct debits and checks. It is composed of two different systems: PBS clearing and the electronic clearing and truncation system. PBS clearing handles direct debits; whereas the electronic clearing and truncation system processes credit transfers.

Sumclearing operates a two-tier system. All Danish banks may participate on the retail clearing system, and there are currently 68 direct participants, one of which is Danmarks National Bank. Four of the direct participants are branches of banks from other EU countries and one direct participant is a branch of an European Economic Area (EEA) bank. There are 146 smaller banks that participate indirectly.

Access to Sumclearing requires participants to sign the Agreement on participation in the electronic clearing or truncation system or have access to the PBS clearing system. Furthermore, all direct participants must enter into the Agreement on participation in the retail clearing system and on the settlement of this system, which is a bilateral agreement between the individual participant and the Danish Bankers' Association. All direct participants must hold current and settlement accounts with Danmarks Nationalbank in the relevant currency (Danish kroner or euro) and must participate in the respective RTGS systems.

The Clearing Agreement between Danmarks Nationalbank and the Danish Bankers' Association regulates the terms and conditions for settlement of the retail clearing system at Danmarks Nationalbank.

The Danish Bankers' Association's members include all Danish commercial banks, savings banks, co-operative banks and subsidiaries and branches of foreign banks. The Danish Bankers' Association coordinates any work to further develop the payments infrastructure and the wide range of mutual agreements behind this infrastructure. The Competition Authority and the Financial Supervisory Agency also take an interest in the agreements that form the basis for functioning of PBS.

Operational Details

Retail payments in Denmark are processed through PBS clearing and the electronic clearing and truncation systems, both of which result in the final settlement on the participant's settlement account with Danmarks Nationalbank.

The transaction flows for both systems are essentially the same. For the PBS clearing system, banks submit payment instructions to their computer centers. PBS calculates net positions, reports these to Sumclearing and sends transaction information to the computer centers. Figure 1 illustrates the transaction flow of the PBS clearing system.

For the electronic clearing and truncation system, banks submit payment instructions to their computer centers. Every evening, data are collected in each computer center and are

subsequently exchanged bilaterally with other computer centers. At the same time the net positions calculated by the respective computer centers are transmitted to Sumclearing. Figure 2 illustrates the transaction flow of the electronic clearing and truncation system. The basic difference between these two systems is that the computer centers handle both the remittance and receipt functions for the electronic clearing and truncation system, whereas the computer centers solely handle the receipt function for the PBS clearing system.

Figure 1:[149] Transaction flow of the PBS clearing system

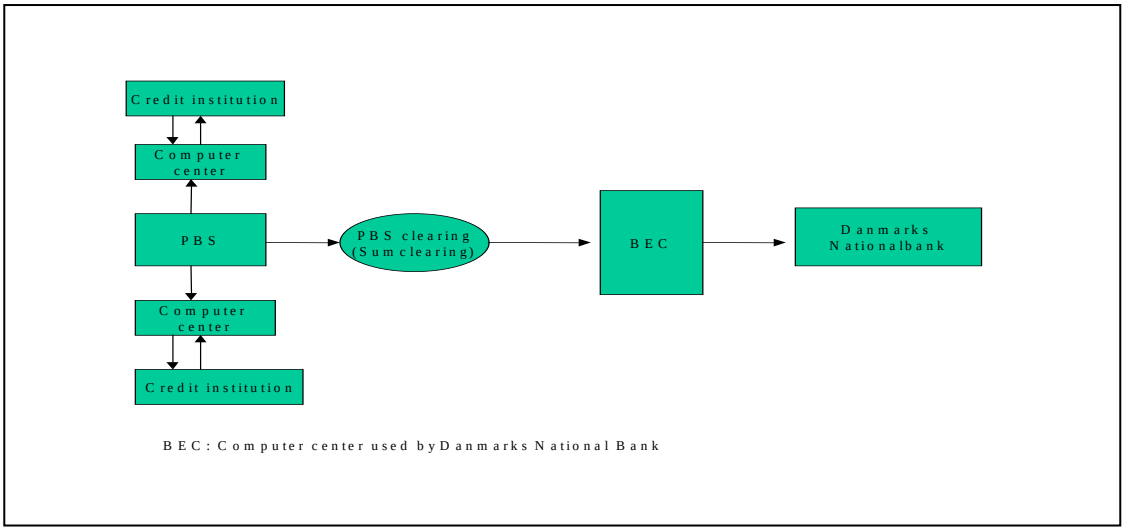
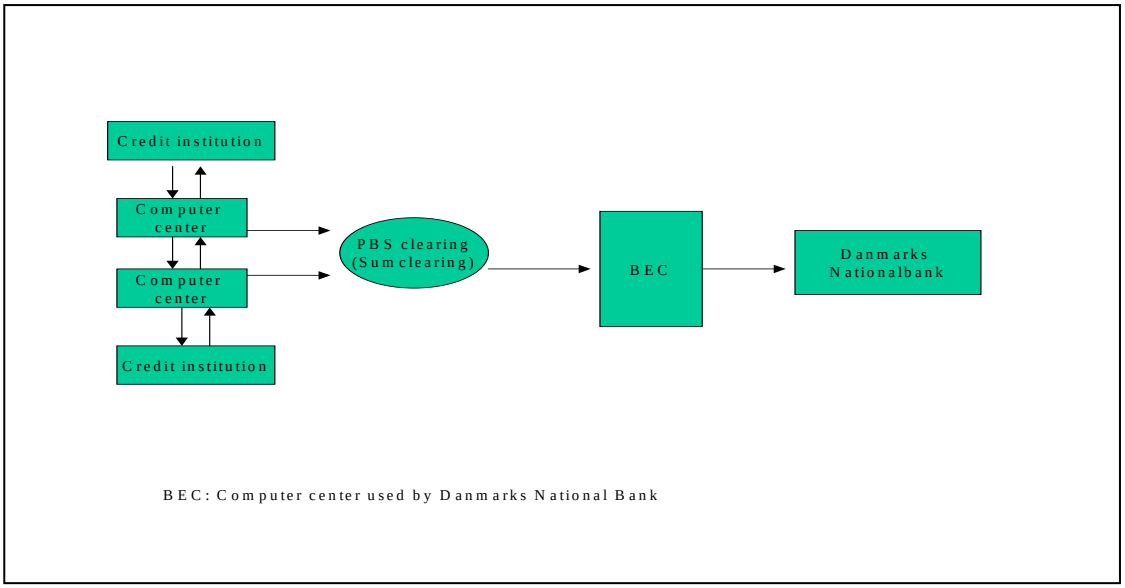


Figure 2: Transaction flow of the Electronic Clearing and Truncation System



All participants on PBS clearing and electronic clearing and truncation system enter upper limits for the amounts for which they can be debited in a single transaction in advance. The maximum upper limit is set at 100 million Danish kroners. Before retail data are sent to Sumclearing, each participant validates the bilateral limits versus other participants. The entries sent for clearing after this validation are called 'A' entries, while the unvalidated entries are called "B' entries. Both entries are settled via the Danmarks Nationalbank's Settlement system.

Clearing in euro and Danish kroner differ in several respects. The Sumclearing in Danish kroner has three settlement blocks. The first two are the 1st and 2nd normal settlements, and the last block comprises 1st and 2nd extra settlements. The "A" entries are settled through the 1st and 2nd normal settlements and the 1st extra settlement. The two normal settlements and the 1st extra settlement take place between 1.30 a.m. and 7.30 a.m. Central European time (CET). The "B" entries are settled through the second extra settlement. The second extra settlement must be completed by 9.15 a.m. CET and takes place while the Danmarks Nationalbank's RTGS system is open to enable banks to get necessary liquidity via the RTGS system in order to place it on the accounts for the settlement of retail payments.

For Sumclearing in euro, participants must supply sum amounts by 6.30 a.m. with the option to revise until 7.30 a.m. Normal settlement in euro takes place at 10.00 a.m. There are also two extra settlement blocks for settlement in euro. The first extra settlement takes place by 12.00 p.m. and the second extra settlement takes place by 2.00 p.m. CET.

All Danish banks operate on one network standard called Pi-net. They use Edifact standards to communicate with customers. Sumclearing does not have remote access capabilities. Banks can access the Sumclearing system remotely through an agreement with a direct participant. Finally, euro and Danish kroner are the only two currencies that are processed through the PBS system.

Infrastructure

Technology

Denmark's technological infrastructure is relatively advanced with a government that has announced its goal to make Denmark, "The world's most advanced IT nation." Denmark has lower growth rates in e-commerce than seen in the U.S., but Danish technology is sophisticated and several government efforts have been made to investigate ways to favor vendors with e-commerce capabilities. A recent survey showed one third of the population uses the Internet on a daily basis, and many expect e-commerce to play a significant role in the B2B sector. Home banking is already very popular, and many banks' only presence is on the Internet.[150]

Payment Opportunities

The U.S. is Denmark's largest trading partner outside the European Union and shares roughly five percent of the Danish import market. Denmark is heavily dependent on foreign trade, particularly in high technology areas such as information technology, and Denmark expects much U.S. and/or international investment in this market. Leading

sectors for imports from the U.S. include telecommunication services, computer software, medical equipment and biotechnology, pollution control equipment, electrical power systems and services, distribution and warehousing services. Nearly 300 American-owned service, sales and manufacturing companies operate in a variety of Danish trades and Denmark has historically maintained a no-barrier policy, taking a lead in the international fight against non-tariff barriers.[151]

Banking

Denmark has 97 commercial banks and 90 small local savings and co-operative banks with the largest, Danske Bank and Unibank, offering a broad variety of financial services in Denmark and abroad. A number of U.S. financial entities operate in Denmark, and all major Danish banks have correspondent bank relationships in the U.S. The Danish banking system is sound and under strict control by the Financial Sector Supervisory Authority[150]. There are no restrictions to open foreign currency accounts in Danish commercial banks.

France[152]

ACH Basics

The French ACH Systeme Interbancaire de Telecompensation (SIT) is the leading clearing system for retail transactions in the world. In 2002, SIT exchanged and cleared nearly 11.17 billion interbank transactions worth approximately 4.5 trillion euro. Banque de France is the only regulator of the SIT system. During 2002, SIT was deemed by the Banque de France to be a system of systemic importance. While all large-value payment systems in the Euro area are considered to be systematically important, some retail payment systems may be as well. The central banks of the Eurosystem periodically review euro retail payment systems and may conclude that certain retail payment systems qualify as systematically important payment systems[153] (SIPS). As of July 2002, the SIT system of France and the PMJ system of Finland were the only euro retail payment systems to qualify as SIPS.

There are three types of participants in SIT: direct participants, indirect participants, and customers. There were 17 direct participants at the end of 2001. Direct participants are financially liable for their own operations and those of the indirect participants or customers they represent. They have to comply with minimum volume requirements, fulfilling a certain percentage of volume exchanged annually via SIT. The minimum volume requirements are set by the Board of the GSIT (Groupement pour un systeme interbancaire de telecompensation -Interbank automated clearing consortium). Indirect participants send and receive payments via a direct participant. There were 689 indirect participants at the end of 2001. Customers are defined as credit institutions[154] that exchange their transactions via a direct or indirect participant.

The SIT system is operated by GSIT. Fourteen financial institutions including the Bank of France are GSIT's founding members. GSIT takes an active role in the European Committee for Banking Standards and plays a key role in standardization and security for the French banking industry. GSIT has also participated in the European Automated

Clearinghouse Association (EACHA) since 1997, where managers of European automated clearinghouses exchange information concerning use, standards, and security.[155]

SIT handles all retail payments between banks, including credit transfers, direct debits, card payments, and bills of exchange. Direct debits are generally used for recurrent payments such as utility payments and monthly tax payments. More than 1.37 billion direct debit transactions were exchanged in France in 2001, with an average value of EUR238. Credit transfers are used for payments made by companies, government agencies, and local authorities, but seldom by individuals. Retail credit transfers are the third largest in France behind checks and card payments. There are various types of credit transfers. Credit transfers from abroad (Virement d" Origine Exterieure- VOE) enable a bank established in France to send a transfer received from abroad via SIT to the payee's bank, along with the information needed by the payee, such as the exchange rate applied and the commission charged. These credit transfers from abroad are received via SWIFT or other means by an SIT participant. The SIT participant then converts these transfers to the SIT format to be processed in the SIT. Credit transfers by electronic data interchange (Virement Echange de Donnees Informatisees- VEDI) contain message references in EDIFACT format. Referenced credit transfers (Virement Reference- VR) are initiated through a home-banking service in settlement of an invoice and contain all the references of the creditor.

Operational Details

The operations of the system are ruled by an interbank agreement (Charte Interbancaire Regissant les Conditions d'Ecange-CIRCE), which governs the exchange conditions.

SIT currently uses a proprietary standard; however, it is currently under redesign and could move to an international standard. Compared to systems that use batch operations, the SIT is a real-time exchange system and is made up of a network allowing a direct exchange between banks' computer centers. SIT consists of a network of computers, called stations, located on each participant's premises. Stations must be approved by the GSIT. Each direct participant has one or more access points to the stations. Eighty stations were connected to the SIT network at the end of 2001, while the network is designed to support 250 stations. Currently there are no banks outside of France that access the SIT system remotely; however, there is no technical impediment to do so.

The SIT is open for exchange six days a week, operating 21 hours a day from Monday to Saturday, starting at midnight and ending at 9:00 p.m., Central European time. Data are transferred via the TRANSPAC public packet-switching network (gradually evolving to an IP network since mid-2002). The final settlement takes place at 2:30 p.m., Central European time. The acknowledgement of payment transactions between a sending and a receiving credit institution automatically triggers the transmission of an accounting message from the sending party to the SIT accounting center, which calculates daily clearing balances to be forwarded to the Bank of France for settlement in TBF (Transferts Banque de France). TBF is the RTGS system operated by the Bank of France and is the French component of TARGET that conducts large-value operations.

SIT balances are calculated after the cutoff and net balances for debiting and crediting to the accounts of direct participants are then transmitted to the Center for Interbank Funds Transfers (CRI) to be settled in TBF at 3:15 p.m., Central European Time.

Finally, euro is the only currency that is currently processed through SIT. However SIT is technically capable of processing other currencies as well, since there is a currency field in the message format.

Infrastructure

Technology

France's technological infrastructure is sophisticated, with telephone lines and easy Internet access available. Though France is behind the U.S. and some others in the use of personal computers and the Internet, it is catching up rapidly. High-speed Internet access is still limited, but the government is working to endorse better use of information technologies. Representing 75 percent of all e-commerce, B2B has been experiencing large growth, and analysts predict it to reach USD 8.5 billion by 2003.[156]

Payment Opportunities

The U.S. is the largest foreign investor in France and represents 17 percent of the stock in direct foreign investment.[157] The U.S. and France share many trade similarities. In particular, they export the largest quantities of defense products, agricultural goods, and services. Leading sectors in France for imports from the U.S. include computer software, aircraft and parts, industrial chemicals, travel and tourism, employment services, computers and peripherals, electronic components, and telecommunications equipment. There is strong competition from Europe and Asia for market share in French service sectors.[158]

Banking

The French banking system underwent significant reform in 1984, when most financial institutions were combined under a single supervisory system. The largest French commercial banks are among the largest in the world. Currently, there are 169 foreign-owned banks residing in France, some with sizeable branch networks. All large French banks have correspondent U.S. banking arrangements, and many French banks have subsidiaries or branch offices in the U.S. (see Appendix for a list of French-owned banks and US-owned financial institutions operating in France). There are no restrictions to open foreign currency accounts in French commercial banks.

Germany[159]

ACH Basics

The Retail Payment System (RPS), processes non-urgent retail payments that are batch-processed "overnight". The Deutsche Bundesbank owns and operates RPS that processes 15% of all retail payments in Germany. The rest of the retail payments are processed on a bilateral basis through giro networks.

RPS processes credit transfers and direct debits. In Germany credit transfers have traditionally been the predominant form of payment. In 2001, approximately 7.0 billion credit transfers were processed by the German banking industry. Credit transfers constitute 49.8% of the total number of cashless payment transactions in 2001, whereas direct debits constitute 36.4%. The share of credit transfers has decreased in the recent years with respect to the total volume of payment transactions, because more suitable payment instruments, especially direct debits, are being used for certain purposes (i.e. for the collection of identical payments due on a regular basis).

Each credit institution[160] with an account at a Deutsche Bundesbank branch that meets the technical requirements of the RPS, as well as other Deutsche Bundesbank account holders, such as public authorities can participate in the RPS.

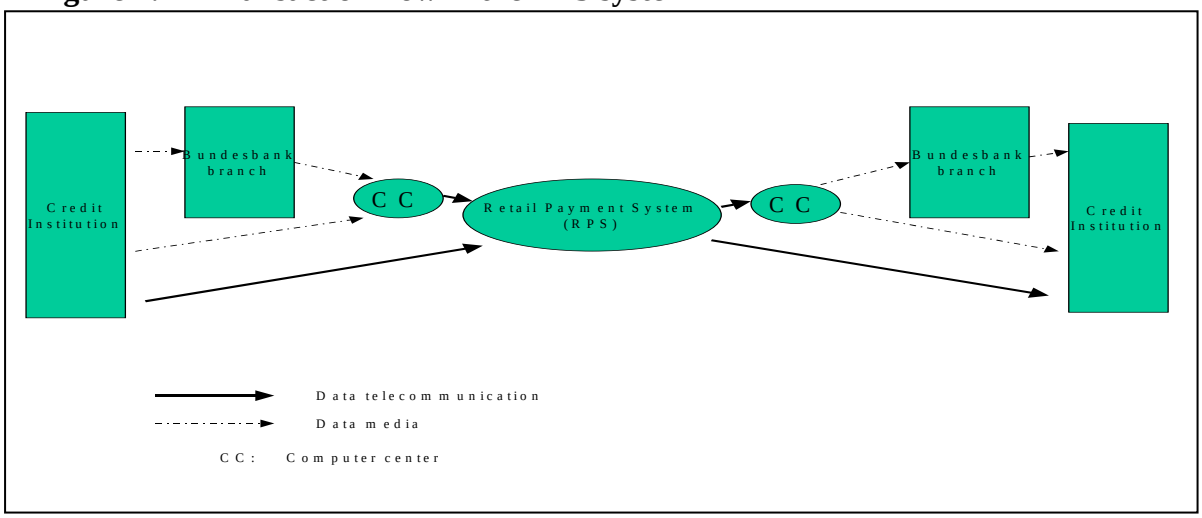
The RPS operations are based on a number of agreements between the central associations of the banking industry and the Deutsche Bundesbank. The content of these agreements relates both to technical requirements and to certain conversion requirements. Both the "Special terms of the Deutsche Bundesbank for the Retail Payment System" (RPS conditions) and the "Special terms and conditions of the Deutsche Bundesbank governing electronic order placing, data transmission and account information" (EADK conditions) are applicable with regard to clearing in the RPS procedure.

The Deutsche Bundesbank discusses topics concerning payment systems with the banking industry in a working group of the Zentraler Kreditausschuss (ZKA). ZKA is a committee of the German banking associations to discuss banking issues. Payments issues, especially standards are discussed in the Automation Working Group of the ZKA. The Deutsche Bundesbank regularly participates and chairs this working group. Matters specifically concerning RPS are discussed in a sub-group of the Automation Working Group.

Operational Details

RPS processes ACH transactions through a centralized automated clearinghouse. About 120 Bundesbank branches act as submission and delivery points for data media. Nine computer centers are responsible for reading data media and producing them. The actual processing of the payments submitted on data media or those transferred directly by data telecommunication is carried out at a central computer center.

Figure 1:[161] Transaction flow in the RPS system



Incoming and outgoing payments can be processed on both electronic media (magnetic tapes or diskettes) and data telecommunication. In 2002, the share of payments processed through data telecommunication reached more than 50%.

There are two processing cycles in the RPS: the evening cycle and the morning cycle. For the evening cycle, the data media must be submitted to the Deutsche Bundesbank branches by 2:30 p.m. Central European time or, in the case of direct submissions to the computer centers, by 6:30 p.m. Central European time. Submissions by data telecommunication must be concluded either by 8:00 p.m. for credit transfer files or 9:00 p.m. Central European time for direct debits. For the morning cycle, any payment order can be delivered until 7.00 a.m., Central European time the following day. The settlement of both cycles is being done at about 7.00 a.m., Central European time, after the clearing cycle. The Deutsche Bundesbank is permitted to execute credit transfers only if there is sufficient fund available for the complete order. To ensure that, the debit amounts for credit transfers are blocked on the accounts until settlement next morning. The following business day, the account of the submitting bank is debited and the blocked funds are released. Crediting and debiting of accounts always takes place at the same time on the working day after submission.

Credit institutions also have the option of joining a service center or clearing institution and having their transactions effected by this institution. In these cases, the settlement is done via the clearing institution.

Remote access is subject to the “External specifications for electronic access to the Deutsche Bundesbank”. Currently, there are no banks that access the RPS remotely; however there are no restrictions to do so. Furthermore, euro is the only currency that is processed through RPS.

Orders must be presented to the RPS in paperless form and in the German DTA format. DTA is a common data format standard to exchange domestic payments between banks. Discussions have been in progress to use the international SWIFT data exchange standards in RPS and to use the system as a German entry point to STEP2, a clearing and settlement system for European retail payments of the Euro Banking Association (EBA). As a result, starting from November 3, 2003 SWIFT MT 103+ data standards for cross-border payments will also be available. Moreover, OFTP and OSI/FTAM are the data telecommunication standards in the RPS system.

Infrastructure

Technology

In addition to being one of the most sophisticated e-commerce markets in the world, Germany has an open telecommunications network. The number of telecommunication service providers rose 41.6 percent between 1998 and 2000, many of which are American. B2B and B2C ventures are continually growing, although the volume of e-commerce trade share is still below one percent. German companies using e-business

technologies allocate two percent of their revenues to developing stronger e-commerce capabilities.[162]

Payment Opportunities

Germany is the United States' largest European trading partner and fifth largest trading partner with respect to all other countries. Germany has a "social market" economy that employs mostly free-market principles with some government regulation and significant social welfare protections. The German market, which is Europe's largest, is particularly attracted to the U.S.' reputation of being a service-oriented economy. For American companies, Germany is a key to any export strategy in Europe and is known as a country with high production levels and advanced infrastructure. Leading sectors for imports from the U.S. include computer software, computer services, management consulting services, telecommunication services, travel and tourism, computers and peripherals and medical equipment.

Banking

Germany's financial services institutions are well developed and non-discriminatory. Their systems for finance, capital availability and payment restrictions for foreigners are similar to those in the U.S., and Germany has no restrictions or barriers on the movement of foreign exchange earnings, capital or dividends. All major U.S. banks are represented in Germany, and many German banks also maintain subsidiaries and branches in the U.S., the big three private banks being Deutsche Bank, Dresdner Bank and Commerzbank.[163] There are no restrictions to open foreign currency accounts in German commercial banks.

Italy[164]

ACH Basics

BI-COMP is the clearing system for domestic retail payments in Italy, and is regulated by the Bank of Italy. It is composed of two subsystems: the local clearing sub-system for paper-based transactions and the retail sub-system for electronic transactions. The retail subsystem is managed by Bank Interbank Company for Automation (SIA) on behalf of Bank of Italy. On average, the BI-COMP system handles about 4 million payments a day.

The retail subsystem handles electronic retail transactions including direct debits and credit transfers. In 2000, there were 320 million credit transfers in Italy for a total value of 4.5 trillion euros. Direct debits are mainly used to collect low-value recurrent payments such as utility bills. There were 326 million direct debit transactions in Italy in 2000.

Participation in the BI-COMP system, which may be direct or indirect, is restricted to banks, the Postal Administration, the Bank of Italy, and the Ministry of the Treasury. Direct participants settle their balances through BI-REL, the RTGS system of Italy, while indirect participants settle their transactions via direct participants.

The Post Office, which is a private company owned by the Ministry of Treasury, also plays an important role in retail payments. Over the last few years, postal bank payment services have been growing rapidly so as to compete with the banking system. The postal bank payment services include credit transfers and giro transfers.

CIPA (Convenzione Interbancaira per l' Automazione), the interbank association in charge of planning initiatives in the field of interbank automation, sets up technical standards applied to the retail subsystem of BI-COMP.

Operational Details

BI-COMP processes retail transactions through a centralized automated clearinghouse system, and transactions are settled on a net basis. Banks send payment instructions electronically through RNI (Rete Nazionale Interbancaira), the national interbank domestic network, to their respective processing centers ("centro applicativi", also known as "service providers"). Processing centers are bank-owned software companies that carry out a number of activities on the banks' behalf in connection with the exchange of accounting information for interbank payments.

Currently, there are four processing centers within the retail subsystem in Italy, and banks have to send payment instructions to them before midnight. The four processing centers send the bilateral balances for each of their customer banks to SIA before 9.30 a.m. Central European time the next day. SIA aggregates the bilateral balances and calculates the national bilateral balances in the retail subsystem for each participant on behalf of Banca d' Italia. Banca d' Italia then calculates the multilateral balances for the whole BI-COMP system by aggregating the multilateral balances of the retail subsystem and the local clearing subsystem. The final net balance is eventually settled on the Italian RTGS system, BIREL at noon. However, some payments, specifically direct debits and firms' commercial payments, can also be sent to the processing center with a deferred settlement date (up to one month).

Italian Bankers' Association's regulations provide for maximum payment execution times ranging from same day execution for urgent credit transfers initiated before 11:00 a.m. to up to four days for ordinary credit transfers.

The BI-COMP system currently supports RNI, a proprietary standard. In Italy RNI standard is the only national standard, and it is used not only for BI-COMP, but for other interbank trading and clearing systems as well.

BI-COMP does not currently have remote access capabilities. Also, BI-COMP only processes transactions in euro.

SIA has been selected by the Euro Banking Association (EBA) as the technological partner to implement and manage STEP2, the new pan-European Clearinghouse for retail euro payments. SIA built the central infrastructure of STEP2 as well as the system that participants use to connect it. STEP 2 went live on April 28, 2003.

Infrastructure

Technology

Italy is beginning to rely on external service providers because of new advances in information technology and telecommunications. Italy looks to the U.S., who dominates this market, and is eager and willing to team up with new U.S. companies. Although the country started slowly, Internet usage in Italy has experienced large growth. By the end of 2003, e-commerce is expected to reach over $50 billion, B2B transactions to reach $38.5 billion and B2C to reach $11.5 billion.[165]

Payment Opportunities

With USD $36 billion in two-way trade in 2000, the U.S. and Italy have developed a strong commercial relationship, and the expansion of these relations is one of Italy's highest priorities.[166] As long as Italy continues with its economic institutional reforms, foreign countries like the U.S. have much room for growth in such areas as information and communications technology, infrastructure development, and services. Other leading sectors in Italy for imports from the U.S. include computer services, computer software, management consulting services, computers and peripherals, travel and tourism, and medical equipment.

Banking

Italy's central bank, the Bank of Italy, is respected throughout the world for its proven ability to cope with inflation and the politics of the balance of payments. They have a well-developed banking and credit system with many correspondent U.S. banks. Several U.S. banks also have branches in Italy, including Chase, Citibank, Morgan Guaranty Trust, Bank of New York, and Bank of America. All banks are under close supervision by the government, and any new bank must be authorized by the Bank of Italy. There are no restrictions to open foreign currency accounts in Italian commercial banks.

Netherlands[167]

ACH Basics

Interpay Nederland B.V. operates Clearing and Settlement System (CSS), the domestic low value bulk payment system, in the Netherlands. Currently, nine banks own Interpay's shares. Interpay is organized in two divisions: Giro Services, which is responsible for the clearing settlement-related operations, and Acquiring Services, which runs the authorization network for card transactions. De Nederlandsche Bank (DNB), the central bank of the Netherlands, oversees Interpay's system.

Interpay handles all types of retail transactions including credit transfers and direct debits. The Netherlands relies heavily on credit transfers, which constitute the 38% of total value of retail payments. Credit transfers are used by households, industry, central government and local authorities. Direct debits are frequently used for collecting recurrent payments, such as payments to public utilities and telephone companies. In 2001, 27% of all retail payments were made by means of direct debits.

Financial institutions need to sign an agreement with Interpay and to get an appropriate license from the DNB to become participants on Interpay. There are two types of participants. Direct participants have a settlement account with the DNB and authorize Interpay to prepare settlement transactions for their account to be settled by the DNB. Indirect participants are usually smaller banks and they settle their transactions through direct participants. Approximately 70 banks participate on Interpay, with a combined total of 15.2 million accounts. The banks are both its shareholders and customers. Corporations can also send payment orders directly to CSS.

The Netherlands Bankers' Association (NVB) is the most important interbank consultative body in the banking sector in the Netherlands. NVB's Policy Committee on payments plays an advisory role with respect to payment systems. The Policy Committee is made up of members of the Boards of Management of various banks who are in charge of payment systems. An Advisory Committee on payments consisting of the banks' senior payments managers supports the Policy Committee. Interpay holds consultations with an Advisory Board, made up of the members of the Netherlands Bankers' Association's Advisory Committee on payments.

It should be noted that a considerable amount of retail transactions are also processed by the large banks themselves using in-house processing facilities.

Operational Details

The Interpay system is a net settlement system, and ACH processing is centrally handled through the Clearing and Settlement System (CSS) for bulk payments. Banks participating in ACH have a common account numbering system, which allows for automated error controls. All numbers contain nine digits and are centrally distributed by Interpay.

Payment instructions may be submitted in several different ways, by both banks and corporations. Corporations deliver their mass payment orders and direct debits directly to CSS via data communication lines or on magnetic tapes. Banks submit payment instructions using the same methods, but may also present bulk payment orders on paper, in which case Interpay converts them into digital form. Payments are settled via TOP, which is the real-time gross settlement system of DNB.

Transactions are cleared in two daily runs using the net settlement procedure. There are two types of transaction bundles, the so-called "debit" and "credit" lots. The clearing of retail payments closes every 30 minutes for settlement at the DNB and then reopens for the next clearing round.

Payment orders that are delivered before 3:30 p.m. Central European time can be settled the same day. During settlements, short banks pay their due amounts on Interpay's clearing account at the DNB, after which Interpay pays out to the long banks. Settlement of the debit and credit lots takes place about every 30 minutes between 07:30 a.m. and 5:00 p.m. Multiple settlement process reduces systemic risk, improves the service to

banks by providing irrevocable output after settlement of each lot, and speeds up the overall processing time of transfer orders.

Financial institutions can access the Interpay system remotely only if they have an account with a bank in the Netherlands. Interpay currently supports a set of proprietary standards and SWIFT standards (MT102, MT202). Furthermore, Interpay is currently developing the SWIFT standard (MT103) and the EBA-file format to facilitate cross border transactions for some banks.

Interpay processes ACH transactions only in euro. However, the system can potentially be adjusted to process multi-currency transactions.

Infrastructure

Technology

The fastest growing sector for the Netherlands is information and communication technologies (ICT). Although the ICT's share of GDP is smaller than in other European countries, during the second half of the previous decade, the ICT sector expanded to contribute more than a 0.6 percentage point annually to GDP growth, which is larger than many other countries. However, there has been a recent slowdown in information and communication technologies because of consumer hesitation to adopt e-commerce.[168]

Payment Opportunities

The U.S. has had a long history of trade partnership with the Netherlands and has developed excellent relations due to both historical and cultural ties and a common commitment for open markets and free trade. They cooperate together on many trade and policy issues. The Netherlands is eighth in imports of goods and services from the U.S. and is the third largest foreign investor in the U.S. Similarly, the U.S. is the largest foreign investor in the Netherlands with a trade surplus of $12.3 billion in 2000, the largest in the world. U.S. foreign direct investment was $55 billion in 2000.[169] More than half of its GDP comes from imports. Leading sectors in the Netherlands for imports from the U.S. include telecommunication services, computer services, computer software, defense equipment, automotive parts and equipment and electromedical equipment.

Banking

Banks in the Netherlands provide support for both international and domestic markets. Three Dutch banks dominate the financial sector: ABN Amro, Rabobank, and ING Bank, which hold 75 percent of total lending. The Finance Ministry and Central Bank have given full national treatment to foreign banks. Banking facilities for international transactions available in the Netherlands generally meet or exceed U.S. standards. Nonresident accounts maintained in both the national currency or in foreign currency are available, providing greater liquidity for international transactions.[170] All major banks have correspondent U.S. banking arrangements (see Appendix for a list of correspondent arrangements).[171] There are no restrictions to open foreign currency accounts in Dutch commercial banks.

Spain[172]

ACH Basics

SNCE (Sistema Nacional de Compensacion Electronica- National Electronic Clearing System) processes retail payments in Spain. It clears all retail payment transactions including credit transfers and direct debits. The SNCE's operating scheme relies on six clearing sub-systems, each of which specializes in a single instrument. These sub-systems are: current account cheques, credit transfers, petrol and traveller's cheques, direct debits, commercial paper, and diverse operations.

SNCE clears all the low-value payment instruments issued in euro. In terms of volume, direct debits are the most significant instrument in Spain. They are used for public utility bills (telephone, water, and electricity).

Banco de Espana is in charge of the oversight of SNCE. SNCE rules and the general operating conditions of each of the sub-systems are established through Banco de Espana circulars, which must be approved by the Bank's Governing Council. Banco de Espana is assisted by the Advisory Committee of the SNCE. The Committee is fully operational and is made up of representatives of credit institutions[173] and is chaired by the Banco de Espana. The main function of the Committee is to submit regulatory proposals with regards to operations for approval by the Banco de Espana. It also acts as a forum for the discussion of any topic relating to the operations of the SNCE. The Advisory Committee is assisted by three working groups, which are co-ordinated by Banco de Espana. These groups comprise representatives of member credit institutions and they discuss and propose rules to be submitted for approval by the Advisory Committee.

Banks, savings banks, and credit cooperatives operating in Spain are eligible to be members of SNCE. There are two types of participation to the SNCE system: direct participants (member institutions) and indirect participants (represented by a member institution). Direct participants have joint responsibility for the transactions of the institutions they represent. In order to participate directly, the institution must have sufficient technical capability and perform a certain minimum number of operations. Any institution may apply for indirect participation as long as a direct participant accepts acting as its representative.

Operational Details

The SNCE had adopted an intermediate solution, which is neither a completely centralized nor a completely decentralized clearing and settlement system. Institutions transmit information bilaterally using electronic procedures. Telecommunication lines between the SNCE and member institutions (direct participants) are the main channel for communicating, via "common software" of the National Settlement System. The "common software" is a proprietary software that is used by all participating credit institutions. Each document is processed in its respective sub-system, so a net balance for each pair of institutions is obtained in each of the subsystems. Each subsystem has its own timetable for communications.

In the direct debit sub-system, direct participants transmit data between 4.30 p.m. to 9.30 p.m., central European time (CET). Once the net amount has been confirmed, the settlement takes place through the SLBE[174] accounts held at the Banco de Espana, the next morning between 8.00 a.m. and 11.30 a.m., CET. For the credit transfer sub-system, data transmission between direct participants takes place between 6.00 p.m. and 8.00 p.m., CET. The settlement takes place the next morning between 8.00 a.m. and 11.30 a.m., CET.

Institutions send Banco de Espana all the bilateral totals resulting from their exchanges with each counterparty and each sub-system in which they participate via the "common software." Banco de Espana calculates each institution's final net position with the system. The balances are then settled on the participant's RTGS accounts at the Banco de Espana by first debiting short participants' accounts before crediting the long ones. Settlement is considered final at the moment it takes place.

SNCE does not have remote access capabilities, therefore only the institutions established in Spain may participate in the SNCE system. However, banks outside of Spain can move their transactions via SWIFT. Moreover, euro is the only currency that is processed through SNCE.

Infrastructure

Technology

Spain's telecommunications' total market size was $25,645 in 2001, which is a 15 percent growth from 2000. Its revenue was U.S. $22.3 billion in 2000, which is a 27 percent increase from 1999. The technological sector is growing rapidly because of increased use in the Internet and e-commerce. Although Spain has about 300 Internet Service Providers currently, this number is expected to drop substantially over the next few years as larger ISPs begin to take over smaller ones.[175]

Payment Opportunities

The U.S. is one of the top ten investors in Spain with direct investments of $11.8 billion in 1999 and $25.0 billion in 2000. Although the U.S. pays higher tariffs than EU countries and Japan in Spain, when U.S. products are made in Spain, they often have lower production costs. Spain views U.S. products as technologically advanced and of the highest quality and, as NATO allies and industrial democracies, the two countries have strong relations. In 2000, U.S. exports to Spain were $8.0 billion and imports were $5.5 billion.[176] Leading sectors in Spain for imports from the U.S. include pollution control and water resources, telecommunication services, franchising, telecommunications equipment, tourism, electric power systems, and medical equipment.

Banking

Spain's banking system is regulated by the Ministry of Economy, the Bank of Spain, the Directorate General of Foreign Transactions, and the Directorate General of the Treasury and Financial Policy. Its financial system is fully integrated with international banks and has a diversified modern financial system. Because of the recent improvement in Spain's economy, inflation and interest rates are at record lows and banks are well capitalized.

All major Spanish banks have relations with one or several U.S. banks. (See Appendix for a list of Spanish-owned banks and US-owned financial institutions in Spain). There are no restrictions to open foreign currency accounts in Spanish commercial banks.

United Kingdom

ACH Basics

In the U.K.'s payment industry, the main private sector body is the Association for Payment Clearing Services (APACS). APACS is a non-statutory association providing a forum for the major banks and building societies to discuss non-competitive issues relating to money transmission.[177] The U.K.'s operational clearing companies fall under the APACS umbrella, which includes BACS Ltd, the U.K.'s ACH operator.

BACS Ltd. owns and operates the BACS clearing service and provides operational rules and standards for settlement participants. Settlement members are involved in setting rules through their membership of BACS Ltd's Board and its subcommittees.

Membership of the BACS clearing service, which was established in 1968, consists of the Bank of England, twelve commercial banks that represent 10 separate banking groups, and one building society, which is comparable to a savings and loan institution in the U.S.[178] These fourteen credit institutions are the shareholders of BACS Ltd. and they are responsible for settling all inter-bank obligations arising from the BACS clearing process. Settlement between BACS direct members occurs across accounts at the Bank of England. 3.73 billion inter-bank transactions (valued at GBP 2.38 billion) were processed in 2002.[179]

Although BACS Ltd. is self-regulated to a large degree, it operates under the broader oversight of the Bank of England. The Bank of England is responsible for the oversight of U.K. payment systems and as such for ensuring that sufficient weight is given to risk reduction and management in such systems' design and operation.[180]

BACS Ltd. expects a massive increase in domestic ACH transactions over the next few years because the U.K. government is phasing-out paper check payments to welfare claimants and state pensioners in an effort to reduce government expenses. The government will make payments directly to recipients' bank accounts via BACS.[181]

In 2000, approximately 60 percent of direct credits in the U.K. arose from the payment of wages, salaries and company and private pensions.[182] In recent years, businesses have started using direct credits for payments to business suppliers and to make consumer payments initiated through telephone and PC banking.[183] In 2002, the total volume of Sterling-denominated, inter-bank direct credits in the U.K. was 1.17 billion transactions. During the same period, the total volume of euro-denominated, inter-bank direct credits in the U.K. was only 37,000 transactions.[184] Standing Orders, direct credits involving repeated and fixed amounts, have been widely adopted in the U.K. 273 million standing order transactions were processed in the U.K. in 2002.[185]

In 2002, approximately 2.29 billion direct debit inter-bank transactions were processed in the U.K.[186] 75 percent of adults in the U.K. use Direct Debit.[187] Approximately 16,000 organizations use direct debits for collecting a variety of bills including utility payments, insurance premiums, city council tax, mortgages, loans and subscription payments.

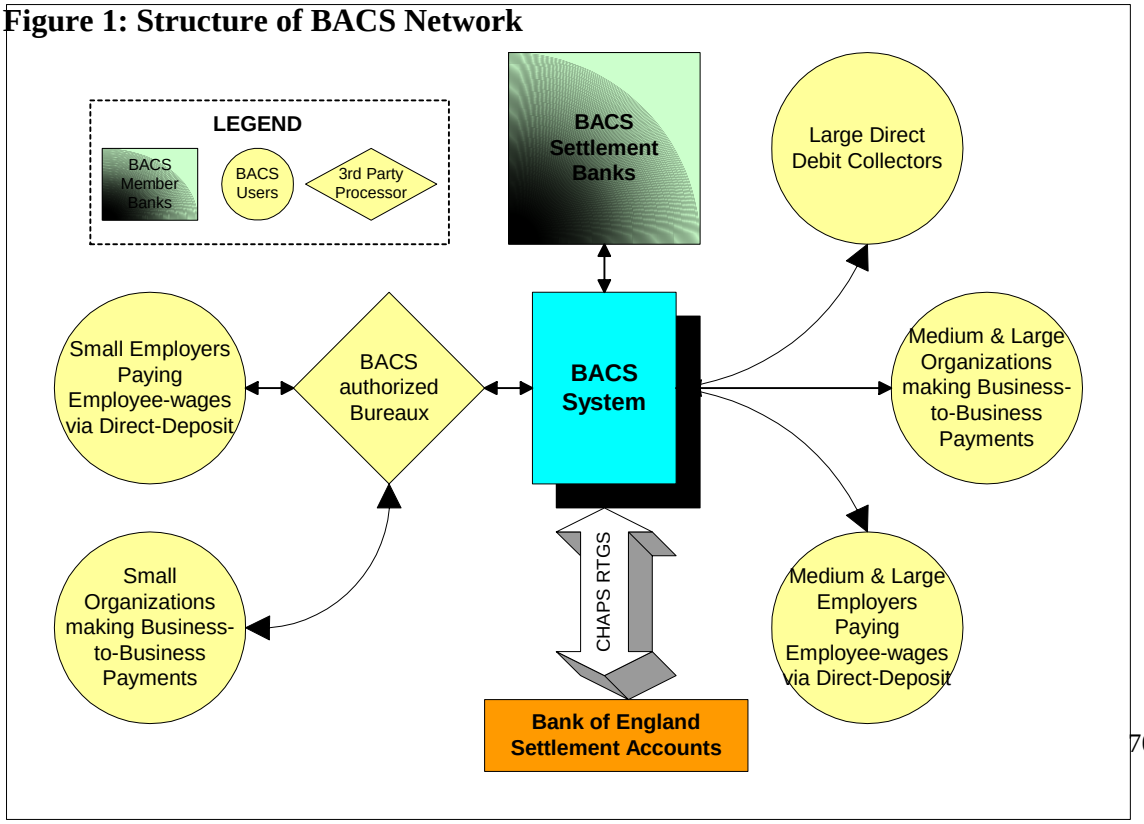
Operational Details

Bulk debit and credit electronic transfers in the United Kingdom (U.K.) are cleared via BACS (Banks Automated Clearing System). BACS supports Sterling-denominated and euro-denominated transactions. Specifically, BACS provides Sterling-dominated ACH services, including electronic bulk clearing for direct debits and standing orders, as well as non-urgent automated credit transfers. In 1999, a separate credit transfer system for domestic euro transactions was added to BACS; the service caters for direct credit payments to accounts in the U.K; if currency conversion is required for domestic euro credit transfers, it is made by the receiving bank.[188] Although BACS' focus is on smaller retail payments, BACS can accommodate non-urgent, large-value transfers if needed.

BACS-members (i.e. the 14 shareholders of BACS Limited) are able to sponsor other organizations as users of the service (i.e. BACS-users). BACS-users are allocated a BACS user-number by their sponsor and they are able to submit payment instructions directly to the BACS clearing house.

There are approximately 60,000 BACS-users that consist of *Direct Submitters* and *Indirect Submitters*. Direct Submitters are comprised primarily of commercial and public sector bodies such as large direct debit collectors (e.g. insurance, utility and telephone companies) that make regular collections from their customers' accounts. Indirect Submitters are typically small organizations that submit payment instructions to BACS via intermediaries.[189] In 2002, there were a total of 600 intermediaries (i.e. BACS authorized bureaux) in the U.K.[190]

Figure 1: Structure of BACS Network



BACS member banks and BACS users submit payment data to the BACS clearing house directly through a telecommunications service called BACSTEL or a web-based service called BACSTEL-IP. BACSTEL is a telecommunications service that operates via a public switched network and leased telephone lines. In March 2003, BACS unveiled a new network called BACSTEL-IP, which is a component of a broader five-phase program known as NewBACS. BACSTEL-IP (and NewBACS) utilizes Web-based technology and a multi-layer PKI security platform. BACSTEL-IP is faster and more efficient than BACSTEL. Some of the major users of the system use direct high-speed links. NewBACS is scheduled to replace BACTEL by 2005.[191]

BACS Ltd. sets common standards for the format in which payment information is supplied. Users may submit payment instructions between 2 and 71 days ahead of the payment date. Payments submitted to BACS are subject to the following three-day clearing and settlement cycle.[192]

- Submission of Payment Information: The BACS deadline for receipt of payment information from users is at 10:30 p.m. (U.K. time) on Day 1 of the cycle. The payment data are sorted into bank-order and are transmitted to destination credit institutions. The destination bank can be either a receiving bank or a paying bank (depending on whether the transaction is a credit or debit). The sorting process must be completed before 6 a.m. (U.K. time) on Day 2 of the cycle.
- Confirmation of Submission: On Day 2, the paying bank receives a report confirming each submission that was received on Day 1.
- Settlement of Payments: On Day 3, transfers are debited / credited to respective payer / payee accounts at the beginning of the operating day. The inter-bank obligations that arise in BACS are settled at the Bank of England on a multilateral net basis. Settlement occurs at 9:30 a.m. each day by posting the multilateral net amounts directly to the BACS members' settlement accounts via the CHAPS RTGS processor. Each of the 14 settlement members is responsible for settling the payments generated by the users that it sponsors. BACS Limited does not impose system-wide limits on the number or value of payments that may be submitted by BACS users (i.e. direct and indirect submitters). Each BACS member (settlement bank) bilaterally determines the terms and conditions under which the respective BACS users (that it sponsors) can initiate transfers.

BACS member banks and BACS users connect directly onto the BACS system. Whereas the 14 BACS member banks are British-based institutions, the 60,000 BACS users include a number of overseas (i.e. Non-British) institutions. Non-British based BACS users have the means to connect to BACS from overseas i.e. remotely via BACSTEL or BACSTEL-IP.[193] *Infrastructure*

Technology

Technology is relatively advanced in the UK with a $60 billion telecommunication services market, the second largest in Europe. A main source of this growth was the market for mobile services but, although it has seen rapid growth in recent years, it is not expected to continue growing as quickly because the mobile equipment market penetration rates are already close to fifty percent and the costs are beginning to escalate.

In most surveys, Britain is held as having the least affordable broadband access and market penetration resulting in a dent in the British government's attempt to make the UK the best place in the world for e-business.[194]

Payment Opportunities

The U.S. and the UK are each other's largest foreign investors in all products. By 1999, the U.S. had $212 billion invested in the UK, which rose even further to $233 billion in 2000.[195] The UK has relatively low rates of taxation and inflation and its common language, legal framework and business practices make it ideal for U.S. companies. In 2002, the top 3 categories of U.S. imports from the U.K. were medicinal, dental and pharmaceutical preparations (USD 5.3 billion); new and used passenger cars (USD 4 billion); and crude petroleum (USD 3.8 billion). In 2002, the top 3 categories of U.S. exports to the U.K. were: pharmaceutical preparations (USD 2.2 billion); computer accessories (USD 2.2 billion); and civilian aircraft engines (USD 1.6 billion).[196] The UK has no restrictions on the repatriation of capital and profit and is very receptive to U.S. goods and services.[197]

Banking

Commercial banks in the U.K. accept various types of deposits in domestic and foreign currency from the public (primarily in euro). The Cheque Clearing and Credit Company (CCCC) has developed a euro bulk paper clearing to handle U.K. issued checks drawn in euro and presented in the U.K. However the number of payments cleared through the euro scheme remains very low with annual volumes in 2000 of around 154,000 items (and a value of approximately EUR 1,500 million). In contrast, a total of 2,286 million Pound Sterling denominated items were processed in 2000 (valued at GBP 1,670 billion).[198]

There are more U.S.-owned banks with branches and subsidiaries in London than on Wall Street. Many small U.S. banks have correspondent relationships with one or more major British banks whose UK correspondents provide a wide variety of financial services for both exporters and investors. Specifically, all the major UK banks have the ability to deal in and carry accounts in the major foreign currencies. In fact, most law firms hold accounts in US dollars, sterling and euro. UK banks believe that the ability to deal through time zones is important and those banks that regularly handle major firms in different countries like the European Commission bodies and governments (including Africa, the Far East and the US) are experienced in providing customers with bids, tender bonds, and guarantees[199]. In summary, the UK financial market is impartial, organized and highly advanced.[194]

North America

Canada

ACH Basics

Canada is a dual-currency economy; payments are accepted in U.S. Dollars (USD) and Canadian Dollars (CAD). The clearing and the settlement of ACH payments in Canada are handled separately. Domestic Canadian ACH payments are not cleared through centralized public or private entities as observed in the U.S. payments system. Domestic ACH payments are exchanged directly among 12 direct-clearing banks. The Canadian central bank, known as the Bank of Canada, facilitates the settlement of payments processed.[200]

The Canadian Payments Association (CPA), established in 1980, is a not-for-profit organization with a mandate to operate systems for clearing and settling payments. Under this mandate, the CPA owns and operates two national payments systems namely: a wholesale payments system called LVTS (Large Value Transfer System) and a retail payment system called ACSS (Automated Clearing Settlement System).

The Ministry of Finance has oversight responsibilities over the CPA. The CPA sets by-laws, rules, and standards that govern members' participation in ACSS; the Minister of Finance (as head of the Ministry) has approval and directive powers regarding the CPA by-laws, rules, and standards.

ACSS is a deferred-settlement system that is used to process a broad range of low-value, Canadian Dollar denominated interbank transactions including paper-based debit items (e.g., checks); paper-based credit items (e.g., account holder initiated transfers); electronic payment items such as direct debits and direct credits; electronic account holder initiated payments; Electronic Funds Transfers at Point of Sale (EFTPOS), and cash disbursement through shared ATM networks (e.g., Interac).[201] More than 4.5 billion payments (valued at CAD $5.017 trillion) were cleared through ACSS in 2002.[202]

ACSS has a tiered membership structure which consists of:

- Direct Clearers: CPA member institutions[203] that are permitted to input transactions daily into ACSS and settle for the net value of payment items payable via settlement accounts at the Bank of Canada. In November 2002, there were 12 direct clearers comprised of eight commercial banks, two federations of credit union centrals, one government savings institution and the Bank of Canada.[204]
- Indirect Clearers: CPA member institutions that access ACSS via the services of Direct Clearers. Items payable by Indirect Clearers are settled through a settlement account at the direct clearing institution.[205] There are 117 Indirect Clearers.[206]

ACH and other low-value electronic payment services have been highly adopted in Canada. In 2002, electronic payments accounted for 71.7 percent of the total payment

items that were cleared via ACSS. A total of 433,681,921 direct debit transactions (valued at CAD 256,707,663) were processed in 2002.[207] Common uses of Canadian direct debits include rent or mortgage payments, utility bill payments and tax payments. A total of 372,949,611 direct credit transactions (valued at CAD 505,310,022) were processed in 2002.[208] Common uses of Canadian direct credits include payment items such as direct payroll deposit and government transfer payments

Operational Details

Domestic ACH Payments

Domestic payment items exchanged throughout the day are processed overnight and settled the next day for value as of the day before. Generally, transactions are subject to the following two-day clearing and settlement cycle.[209]

- Day 1 (Submission and Clearing of Payment Information): Items collected by CPA members [prior to and throughout Day 1 (V)] are forwarded to a local data center that is operated or contracted by a direct-clearing bank. The items are sorted at the data center according to the institutions on which they are drawn. Once sorted, the items that do not belong to the data center (i.e., the items that are drawn on other institutions) are transmitted to the data centers of the appropriate direct-clearing bank via ACSS terminals. The receiving data center verifies the information and disputes any discrepancies if necessary. The exchanging of items, entering of information into ACSS terminals, and potentially contesting of entries continue until 11 p.m. (EST) on Day 1 (V). ACSS calculates each direct-clearing bank's net position across all payment stream identifiers (payment codes).
- Day 2 (Settlement of Transactions): Financial institutions typically finish making adjustments to their clients' accounts (i.e., debiting payers' accounts and crediting payees' accounts) by 8 a.m. (EST) on Day 2 (V+1). Initial net balances are available to all direct clearers by 9:30 a.m. (EST). Bilateral reopening of the clearing may occur to correct any errors. Otherwise, the final multilateral positions of the direct clearers are calculated and made known to the Bank of Canada by 11 a.m. (EST). Direct clearers' net positions are settled by adjustments to their net accounts at the Bank of Canada by 12 p.m. (EST). Direct clearers in a net debit position incur an overdraft that they fully collateralize for an amount equal to the their net debit position. Direct clearers in a net credit position have the funds credited to their account and value is returned to them through an LVTS payment on Day 2 (V+1). Although settlement is completed on Day 2 (V+1), clients (of the direct clearing banks) receive value as of Day 1 (V).

Cross Border ACH Payments

There are two cross border electronic batch payment systems operating in Canada: the Federal Reserve Bank's International Automated Clearing House (IACH) and the European Transferts Interbancaires de Paiements Automises Network (TIPANET).

International ACH (IACH):

The FedACH International Canada service sends cross-border debit and credit ACH payments between the U.S. and Canada. Currently the service *only* facilitates payments *originating* in the U.S. for delivery in Canada. The Federal Reserve Bank of Minneapolis serves as the Originating Gateway Operator (OGO) and Toronto-Dominion bank serves as the Receiving Gateway Operator (RGO).[210]

FRB Minneapolis and Toronto-Dominion bank function as conduits to their respective domestic payment systems in order to accomplish straight through processing of payments.

The settlement process is divided into two legs: the U.S. leg and the Canadian leg. Settlement for payments originating in the U.S. occurs through FedACH at the end of Day T. If the payment is payable in Canadian Dollars, the Canadian gateway operator (Toronto-Dominion bank) converts the payment from U.S. Dollars to Canadian Dollars on Day T+1 and formats the payment instruction to be cleared and settled through ACSS by 12 p.m. on Day T+2. If the payment is payable in U.S. Dollars, it is cleared and settled through the U.S. Bulk Exchange System (USBES). The USBES is owned and operated by the CPA to facilitate the clearing of U.S. Dollar-denominated payments (both checks and certain types of electronic payments) between CPA members. The USBES clears payments, calculates the multilateral net positions for the CPA members; the net positions are then settled through CHIPS or via correspondent arrangements.[211]

Transferts Interbancaires de Paiements Automises Network (TIPANET):

TIPANET is operated by TIPA Group SC, a club arrangement involving shareholder cooperative banks in various countries[212] (located primarily in Europe); Canada's *Caisse centrale Desjardins* is a TIPA Group shareholder. TIPANET facilitates the clearing of cross-border retail payments through the SWIFT FIN messaging system. Payments are converted to local currency by the receiving TIPNET partner bank with each leg cleared and settled by the originators and receivers in their respective national payment systems. Cross-border settlement is performed via the correspondent banking arrangements between TIPA partners.[213]

Infrastructure

Technology

Canada has a highly developed telecommunications industry. The Canadian telecommunications sector is expected to sustain its rapid growth rate due to the continued demand for wireless telecommunications, Internet access, satellite broadcasts, and data transmission.

Canada is one of the most "wired" nations in the world; all major cities are well connected to a high-speed Internet backbone and, according to OECD figures, Canada has the lowest Internet access costs among G-7 countries. The Government of Canada has made a priority of supporting high-speed research networks and Internet access for institutions and communities. An example is the world's first all-optical network designed to carry only Internet data traffic. This network, called CA*Net3, offers a bandwidth capacity of 40 gigabytes per second - about sixteen times greater than the capacity planned for the fastest current US initiative, the Abilene network.[214]

Payment Opportunities

Canada is one of the U.S.' largest export markets. In 2000, U.S. – Canadian bilateral trade of goods and services (including transfers and investment income) was USD 515 billion. The U.S. is the largest importer of Canadian goods and services. In 2000, Canada exported USD 264.6 billion in goods and services to the U.S., thereby giving the U.S. an 83 percent share of Canadian exports. The U.S. is the largest exporter of goods and services to Canada. Canada imported USD 206.7 billion in goods and services from the U.S., thereby giving the U.S. a 72 percent share of Canadian imports.

In 2002, the top 3 leading sectors of U.S. imports from Canada were new and used passenger cars (USD $31 billion); other parts and accessories of vehicles (USD $12.9 billion); and crude petroleum (USD $11.1 billion). The top 3 sectors of U.S. exports to Canada in 2002 were other parts and accessories of vehicles (USD $21.7 billion); new and used passenger cars (USD $10.2 billion); and trucks, buses and special purpose vehicles (USD $6.4 billion).[215]

Banking

Commercial banks in Canada accept various types of deposits in domestic and foreign currency from the public, including accounts payable on demand; personal savings deposits - both checkable and non-checkable, non-personal notice deposits; and fixed-term deposits. Banks make loans to businesses and consumers, make residential mortgage loans, and hold a portfolio of securities. Banks also deal in foreign exchange, provide safekeeping facilities, and perform various other services. In the instance of the largest banks, these operations are, for the most part, carried out through their extensive network of branches.[216]

Canada is open to foreign investment in the banking, insurance, and securities brokerage sectors. However, Canada has relatively high entry barriers into its domestic retail banking market due to the high economies of scale associated with retail banking coupled with Canadian domestic banks' well-established networks. US firms are present in the Canadian banking, insurance and securities brokerage market-segments, however they generally play secondary roles to domestic competitors. Ten U.S. financial institutions have established subsidiaries in Canada, chiefly targeting commercial lending, investment banking and niche markets such as credit card issuance.[217]

The stock of U.S. foreign direct investment (FDI) in Canada was USD $125.4 billion in 2000. U.S. investment in Canada represents 64 percent of total FDI in the country and is concentrated in manufacturing, finance, and the resource sectors. Conversely, the stock of Canadian FDI in the United States was USD $103.7 billion in 2000. This amounts to 51 percent of total Canadian direct investment abroad and includes investments from Canadian holding companies in the Netherlands. Canadian FDI in the United States is concentrated in finance and insurance, metallic minerals and metal products, communications, and chemical products.

Mexico

ACH Basics

Mexico has two payment system operators that are relevant to inter-bank retail payments: Banco de Mexico and the Banking Clearing Center (*Centro de Compensacion Bancaria*, CECOBAN).

CECOBAN owns and operates Mexico's deferred net settlement system for retail payments called the Cámara de Compensación Electrónica Nacional (CCEN).[218] CECOBAN is a consortium of commercial banks; in December 2001, CECOBAN had 44 shareholder-banks. CECOBAN facilitates countrywide clearance of ACH, checks and other means of making credit and debit retail payments (except payment cards and ATM transactions).[219] CECOBAN member banks have direct access to CCEN. Each CECOBAN member bank assumes the full responsibilities associated with liquidation and registering of the settled operations. Non-CECOBAN members participate indirectly through bilateral agreements with CECOBAN members.[220] ACH and other CCEN transactions are cleared and settled via Banco de Mexico's SICAM and SIAC systems respectively.

Banco de Mexico owns and operates two electronic systems that facilitate the clearing and settlement of retail payments:

- The Clearinghouse System (*Sistema de Camaras*, SICAM). SICAM clears the retail payments (that CECOBAN processes) up to the morning following the day in which the documents or files are presented for collection. The resulting balances are settled at the SIAC.[221]
- Account Holders Service System (*Sistema de Atencion a Cuentahabientes*, SIAC). SIAC is a large-value payments system that handles the current accounts that financial institutions such as banks, brokerage houses, mutual fund management firms and insurance companies maintain at the central bank. Third-party payment instructions cannot be processed via SIAC.[222]

CECOBAN offers an electronic credit service known as Electronic Funds Transfer (*Transferencias Electronicas de Fondos*, TEF); prior to March 2002, the service was known as Interbank Payment (*Pago Interbancario*). Bank clients send payment instructions from bank-branches, or alternative channels such as the Internet and telephone, so that the corresponding funds can be credited to clients who have accounts at other banks. The TEF service has national coverage and every bank participates in it.[223] The annual volume of interbank direct credits was 6.5 million transactions in 2002.

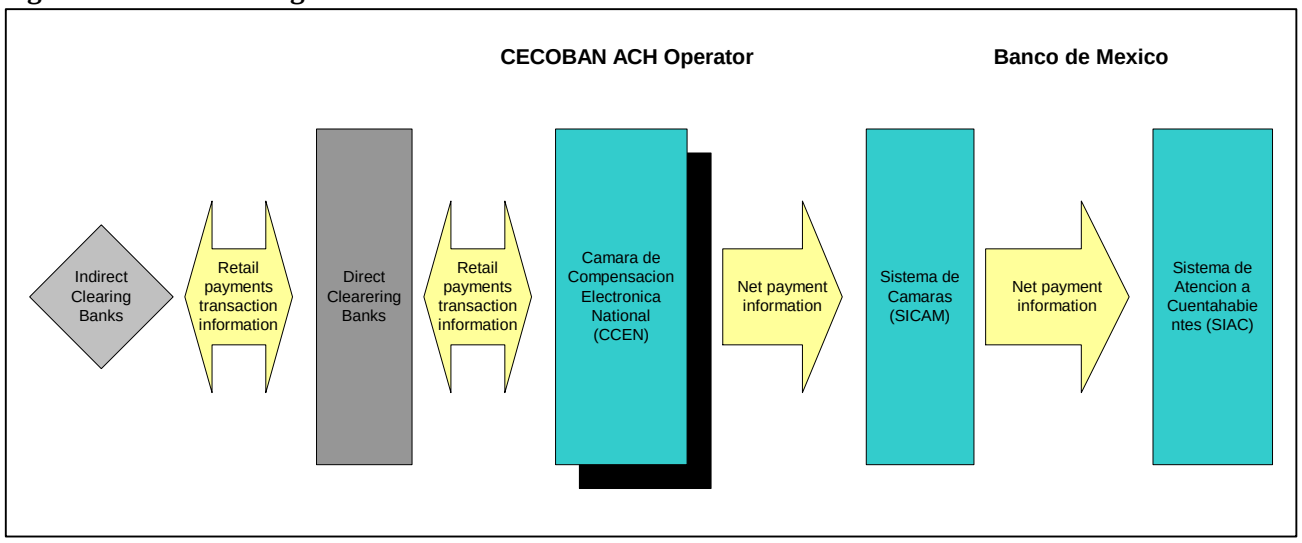
CECOBAN offers a direct debit service known as *Domiciliacion*. Prior to 2002, banks offered direct debit services solely to large companies at the *intra*-bank level; the respective transactions were charged against the client's checking or credit card accounts held with the respective bank. Prior to 2002, both the payer and the beneficiary had to have accounts at the same bank in order for a direct debit transaction to occur.

CECOBAN began offering direct debit *inter*-bank services to banks in 2002 whereby bank customers authorize a corporation to request charges to a customer's account for the payment of goods and services. Direct debits can be one-time payments or recurring payments.[224] The annual volume of interbank direct debits was 9 million transactions in 2002.[225]

Banco de Mexico is responsible for regulating, organizing and controlling its own payments systems as well as overseeing self-regulated private systems such as CECOBAN. CECOBAN does not offer remote (cross-border) access to CCEN.

Operational Details

Figure 1: ACH Clearing and Settlement Process in Mexico



CECOBAN supports both Mexican Peso and U.S. Dollar denominated retail payments. ACH documents and transactions executed through CECOBAN's TEF electronic credit and *Domiciliacion* direct debit services are processed via CECOBAN's CCEN then cleared and settled through Banco de Mexico's SICAM and SIAC respectively.

The issuing banks (ODFIs) send TEF and *Domiciliacion* electronic files to CECOBAN between 5:30 p.m. and 8:30 p.m. (Mexico City Time) on Day T. CECOBAN validates the format and dates of the transactions and informs each ODFI of the outcome between 5:30 p.m. and 8:30 p.m. (Mexico City Time). Then CECOBAN begins processing the electronic files and generates the outgoing files for each participating bank. The outgoing files may be accessed by the receiving banks (RDFIs) between 8:31 p.m. and 9 p.m. If any of the transactions contained in the outgoing file cannot be executed, the receiving banks generate a returned items file and transmit the file to CECOBAN between 9:30 p.m. (on Day T) and 6:30 a.m. (on Day T+1). CECOBAN validates this information between 6:30 a.m. and 7:30 a.m. then sends information to Banco de Mexico that is needed to determine the net credit or debit position resulting from the transactions. SICAM then determines the amount of credit or debit needed to settle the balances

resulting from the clearing process.[226] Banco de Mexico executes final settlement via SIAC by debiting and crediting the participating banks' current accounts before 9 a.m. (Mexico City Time).

Credit transfer orders executed through the TEF service are credited to the beneficiary account on T+1 or T+2 (based on the Originators' instructions); the funds are available after 9 a.m. *Domiciliacion* direct debit transactions must be sent to CECOBAN for processing one business day before the charge is to be made. Direct debit transactions are debited to the beneficiary account on T+1.[227]

Infrastructure

Technology

The Mexican telecommunications market has grown four times faster than the rest of the economy in recent years. However, market penetration remains relatively low. In 2001, Mexico had 68.7 personal computers per 1,000 people and only 3.6 million Internet users (out of a national population of 99.4 million).[228]

Payment Opportunities

Mexico is open to foreign direct investment (FDI) in most economic sectors. In 2001, Mexico's foreign direct investment was USD 24.7 billion.[229] While foreign investment in the energy sector is sharply limited by the Mexican Constitution, the government is preparing legislation, which over the next ten years, should effectively open up the energy generation and distribution sectors. The U.S. is the largest source of FDI in Mexico.

In 2002, the leading sectors of U.S. exports to Mexico were as follows: other parts and accessories of vehicles (USD 8.7 billion), electric apparatus (USD 7.5 billion) and semiconductors (USD 4.8 billion). In 2002, the major U.S. imports from Mexico were as follows: other parts and accessories (USD 17.5 billion), passenger cars – new and used (USD 13.5 billion) and crude oil (USD 11.4 billion).[230]

Banking

Prior to the mid-1990s, the Mexican payments system had only two clearance and settlement mechanisms that were relevant to the financial markets: the check clearinghouse and an electronic procedure for inter-bank transfers. The central bank (Banco de Mexico) guaranteed the settlement of all transactions; there were no limits on transaction amounts or on bank balances at the central bank. Banks made uncollateralized over-drafts on their current accounts at Banco de Mexico, hence the central bank assumed excessive credit risk.

In 1994, Banco de Mexico initiated a comprehensive reform of its payment system in an effort to remedy some of the weaknesses associated with payment risk and reliability that were inherent in the clearance and settlement system at the time. The reforms were aimed at reducing the reliance of the payments systems on the settlement-guarantee provided by Banco de Mexico and at giving payment system participants the right incentives to

contribute to the financial stability of the overall system. These reforms were the genesis of the payment clearance and settlement mechanisms that are in use today.

Commercial banks in Mexico accept various types of deposits in domestic (Pesos) and foreign currency (primarily in U.S. Dollars) from the public. Checks denominated in Pesos and Dollars are cleared electronically via CECOBAN's Camara de Compensacion Electronica Nacional (CCEN). In 2002, a total of 5,714,000 foreign denominated checks (valued at USD 45 billion) were cleared in Mexico.[231]

In Mexico, commercial banks can open offices and operate from anywhere in the country. Foreign banks are permitted to establish subsidiaries. Commercial banking is highly concentrated. The two biggest banks, Banamex-Citibank and BBVA Bancomer, constitute more than 50 percent of the market (based on asset-size or deposits). One quarter of all banks control almost all retail operations and services. Commercial banks are the only institutions that are authorized to operate with checks and to provide inter-bank payment services through Banco de Mexico's SPEUA system and the Internet.

Development banks are entities controlled by the federal government that perform second-tier activities such as supplementing the financing shortfalls in the commercial banking sector. Mexico has seven government-owned development banks that provide services to specific areas of the economy. The dominant institutions are Nacional Financiera (Nafinsa) and the External Trade Bank (Bancomext). These institutions have become primarily second-tier banks that reach priority sectors by lending through commercial banks and other financial intermediaries such as credit unions, savings and loans, and leasing and factoring companies. Nafinsa's primary program funds micro, small and medium-sized businesses. Nafinsa also undertakes strategic equity investments and contributes equity to joint ventures. Bancomext provides financing to Mexican exports and to small and medium-sized companies. It also offers working capital, project lending, and training to firms in several specific sectors that require support, such as textiles and footwear.[232]

South America

Brazil

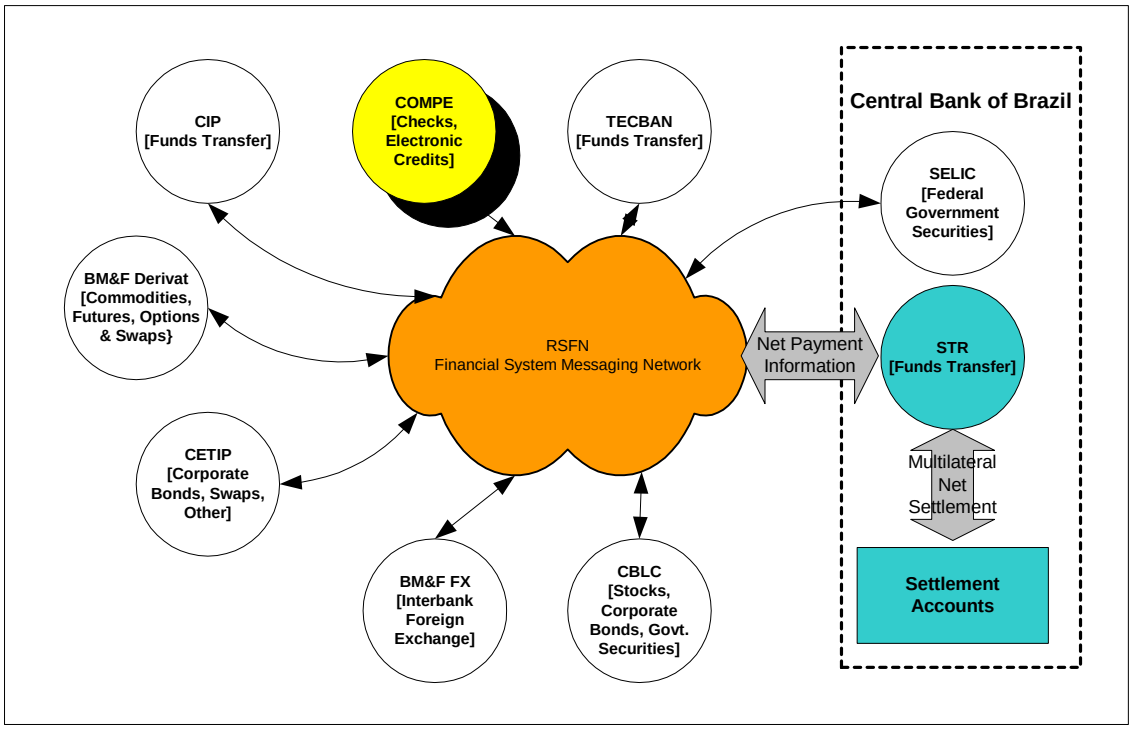
ACH Basics

Banco Central do Brasil (Central Bank of Brazil, BCB) rests at the center of Brazil's inter-bank funds transfer systems. Brazilian banks are prohibited from holding demand deposit accounts at other banks, therefore the BCB functions as Brazil's primary payments settlement agent.[233] *Banco do Brasil* SA (Bank of Brazil) operates Brazil's ACH system.

Banco do Brasil S.A (Bank of Brazil) is a government-owned commercial bank that operates a retail payment clearing system known as COMPE (Centralizer Clearance for Checks and Other Documents). COMPE clears inter-bank obligations related to checks

and direct credits. COMPE had 145 participants in 2002; participation in COMPE is mandatory for institutions that take demand deposits. The COMPE clearing network is comprised of a national clearinghouse, 15 regional clearinghouses and 10 local clearinghouses.[234] The daily average volume of electronic COMPE transactions in December 2002 was 13,889,251 transactions per day[235] (valued at USD 2,789 million).[236] Final settlement of COMPE transactions occurs via *Banco Central do Brasil* (BCB) Real Time Gross Settlement System (RTGS) called STR (Reserves Transfer System). The Central Bank of Brazil regulates, authorizes and supervises the Brazilian clearing and settlement systems.

Figure 1: Overview of Brazilian Settlement Systems[237]



Summary of Brazilian Payment Instruments

In 2000, the leading non-cash payment instruments in Brazil were as follows: Checks (60.4 percent of transaction volume), Credit Cards (23.8 percent of transaction volume), *Bloquetos de Cobranca* i.e documents that represent a debt originating from the purchase of goods and services (14.3 percent of transaction volume), Credit Order Documents (DOCs) i.e. inter-bank electronic credit payments and intra-bank funds transfers between accounts (1.6 percent of transaction volume).[238]

> Credit Order Documents (DOCs): DOCs are the primary instruments used to perform inter-bank direct credits. Specifically, DOCs are used to make inter-bank payments; intra-company payments through accounts maintained at the same financial institution; and consumer-to-consumer payments through accounts held

at the same financial institution. DOCs can be initiated in paper and electronic form. All paper-based DOCs are converted into electronic files at the originating institution. The electronic DOC files are processed in batch, cleared and settled through *Banco do Brasil S.A's* national COMPE clearing house. Brazilian corporate receipts are usually in the form of *Bloquetos de Cobranca* and Credit Order Documents (DOCs).

Bloquetos de Cobranca: The Brazilian postal system is generally unreliable and consequently consumers are reluctant to make bill-payments via the postal system. Therefore *Bloquetos de Cobranca* have emerged as a popular vehicle for facilitating payments independently of the postal service. *Bloquetos de Cobranca* are standard two-part payment slips on which most consumer-bills are printed. The payment slip *(bloquete)* is issued by the seller and contains the invoice information, payment amount and due date. The *bloquete* is delivered to consumers via mail. The consumer pays for the good or service via the following means:

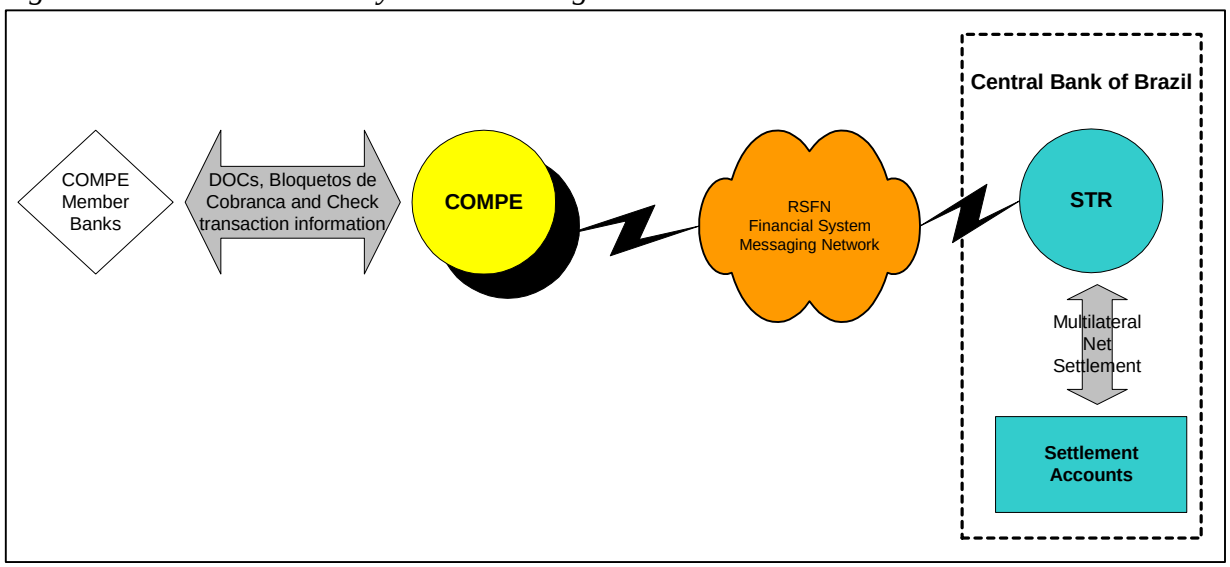
- *Payment Agent:* Taking the *bloquete* to a payment agent (typically a bank) and paying the *bloquete* face-value via check, cash or bank-card. Early payments can be made to any authorized agent; late payments must be made to the *bloquete*-issuing bank.
- *ATM:* Using an ATM to scan the bar-code identifiers that appear on each *bloquete* and then making a payment for the good or service via ATM.
- *Internet*: Making payments of the *bloquete* face value via authorized web-sites.

Bloquetos de Cobranca are a direct credit service that is commonly used to make utility bill payments. The *bloquete* serves as the buyer's payment receipt and the inter-bank clearing document. *Bloquetos de Cobranca* are converted into electronic files and cleared via *Banco do Brasil S.A's* national COMPE system.

Direct deposit and direct debit services exist in Brazil although not on an inter-bank basis. Direct debits are limited to transactions within the same bank; both the paying and receiving parties must have accounts at the same bank. In order to facilitate bill-paying, utility companies often maintain accounts at several major banks.

Operational Details

Figure 2: Brazilian Retail Payments Clearing and Settlement Process



Brazilian retail inter-bank payments are cleared through the COMPE and TecBan systems and settled via the central bank's STR RTGS system. COMPE clears inter-bank obligations related to DOCs, *Bloquetos de Cobranca* and Checks. Two clearing sessions are carried out every business day (Day T). In each session, COMPE calculates a single nationwide multilateral net settlement position for each participant. On Day T+1, inter-bank settlement for COMPE transactions are processed via STR, based on the presentment date of the document from which the obligation originates. COMPE payment information is transmitted to the STR RTGS system via the RSFN (National Financial System Network). RSFN is a financial system network that carries payment messages across the Brazilian payment system. RSFN uses a proprietary messaging protocol, based on XML standard format, developed jointly by the central bank, banking associations and clearing and settlement system providers. Final settlement occurs across STR accounts belonging to the respective COMPE-participants on Day T+1.

The Brazilian inter-bank funds transfer systems do not support multi-currency transactions. All transactions must be denominated in Brazilian Real (BRL).[239] Banco do Brasil does not offer remote access to COMPE.

Infrastructure

Technology

Brazil has the largest telecommunications sector in Latin America, with an estimated market of USD17.9 billion in 2001 for both telecommunications equipment and services. The Brazilian telecommunications sector has experienced explosive growth since it was privatized in 1999, and investments in this sector are expected to reach USD 64 billion by 2005 with the U.S. holding the largest share. Brazil also has the most advanced Internet and e-commerce industries in Latin America due to direct-investment by Brazilian banks. Brazil has developed one of the most advanced home-banking systems in the world and is growing steadily in B2B, B2C and C2C services.[240]

Payment Opportunities

As of December 1998, the U.S. was the single largest foreign investor in Brazil followed by Spain and Germany. Brazil welcomes foreign investment and has lifted many investment restrictions in the past several years. Out of the USD130.7 billion stock of direct foreign investment, U.S. had the largest share at about 30% or USD 39 billion.[241] As Brazil's leading trade partner, the U.S. accounts for almost a quarter of Brazil's imports and exports. In 2002, the leading sectors of U.S. exports to Brazil were as follows: computers and accessories (USD 841 million), organic chemicals (USD 691 million) and civilian aircraft parts (USD 652 million). In 2002, the major U.S. imports from Brazil were as follows: civilian aircraft (USD 1.8 billion), footwear (USD 1 billion) and clocks, port typewriters & other household goods (USD 1 billion).[242]

Banking

Brazil's banking system is the largest in South America and is one of the most highly developed and efficient financial systems. Almost all project financing is handled through the international market because of high domestic interest rates.[243] U.S. commercial banks have been operating in Brazil since1915, and numerous American banks continue to have a large presence today. Although publicly available information does not support the existence of multi-currency demand deposits in Brazil, it is highly likely that commercial banks permit some customers to maintain multi-currency demand deposits (as is the case in other Latin American countries with comparable financial markets to Brazil e.g. Mexico).

BATCH RETAIL PAYMENT (ACH) SYSTEMS IN SELECTED COUNTRIES

Country	Name of ACH System	Owner/ operator	Primary Regulator	Operating Hours	Settlement Time	Total Value of ACH Transactions (Electronic Credits and Direct Debits) Processed per Year in Billions (USD)	Remote (Cross Border) Access	M
Australia	BECS	APCA	APCA	File exchange times: 1:00 PM, 6:30 PM, & 8:15 PM Sydney time Monday – Friday	9:00 AM Sydney time	$1,918.2 billion[244]	Technically possible, but access is usually local	
Austria	No ACH system. Instead "correspondent banking system"	NA	NA	NA	NA	NA	Yes	
Brazil	COMPE	Banco do Basil	Banco Central do Basil (central bank)	2 clearing sessions are carried out every business day (Day T)	Day T+1	$45.9 billion[245]	No	
Canada	ACSS	CPA	Ministry (Department) of Finance & CPA	Payment files are accepted and processed until 11 PM (ET) on each business day (Day T) Initial net balances are available to all direct clearers by 9:30 AM (ET) on Day T+1	11 AM to 12 PM on Day T+1	$482.3 billion[246]	No	(U Ca

BATCH RETAIL PAYMENT (ACH) SYSTEMS IN SELECTED COUNTRIES

Country	Name of ACH System	Owner/ operator	Primary Regulator	Operating Hours	Settlement Time	Total Value of ACH Transactions (Electronic Credits and Direct Debits) Processed per Year in Billions (USD)	Remote (Cross Border) Access	M
Denmark	Sumclearing	PBS	Danmarks Nationalbank	For Danish kroner: Files are submitted and exchanged on Day T. For Euro: Participants supply amounts by 6:30 AM, Central European time on Day T.	For Danish kroner: 2 normal settlements and first extra settlement: 1:30 AM and 7:30 AM second extra settlement by 9:15 AM, Central European time on T+1 For Euro: Normal settlement at 10:00 AM, Central European time on T, First extra settlement by 12:00 PM, second extra settlement by 2:00 PM on T	$387.2 billion[247]	No (only indirectly if they have an agreement with a direct participant)	No
France	SIT	GSIT	Banque de France	File exchange times: 12:00 AM-9:00 PM, Central European time Monday-Saturday	2:30 PM Central European time	$1,925.5 billion[248]	It is technically possible	Curr i how i pr

BATCH RETAIL PAYMENT (ACH) SYSTEMS IN SELECTED COUNTRIES

Country	Name of ACH System	Owner/ operator	Primary Regulator	Operating Hours	Settlement Time	Total Value of ACH Transactions (Electronic Credits and Direct Debits) Processed per Year in Billions (USD)	Remote (Cross Border) Access	M
Germany	RPS	Deutsche Bundesbank	Deutsche Bundesbank	Evening cycle: Data media by 6:30 PM, For submissions by data telecommunication; credit transfer files by 8:00 PM, direct debits by 9:00 PM, Central European time on Day T Morning cycle: Any payment order by 7:00 AM Central European time on T+1	7:00 AM Central European time	$2,214.3 billion[249]	It's technically possible	N
Italy	BI-COMP	SIA	Bank of Italy	Payment files accepted by 12:00 AM on T	12:00 PM on T+1	$1,816.0 billion[250]	No	
Japan	Zengin	TBA	Bank of Japan	8:30 – 15:30 local time	16:15	$19,517.3 billion[251]	No	
Korea	Bank Giro	KFTC	General Meeting of KFTC and BOK	Direct credits must be submitted on (T-2) and direct debits must be submitted on (T-3)	Direct credits are settled at 11:30 on T and direct debits are settled on T+3	$1,733.8 billion[252]	No	
Mexico	CCEN	CECOBAN	Banco de Mexico	Processing: 9:30 PM (Day T) to 7:30 AM (Day T+1)	Before 9 AM (Day T+1)	$23.6 billion[253]	No	(U M
Netherlands	CSS	Interpay	De Nederlandsche Bank	Files are submitted by 3:30 PM Central European time on T for same day settlement	Every 30 minutes between 07:30 AM and 5:00 PM, Central European time on T or T+1	$1,754.5 billion[254]	No (can access the system indirectly only if they have an account with a bank in the Netherlands)	N F s

BATCH RETAIL PAYMENT (ACH) SYSTEMS IN SELECTED COUNTRIES

Country	Name of ACH System	Owner/ operator	Primary Regulator	Operating Hours	Settlement Time	Total Value of ACH Transactions (Electronic Credits and Direct Debits) Processed per Year in Billions (USD)	Remote (Cross Border) Access	M
New Zealand	ISL	ISL	ISL	Files are submitted and exchanged on Day T. Specific processing hours are not publicly available	9 a.m. New Zealand time on Day T+1	Not Publicly Available	No	
Spain	SNCE	SNCE	Banco de Espana	For direct debits files are transmitted between 4:30 PM to 9:30 PM Central European time on Day T For credit transfers, between 6:00 to 8:00 PM Central European time on Day T	8:00 to 11:30 AM Central European time on T+1	$535.2 billion[255]	No	N
Switzerland	DTA LSV	Swiss Interbank Clearing AG	Swiss National Bank	File transmission can be undertaken 24 hours a day, 7 days a week	First settlement cycle between 5:00 PM to 8:00 PM, Central European time on Day T. Second settlement cycle between 1:00 to 4:15 PM, Central European time on Day T+1	$257.6 billion[256]	Yes	D Fr LSV
United Kingdom	BACS	BACS Ltd.	BACS Ltd.	File submission times: 7 AM – 10:30 PM [Mon-Fri]	9:30 a.m. U.K. time on Day T+1	$3,833.8 billion[257]	Yes [via leased phone-lines & Internet]	(Po

USE OF BATCH RETAIL PAYMENTS (ACH) IN SELECTED COUNTRIES

Country	Total* Number of Transactions Processed Per Year (in millions)						Total* Number of Transactions Processed Per Inhabi			
	1997	1998	1999	2000	2001	2002	1997	1998	1999	2000
Australia [258]	581.0	633.0	731.0	883.0	N/A	N/A	31.2	33.6	38.4	45.8
Austria [259]	685.0	697.0	703.0	768.0	806.0	N/A	85.0	86.0	87.0	94.0
Brazil	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Canada [260]	710.2	825.4	913.9	1,013.9	1,079.8	1,178	23.6	27.2	29.8	32.8
Denmark [261]	281.0	306.0	324.0	343.0	348.0	N/A	53.0	57.0	61.0	64.0
France [262]	3,290.1	3,529.7	3,781.3	4,062.2	4,239.0	4,677.2	55.0	58.8	62.7	67.1
Germany [263]	10,255.0	10,817.1	11,831.3	11,473.0	12,038.2	11,548.5	125.0	131.9	144.1	139.6
Italy [264]	1,266.1	1,301.2	1,500.1	1,588.4	1,648.9	1,687.3	22.0	22.6	26.0	27.5
Japan [265]	1,105.5**	1,143.2**	1,166.9**	1,215.4**	1,269.2**	1,292.5	8.8**	9.0**	9.2**	9.6**
Korea [266]	1,229.0	1,303.0	1,457.0	1,804.0	N/A	N/A	26.7	28.2	31.2	38.4
Mexico [267]	N/A	0.7	1.6	4.5	11.0	15.5	N/A	N/A	N/A	N/A
Netherlands [268]	1,695.9	1,798.1	1,871.2	1,976.6	2,056.5	2,198.7	108.7	114.5	118.4	124.1
New Zealand [269]	325.0	308.0	329.0	378.0	370.0	370.0	86.5	81.2	86.3	98.7
Spain [270]	989.0	1,088.0	1,275.0	1,514.0	1,508.0	N/A	25.0	27.0	32.0	37.0
Switzerland [271]	530.0	581.0	616.4	591.3	550.6	587.7	74.5	81.5	86.0	82.1
United Kingdom [272]	3,243.0	3,462.0	3,660.0	3,855.0	4,083.0	4,297.0 [273]	54.9	58.4	61.5	64.5

* Total includes both total credit transfers and total direct debits for the year.
** Total only includes credit transfers. Direct debit data not available.
N/A – data is not publicly available

Sources

Total transactions by volume: ECB Blue Book 2001, Table 10; CPSS Red Book 2003, Table 11; EMEAP Red Book 2002 Table 5
Total transactions per inhabitant: ECB Blue Book 2001, Table 11; CPSS Red Book 2003, Table 12; EMEAP Red Book 2002 Table 6

Section III: Policy Issues for Central Banks in Retail Payments

Retail payment systems have been evolving over the past several decades, and will continue to evolve. These systems are important contributors to consumer confidence and the functioning of commerce, and their stability and effectiveness is critical to the stability of the broader financial system. The introduction of new technology or business strategies, or changes in market structure, may have implications for the safety and efficiency of retail payment systems, and are therefore of interest to central banks. In March 2003, the Bank for International Settlements issued the report "Policy Issues for Central Banks in Retail Payments" which explores these issues for the G10 countries and Australia and considers how central bank responses might further certain public policy goals. This section summarizes that report.

Present involvement of central banks with retail payment systems
The objectives of the efficiency and safety of retail payments systems are important to all central banks. Their three roles in payments markets (as operators, overseers, and catalysts or facilitators) give them various avenues through which to pursue these objectives. There is significant institutional variation across central banks, and in the weight they place on each of these roles. In many cases, these roles are not mutually exclusive, but rather are mutually reinforcing.

Operational Role
All of the central banks considered in this report provide settlement services for at least some of the retail payment systems in their counties. They do so because they perceive a comparative advantage over the private sector in terms of providing safety and sometimes efficiency. In addition, providing settlement services means that central banks can ensure open access for banks

Not all of the central banks provide clearing services and those that do provide clearing for only a limited set of payment instruments. Central banks that do not provide clearing services have largely taken the view that their objectives of efficiency and safety will be best met by private-sector clearing. In other countries, central banks have responded to concerns about the efficiency of purely private-sector arrangements by providing clearing services themselves, either as competitors or complements to private-sector services. In some countries, the provision of clearing services is mandated by law as a way of preserving efficiency and access, and in others the central bank sees provision of services as a way to enhance understanding of and influence over the retail payments sector.

Oversight Role
As overseers of retail payment systems, central banks focus on guarding the efficiency and safety of systems, as opposed to that of individual participants. This role is often seen as integral to the mission of ensuring financial stability, though there is considerable variation in how this role is carried out. In some countries, the central bank oversees all retail payment systems and arrangements, and in others the central bank oversees only a select group or none at all. The scope and purpose of central bank oversight also vary. In most cases, the objectives of efficiency and safety are explicitly mentioned while

consumer protection or the prevention of money laundering are sometimes mentioned as well.

The Eurosystem is in the process of defining oversight standards for euro retail payment systems in order to promote their smooth operation. Such standards were previously established for systemically important payment systems, such as large-value systems, in "Core Principles for Systemically Important Payment Systems."[274] The Eurosystem has taken the view that certain important retail payment systems should observe a subset of the Core Principles. Retail payment systems that are not judged to be systemically important need not adhere to the Principles as strictly.

Catalyst or Facilitator Role

For many central banks, the role as a catalyst or facilitator of market and regulatory evolution is particularly important in retail payments markets, where the central bank may have less involvement as an operator or overseer. Several tools support this role. Central banks often apply their research capabilities to assist or speed a market outcome or to publish an analysis that promotes transparency. They are also in the unique position to approach issues from a system-wide perspective, due to the combination of their strong relationships with financial institutions, public policy interests, and oversight role.

Central banks' relationships with private-sector payment providers vary across countries. In some cases, the central bank plays a formal role in the governance of retail payment systems, for example by participating in a private retail clearing organization or the country's payments association. Some central banks also set up formal groups to consult with the private sector, while in other countries consultation is fairly informal. The Eurosystem has worked extensively with the private sector to achieve a single euro payments area.

Market Trends and their Implications for Efficiency and Safety

Certain trends have significant implications for central banks and their public policy objectives. From time to time, central banks should examine developments in their markets and reassess whether persistent impediments to appropriate market outcomes exist.

Innovation

Over the past two decades, the most significant trend in consumer retail payment services has been the relative shift away from cash and toward electronic payment methods. Retail payments innovations are typically extensions of existing products. For example, credit and debit cards were initially designed for use at the point-of-sale, but are now being used for more remote applications, such as across borders and currencies.

Delivery channels, both new and existing, are the primary area of innovation. The Internet and mobile devices are both examples of new delivery channels and have made possible new payment arrangements such as electronic bill presentment and payment. Other trends in retail payments include a reduction in manual procedures in check processing, an increase in straight through processing and interoperability, an increase in

safety, and increased facilitation of cross-border payments. Advances in settlement services, both as provided by central banks and the private-sector, include reductions in the lag between a transaction and its final settlement and increases in the frequency of settlement.

While it is generally believed that innovation has the potential to bring about increases in efficiency, one must consider whether any persistent impediments prevent the market from realizing its potential. New services are being brought to the market regularly, but it may still be relevant to consider whether there are any noteworthy areas where either new services have not been developed or where user adoption has been inadequate.

Market Integration and Consolidation

Trends in retail payment systems are moving the market both toward and away from greater integration. The trend toward greater integration is being driven by advances in technology, the realization of economies of scale and scope, and other trends such as the increasing internationalism of economic activity and consolidation in the banking industry and its infrastructure. However, the emergence of many innovative niche products offsets this trend somewhat and has increased the number of providers in payments markets.

In some areas, banks' control over payment infrastructure, such as ATM and POS networks, has widened and has increasingly begun to overlap across systems and countries. Many of these institutions also participate in foreign clearing systems, and may be able to specialize increasingly in the provision of multicurrency correspondent banking services. Consolidation can also allow banks to process a larger portion of payments in-house rather than through traditional clearing systems. This could eventually lead to pricing changes that could further increase the dominance of large institutions in payments processing. Retail clearing systems, too, have experienced consolidation. In some countries, decentralized systems have evolved into a single centralized system, while in others specialized systems have evolved to process a wider range of instruments. Within the Euro area, some national ACHs are now participating in the cross-border market alongside the recently introduced cross-border retail clearing system.

The implications of these trends for the efficiency and safety of retail payment markets may be very complex. For example, higher concentrations of activity in a single institution may concentrate operational risk but introduce economies of scale that reduce the total cost of effective safety measures. Similarly, consolidation may reduce the number of competitors in a certain area at the same time that competition is expanding geographically.

New Market Participants

Non-banks and foreign institutions without a domestic presence are also participating in retail payments markets. They are typically not fully integrated into the provision of retail payment services for economic, legal, and regulatory reasons. Recently, some non-banks have begun to provide certain types of retail payment services to end users or to

support the banks' provision of these services, such as electronic bill payment services and cross-border payments. In most cases, statutes or policies prevent non-banks from holding settlement accounts at central banks, and therefore from having direct access to settlement arrangements, though this is changing in some countries. Broadly speaking, increases in access to retail payments markets could have positive implications for competition and contestability, but could also alter the balance of risks and the incentives for cooperation. For example, differences in the legal and regulatory regimes governing participants could produce an uneven distribution of credit or liquidity risks.

Cross-Border Payments

Increasing economic internationalism has brought a rising need for cross-border payments. The market for cross-border payments is still small relative to the market for domestic payments, and is relatively fragmented. Anecdotal evidence suggests that less than 2% of retail payments are cross-border and perhaps even fewer than 1%.[275]

In the market for credit transfers as a whole, there have been few developments toward common standards or in business and technical infrastructure. Various groups and initiatives, including the Single Euro Payment Area (SEPA) initiative, have considered the creation of links among existing ACHs or the creation of an ACH serving several countries. In mid-2003, the Euro Banking Association (EBA) launched a pan-European ACH, STEP 2. In Germany, the central bank has begun an initiative to link its Retail Payment System (RPS) to STEP 2 with the aim of offering services complementary to those of the banking industry. In 2001, the U.S. Federal Reserve began offering correspondent services to domestic financial institutions that allowed them to make ACH payments into Canada, and later into Mexico.

The interconnectivity and interoperability among national networks have allowed other methods of payment, particularly card-based payments, to be used in an increasing number of cross-border contexts. This cooperation has been formalized either by bilateral or multilateral agreements between domestic network operators, or by the development of transnational networks and clearing operations, such as those of the major credit card companies. These arrangements have also brought about the development of new services and delivery channels.

The European Commission has carried out a number of studies on the speed and transparency of low-value cross-border payments. Their findings suggest that, even in the Euro area, there was little improvement in the speed or price of service between 1999 and 2001. In response, the "Regulation on Cross-Border Payments in Euro" was adopted in 2001. Very little data on improvements in the speed or price of payments services is available for other geographic areas.

The factors to consider in evaluating the impact of innovation on the safety and efficiency of retail payment systems, as set out above, also apply to cross-border markets, though cross-border markets may also have some specific characteristics relevant to efficiency and safety, such as:

- Cross-border markets may face additional legal impediments.
- Standards and practices may vary more widely in cross-border markets than in domestic markets.
- The small size of the market may mean high unit costs relative to domestic markets.
- Recent mergers may have significantly concentrated the market for cross-border credit transfer services in some areas.

These four factors may have implications for the efficiency and/or safety of current and potential retail payment solutions in cross-border markets.

Implications for Public Policy Objectives

According to the report, the implications of these trends bring rise to policy issues that relate to the possibility of various persistent impediments to appropriate market outcomes. From time to time, central banks should consider the following questions to form a view on whether such impediments exist in practice.

- Is the legal and regulatory framework sufficient and consistent so as to avoid unintended ill effects, and does the legal and regulatory framework support efficient and safe cross-border payments?
- Has the legal framework kept pace with changing circumstances, in particular in technical innovation and changing market participation?
- Have uncertainties about the rights and responsibilities of the providers and the customers for a new service impeded innovation by potential providers and/or users?
- Do any legal or regulatory provisions obstruct market entry, and do they have a valid and current rationale?
- Are existing regulations countering the criminal use of retail payment systems adequate when applied to the increasingly varied types of payment methods and market participants?
- Does the market achieve an adequate balance between competition and cooperation?
- Does the market structure support innovation and new market entrants while also preserving safe systems?
- Do existing access restrictions serve to promote or impede competition and contestability?
- Is market transparency adequate to promote competition and contestability and to support end user protection?
- Are security arrangements (including arrangements for confidentiality, authentication, integrity, authorization, and non-reputability) adequate and keeping pace with changing circumstances and technological changes?
- Are adequate measures in place to safeguard operational reliability, particularly in light of technological and institutional changes?

- As multiple institutions or systems outsource to the same suppliers, are there critical concentrations of operational risk that may not be apparent or fully appreciated?
- Are infrastructure arrangements sufficiently robust to address any increasing concentration of risk within institutions and systems?
- Are market incentives conducive to the development of standards and an appropriate degree of interoperability?
- Do governance structures for infrastructure facilitate innovation and ensure appropriate levels of safety for all payment system participants?
- Are central bank services provided transparently and are they keeping pace appropriately with changing patterns of market demand; and is access to central bank services arranged so as to facilitate innovation and competition while containing moral hazard and credit risk?

Possible Approaches to Policy Issues

According to the report, public policy relating to the efficiency and safety of retail payments should be designed, where appropriate, to:

A. Address legal and regulatory impediments to market development and innovation;
B. Foster competitive market conditions and behaviors;
C. Support the development of effective standards and infrastructure arrangements;
D. Provide central bank services in the manner most effective for the particular market.

The report outlines certain minimum policy actions recommended for all central banks. Central banks face varying circumstances and priorities when evaluating retail payments markets, and these recommendations are not meant to imply that central banks should take uniform action. The recommended minimum actions primarily involve the central bank's role as a catalyst or facilitator. The report goes on to suggest possible further actions that rely on the central bank's capacity as an overseer or service provider.

Public Policy Goal A: Legal and Regulatory Framework

Policies relating to the efficiency and safety of retail payments should be designed, where appropriate, to address legal and regulatory impediments to market development and innovation.

The central bank should, at minimum:

(i) Review the legal and regulatory framework to identify barriers to improvements in efficiency and/or safety;
(ii) Cooperate with relevant public and private entities so that the legal and regulatory framework keeps pace with changing circumstances and that impediments to improvements in efficiency and/or safety are addressed, where appropriate.

The range of possible additional actions could include, depending on the individual central bank's responsibilities, powers and priorities:

- Altering regulations that currently present barriers to improving efficiency and safety, where this is within the central bank's remit and where other public interest arguments to do militate against such action;

- Introducing or proposing new regulations, as the central bank's remit allows, where the legal or regulatory framework is sufficient to support increase efficiency and/or safety.

Public Policy Goal B: Market Structure and Performance
Policies relating to the efficiency and safety of retail payments should be designed, where appropriate, to foster competitive market conditions and behaviors.

The central bank should, at a minimum:
(i) Monitor developments in market conditions and behaviors relating to retail payment instructions and services and assess their significance;
(ii) Cooperate with other public or private entities, as appropriate, to foster competitive market conditions and to address any significant public policy issues arising from market structures and performance.

The range of possible additional actions could include, depending on the individual central bank's responsibilities, powers and priorities:
- Promoting appropriate standards or guidelines for transparency, in cooperation with relevant public and private-sector entities;
- Reviewing conditions in the market for cross-border retail payments, with a view to promoting improvements, if such action is warranted;
- Considering and, if appropriate, performing regulatory and/or operational intervention in cases where market forces are judged not to have achieved or not to be likely to achieve an efficient and safe solution.

Public Policy Goal C: Standards and Infrastructure
Policies relating to the efficiency and safety of retail payments should be designed, where appropriate, to support the development of effective standards and infrastructure arrangements.

The central bank should, at a minimum:
(i) Monitor developments in security standards, operating standards and infrastructure arrangements for retail payment systems, which the central bank judges to be important for the public interest, and assess their significance;
(ii) Cooperate with relevant public and private-sector entities to encourage market improvements in such standards and infrastructure arrangements, where appropriate.

The range of possible additional actions could include, depending on the individual central bank's responsibilities, powers and priorities:
- Participating actively in reviewing and developing appropriate standards and arrangements, in cooperation with relevant public and private-sector entities, where the central bank judges its more intensive involvement to be necessary to furthering the goal;
- Considering and, if appropriate, performing regulatory and/or operational intervention in cases where market forces are judged not to have achieved or not to be likely to achieve an efficient and safe solution.

Public policy goal D: Central Bank Services
Policies relating to the efficiency and safety of retail payments should be designed, where appropriate, to provide central bank services in the manner most effective for the particular market.

The central bank should, at a minimum:
(i) Review, and if appropriate, adapt its provision of settlement services to contribute to efficient and safe outcomes;
(ii) Be transparent in its provision of services.

The range of possible additional actions could include, depending on the individual central bank's responsibilities, powers and priorities:
- Reviewing the relevant non-settlement services it provides and considering their adaptation to changing market conditions;
- Reviewing policies on access to central bank services and on pricing.

Conclusions
The safety and efficiency of retail payment systems is of interest to all central banks, though the mix of actions taken in pursuit of these goals varies from country to country and is influenced by their institutional structures and traditions.

Evolution in retail payments markets will continue, and market trends in information technology and business strategy will be of particular interest to central banks as they may have implications for the safety and efficiency of retail payment markets.

The central banks involved in this report agree that market mechanisms should be the primary vehicle for achieving safety and efficiency in retail payment markets. From time to time, these markets may encounter persistent impediments to safe and efficient outcomes, which may raise policy issues for central banks.

Though the policies of central banks vary from one country to another, in general they should be designed to:
(a) address legal and regulatory impediments to market development and innovation;
(b) foster competitive market conditions and behaviors;
(c) support the development of effective standards and infrastructure arrangements;
(d) provide central bank services in the manner most effective for the particular market.

In keeping with this report's emphasis on market mechanisms, particular weight is placed on pursuing central bank goals through market monitoring and cooperating with and advising public and private sector bodies. This is reflected in the recommended minimum actions for central banks.

The public policy goals outlined in this report are particular to the countries examined in it. The goals could also be appropriate for a wider group, though the approaches taken by central banks might vary. In particular, the central banks of emerging market economies may need to adopt a more proactive approach to public policy in, for example, the provision of services.

Section IV: Future Considerations

A survey of the global payments marketplace indicates that the cross border payment business is concentrated among a few players, including: financial institutions that have adequate financial strength, substantial investments in technology platforms and access to sufficient liquidity pools to support the business; non-bank participants (e.g. Western Union, credit card companies) and central bank or privately owned payment systems (e.g. EURO 1, TARGET, Eurogiro, CLS, Step2, etc.). Moreover, the infrastructure costs related to supporting cross border payments may drive further consolidation in the European Union. For example, the ECB has announced that TARGET2 will be based on the EU's most efficient RTGS systems. Any domestic payment system that does not meet cost recovery requirements in four years will be closed.

As noted in the BIS report, *Policy issues for central banks in retail payments,* four factors may impact the safety and efficiency of the cross border payments market:

- Additional legal impediments
- Standards that vary more than in domestic markets
- High unit costs relative to domestic markets
- Concentration in the cross border credit transfer service in some areas

The projected growth in global payments may entice new entrants into this market, which requires establishing direct or indirect access to the world's major payment systems or partnering with entities that have an established cross border network. Those that choose the former option face challenges related to developing a critical mass that will result in an economically viable, cross border service. Moreover, new entrants to the cross border marketplace as well as current providers of these services face challenges related to meeting end user needs, maintaining profitability in a shifting marketplace, educating corporates and consumers, and implementing common standards.

The Business Case/End User Needs

Developing the critical mass for a new, economically-viable cross border payment service requires an estimation of market interest that includes an examination of the benefits the service will provide to key payments participants and an analysis of how the new service compares to current products in the marketplace. Such an exercise will help prevent the outcome experienced in Europe during the mid 1990's when gateway arrangements that linked national ACH systems were discontinued because banks preferred to use existing business relationships. Feedback should be sought from banks, corporates and consumers to identify unmet needs and gaps in existing cross border arrangements.

A review of available literature, however, found little information related to corporate cross border payment needs. The individual country reports in Section II include major import/export industries between the U.S. and the 16 specified countries, which may facilitate further study to identify the largest corporations involved in these industries.

Once identified, these corporations can be targeted for market research to ascertain unmet cross border payment needs.

For cross border payment providers that desire to establish a service that will be widely used by consumers for remittance payments, the challenges related to establishing a banking relationship with communities, that may be currently unbanked, should be assessed.

Incentives
Tensions exist between corporate customers and consumers who are seeking low cost cross border transfer methods and banks desiring to maintain profits in this marketplace. This tension can result in behaviors such as the reaction to the July 2003 European Commission rule, requiring banks to charge no more for cross border retail transactions than for domestic ones. In response to this pricing rule, most banks raised their fees for wire transfers or increased other domestic bank charges. Banks will face the challenges of meeting end user needs at a reasonable cost in order to drive the adoption of cross border payments while seeking alternative sources of revenue.

Bank, Corporate, and Consumer Education
After developing a business case, cultivating a critical mass for cross border requires an intensive education and marketing campaign targeted to banks, global corporations and consumers.

Standards
A review of current participants in the cross border marketplace indicates that cross border payment providers are migrating toward SWIFT standards. Some of the 16 domestic ACH systems surveyed utilize SWIFT standards while others support proprietary standards. Communication and messaging standards introduced by SWIFT have the potential to drive the payments industry towards a payment messaging standard because of the SWIFT network's broad span.

It is recommended that cross border payment providers facilitate a wider adoption of cross border standards by participating in forums such as:

- the European Committee for Banking Standards and SWIFT
- the introduction of XML-based standards on SWIFTNet
- the NACHA Cross Border Payments Council
- the EPC's end-to-end STP Working Group, whose task is to promote end-to-end STP for each SEPA instrument,
- and TWIST,[276] among others.

END NOTES

[1] The Payments Risk Committee. Federal Reserve Bank of New York. *Managing Payment Liquidity in Global Markets: Risk Issues and Solutions*. March 2003, p 35-36.

[2] *Billions in Motion: Latino Immigrants, Remittances and Banking.* Pew Hispanic Center and the Multilateral Investment Fund. 2002.

[3] www.afponline.org/pdf-non/intpay00.pdf

[4] Treasury Workstation Integration Standards Team (TWIST) is a group of 15 global companies driving XML-based standards that facilitate STP.

[5] The Americas is defined as the U.S., Canada, Mexico, Brazil, Argentina and other Latin America countries.

[6] *Global Payments 2003:The Payments Puzzle.* Boston Consulting Group, 2003 p. 37.

[7] *Beyond the decline of the check.* White Paper. Unisys Corporation, Global Concepts and Talson Associates. 2003.

[8] *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, p. 18.

[9] Committee on Payment and Settlement Systems. *Policy issues for central banks in retail payments.* Bank for International Settlement. March 2003, p. 22.

[10] *Payments market demands a collaborative approach.* International Payments. April 2003, p.6.

[11] Amati, Simona. *Improving Cross-Border Payments in the Euro Area.* Working Paper. European Parliament. June 2000, p. viii.

[12] McKinsey & Co. Brussels. *Creating a single payments area for the Euro-zone.* Payment Systems Worldwide. Winter 2002.

[13] An ACH System, as defined by the European Central Bank in its June, 2001, Blue Book is an electronic clearing system in which payment orders are exchanged among financial institutions, primarily by using magnetic media or via telecommunication networks, and handled by a data-processing centre.

[14] European Central Bank. *Towards a single Euro Payments Area – progress report.* June 2003, p. 11-12.

[15] King, Marion. *Metamorphosis in European Payments.* The Banker. June 2003.

[16] *Cross Border Euro Transfers Remain an Arduous Process.* Wall Street Journal. August 27, 2003.

[17] McKinsey & Co. Brussels. *Creating a single payments area for the Euro-zone.* Payment Systems Worldwide. Winter 2002, p. 5-6.

[18] *Euroland: our Single Payment Area!* White Paper. May 2002. Workshop Participants and the 3 ECSAs, p.2.

[19] *Cross Border Euro Transfers Remain an Arduous Process.* Wall Street Journal. August 27, 2003

[20] Bank for International Settlements. *Clearing and Settlement Arrangements for Retail Payments in Selected Countries.* September 2000, p. 18-36

[21] King, Marion. *Metamorphosis in European payments.* The Banker. June 2003, p. 114.

[22] *Improving Cross-Border Payments in the Euro Area.* Working Paper. Simona Amati. European Parliament. June 2000, p. viii.

[23] *Cross Border Euro Transfers Remain an Arduous Process.* Wall Street Journal. August 27, 2003.

[24] Mind you BICS and IBANS – Euro rip-offs in Europe. The Economist. August 9, 2003.

[25] The Payments Risk Committee. Federal Reserve Bank of New York. *Managing Payment Liquidity in Global Markets: Risk Issues and Solutions*. March 2003, p. 18, 29, 30.

[26] Ibid, p 35-36.

[27] Ratha, Dilip. *Workers' Remittances: An Important and Stable Source of External Development Finance.* World Bank. Global Development Finance 2003.

[28] *Billions in Motion: Latino Immigrants, Remittances and Banking.* Pew Hispanic Center and the Multilateral Investment Fund. 2002.

[29] www.afponline.org/pdf-non/intpay00.pdf

[30] *Payments market demands a collaborative approach.* International Payments. April 2003, p.6.

[31] European Central Bank. *Improving Cross-Border Retail Payment Service:The Eurosystem's View.* September 1999, p. 9-13.

[32] *Consolidation of the payment systems industry: the eurosystem's perspective.* Keynote address given by Mr. Tommaso Padoa-Schioppa during the International Payment Systems Week 2001. London, 2 April 2001.

[33] European Central Bank. *Improving Cross-Border retail Payment Services: The Eurosystem's View. September 1999*, p. 10.

[34] *Clearing and Settlement Arrangements for Retail Payments in Selected Countries.* Committee on Payment and Settlement Systems. Bank for International Settlement. September 2000, p.18.

[35] Ibid, 23-30.

[36] Ibid, 30.

[37] European Central Bank. *Improving Cross-Border retail Payment Services: The Eurosystem's View. September 1999*, p. 9.

[38] www.corporate.visa.com/mc/stats/statistics-cardsales

[39] Mobile payments include a broad range of wireless devices that could become payment-enabled, including mobile phones, PDAs, wireless tablets and mobile computing devices.

[40] Payment and Settlement Systems in Selected Countries. CPSS Publications Number 53. April 2003, p. 458

[41] Ibid, p. 457

[42] www.mastercardinternational.com/corporate/corp_stat

[43] CPSS Red Book 2003, Page 460

[44] www.firstdata.com/businessesandsubsidiaries/westernunion

[45] First Data 2002 Annual Report, p. 24

[46] Ibid, p. 42

[47] Carver-Herbert, Wendy. Vice President of Corporate Communications, Western Union

[48] Bank for International Settlements. CPSS Red Book 2003, p. 95-96.

[49] Per Soren Rose, Eurogiro.

[50] Bank for International Settlements. CPSS Red Book 2003. P. 95-96.

[51] Per Soren Rose, Eurogiro.

[52] *Deutsche Postbank is the new EUR Settlement Service Provider.* Eurogiro News. August 2003, p.1.

[53] *Steady growth in Eurogiro while preparing for the future.* Eurogiro News. August 2003, p.4.

[54] Bank for International Settlements. CPSS Red Book 2003. P. 95-96.

[55] Per Soren Rose, Eurogiro.

[56] *Agreement for a transatlantic gateway for credit payment signed between Eurogiro and Federal Reserve Bank (FRB) of US.* Eurogiro News. May 2003, p.1.

[57] G. Lichter. ECB Conference on Payments

[58] www.abe.org/STEP1/features.htm

[59] www.abe.org/setp2/features_and_functions

[60] www.abe.org

[61] Federal Reserve System. *FedACH International Canada Service Manual.* June 25, 2003.

[62] Information from the Minneapolis FedACH Central Operations Support.

[63] Federal Reserve System. *FedACH International Canada Service Manual.* June 25, 2003.

[64] Ibid

[65] Silver, Sara. *Cost of sending dollars to Mexico may tumble.* Financial Times. June 11, 2003, p.1.

[66] *International ACH:Assessing Needs & Solutions.* Presentation by Elizabeth McQuerry and Henrik Parl at the NACHA Payments 2003 conference. April 28, 2003.

[67] Federal Reserve Financial Services. *FedACH International Fact Sheet.* July 3, 2003.

[68] European Central Bank. *Improving Cross-Border Retail Payment Services The Eurosystem's View." September 1999,* p. 9.

[69] Watch: A New Global Payments Channel. www.globalach.org

[70] The other three are the French Paris Net Settlement (PNS), the Spanish Servicio de Pagos Interbancarios (SPI), and the Finnish Pankkien On-line Pikasiirrot ja Sekit-järjestelmä (POPS).

[71] See http://www.abe.org/EURO1

[72] www.nych.org/news.htm

[73] CPSS Red Book 2003.

[74] www.nych.org/news.htm

[75] *Now for a Single European Payments System.* Global Custodian. Winter, 2002, p.21.

[76] Market share is measured by the percentage of large value payment exchanged in all euro large value payment systems including EURO 1, Paris Net Settlement (PNS), Servicio de Pagos Interbancarios (SPI), and Pankkien Online Pikasiirrot ja Sekit-järjestelmä (POPS).

[77] European Central Bank. Target Annual Report 2002.

[78] CPSS Red Book 2003, p. 86-90.

[79] ECB press release: The long-term evolution of TARGET. 24 October 2002.

[80] European Central Bank. Target Annual Report 2002.

[81] www.cls-group.com

[82] CPSS Red Book 2003 Pages 377 to 380

[83] www.sic.ch/tkicch_index/tkicch_financialinstitutions/tkicch_financialinstitutions_sic.htm

[84] www.sic.ch/tkicch_index/tkicch_financialinstitutions/tkicch_financialinstitutions_multisic.htm

[85] *Payment and Settlement Systems in Selected Countries*. CPSS Publications Number 53. April 2003, p. 455

[86] www.swift.com/latestfinstatistics

[87] SWIFT Standards XML for Bulk Payments (http://www.swift.com/index.cfm?item_id=41644)

[88] Payments and Settlement Systems in Selected Countries. CPSS Publications Number 53. April 2003, p.457

[89] Visa International 2002 statistics

[90] MasterCard International 2002 statistics

[91] Average daily volume of gross consumer to consumer & consumer to business transactions processed in 2002 (First Data)

[92] Average daily value of gross consumer to consumer & consumer to business transactions processed in 2002 (First Data)

[93] CPSS Red Book 2003, p. 96.

[94] EBA, average daily volume of STEP1 transactions processed in July 2003

[95] EBA, average daily value of STEP1 transactions processed in July 2003

[96] Federal Reserve International Retail Product Office

[97] Ibid

[98] CPSS Red Book 2003

[99] Ibid

[100] ECB TARGET Annual Report 2002

[101] Ibid

[102] www.cls-group.com

[103] Ibid

[104] Swiss Interbank Clearing, 2002 annual statistics

[105] Ibid

[106] Ibid

[107] Ibid

[108] SWIFT headquarters are located in Belgium

[109] Unless otherwise indicated, this information was obtained from the *Payment Systems in EMEAP Economies*, Executive Meeting of East Asia-Pacific Central Banks and Monetary Authorities – EMEAP Working Group on Payment and Settlement Systems, July 2002.

[110] Michelle Bullock, Reserve Bank of Australia

[111] Australian Payments Clearing Association Limited (2003), *Regulations for Bulk Electronic Clearing System* (Sydney, Australia: Australian Payments Clearing Association Limited).

[112] U.S. Commercial Service (2002), *Country Commercial Guide for Australia* (Washington, DC: U.S. & Foreign Commercial Service and U.S. Department of State).

[113] Unless otherwise indicated, this information was obtained from the *Payment Systems in EMEAP Economies*, Executive Meeting of East Asia-Pacific Central Banks and Monetary Authorities – EMEAP Working Group on Payment and Settlement Systems, July 2002. Some text is reprinted directly from this document.

[114] At the end of 2001, the other types of financial institutions that join these groups are: shinkin banks, credit cooperatives, labor banks, credit federations of agricultural cooperatives and fishery cooperatives,

and agriculture cooperatives. Participants in the Zengin System, both direct and indirect, are limited to deposit-taking institutions. Source: Kenji Hayashi, Bank of Japan.

[115] Source: Kenji Hayashi, Bank of Japan

[116] Japanese Bankers Association and Bank of Japan.

[117] Source: Japanese Bankers Association and Bank of Japan. There is no data available for direct debits.

[118] U.S. Department of Commerce. Japan Country Commercial Guide 2002.

[119] World Trade Organization. World Trade Report 2002.

[120]U.S. Department of Commerce. Trade Information Center for Japan, September 2001.

[121] Unless otherwise indicated, this information was obtained from the *Payment Systems in EMEAP Economies*, Executive Meeting of East Asia-Pacific Central Banks and Monetary Authorities – EMEAP Working Group on Payment and Settlement Systems, July 2002. Some text is taken directly from this document.

[122] Bank of Korea. The rest of the transfers were paper-based.

[123] Monetary Stabilization Bonds (MSBs) are bonds bought and sold by the BOK as a tool to control liquidity in order to maintain economic stability.

[124]http://www.countryreports.org. Korea Country Report 2003.

[125] Stinson, Allison & Wolyncewicz, Michael. Reserve Bank of New Zealand: Bulletin Vol. 66 No. 1

[126] Payments Systems in EMEAP Economies – July 2002, Page 323 (www.emeap.org/redbook2/redbook.pdf)

[127] Stinson, Allison – Advisor, Financial Stability Department, Reserve Bank of New Zealand. November 19, 2003

[128] Payments Systems in EMEAP Economies – July 2002, Page 324

[129] Ibid (www.emeap.org/redbook2/redbook.pdf)

[130] Ibid, p. 315, 321 and 322 (www.emeap.org/redbook2/redbook.pdf)

[131] Comparison of Payment Methods (Non-Cash) 1998 to 2002. New Zealand Bankers' Association. (www.nzba.org.nz/PUBLIC.htm)

[132] Payments Systems in EMEAP Economies – July 2002, Page 313

[133] Stinson, Allison. Advisor – Financial Stability Department at Reserve Bank of New Zealand. October 27, 2003.

[134] Ibid.

[135] Stinson, Allison. Advisor – Financial Stability Department at Reserve Bank of New Zealand. October 28, 2003

[136] New Zealand's Economic and Trade Development Agency. New Zealand Trade and Enterprise 2003.

[137] http://www.emarketservices.com/reports_facts/. eMarket Services, April 2003.

[138] http://www.census.gov/foreign-trade/statistics/product/enduse/index.html ,U.S. Census Bureau – Foreign Trade Statistics 2002

[139] U.S. Department of State. New Zealand Background Note, January 2003.

[140] Reserve Bank of New Zealand: *Bulletin Vol. 65 No. 2*, June 2002.

[141] Unless otherwise stated, the information is obtained from input provided by Mr. Francesco Re of the Swiss National Bank and Committee on Payment and Settlement Systems, Red Book 2003

[142] http://www.lowtax.net/lowtax/html/jswecom.html

[143] http://www.countryreports.org. Switzerland Country Report 2003.

[144] U.S. Department of Commerce. Switzerland Country Commercial Guide 2002.

[145] Unless otherwise stated, the information is obtained from input provided by Mr. Walter Hoffenberg of the Austrian National Central Bank and the European Central Bank, Blue Book 2001.

[146] U.S. Department of Commerce. Austria Country Commercial Guide 2002.

[147] U.S. Department of State. Austria Background Note, April 2003.

[148] The information in this summary benefited from input provided by Mr. Peter Jensen of the Danmarks Nationalbank. Other resources include European Central Bank, Blue Book 2001, PBS web site: http://www.pbs.dk and Danmarks Nationalbank's website: http://www.nationalbanken.dk

[149] Figures are obtained from European Central Bank, Blue Book 2001

[150]U.S. Department of State. Denmark Background Note, June 2003.

[151]U.S. Department of Commerce. Denmark Country Commercial Guide 2002.

[152] Unless otherwise stated, the information is obtained from input provided by Ms. Christine Bardinet of Banque de France, Committee on Payment and Settlement Systems, Red Book 2003 and http://www.gsit.fr

[153] European Central Bank, Oversight Standards for Euro Retail Payment Systems, July 2002

[154] Credit institution is the definition given to a "bank" in the European Union

[155] GSIT annual report, 2002

[156] U.S. Department of Commerce. France Country Commercial Guide 2002.

[157] World Bank. World Development Indicators 2002.

[158]U.S. Department of Commerce. Trade Information Center for France, February 2003.

[159] Unless otherwise stated, the information is obtained from input provided by Mr. Christian Stark of the Deutsche Bundesbank, Committee on Payment and Settlement Systems, Red Book 2003 and http://www.bundesbank.de

[160] Credit institution is the definition given to a "bank" in the European Union

[161] "The Electronic Retail Payment System of the Deutsche Bundesbank" taken from http://www.bundesbank.de

[162] U.S. Department of Commerce. Trade Information Center for Germany, February 2001

[163] U.S. Department of Commerce. Germany Country Commercial Guide 2002.

[164] Unless otherwise stated, the information is obtained from Luca Arciero and Luca Rissolo of Bank of Italy, Committee on Payment and Settlement Systems, Red Book 2003, Bank of Italy's website at http//www.bancaditalia.it and SIA's website at http://www.sia.it

[165] U.S. Department of Commerce. Italy Country Commercial Guide 2002.

[166] U.S. Department of State. Italy Background Note, June 2003.

[167] Unless otherwise stated, the information is obtained from input provided by Ed Fredriksz and Gerard Raijmaeker of Interpay, Committee on Payment and Settlement Systems, Red Book 2003 and http:// www.dnb.nl

[168] U.S. Department of State. Netherlands Background Note, June 2000.

[169] World Bank. World Development Indicators 2002.

[170] "Annual Report on Exchange Arrangements and Exchange Restrictions." *International Monetary Fund 2002.*

[171] U.S. Department of Commerce. Netherlands Country Commercial Guide 2002.

[172] Unless otherwise stated, the information is obtained from input provided by Mr. Jesus Lopez, Ms. Ana Orland and Mr. Carlos Conesa of the Banco de Espana, European Central Bank, Blue Book 2001 and http://www.bde.es/sispago/snce/snceinfe.pdf

[173] Credit institution is the definition given to a "bank" in the European Union

[174] SLBE, Banco de Espana Settlement Service, is the Spanish RTGS system connected to TARGET

[175] U.S. Department of Commerce. Spain Country Commercial Guide 2002

[176] U.S. Department of State. Spain Background Note, June 2002.

[177] CPSS Red Book 2003, Page 407

[178] Refer to Appendix A for list of BACS Ltd shareholders

[179] APACS Annual Summary of Clearing Statistics 2002 (www.apacs.org.uk/downloads/annsum02b.pd)

[180] CPSS Red Book 2003, Page 397

[181] Arnfield, Robin. "At Last, PKI Gets Down to Work" Card Technology. September 2003, Page 24

[182] www.apacs.org.uk/direct_credits

[183] CPSS Red Book 2003, Page 404

[184] APACS Annual Summary of Clearing Statistics 2002

[185] Ibid

[186] Ibid

[187] www.bacs.co.uk/services/dd.php

[188] www.bacs.co.uk/services/euro/php

[189] CPSS Red Book 2003, Page 410

[190] www.bacs.co.uk/service_providers/bureaux.ph

[191] McLean, Scott and Benvie, Drew. "Thales E-Security Solution for New BACS Wins Aware for Best Use of B2B E-Commerce". Thales eSecurity Press Release

[192] CPSS Red Book 2003, Page 411

[193] John Skipper, Product Marketing Manager, Thales eSecurity Inc. October 7, 2003. Thales eSecurity provides the middleware infrastructure (known as AssureTransaction) that is used to authenticate BACS users when they access the system and to verify the users' digital signatures in the NewBACS program.

[194]U.S. Department of Commerce. United Kingdom Country Commercial Guide 2002.

[195]http://www.countryreports.org. United Kingdom Country Report 2003.

[196] http://www.census.gov/foreign-trade/statistics/product/enduse/index.html US Census Bureau, Foreign Trade Statistics, 2002.

[197]U.S. Department of State. United Kingdom Background Note, April 2003.

[198] CPSS Red Book 2003, Page 404

[199]http://www.foxwilliams.com/newlawfirms.pdf. Law Firms New to London Brochure, pg. 14, May 2000.

[200] FedACH International Canada Service Manual, June 25, 2003, Page 4

[201] CPSS Red Book 2003, Page 57

[202] www.cdnpay.ca/about/facts.asp

[203] Membership to the CPA is open to deposit-taking institutions (e.g. banks and credit unions) and non-deposit taking institutions (e.g. life insurance companies and money market mutual funds).

[204] Refer to Appendix A for list of ACSS Direct Clearers

[205] CPSS Red Book 2003, Page 57

[206] www.cdnpay.ca/membership/member.asp

[207] www.cdnpay.ca/publications/acss_ann.asp

[208] http://www.cdnpay.ca/publications/acss_ann.asp

[209] CPSS Red Book 2003, Page 57

[210] FedACH International Canada Service Manual June 25, 2003, Page 4

[211] CPSS Red Book 2003, Pages 59 and 60

[212] Refer to Appendix B for list of countries that participate in the TIPANET network

[213] CPSS Red Book 2003, Page 60

[214]U.S. Department of Commerce. Canada Country Commercial Guide 2002.

[215] www.census.gov/foreign-trade/statistics/product/enduse/index.html US Census Bureau – Foreign Trade Statistics 2002.

[216] CPSS Red Book 2003, Section 1.1.2.

[217] Department of Foreign Affairs and International Trade, 2002.

[218] McQuerry, Elizabeth. International Retail Payments Office. September 11, 2003

[219] Payments and Securities Clearance and Settlement Systems in Mexico (Western Hemisphere Payments and Securities Clearance and Settlement Initiative, Center for Latin American Monetary Studies, and the World Bank) March 2003. Page 20

[220] Electronic Funds Transfers (TEF) Manual – English Language Translation (Cecoban) April 5, 2002. Page 5

[221] Payments and Securities Clearance and Settlement Systems in Mexico (Western Hemisphere Payments and Securities Clearance and Settlement Initiative, Center for Latin American Monetary Studies, and the World Bank) March 2003. Page 11

[222] Ibid

[223] Ibid, p. 21

[224] Ibid, p. 36

[225] Ibid, p. 107

[226] Ibid, p. 40

[227] Ibid, p. 43

[228] Mexico Country Data Profile, World Bank (www.worldbank.org)

[229] Ibid

[230] Foreign Trade Statistics (U.S. Census Bureau)

[231] Payments and Securities Clearance and Settlement Systems in Mexico (Western Hemisphere Payments and Securities Clearance and Settlement Initiative, Center for Latin American Monetary Studies, and the World Bank) March 2003. Page 107 and 108

[232] Mexico Country Commercial Guide FY 2002 (U.S. Department of Commerce)

[233] The Brazilian Payment System Central Bank of Brazil May 2003, Page 7

[234] Ibid, p. 14

[235] www.bcb.gov.br/Pom/Spb/Ing/compe_i.htm

[236] Daily average value of electronic COMPE transactions in December 2002 was BRL 9,873 million. Conversion of transaction value from BRL to USD is based on 12/31/2002 exchange rate of USD 1 = BRL 3.540.

[237] The Brazilian Payment System Central Bank of Brazil May 2003 Page 9

[238] Sales, Adriana Soares Banco Central do Brasil Technical Notes Number 17 April 2002, Page 30

[239] The unit of currency in Brazil is the Real (plural is Reais). The Dollar-Real exchange rate on 10/24/2003 was USD 1 = BRL 2.867

[240] U.S. Department of Commerce. Brazil Country Commercial Guide 2002.

[241] World Bank. World Development Indicators 2002.

[242] Index of Economic Freedom, 2003.

[243]U.S. Department of State. Brazil Background Note, June 2003.

[244] EMEAP Red Book (July 2002), Table 8, Page 56. ACH transactions consist of Credit Transfers and Direct Debits processed in 2000. Annual transaction value was converted to U.S. Dollars based on 12/29/2000 spot exchange rate of USD 0.5560 = AUD 1.

[245] Banco Central do Brasil. ACH transactions consist of electronic retail payments processed by COMPE from January – March 2002 (estimate) and April - December 2002 (actual). Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of BRL 3.5400 = USD 1.

[246] CPSS Red Book Statistical Update (November 2003), Table 8, Page 22. ACH transactions consist of interbank Automated Funds Transfer (AFT) credits and debits processed by ACSS in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of CAD 1.5800 = USD 1.

[247] ECB Blue Book Addendum Incorporating 2001 Figures (September 2003), Table 8, Page 60. ACH transactions consist of interbank paperless Credit Transfers and Direct Debits processed in 2001. Annual transaction value was converted to U.S. Dollars based on 12/31/2001 spot exchange rate of DKK 8.3529 = USD 1.

[248] CPSS Red Book Statistical Update (November 2003), Table 8, Page 35. ACH transactions consist of interbank Credit Transfers and Direct Debits processed by SIT in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of EUR 1 = USD 1.0485.

[249] CPSS Red Book Statistical Update (November 2003), Table 8, Page 49. ACH transactions consist of interbank Credit Transfers and Collection Items processed by the RPS retail payments system in 2002. Transactions include payments submitted in a paper-based form which were truncated and passed on in a paperless form by the Bank. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of EUR 1 = USD 1.0485.

[250] CPSS Red Book Statistical Update (November 2003), Table 8, Page 73. ACH transactions consist of interbank payments submitted in a paper-based form which were truncated and passed on in a paperless form (Cheque Truncation), Collection Orders and Credit Transfers processed by the BI-COMP retail payments system in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of EUR 1 = USD 1.0485.

[251] CPSS Red Book Statistical Update (November 2003), Table 8, Page 88. ACH transactions consist of interbank transfers processed by the Zengin retail payments system in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of JPY 114.3500 = USD 1.

[252] EMEAP Red Book (July 2002), Table 8, Page 268. ACH transactions consist of retail payment Credit Transfers and Direct Debits processed in 2000. Annual transaction value was converted to U.S. Dollars based on 12/29/2000 spot exchange rate of KRW 1,267 = USD 1.

[253] Western Hemisphere Payments and Securities Clearance and Settlement Initiative, the Center for Latin American Monetary Studies and the World Bank (March 2003), Table A9, Page 108. ACH transactions consist of paperless credit transfers initiated by clients and Direct Debits processed in 2002. *NOTE: Interbank / Large Value paperless credit transfers were excluded from the calculation of ACH transactions.* Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of PESO 10.4300 = USD 1.

[254] CPSS Red Book Statistical Update (November 2003), Table 8, Page 100. ACH transactions consist of interbank transfers processed by the Interpay retail payments system in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of EUR 1 = USD 1.0485.

[255] ECB Blue Book Addendum Incorporating 2001 Figures (September 2003), Table 8, Page 95. ACH transactions consist of interbank paperless Credit Transfers and Direct Debits processed by the SNCE retail payments system in 2001. Annual transaction value was converted to U.S. Dollars based on 12/31/2001 spot exchange rate of EUR 1 = USD 0.8901.

[256] CPSS Red Book Statistical Update (November 2003), Table 8, Page 135. ACH transactions consist of interbank Payments on Data Carrier or File Transfer processed by DTA (data media exchange facility) and LSV (direct debit procedure) in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of CHF 1.3833 = USD 1.

[257] CPSS Red Book Statistical Update (November 2003), Table 8, Page 135. ACH transactions consist of interbank Credit Transfers and Debit Transfers processed by the BACS retail payments system in 2002. Annual transaction value was converted to U.S. Dollars based on 12/31/2002 spot exchange rate of GBP 1 = USD 1.6095.

[258] EMEAP Red Book, July 2002, Tables 5 and 6

[259] CPSS Red Book Statistical Update, April 2003, Tables 11 and 12

[260] Ibid

[261] ECB Blue Book Addendum Incorporating 2001 Figures, September 2003, Tables 11 and 12

[262] CPSS Red Book Statistical Update, April 2003, Tables 11 and 12

[263] Ibid

[264] Ibid

[265] CPSS Red Book Statistical Update, April 2003, Tables 11 and 12

[266] EMEAP Red Book, July 2002, Tables 5 and 6

[267] Payments and Securities Clearance and Settlement Systems in Mexico (Western Hemisphere Payments and Securities Clearance and Settlement Initiative, Center for Latin American Monetary Studies, and the World Bank) March 2003. Table A8

[268] CPSS Red Book Statistical Update, April 2003, Tables 11 and 12

[269] EMEAP Red Book, July 2002, Tables 5 and 6

[270] ECB Blue Book Addendum Incorporating 2001 Figures, September 2003, Tables 11 and 12

[271] CPSS Red Book Statistical Update, April 2003, Tables 11 and 12

[272] Ibid

[273] Association for Payment Clearing Services (APACS) Annual Summary of Clearing Statistics 2002

[274] See *Core Principles for Systemically Important Payment Systems*, BIS, January 2001

[276] Treasury Workstation Integration Standards Team (TWIST) is a group of 15 global companies driving XML-based standards that facilitate STP.