Immediate Funds Transfer as a General Purpose Means of Payment

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Introduction

In a modern economy, transactions for goods and services as well as transactions in financial markets are paid for by transferring money held in accounts with banks. For the better part of the last century in the United States, most noncash payments were made with the paper check, a payment instrument that met most needs for payment services. Since the mid-1990s, use of the paper check has been in decline (Gerdes, 2008), a development that reflects technological advances and innovations by providers of payment services in response to needs for new and different payment instruments. Today, individuals, businesses, and governments can choose from a variety of payment instruments, each of which is designed to meet the specific needs for attributes such as certainty, speed, security, convenience, and cost (Foster et al., 2010). The most advanced means of transferring money between bank accounts is immediate funds transfer (IFT), which allows senders to pay receivers electronically in a highly convenient, certain and secure manner, with no or minimal delay in the receivers' receipt and use of funds.

Today in the U.S., most IFT payments are limited to large-value business payments, interbank transfers, and specialized financial market transactions that in total account for a small proportion of the total number of payments made. Industry data, however, indicate that the popularity of IFT for general purpose payments is growing (BAI, 2010). To date, most general purpose IFT payments are made on systems operated by nonbanks, the most recognized being PayPal.[2] A notable development in a number of countries around the world, and also to a limited extent in the U.S., is broader use of IFT for general purpose payments. Broader use is enabled by applied technologies that allow banks to provide low cost IFT services to the general population of users. The principal IFT innovators in other countries are banks, working together collectively and in cooperation with public authorities, such as central banks, to provide national clearing and settlement for the new IFT service. In contrast, the principal IFT innovators in the U.S. are nonbank companies providing coverage that is limited to their closed customer groups.

This paper examines the emergence of IFT as a general purpose means of payment in the U.S., presents four case studies of IFT in other countries, and identifies public policy and business issues that arise when a new means of payment is introduced nationally.

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[2] https://www.paypal.com.

Section 2 describes the attributes of payment instruments that users find attractive and compares the attribute profiles of different kinds of instruments, including IFT. Section 3 examines demand for IFT in the U.S. Section 4 presents four international case studies of IFT. Section 5 discusses barriers to adoption in the U.S. Section 6 offers concluding remarks.

2. Payment Attributes

Payments are made to satisfy personal or commercial obligations between and among individuals, businesses (including for profit and non-profit), and government entities (including local and federal). Cash is the most basic and widely used means of payment by individuals in industrialized countries for transactions up to about USD 25 (Rysman, 2009; Smith, 2009). Apart from small-value payments, however, cash is not a preferred means of payment.[3] Most money is held in transaction accounts at depository institutions.[4] Payment instruments that provide access to this "deposit money" are the primary means of making payments (See Box 1 for discussion of bank payments business). Payment instruments are generally either credit transfers, whereby a payer (sender) directly authorizes the movement of money, or debit transfers, whereby a sender indirectly authorizes the movement of money via the payee (receiver). Regardless of payment type, the end result is the same; deposit money is transferred from sender to receiver.[5]

Box 1: Transaction Accounts and the Payments Line of Business at Depository Institutions

For banks, transaction accounts offered to individuals and business customers, while considered part of the "payments business," are estimated to account for only a fraction of total payments business revenue. Revenue from transactions accounts is attributable to net interest income earned from balances on deposit (typically the largest component), transaction fees, penalty fees, and a variety of other fees. The payments business also includes issuing credit cards to consumers, which is the largest piece of payment business revenue. Other payments businesses include issuing commercial cards, card services for merchants, money transfer services, issuing pre-paid cards, and other smaller businesses (McKinsey & Company, 2009).

The fact that the majority of payment revenue comes not from transaction accounts, which are typically considered "core" banking services, can be explained by banks' ability to generate higher marginal returns from credit-related services. The transaction-account payments business has until recently emphasized "free" account services provided at very low fees, perhaps even below cost fees, as an inducement to build customer accounts and grow net interest income.

[3] The exception to the norm is Japan, where cash is more widely used than in any other industrialized country due to factors such as relatively low crime rates, effective anti-counterfeiting measures, and low-cost nationwide ATM networks (BIS, 2003).

[4] Depository institutions include banks, thrifts, and credit unions. For this paper the term "bank" means all depository institutions.

[5] A full discussion of credit transfers and debit transfers is provided in the Appendix.

In the U.S., various payment instruments, supported by core processing systems in banks and interbank clearing and settlement mechanisms, are used to transfer deposit money. These include paper check, payment cards, electronic debits and credits, and wire transfer which, as discussed below, is a specialized form of IFT. Senders select a payment instrument based on how well its attributes match the purpose of the payment (e.g., point of sale transaction, trade payments between businesses). Because payments are two-sided transactions, the needs of both the sender and receiver are relevant in selecting the payment method to be used.[6]

The primary attributes considered by senders and receivers when selecting a payment instrument are as follows:

- Certainty – assurance to the sender and receiver that funds are transferred as ordered
- Speed – timeliness of funds transfer from sender to receiver
- Security – assurance that payment is protected against fraud and completed as ordered
- Control – the sender and receiver have good information about and are able to control the timing of payment
- Universal acceptance – the payment instrument is broadly accepted
- Versatility – useful for a variety of personal and business transactions, including the ability to transmit remittance information
- Low cost and transparent pricing – reasonable cost relative to value; fees are clear to sender and receiver

Providers of payment services attempt to deliver these attributes in combinations that best meet the needs of the customers they serve. Technology is a principal catalyst leading to improvements in such services as one or more attributes can be strengthened without degrading other attributes.

A comparison of attributes across different payment instruments, including IFT, is shown in Table 1. Such a comparison helps explain the growth in popularity of IFT as a general purpose means of payment. The attributes summarized in Table 1 are discussed more fully below.

[6] Two-sided markets are those that require the participation of two separate parties in order to succeed (Rochet & Tirole, 2003). A sender and receiver of a payment must use the same payment system in order to exchange monetary value.

Payment Types – Debit Transfer

Debit transfers support the movement of money between accounts held with banks. Paper check and direct electronic debit are the most common debit transfer instruments. Historically, paper check has been the most widely used method for making debit transfers. Paper checks have many attractive attributes including payer control over the timing of payment and near universal acceptance by payees. Checks are also very versatile in that they can be used for most personal, commercial, and government payments. Businesses in particular are heavy users of checks due to established back-office processes that link invoicing and accounts payable systems to check-based payment systems. In general, the need to link remittance information with a payment is a key factor in business' choice of a payment instrument and, historically, a paper-based remittance process has been used by businesses because of the paper-based payment type.

For individuals, the cost of a check payment is not necessarily transparent because most banks bundle check fees with other transaction account fees. Other banks offer "free checking," which does not reflect the true cost. Businesses and governments are typically charged explicit per-item transaction fees by their banks, which, in combination with back-office processing costs, make checks relatively more expensive than electronic substitutes (Wells, 1996). Despite higher costs, many business users find established payment processes effective, and the cost of switching to an electronic workflow, including persuading counterparties to accept electronic payments, prohibitive (AFP, 2010).

Historically, the process of clearing checks, which involves moving the check from sender, to receiver, to receiving bank, to paying bank (possibly through intermediary banks or a central clearinghouse), was labor and capital intensive. Today, checks are converted to digital images for electronic processing once they enter the clearing process. This may happen at a merchant location, even as early as the merchant point of sale. Even though most checks are cleared electronically, funds movement is still a relatively slow process.[7] Depending upon when checks are entered into the collection process by the receiving bank, provisional credit is available to a receiver either the same or the next-day, and deposit money is transferred from the sender's bank within one or two days.

Another type of debit transfer is the electronic equivalent of a check, called direct debit. Direct debits are marketed to individuals as "autopay" or "direct bill." This instrument allows individuals to make payments directly from their bank accounts by supplying their bank account and routing number to the payee. The true cost of direct debit is hidden because it is typically free, or bundled with account service fees. Direct

[7] Some checks are converted to electronic format at the point of acceptance and are cleared through the automated clearinghouse (ACH) network, as described below.

debits are used primarily to pay bills and, more recently, for online purchases. Acceptance of direct debit is limited because not all payees offer this option to individual payers.

Businesses are heavy users of direct debits to make and receive trade payments, because fees are lower than for checks and because electronic payments support greater back office operating efficiency. Direct debits are typically as versatile as checks because remittance information may be included electronically with payments. Yet, acceptance is limited because both the sender and receiver must agree to use electronic payments.

Direct debits are cleared and settled via the automated clearinghouse (ACH) network, to which payees gain access through their account-holding banks. Payment transactions are sent in batch form to a central operator for processing with settlement at pre-scheduled times during the day. Sending and receiving banks subsequently update the accounts of senders and receivers. The ACH was designed as a batch system because checks are processed in batch form, and this processing model persists to this day. Because of batch processing, ACH debit transfers are relatively slow – there is a one day gap between the time a payment is initiated and the time deposit money is transferred. Thus direct debits, though electronic, are not necessarily quicker for end-users than check payments.

As shown in Table 1, checks and direct debits fall short in terms of certainty, control, and security. Because payees initiate the movement of funds from the accounts of payers, payers are uncertain about the timing of the funds. The lack of certainty and control for payers has a direct bearing on payment fraud, because a perpetrator who has obtained bank account and routing information from a stolen check, for example, is able to initiate an account debit without a payer's knowledge. Fraudulent payments, once identified by the payer or the payer's bank, may be returned, but returned payments undermine certainty and security.

Credit Transfer

Credit transfer is accomplished in a variety of ways, principally as electronic credit and wire transfer.[8] Electronic credit transfers are used by businesses and governments to make recurring payments to individuals for obligations such as, payroll and social security payments, respectively. They are also used for business trade payments. Recurring payments are received by individuals as "direct deposit." Direct deposit is used for nearly all government-to-individual payments, but not all businesses have adopted direct deposit. The cost of direct deposit is not transparent to individuals because they are typically not charged to receive them whereas business users pay an explicit per-transaction fee.

[8] A cash payment is also a credit transfer.

Direct deposits and some other types of electronic credit transfers are processed on the ACH network. As in the case of debit transfers, ACH credit transfers are relatively slow, with a one or two day lag between the time the payment is initiated by the sender and the time deposit money is transferred to the receiver. As shown in Table 1, electronic credits offer more certainty, control, and security for senders, who directly authorize movement of money.

Immediate funds transfer is used today primarily for large-value business and financial market transactions, through bank wire transfer services. Wire transfers constitute a small portion of the overall number of payments and a large portion of the overall value of payments; their daily value exceeds a trillion dollars. Wire transfers are expensive, typically costing about USD 25 – 35 per transaction, and are thus not widely used by individuals. Wire transfers are not only immediate, they are final. That is, wire transfers are irrevocable and unconditional and offer the highest certainty of any payment type. Wire transfers are accepted by most banks.

Clearing and settlement of wire transfers takes place over one of two specialized systems: Fedwire, which is operated by the Federal Reserve Banks, or The Clearing House Interbank Payment System (CHIPS), which is operated by The Clearing House Payments Company L.L.C. In the case of Fedwire, banks transfer balances directly between accounts they hold with the Federal Reserve Banks. CHIPS is a closed network whose members exchange payments, which are settled by means of continuous multi-lateral netting. As indicated in Table 1, wire transfers are quick, certain, and secure, and accordingly they are relied on in inter-bank and financial markets world-wide and are often made using real-time gross settlement (RTGS) systems (World Bank Group, 2008). Virtually all RTGS systems, including Fedwire, are operated by central banks, which for these purposes are functioning as bankers' banks. Wire transfers involve the transfer of deposit money that banks hold in accounts with central banks (sometimes referred to as "central bank money"). Public oversight authorities have made the use of RTGS a virtual requirement for systemically important payment systems (BIS, 2001).

Debit Cards

Debit cards are a unique type of payment. While payments made by debit card are cleared and settled like debit transfers, they offer IFT-type attributes to both card holders and merchants, as shown in Table 1. In particular, debit card payments offer speed, certainty, and control to both parties. Speed, certainty, and control are accomplished by specialized authorization systems that instantaneously check, at the point of sale, whether payers are able to fund purchases from their bank accounts. Once a transaction is authorized, merchants have the certainty of knowing that payment will be received. Unlike IFT, however, funds are not transferred from the individual's to the merchant's account

until the end of the day at the earliest. Yet, the pre-authorization makes the payment seem immediate to cardholder and merchant.[9]

Debit cards offer limited versatility, as they are used primarily at the merchant point-of-sale, with merchants who have agreed to join a debit card network. The cost of debit cards is not transparent to cardholders (typically transactions are free), and merchants pay ad valorem fees which are a percentage of the transaction amount.[10] Debit cards are subject to unauthorized use if stolen, and the card networks have security measures in place to limit unauthorized transactions as well as rules on limited liability for merchants. (Credit cards are not taken up directly because, as described in Box 2, their principal purpose is to provide credit services.)

Box 2: Credit Card Transactions

Credit cards are also commonly used by individuals at merchant locations yet credit card transactions are not debit or credit transfers. Credit cards are a form of short-term consumer finance whereby merchants receive funds from their banks at the end of the day but card holders do not authorize the transfer of deposit money until they pay their monthly credit card bill to the bank that issues them the card. This bill is for the aggregate amount owed to cover multiple transactions and is not required to be paid in full. Thus, credit card transactions, while often considered payment transactions, do not fall under either the credit transfer or debit transfer model. The distinction between a credit card transaction and payment transaction holds true even though an estimated 40% of card holders, so-called convenience users, do not rely on short-term credit and pay their balance in full each month (Herbst-Murphy, 2010). Convenience users typically use credit cards for other reasons, such as garnering reward points or simplifying their cash management by accumulating payments over a monthly grace period.

IFT Innovation – General Purpose Payments

Much of the innovation in U.S. payment instruments over the past decade has centered on IFT. Nonbanks have been in the forefront of this innovation. The approach taken by nonbanks is two-fold: (1) offer payment services directly to end users that substitute for and compete with the services provided by banks, and (2) provide banks with the business processes and technical capabilities that allow them to offer IFT services to their account holding customers.[11]

[9] A subset of card holders are aware of the delay in the transfer of deposit money and "play the float" with these transactions. For those card holders, debit card transactions are not perceived as immediate.

[10] Debit card cost structure has become controversial to the point that recent banking reform legislation directs the Federal Reserve Board to regulate merchant fees and includes a provision to allow merchants to offer discounts for customers who pay with cash or check. (Wall Street Reform and Consumer Protection Act, §1075).

[11] As noted in the introduction, the most prominent example of the first approach is PayPal. Examples of the second approach include CashEdge (http://www.cashedge.com/) and OboPay (https://www.obopay.com/consumer/welcome.shtml).

Under the first approach, nonbanks directly provide IFT services to individuals and small- to medium- sized businesses. A nonbank payment provider must first establish a funding source for IFT payments that are initiated by its customers, as it cannot tap directly into the customers' bank accounts. The non-bank provider would typically do so by setting up an omnibus account with its bank, to which its customers make deposits. The customer funds pooled in the omnibus account are then reflected in ledger accounts set up by the nonbank on its computers that are denominated not in commercial bank money but in parallel units of value identified with the nonbank provider (for example, PayPal dollars). Collectively, these ledger accounts constitute a closed, proprietary network that supports transfers of value units among the users of the nonbank providers' services. Payments to receivers outside the network are supported, but in this case a conversion back to bank money is required. The conversion back to bank money is accomplished by sending deposits in the omnibus account back through the traditional payment network, to the bank account of the receiver who is not part of the non-bank network. The nonbank payment networks rely on modern applied technologies to support immediate funds transfers, and in-network transfers occur virtually instantaneously. Out-of-network transfers that rely on the banking system may take up to several days to complete.[12]

Under the second approach, banks use a technology platform supplied by the nonbank company in combination with their own in-house authorization systems to provide IFT services to their account holding customers. Banks following this approach brand the services as their own. Again, however, the resulting network is closed, and proprietary, connecting holders of account at the limited number of banks that use a particular nonbank vendor's platform. So long as a payee and payer hold accounts at banks that use the same non-bank provider's technology, they can transfer funds directly to each other's accounts.[13] Out of network transfers are possible, but again the transfer may take up to several days to be completed.

[12] These closed proprietary networks were first described by Kuttner & McAndrews (2001).
[13] The same description applies to transfers among accounts held at the same bank, called intra-bank or "on us" transfers.

Table 1: Attributes of Payment Instruments

Attribute	Check	Direct debit	Direct credit	Debit card	Wire transfer	General purpose IFT[14]
Certainty	Provisional payment to receiver	Provisional payment to receiver	Payment is guaranteed to the receiver	Payment is guaranteed to the receiver	Payment is guaranteed to the receiver with immediate finality	Payment is guaranteed to the receiver
Speed	Minimum one day	Minimum one day	Minimum one day	Authorization and guarantee is real-time; funds transferred end-of-day at the earliest	Real-time	Within minutes
Security	Checks may be stolen and/or forged	Perpetrator uses bank account and routing information from a check to originate a debit transfer	Fraud is limited because payer directly sends funds from its account	Card numbers may be stolen; use of PIN with certain cards limits unauthorized transactions	Fraud is limited because payer directly sends funds from its account	Fraud is limited because payer directly sends funds from its account
Control of Timing	Payer controls instruction but cedes control of funds movement to payee	Payer controls instruction but cedes control of funds movement to payee	Payer controls transaction	Payer controls transaction	Payer controls transaction	Payer controls transaction
Universal acceptance	Yes	Sender and receiver must agree to use	Sender and receiver must agree to use	Limited by merchant acceptance	Yes	Closed system with limited number of users[15]
Versatility	Most types of payment transactions	Bill payments, business-to-business trade payments (with remittance information)	Recurring payments, business-to-business payments (with remittance information)	POS and online only	Financial market transactions (with limited remittance information)	Most types of transactions but limited POS
Low cost & transparent pricing	Not transparent to individuals; per-transaction fee to businesses	Not transparent to individuals; per-transaction fee to businesses	Not transparent to individuals; per-transaction fee to businesses	Not transparent to individuals; ad-valorem fee to merchant	High cost for sender and receiver (transaction fee)	Not transparent to individuals; ad-valorem to merchant (PayPal)

[14] Information in this column is based on the features of PayPal, which is the nonbank IFT service most commonly used today by individuals (Shevlin, Fishman & Bezard, 2010), and CashEdge and Obopay. Pricing information is not available for the latter two providers.

[15] As discussed below, IFT in other countries link all or most transaction accounts held at banks.

The foregoing discussion of payment instruments and their attributes shows that wire transfer and general purpose IFT offer attractive combinations of attributes compared to other types of payment instruments, especially certainty, speed, control, and versatility. The average price of a wire transfer makes this payment instrument unattractive for general purpose use, and a primary advantage of IFT is its low price. As discussed below, evidence of latent demand and revealed preference for certain combinations of attributes support the view that there is an unmet need for broadly available IFT in the U.S.

3. Demand for IFT

Latent demand

Research conducted by the Federal Reserve on payment system user preferences provides evidence that businesses desire a service with the attributes of IFT. In a 2002 survey on the future of retail electronic payments (Board of Governors of the Federal Reserve System, 2002) respondents appealed for the development of a low-cost way for individuals and businesses to make online real-time funds transfers.[16] Survey participants also noted the need for a new, uniform "deposit directory" of account numbers and account status, or some other means of account verification as well as a directory to route electronic payments more easily to recipients. Further, in a 2006 survey on barriers to innovation in payments (Board of Governors of the Federal Reserve System, 2006) payment industry respondents indicated that wire transfers would be an effective mechanism for making smaller value payments at an acceptably low price (presumably the price would need to be lower than the average bank wire transfer fees) and if remittance information could be easily linked to corporate billing systems. These two surveys reveal a clear interest in IFT, subject to the availability of directory and routing information and responsiveness to specific user requirements including low cost and improved support for remittance information.[17]

Revealed preference

Other evidence to support the view that IFT may be desirable more broadly in the U.S. is increased use of payment instruments that offer attributes most closely related to IFT. For example, individuals' use of debit cards, which offer more control, certainty and speed compared to other payment instruments, has grown more rapidly than any other means of payment for point of sale and online purchases. In 2008, individuals held more

[16] Respondents included corporations, technology firms, banks, payment processors, and infrastructure providers.

[17] In a joint April 26, 2010 press release, the Federal Reserve Banks and The Clearing House Payments Company L.L.C. announced plans to implement enhanced message formats to support extended character business remittance information for U.S. dollar wire transfers on November 11, 2011.

debit cards than credit cards and used debit cards more often on average than cash, credit cards, or checks individually (Foster et al., 2010). Additionally, in 2001 one of every 14 dollars was spent with a debit card whereas in 2008 one of every five dollars was spent with a debit card (Herbst-Murhpy, 2010).

A portion of the increase in debit card usage can be explained as a secular trend attributed to growing familiarity with electronic payments in general. As shown in Figure 1, the percent of noncash payments made by electronic methods has grown in the last ten years, which reflects this trend. Yet, other stated reasons for debit card preference include increased convenience and speed of payment (Rysman, 2009), which make debit cards more attractive than checks for payments where cards are a substitute for checks. Part of the growth in debit card usage and decline in check usage shown in Figure 1 can be attributed to this substitution.

[Figure 1 here]

Business use of payment instruments having attributes that closely resemble those of IFT has grown as well. In 2010, one of the fastest growing transactions processed on the ACH network was a direct electronic credit used primarily for sending bills paid through online banking sites to biller receivers (Digital Transactions, 2010). Direct credits offer advantages over checks and direct debits for bill payment in terms of certainty and security, much like an IFT payment.

Experience with IFT in other countries provides insights to the potential for this type of payment in the U.S. Four international case studies of the successful introduction of IFT are presented in the next section. In each case, IFT has been introduced as a universal payment instrument supported by clearing and settlement mechanisms that connect virtually all bank accounts within a given country. Universal support for IFT has been accomplished through industry-wide cooperation, sometimes facilitated and energized by public authorities.

4. IFT Case Studies

As noted earlier, wire transfer is a standard means of payment world-wide and is most often supported by the RTGS system operated by the central bank. These RTGS systems are capital intensive, benefit from economies of scale, and most are operating well below efficient scale (Allsopp, Summers, and Veale, 2009). The services provided by RTGS systems in at least seven countries have been expanded to general purpose payments: these countries are China, Czech Republic, Serbia, Slovak Republic, Switzerland, Turkey and Ukraine.

The banking systems of at least three other countries have created transaction processing infrastructures specifically designed for IFT; these countries are Mexico, South Africa, and the United Kingdom. Consequently, although their implementation approaches may differ somewhat, the banking systems of at least ten countries have taken cooperative steps to support the provision of IFT services. The business case and public policy considerations leading to the introduction of IFT for general purpose payments are illustrated below through experiences in Mexico, South Africa, Switzerland, and the U.K.[18] These case studies help in identifying several business and public policy considerations that arise when taking a national approach to establishing a national network to support a new payment instrument. A common consideration is reliance on the national RTGS system to provide finality for IFT payments, either directly by means of transaction processing or indirectly by means of inter-bank settlement of IFT obligations.

Mexico

Immediate funds transfer was introduced in Mexico in 2004, with the implementation of a new RTGS system by Banco de Mexico. The new RTGS system, know by the acronym SPEI, takes advantage of new processing technologies that allow continuous upward scaling of transaction processing volumes at low marginal cost, with strong security based on a Public Key Infrastructure (PKI). During the SPEI project, some commercial banks indicated that they considered two credit transfer systems (the other being the Mexican ACH) to be wasteful. Accordingly, Banco de Mexico designed SPEI to support a variety of credit payments on one processing system, providing banks with a choice between using the new RTGS and ACH. Banco de Mexico has promoted the use of IFT through advertisements in the mass media.

The central bank also provides payment services to the federal government and was using its old RTGS for large government disbursements and the ACH for smaller disbursements. It was clear that so long as the federal government continued using the ACH for any disbursements, commercial banks would be forced to maintain their ACH systems. In 2008, Banco de Mexico asked and the federal government agreed to use SPEI for all disbursements. The government further decided to centralize its payroll processing and to use SPEI for government payrolls by the end of 2009. To support government payments, Banco de Mexico instituted an earlier opening time for SPEI in order to allow commercial banks to maintain their established processing schedules. The federal

[18] The findings in this section of the paper are based on correspondence with central bankers and examination of the public web sites of payment services providers, including commercial and central banks, and the publically operated financial post. The authors acknowledge and are grateful for the assistance provided by Ricardo Medina (Banco de Mexico), Dave Mitchell and Mike Stocks (South African Reserve Bank), Philipp Haene and Dave Maurer (Swiss National Bank), and Paul Smee (U.K. Payments Council), none of whom bear any responsibility for the descriptions, analysis, and conclusions presented in this paper.

government and banks use the straight-through processing capabilities that SPEI offers, with the expectation that both efficiency and service levels will increase throughout the payment system.[19] Most SPEI payments take less than a couple of minutes to reach the beneficiary's accounts. By law all SPEI payments are final, regardless of their size or the beneficiary. Payments are final as soon as the beneficiary's bank receives a settlement notice.

The Mexican commercial banks offer their customers IFT payment services mainly in the form of online banking, through their web sites and over the Internet. The payer must provide the bank routing and account numbers. One-off payments are therefore difficult to make because of the information that is needed on the payer side. Point-of-sale transactions are not currently supported, in part because of stringent security requirements established by the Mexican Banking Commission. Small mobile payments are, however, now being supported by new regulations and by a security agreement between banks and the Banking Commission.

Banks follow a variety of practices for pricing IFT payments. Large banks charge per-transaction fees of up to USD 0.50, or bundle credit transfer services with their Internet banking offerings for a fixed fee. The typical fixed fee for Internet banking service in Mexico is around USD 2.00. Prices for over-the-counter payments usually are higher than Internet banking transactions. Some banks charge about half as much for ACH credit transfers as for real-time credit transfers, whereas other banks charge the same for both payment service.

South Africa

The introduction of IFT services for use by the general public is a direct result of a recent initiative by commercial banks. The South African payment system has supported a number of general purpose payment options, including the paper check, the check card (a means of initiating a credit transfer from a checking account at the point of sale, upon authorization, and usually available only to high-net-worth customers), debit and credit cards, and ACH-type electronic funds transfer (EFT) debit and credit payments. Access to check payments would take from one to seven days, and EFT and Internet payments would take on average one day for the transfer of funds intra-bank, and three days for the transfer of funds inter-bank.

Commercial banks in South Africa identified the need for a payment instrument that would give the general public the ability to transfer funds quickly and in a manner that made funds available to the payee immediately. Seven banks began collaborating in 2005 to develop a new clearing and settlement mechanism called Real-Time Clearing (RTC), in

[19] Straight-through processing (STP) is an operational design based on standards that allow for fully automated processing of a payment from its origination by the payer to its receipt by the payee.

cooperation with the South African Reserve Bank, and the capability was implemented in March 2007. The banks provide services by Internet banking for consumers, online initiation through corporate banking solutions for businesses, and off-line over-the-counter initiation at a bank branch or by telephone. In each of these cases, the payer must follow an authentication procedure and provide routing information (bank and account number) for the payment. While no point-of-sale facilities are currently available, mobile services over cell phones are supported and in theory a merchant could be paid by mobile IFT, although no confirming message would be sent to the merchant-payee.

IFT payments made by the RTC method are governed by rules established by the Payment Clearing House (PCH), which banks are bound to in bilateral agreements. In addition to rule making, the PCH functions as the system operator. As system operator, the PCH clears RTC payment instructions and provides the interface to the South African Reserve Bank RTGS system, known by the acronym SAMOS, which is relied on to clear and settle the inter-bank obligations arising from RTC. Once an RTC payment instruction is cleared by the PCH, the receiving bank credits the beneficiary's account within 60 seconds. The inter-bank RTC clearing and settlement obligations built up in the PCH are sent to SAMOS on the hour every hour during the business day, which significantly reduces the risks associated with RTC payments.

Banks charge higher prices for IFT than for other Internet banking and mobile payments. Pricing has two parts, a per-transaction fee plus a charge based on the amount transacted for purchases, with a cap on the maximum total cost of the payment. At about USD 1.00, IFT per-transaction fees are about three times the per-transaction fees for regular Internet and mobile payments. The charge based on the transaction amount is the same across all three types of payments at approximately USD 0.07 per USD 1.00. Finally, the cap on the total price per payment is USD 5.00 for IFT payments, compared to USD 1.40 for regular Internet and mobile payments. It should be noted that IFT is differentiated from the pure RTGS wire transfers not only in terms of operational process and timing (up to an one hour delay for IFT compared to pure real-time for RTGS) but also in pricing. In the event that a bank client requests RTGS as the payment method, an even higher premium is charged.

Switzerland

Credit transfers have a long history in Switzerland, where the postal service has offered giro payments using a national standard format for over 100 years. (The credit transfer format known as "Einzahlungsschein" (credit slip), dates to 1906 and prevails to this day in a comparable form.) Traditionally, a credit slip has been used to initiate recurring and one-off payments, either over-the-counter at the post office or bank, or more recently through the mail. The payee company would send a credit slip to the payer with pertinent information filled out, including bank/post and personal address as well as

account number information, and, if relevant a reference number to assist the payee company in processing the payment. For payment purposes, account details are typically not perceived as confidential information by Swiss consumers and companies and are provided on a need-to-know basis to facilitate payments.

Today, IFT is available to businesses and individuals as an extension of the traditional credit slip. In addition to the traditional paper method, IFT is available through Internet banking and ATMs.[20] To illustrate the payer experience with IFT, imagine a computer terminal securely connected to a bank or PostFinance (the Swiss Post's financial institution) web site. The payer clicks on "making payments" and receives a menu of choices among different types of credit slips, for example, payments to accounts at the same bank, at a different bank, payments with or without reference numbers, etc. When it is selected, a digital credit slip opens and the payer fills out the necessary fields using the information received from the payee company. To reduce manual intervention, electronic payment-slip-readers can be used. When the payer completes the instructions, the "electronic credit slip" is immediately verified by the system on-line and, assuming it is complete and correct, delivered to the bank for processing. While the sender would typically not be aware of the particular infrastructure used to settle payments.

Credit transfers are typically settled through the Swiss RTGS system, called Swiss Interbank Clearing (SIC). This system is overseen by the Swiss National Bank (SNB) and operated by the company SIX Interbank Clearing Ltd. on behalf of the SNB. Swiss Interbank Clearing is owned by the Swiss commercial banks and PostFinance. General purpose credit transfers have been more widely settled in SIC since PostFinance joined as a participant in 2001. The extension of SIC services beyond traditional large-value transfers is a cooperative development involving the commercial banks, PostFinance, and the central bank, and reflects their collective interest in supporting modern credit transfers in the most efficient way, which in this case means making greater use of SIC and avoiding duplicative infrastructure for processing small-value payments. In this way the banking system benefits from economies of scale in operations and pooling of liquidity. In addition, standards are followed to facilitate efficient processing (for example, increasing use of the International Bank Account Number (IBAN) for routing information.

Pricing of IFT payments depends on the bank providing the service and on the customer segment being served. Banks often include consumer payments as a component part of their bundled account service packages. Charges for account service packages depend on the balance that is maintained. Domestic payments would typically not carry a per-transaction charge. An exception would be paper payments that require manual

[20] Also, mobile payments for small accounts using cell phones have been introduced by PostFinance for payments between PostFinance account holders.

processing steps for the banks or PostFinance. These payments would typically carry a surcharge as an incentive to use on-line banking.

United Kingdom

Faster Payments is a new IFT service in the U.K. that makes near real-time and irrevocable credit transfers available to individuals, small businesses, and indeed all bank customers at non-premium prices. Introduced in May 2008, Faster Payments is available across the banking industry and is supported by common rules and a shared processing infrastructure. Faster Payments is a voluntary initiative of the banking industry, agreed to by the Payment System Task Force, which was organized and chaired by the U.K. Office of Fair Trading (OFT). The OFT organized the Task Force in response to a mandate from the Chancellor of the Exchequer. The official mandate was reinforced by the threat of government-sponsored legislation to remedy perceived inefficiencies in the payment system resulting from insufficient competition and overly slow cooperation among banks. Of principal concern was a three-day delay in the inter-bank clearing of electronic payments.

The Payment System Task Force told the payments industry to devise a same day service. The industry's response was to propose a near real-time service, delivered through a special purpose infrastructure designed and operated by VocaLink. The scheme company for the Faster Payments Service (a name that is acquiring a brand identity for purposes of marketing the service to the public) is the CHAPS Clearing Company. CHAPS now defines its services as comprising two main parts: CHAPS Sterling for systemically important payments, and Faster Payments for time-dependent payments**.**

The 13 banks that originally agreed to develop the service now originate Faster Payments on behalf of their customers, and approximately 68 credit institutions representing an estimated 90 percent of all transaction accounts in the U.K. receive such payments. Membership in the Faster Payments Service is open to all credit institutions that have settlement accounts with the Bank of England and can connect their networks to the payment system infrastructure continuously, 24 hours per day, seven days per week. Indirect access is also permitted, whereby an institution offers the Faster Payment service and settles through a member.

Customers can originate Faster Payments through their banks either by phone or Internet connection 24 hours a day, seven days per week; it is estimated that approximately two-thirds of all phone and Internet payments are now made by this method. Support for mobile Faster Payments is an important component of U.K. payment system strategy, and is seen by some as a viable alternative to reliance on the paper check (VocaLink & PriceWaterhouseCoopers, 2009). One-off payments are received by the beneficiary usually within minutes but always within two hours. These one-off payments

can be ordered on the payment date or submitted as forward dated payments to be made on designated days in the future. Standing order payments are also possible, although these will be processed for same-day settlement and then only on bank working days. A direct corporate access feature has recently been added that enables companies with large volumes of payments to submit files directly to the Faster Payments Service infrastructure, provided they are sponsored by a member bank. This new feature is intended to increase the attractiveness of the service for firms that have a large number of expenses to pay, including payrolls, and is analogous to the services provided to corporate users of the ACH system in the U.K.

A Faster Payment becomes final at the time the sending bank submits the transaction to the Faster Payments Service processing system; sending banks manage their risk by authenticating the instruction received from the originator of the payment, and checking the customer's account to ensure that the balance is sufficient to fund the payment order. The Faster Payments Service processing system checks to see that all of the required details are provided in the proper format, forwards the payment to the receiving bank which checks to see that the funds are being directed to a valid account, and once the validation is complete sends a message back to the Faster Payments Service indicating that this is the case, upon which the receiving bank is credited with the funds. Confirmations of complete transactions are then provided to the sender and receiver.

The prices charged for Faster Payments are a fraction of those charged for traditional CHAPS transfers, which can cost up to USD 35.00. Marketing information published by banks indicates that per transaction prices are below USD 1.25, ranging downward to about USD 0.50. There is a GBP 100,000 limit on the size of transfers that has been set initially as a risk management measure and may be raised or eliminated in the future.

The four case studies are summarized in Table 2. For each country, the table identifies the catalyst behind the introduction of the service, the delivery channels through which the banks provide the services to their customers, the bank-end system for clearing and settling payments, the routing number scheme, and the prevailing fee structure. The four case studies illustrate two general approaches to inter-bank processing of IFTs. In the cases of Mexico and Switzerland, the national RTGS systems are relied on for inter-bank processing, extending existing RTGS functionality to a broader set of underlying payments. In the cases of South Africa and the U.K., the banks have created new, shared utilities that handle all of the inter-bank processing for the individual transactions, and in turn rely on the national RTGS for final inter-bank settlement of netted IFT transfers on a periodic basis throughout the day.

Table 2: International Experience with IFT

Country	Catalyst	Channel	Clearing & Settlement System	Routing	Fee
Mexico	Central bank	OLB[21], Mobile	RTGS (SEPI)	BAN[22]	Fixed per transaction (could be bundled) USD 0.50 – 2.00
South Africa	Bankers association	OLB, Mobile, OTC[23]	Real-Time Clearing (RTC)	BAN	Fixed per transaction (USD 1.00) + ad valorem (USD 0.07/1.00)
Switzerland	Majority of banks & central bank	OLB, ATM, OTC	RTGS (SIC)	BAN, IBAN[24]	Typically bundled with account service fees
U.K. (Faster Payments)	Competition authority	OLB, Mobile, Direct corporate access	Faster Payments Service (FPS)	BAN	Fixed per transaction (USD 0.50 – 1.25)

In two of the four cases (Mexico and the U.K.), public authorities led in motivating a coordinated response across the banking system. In Mexico, the central bank served as catalyst and did so in part through its operational role as a provider of RTGS services. In the U.K., the OFT, which shares responsibility for aspects of payment system oversight with the central bank, provided the motivation, as a regulator concerned about the quality of payment services available to the general public. In contrast, banks in South Africa and Switzerland identified an unmet service need (and opportunity) and took the lead, enlisting the central bank to provide support where necessary.

The summary provided in Table 2 highlights the areas where banks cooperate and compete in the provision of IFT services. Cooperation in planning is necessary to support nationwide services. In South Africa and the U.K., the operational cooperation extends to governance over creation and enforcement of the rules that apply to the IFT network, and also sharing in the investment and on-going operating costs for the service. With regard to routing of payments, note that only in Switzerland has the banking system adopted a standard routing number scheme, which facilitates processing on the part of all parties to the transactions and, further, makes it easier for senders and receivers of payments to manage the exchange of bank and account number information needed to route the transactions efficiently and correctly. As described above, in the U.K. the banking clearing house provides bank routing information directly to the public.

[21] Online banking.
[22] Bank account number.
[23] Over-the-counter.
[24] International bank account number.

The last column in the table summarizes the price structures that apply to general purpose IFT. In each case except South Africa, the price structure is essentially "cost-plus," that is, fees are based directly on the cost of production plus a markup reflecting service value and profit. In the case of South Africa, the banks not only charge per transaction fees, but also an ad valorem fee component related to the value of the transaction, similar to payment card price structures. The two approaches to pricing highlight an important public policy question concerning the optimal way to price payment network services in the case where credit risk is mitigated through the use of the funds transfer model.

5. Issues with IFT implementation

The national introduction of IFT as a general purpose means of payment in the U.S gives rise to a number of considerations including business and public policy issues. Three primary issues are network reach, payment routing, and governance. Each of these considerations has practical implications for the feasibility of IFT as a new payment service and each is also important from a public policy perspective.

Network reach

As described in Section 2, IFT services are now available in the U.S., but are so far limited to closed proprietary networks. Clearing and settlement for these proprietary networks works efficiently only for the closed group of members who use a particular service provider's technology. In the case of a transfer destined for a receiver who is not a member of the proprietary network, the transaction must be routed through a traditional payment system, such as ACH, using the national banking network. From a public policy perspective, the emergence of multiple proprietary payment networks, each incompatible in terms of its unit of value and each having limited network scope, is not an efficient way to provide IFT service.

A national clearing and settlement mechanism, however, does not guarantee that the payment network supporting an instrument such as IFT will connect all deposit accounts. As illustrated by the case studies, bankers may not be required to provide the service to their customers by regulation or by the terms of their clearing house memberships. An obvious practical problem with voluntary network participation, well illustrated in the case of Faster Payments in the U.K., is that senders who wish to use the service are uncertain whether their intended receivers hold accounts at a bank that can receive IFT transfers. The size of the problem in practical terms can be described as X percent, which is the estimated proportion of customer accounts at banks that have not adopted Faster Payments. Because of this problem, it is necessary for senders to determine whether their intended receivers have accounts at banks that will accept Faster

Payments. A national directory sponsored by the U.K. clearing house is available online to help provide the information as efficiently as possible.[25]

While not the subject of this paper, the chartering and regulatory status of new, nonbank suppliers of payment services also has a bearing on the network reach issue. The innovators should not be prohibited from joining and helping stimulate improvements in the banking payment network, so long as they can meet basic tests of soundness and reliability, just as do regular banks. As members of banking clearinghouses and associations, the nonbank innovators would contribute to network's expansion. Moreover, to the extent that they innovate through the use of "disruptive technologies," these nonbank companies would stimulate technological innovation in services such as IFT. The U.S. financial regulatory authorities should consider how this innovation could take place.[26]

Payment routing

The principal operational advantage of payments such as checks and electronic direct debits is that payers are responsible for providing their bank routing information as part of the information that accompanies the payment instruction. On a paper check, for example, the payer's bank routing number and account number are printed in magnetic ink at the bottom of the check. Thus, the payment instruction automatically contains the data needed by the payee's bank to present the instrument for payment. Routing information is provided with debit card payment instructions as well. For electronic credits and IFT, the payer needs to obtain payee routing information and provide that information to its bank. Acquisition of this information presents additional complexity and cost, especially for transactions between two parties who are not well known to one another.

Account numbers are sometimes considered to be part of one's "transactional identity," which is sensitive information that should be protected. Because of this concern, receivers may be reluctant to give their account number to a payer for an IFT payment. Such concerns should not be exaggerated in the case of IFT, however. First, IFT results in money deposited to the receivers account, not withdrawn from it. Second, bank controls restrict access to accounts only to properly authenticated parties. Thus, the opportunity to fraudulently order an IFT based on knowledge of an account number and routing number is limited.[27]

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[25] The directory can be found at http://www.ukpayments.org.uk/sort_code_checker/.

[26] One approach would be to charter so-called "narrow banks" that specialize in payments. This approach has the advantage of encouraging innovation while at the same time prudently extending the public safety new of deposit insurance to new market entrants (Litan, 1987).

[27] In addition, some banks provide customers the capability to set up an account with a "debit block," which effectively prevents debits to an account. Debit blocks create an issue for payment reversals, which in a credit transfer system would need to be executed by a credit transfer initiated by the receiver.

As mentioned, paper checks contain complete routing information that is in plain view to anyone handling the check. This is prima facie evidence that routing information is not unduly sensitive. It is not considered so in the countries examined in connection with the four case studies. Further, it is notable that the IFT payment services provided by nonbanks often rely on widely known and used "addresses" for routing and information exchange over networks, including telephone numbers and e-mail addresses. The new approaches to routing appear to point to the serviceability of highly public addresses for transferring financial information, including funds transfers, in a strongly controlled environment with electronic security protections.

A somewhat broader issue that arises when considering routing of payments and the use of account numbers concerns standardization and portability of financial addresses. If bank account numbers are not standardized across the banking system and are not portable, bank numbers change whenever an account holder changes banks. Switching banks becomes more complex and because all established payment relationships must be updated with new account information. Progressive banking practice and good public policy call for both standardization and portability of bank account numbers, to increase the efficiency of the payment system and to increase competition among banks by making it harder to "lock in" customer relationships through high switching costs. This is not an unreasonable expectation in an information-intensive industry which indeed banking is. Public policy that is concerned with the efficiency and competitiveness of payment services could be informed by practices and expectations in other information-intensive industries, for example, telecommunications.[28]

Payment system governance

Each of the four case studies discussed in Section 4 provides an example of payment system innovation coordinated at the national level. The catalyst may be from the public sector (central bank or other governmental authority, such as the Office of Fair Trading in the U.K.), or the private sector (banking association, or consortia of commercial banks), but in each case IFT innovation was successful due to a governance approach that was national in scope. In addition, the governance approach in these cases recognized the boundary between cooperation and competition among banks.

This type of national, coordinated approach would be difficult to achieve in the U.S. in light of its highly decentralized payment system management, which is reflected in part by the absence of a truly national clearinghouse association. Currently, multiple publicly- and privately-operated payment systems operate in parallel in a competitive environment. Sweeping national change in the U.S. payments system in this century tends to come about through legislation – the 2003 passage of the Check Clearing for the 21st Century Act, which

[28] Mobile phone numbers, for example, are portable from one carrier to another.

facilitates electronic check clearing, and the 2010 Wall Street Reform and Consumer Protection Act, which mandates limits on fees that banks charge merchants for debit card transactions. Absent legislative mandate, it may be unlikely that banks cooperate to form a national IFT scheme. In addition, because IFT may disrupt banks' revenues from high priced wire transfer services, coordination and cooperation may not be readily forthcoming. Further, unless IFT clearing and settlement relies on existing mechanisms (as in the cases of Mexico and Switzerland), a national IFT system may have high start-up costs that the industry would be unwilling to bear. Overall, the complexity involved with implementing a national IFT solution may be unworkable with the U.S. banking system structure.

6. Conclusion

General purpose IFT is a means of payment that offers attractive combinations of attributes to both senders and receivers, such as, certainty, speed, control, and versatility, all at relatively low cost. There is evidence of strong latent demand for IFT in the U.S. by individuals, businesses, and governments, but to date this demand is being met only to a limited extent and principally by nonbank providers of payment services. To satisfy the demand for IFT it will be necessary to provide access to deposits held in banks by linking all bank deposit accounts through an immediate if not real-time clearing and settlement system.

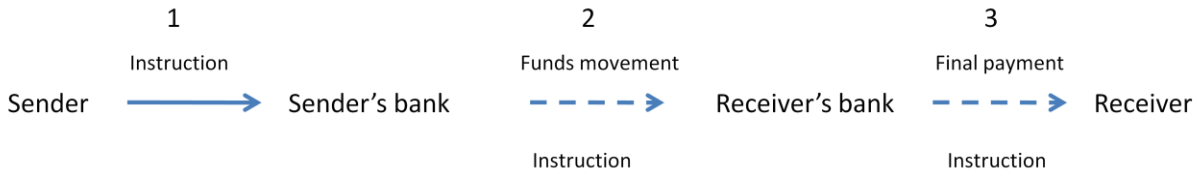
Within the last few years, IFT has become a fully functional nationwide means of payment in a number of countries, including four that are examined in detail in this paper. International experience with IFT shows that technology is a necessary but not sufficient condition for innovation in payments and that enabling real-time access to deposit accounts at banks is the key to meeting the public's needs for more certain, faster, and universal payment services. Perhaps the most critical enabling factor is strong sponsorship by a national body that takes responsibility for and has the ability to implement continuous improvement in the national payment system. This might be a consortium of private banks collaborating through a national payment association, a public authority such as the central bank, or, more typically, a public-private partnership. It is not clear that such sponsorship is can be readily achieved in the U.S., at least not at the present time. As a consequence, IFT and other national payment innovation is likely to progress in a halting and incomplete manner.

Appendix: Models of Payment Transactions

Two basic payment models frame the classification of all types of payment transactions. These are (1) credit transfers and (2) debit transfers. The end result of these transfers is the same; deposit money is transferred from payer to payee. The process that results in the transfer of deposit money, however, is quite different between the two models. For a credit transfer, deposit money is moved directly from a payer's or sender's transaction account to a payee's or receiver's account. Credit transfer is sometimes referred to as a "credit push" payment, meaning that money is delivered directly to the receiver based on instructions made by the sender to the sender's bank. For a debit transfer, deposit money is moved in a less direct manner, and requires the receiver to request a transfer from the sender's bank, based on authorizing instructions provided by the sender. Debit transfer is sometimes referred to as a "debit pull" payment, meaning that the receiver must present the sender's instruction to the sender's bank before deposit money is transferred.

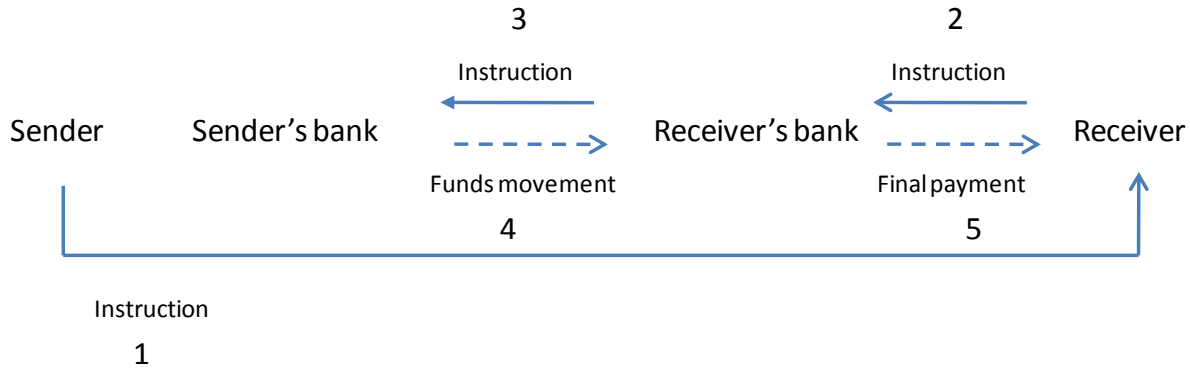
Operationally, payment transactions are more complex than described in the foregoing paragraph. For purposes of modeling, a generic payment transaction can be visualized as consisting of two discrete information flows involving "instructions" and "funds movement," which are illustrated in Figures 1 and 2 for credit and debit payments, respectively.[29] Instructions are shown as solid lines and funds movements are shown as dotted lines.

Figure 1: Credit Transfer



[29] Depending on the payment method and the system used, funds movement may also include data related to the payment such as invoice or remittance information and reference numbers.

Figure 2: Debit Transfer



For credit transfers, as shown in Figure 1, a sender instructs his/her bank to deliver funds to a designated receiver.[30] These instructions result in a debit to the sender's transaction account and initiate movement of funds from the sender's bank to the receiver's bank and credit to the receiver's account. For debit transfers, as shown in Figure 2, a sender does not directly instruct his/her bank to transfer funds. Instead, payment instructions follow a chain from sender to receiver, then from the receiver to its bank, and finally from the receiver's bank to the sender's bank to transfer money from the sender's account.[31] These instructions result in a credit to the receiver's account; however, because the receiver's bank is uncertain at the time instructions are delivered to the sender's bank whether the sender's bank will honor the instructions, final credit to the receiver's account is delayed by the time it takes the sending bank to determine whether it will honor the payment. Accordingly, funds transferred by the debit transfer method are typically made available to receivers as provisional funds and are subject to reversal. If the sender's bank honors the instruction, then the sender's account is debited and provisional funds become final. In both models the payment transaction is completed at the last bank in the instruction chain, which for credit transfers is the receiving bank and for debit transfers is the sending bank.

[30] The discussion in this paragraph closely follows Geva (2009).

[31] For both credit and debit transfers, one or more intermediary bank(s) may stand between a sender's bank and a receiver's bank to execute the transfer of deposit money. In addition, a sender in both models may use an agent such as a payroll processing company to initiate instructions on its behalf.

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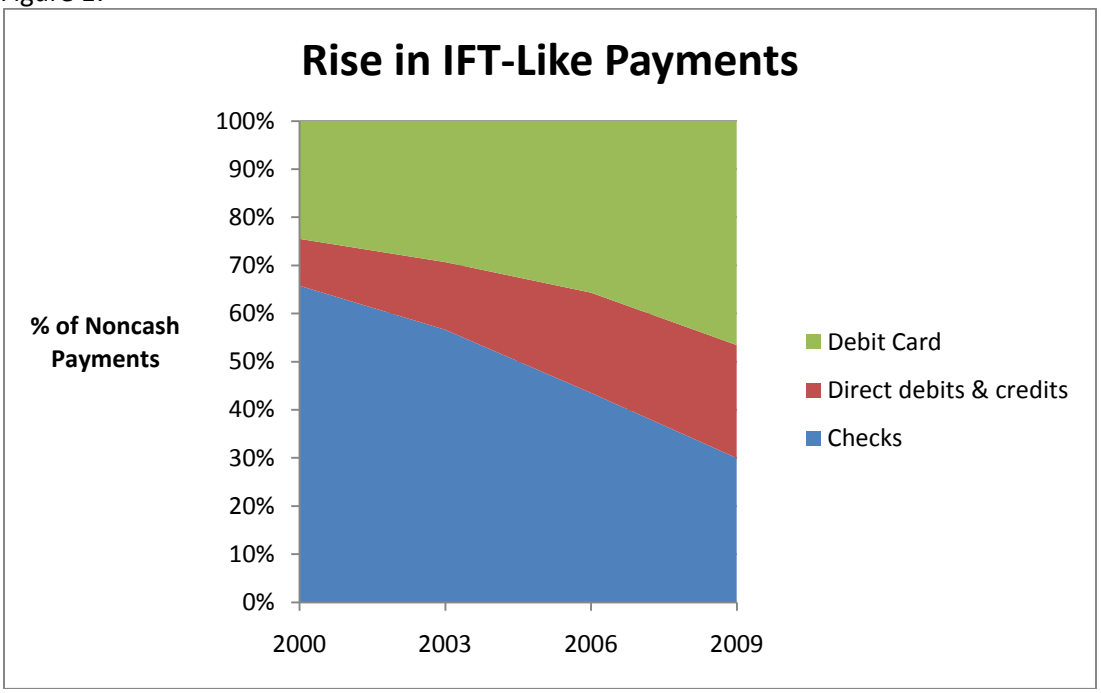
Figure 1:



Source: Federal Reserve Payments Study, 2010, 2007, 2004