Facilitating Consumer Payment Innovation through Changes in Clearing and Settlement

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The purpose of this paper is to stimulate thinking and action leading to innovation in clearing and settlement of consumer payments in the digital economy, where the public has come to expect immediate completion in all manner of information-intensive transactions. In keeping with the international theme of the Federal Reserve Bank of Kansas City's 2012 payments policy conference, the paper draws on the experiences of countries whose payment systems support immediate completion of consumer payments, and considers the policies and policy processes that are friendly to such innovation. In particular, the paper addresses concerns that the U.S. payment system is not keeping up with the rest of the digital economy in providing new methods of payment that give consumers immediate access to and use of their deposits held in accounts with banks and other deposit-taking institutions ("banks" for short).

The financial system and broader economy depend on payment system innovation for their smooth functioning, including and especially innovation in the way payments are cleared and settled. Innovative development of clearing and settlement infrastructure requires cooperation among private and public stakeholders in the payment system, and competition among payment service providers using that infrastructure. Public policy should help establish the boundary between cooperation that develops and implements far-sighted strategy for shared clearing and settlement methods and infrastructure, and competition in the delivery of payment services to consumers. While competition appears vigorous, cooperation resulting in far-sighted development of clearing and settlement infrastructure is not. Rather, infrastructure investment is concentrated on fine tuning clearing and settlement infrastructure that supports existing methods of payment, not on meeting present and future needs of the digital economy.

In the following sections, the first posits assumptions that are fundamental to a discussion of clearing and settlement of consumer payments in the digital economy. The next presents a framework for analyzing issues related to the design

and operation of clearing and settlement infrastructure, and to its use by suppliers of payment services, including policy development and governance issues. This is followed by a discussion of public policy considerations that should motivate and guide the development of clearing and settlement processes and supporting infrastructure in a digital economy. The fourth section then presents a reference model for clearing and settling consumer payments in a digital transactions environment. The fifth section addresses governance problems that explain the U.S. payment system's failure to keep up with the needs of the digital economy. Finally, the concluding section recommends actions that the U.S. Congress, Federal Reserve Board, Federal Reserve Banks, and other payment system stakeholders need to take if the U.S. payment system is to keep up with the changing needs of the digital economy.

Fundamental Assumptions

It is important to begin with some shared assumptions about the needs of consumers using the payment system in the digital economy. Explicit assumptions will help ground debate about public policy and operational design in the reality of consumer needs. Three assumptions that are fundamental to the public policy themes underlying the paper are posited below. While some of these assumptions might be challenged, each is plausibly based in observed changes in consumer behaviors and the use of digital information services in different countries around the world.

Consumers include individuals, businesses, and governments

The subject of this conference, consumer payments in the "connected age," focuses on increasingly immediate connections between consumers who are economic actors and involved in monetary exchange. These consumers include individuals, businesses, and local, state, and federal government entities whose increased connectedness is enabled by social networks (for example, Facebook), business networks (for example, LinkedIn), and a variety of other broadly accessible and "always on" communications channels. This paper takes a broad view of consumers and of their economic connections. Consumers may form various combinations of connections to make and receive payments for a variety of purposes in markets for goods, services, and information. The relevant payment combinations for these connected consumers include all payments with an individual, business, or governmental entity on one or both sides as sender and receiver, such as person-to-person (P2P), person-to-business (P2B), and person-to-government (P2G) payments.

Consumers value immediate completion of digital transactions

Consumer expectations regarding access to and the usability of their information assets have changed markedly in recent years, as they have become more

connected. Today, almost all types of personal, business, and financial records, including assets held in the form of bank deposits, are stored in digital form and are accessed through digital communications systems. Information-intensive businesses models provide, and consumers have come to value and expect, immediate completion of transactions at the time they are made, including many types of financial transactions.

A completed payment is one that is final—that is, irrevocable by the sender and available for unconditional use by the receiver. Methods of payment that provide immediacy and finality have historically been thought of as highly specialized and useful only for large-value payments. The attractiveness of immediate and final payments to consumers for general-purpose use, however, has been recognized for at least a decade (Kuttner and McAndrews 2001). Shifting consumer preferences in the United States for direct access to bank deposits and completion of payments immediately at the time they are made is evidenced in a variety of research, including findings from focus groups assembled by a committee of the Board of Governors of the Federal Reserve System (Board of Governors of the Federal Reserve System 2002a and 2006a). More recent research shows that the banking systems in a number of countries now provide consumers with a method of payment that is immediate and final, known as Immediate Funds Transfer or IFT (Summers and Wells 2011). There is evidence of strong adoption of Immediate Funds Transfer where it has been introduced.[1]

Consumers value a versatile and universal method for making payments

As was mentioned earlier, consumer payments involve all combinations of payments with an individual, business, or government entity on one or both sides as sender and receiver. These payments reflect transactions for goods, services, and information and account for the lion's share of payment transactions.

U.S. consumers value, and have come to rely on, a method for making and receiving payments that is versatile, that is, the method can be used to pay for any type of transaction between any combination of consumers. Consumers also value, and have come to rely on, a method of payment that is universal, that is, the method connects them through their bank accounts no matter where or how frequently they interact. This method is checks, which is relied on by U.S. consumers because it is versatile and connects the accounts they hold in banks. There is a national clearing and settlement infrastructure for checks connecting all banks, and all banks have historically offered checks to their customers as a method of making and receiving payments. Indeed, current or demand accounts in banks are typically referred to as checking accounts. Checks, however, are rapidly declining in use (Gerdes 2008). The use of checks is declining as consumers adopt more specialized, but usually less versatile methods of payment whose connections to bank accounts and other consumers are limited.

The value of a versatile and universal method of payment such as checks is likely to increase in the digital economy, where consumers make connections in various combinations and in borderless markets for information, goods, services and financial investments. While some immediate and final payment services are being introduced in the United States, their clearing and settlement is limited to proprietary and closed networks that do not connect all consumer bank accounts. Rather, the reach of these services is limited to smaller groups of consumers who hold accounts with a small number of banks participating in a proprietary system or to a given bank's customer base (so-called "on-us" payments). Nonbank providers also offer immediate and final payment services that are substitutes for bank payment services, but again it is over closed networks (analogous to bank "on-us" payments). This pattern of innovation results in new service options including immediate completion of payments, but it fragments the universal clearing and settlement network. A strategic challenge is to combine immediacy and finality of payment with the versatility and universality of the check.

Framework for Analyzing Payment and Settlement Issues

A four-part framework is useful in analyzing payment system issues, including and especially issues pertaining to end-to-end clearing and settlement of consumer payments. Consumer end-users of payment services are the starting and finishing points of the end-to-end clearing and settlement process. This framework will help determine why and where cooperation and competition are important to payment system development, and the appropriate scope of oversight and regulation. The four major components of the framework include the *payment system, payment schemes, payment infrastructure,* and *payment services.*

The *payment system* is the network of endpoints represented by deposit accounts in banks. Payment is completed by transferring claims on banks recorded in deposit accounts. As such, payment is a function of money and banking in a nation's financial system. Transferable deposits are known as bank money, and payment and bank money are "…closely linked by law, regulation, and tradition." (Mitchell 1974). The nation's noncash money supply is stored in deposit accounts and bank money's usefulness as a medium of exchange depends on the transferability of deposit money between accounts. Deposits and bank money are, as we know, digital information records in accounts, and payments are bank money in transit, or digital instructions for the transfer of deposit balances. Banks become part of the payment system by agreeing to clear and settle a particular method of payment through customer accounts. As is the case with other information networks, participation in the payment system will always ideally include the universe of banks.

Payment schemes specify payment instruments by which the public gains access to the payment system, that is, the methods by which payments are made and received using deposit accounts in banks. Payment schemes establish the rules and standards that precisely define the operational processes and behaviors which, when followed, allow the public to access the payment system using any given

payment instrument. Laws and regulations also help define schemes, for example, by allocating liability for errors or fraud losses associated with electronic methods of payment. Types of instruments defined by schemes include checks, credit cards, debit cards, online banking applications, etc., and now in some countries Immediate Funds Transfer, each of which requires those involved in its use to follow a set of rules and standards. Schemes may and often do limit the versatility of a payment instrument, for example, payment cards are designed principally for P2B and P2G transactions. As mentioned earlier, use of the check is not limited to a particular combination of consumers or type of transaction, but rather is designed as a versatile instrument that consumers can use to make payment for virtually any purpose. A scheme's rules and standard specify how a particular instrument is cleared and settled and in particular whether the payment is a credit transfer or a debit transfer.[2]

Payment infrastructure supports clearing and settlement of payment instruments across the payment system. Clearing is the exchange of instructions for transferring claims on banks. Settlement is the actual transfer of value ordered in the instructions, which is accomplished by debiting and crediting the deposit accounts of the sender and receiver of a payment, respectively. Clearing and settlement are arcane processes which are the province of operations specialists. Perhaps for this reason, the attention that is given to clearing and settlement is often narrowly focused on the interbank part of the process with less attention given to the end-to-end process that includes the bank-to-customer. An end-to-end view of clearing and settlement infrastructure is especially important for methods that provide immediate completion of payments, as consumers rely on the transfer of deposit balances and immediate notification that their transfers are completed. The clearing and settlement infrastructure should always be viewed as supporting a universal network connecting all deposit accounts held in banks and as an end-to-end process that includes immediate notification to both the sender and receiver that the payment transaction is complete.

Payment services are the specific means by which banks provide their customers with access to their deposit accounts for payment purposes, using instruments specified by various schemes. Banks extend payment services to their customers through back office links to clearing and settlement infrastructures that support schemes. The range of payment instruments that a bank offers and which consumers can use to make payments from and receive payments into their deposit accounts depends on the number of schemes in which a bank participates. The quality and price of service experienced by consumers are determined by the attributes of the scheme, the effectiveness and efficiency of the interbank clearing and settlement infrastructure, and the bank's terms for extending access to the payment system to its customers. For example, it was noted earlier that checks universally connect consumer deposit accounts across the banking system, and that checks can be used to pay for any type of transaction involving any combination of consumer. The physical form of a check, its information content, and certainty that it will be cleared and settled by all banks are features that are well understood by consumers.

Banks compete for the consumer's business in part by distinguishing their check services on the basis of convenience (e.g., completeness and timeliness of check statements, acceptance of customer-generated check images, etc.), credit features (e.g., overdraft protection for check writers), and the prices they charge for writing checks and accepting checks for deposit.

This four-part framework helps define the primary roles played by those responsible for making the payment system work and for innovating to meet consumer needs. The roles include planning for the evolution of the payment system, management of payment schemes, "nuts and bolts" operation of the clearing and settlement infrastructure, and of course the provision of payment services to the public. The first two roles—planning the evolution of the payment system and scheme management—involve stewardship for common interests and shared resources, which, in the final analysis, will be judged successful if they meet public needs. Planning addresses big-picture issues, such as the type and number of schemes that the payment system should support. Major issues today include the speed with which payments are cleared and settled, and development of a versatile and universal method of payment to replace checks. Another planning issue concerns the requirements and regulations that apply to nonbank participants in the payment system, who are the main digital payment innovators. As common interests, the payment system and its schemes require a high degree of cooperation among stakeholders to be successful. In addition, because they determine the usefulness of bank money as a medium of exchange and constitute a network that serves the public interest, the payment system and schemes require some oversight by a public body like a central bank (Summers 2012).

The U.S. payment system does not currently support immediate completion of payments, and there are no plans for doing so despite long-standing evidence of the need for such a capability and development of these capabilities elsewhere around the globe. While there is innovation in immediate payments, it is limited to small closed systems operated by nonbanks, or to small closed systems operated by individual banks or consortia of a handful of banks. Developing a national capability for immediate completion of payments will require far-sighted and inclusive stewardship over the payment system. Stewardship must be national and involve all major stakeholders. Note that fragmented development of new immediate payment capabilities is occurring at the same time that checks are declining in importance as a means of payment. Fragmented development of a new method of payment supporting immediate completion of funds transfers represents a missed opportunity for creating a viable substitute for the check as the check declines. A later section of this paper assesses the prospects for immediate completion of consumer payments in the United States.

Public Policy Considerations

This section discusses public policy considerations that should motivate payment system development in a digital economy and be used to evaluate its

performance, especially clearing and settlement. The discussion begins with an overview of central bank policy principles for payment systems and how these principles are applied to consumer payments. Four paramount principles are then described that will help guide the design of a reference model for clearing and settling consumer payments in a digital economy.

Payment system policy has an international basis

The international community of central banks has promulgated a number of public policies pertaining to the payment system through the Committee on Payment and Settlement Systems (CPSS), which meets at the Bank for International Settlements (BIS).[3] These policies include standards of conduct and other related payment system guidance. The international standards of conduct are primarily intended for systemically important payment systems, that is, payment systems that have the potential to transmit disruptions to the financial markets and even to the broader economy (BIS 2011a). Some of these international standards, however, are relevant to the design and operation of consumer payment systems.

The international standards are meant to foster financial stability, and their main goals are safety and efficiency. The standards are elaborated in an official set of performance expectations for payment systems and institutions whose weakness or failure would pose risks to the financial system as a whole. These systemically important institutions are referred to by the BIS as Financial Market Infrastructures (FMIs); they include large-value payment schemes (such as Fedwire and CHIPS in the United States) as well as central securities depositories, securities settlement systems, central counterparties, and trade repositories.

Some countries have begun to apply the BIS standards, at least in part, to retail and other payment systems serving consumers that are considered important to the smooth functioning of the economy. For example, the Eurosystem (the European Central Bank and the National Central Banks together) has adopted a classification scheme for retail payment systems based on these systems' importance to the economy, and has designated a new classification, "prominently important" (European Central Bank 2003). In the United States, the Board of Governors of the Federal Reserve System (hereafter the Federal Reserve Board) applies the BIS standards to systems and institutions that it considers to be systemically important, primarily institutions that serve the financial markets, but not to consumer payment systems.

Consumer payment systems require policy attention

Payment systems serving consumers are a crucial part of the infrastructure of a modern economy and, as such, require direct public policy attention. Public policy for consumer payments should consider central bank concerns about the stability of the financial system and the broader economy, and the needs of consumers in the digital economy.[4] Four policy considerations appear paramount in motivating responsive development of payment systems serving consumers: financial stability,

operational reliability and security, effectiveness, and efficiency (Summers 2012). Each consideration is elaborated below in terms of its practical implications for the design of clearing and settlement infrastructure that supports immediate completion of consumer payments. This discussion of public policy considerations is not necessarily intended to be definitive; rather, it is intended to suggest a way of thinking about payment system design with the needs of consumers in a highly connected digital economy at the forefront of thinking.

Financial stability depends on the predictability of final consumer payments

A payment system is financially stable if it is likely to engender public confidence and continue functioning normally when subjected to severe stresses, including credit and liquidity crises faced by its participants. Financial stability for consumer payments is a function of the safety of deposits consumers hold in transactions accounts in banks (money as a store of value) and the predictability that funds transfers between their accounts will be completed as instructed (money as a medium of exchange). Consumer confidence in being able to continue to access deposit accounts in banks to make and receive payments is in part a function of the federal safety net that guarantees bank deposits. Consumer confidence that funds transfers made and received are completed predictably is a function of speed, finality, and timely notification. Finality is determined by the terms under which banks provide account and payment services to consumers. By participating in a payment scheme that supports immediate and final clearing and settlement, banks will provide a service that buttresses consumer confidence in the payment system.

The willingness of receiving banks to extend finality to their customers depends in part on their ability to manage credit and liquidity risks faced from sending banks. The stability of interbank settlement can be readily managed using tried and tested clearinghouse risk management practices, including and especially those used with multilateral netting. Because the financial stability of payment systems that clear and settle consumer payments is an important public policy consideration, it is incumbent on public authorities to lay out the minimum financial stability standards that these payment schemes and their clearing and settlement arrangements should meet.

Operational reliability and security is an end-to-end consumer experience

An operationally reliable and secure payment system is one that delivers uninterrupted service to its customers according to contracted terms, and that protects their information assets. End users will gauge the reliability and security of a digital payment system based on their personal experience with it and by comparing it to what they have come to expect through using other digital services. Consumer experience in the digital economy therefore results in de facto performance

standards for digital payments. For example, consumers in the digital economy expect continuous and uninterrupted connectivity and access to their information assets. Further, consumers expect strong protection of their information assets and transactional identities.

In a digital transaction, operational performance and security must be managed and measured end-to-end, from the sender to the receiver of the digital payment. The operational process incorporates the sending and receiving banks and the clearing and settlement infrastructure. The payment scheme's design, and its rules and standards, must, therefore, result in a continuous governance of the end-to-end process between the payment sender and receiver, regardless of the number of operational handoffs. To meet consumer expectations for uninterrupted service, every step in the process, including the communication channels linking the sender and receiver to their respective banks, must contribute its part to meeting the end-to-end performance expectations.

The bar for digital payment security is set very high: expectations are that valuable consumer information will be well protected throughout the payment process. This expectation cannot be overemphasized. From a consumer standpoint, and assuming a payment process based on credit transfer, there are two scenarios around which security should be built. First, senders of digital payments need to be protected against the threat of an unauthorized party gaining access to their account and transferring funds from it. This threat involves a compromise of the authentication process between a sender and the sender's bank, possibly in the form of account takeover. Second, the sending and receiving banks need to be protected against the threat of unauthorized payment instructions being inserted into the interbank clearing and settlement process. If this threat were realized, the sending and receiving banks could be tricked into acting on bogus payment orders that take time to identify, reconcile, and correct, exposing them to losses if deposits made by final payment are withdrawn.[5]

Effectiveness is influenced by speed, versatility, and universal coverage

The effectiveness of a particular method of payment depends on how well it meets the convenience and needs of individual and business consumers in the digital economy. Among the payment attributes that consumers look for, speed in completing transactions, versatility in the use of a given method of payment, and universal connectivity to accounts held in banks are of special importance in the digital economy.

Speed is an especially important consideration for payments in the digital economy. Consumers expect virtually immediate completion of their digital transactions. The idea that money in transit is digital information which can be processed immediately has not been readily accepted by the banking industry. Most

bank-sponsored payment schemes depend on clearing and settlement systems that are designed around batch processing and delayed settlement, and these clearing and settlement arrangements are being nurtured as opposed to being re-designed around continuous, real-time processing.

The time needed to complete the end-to-end sequence of steps involving communication of payment instructions, verification, risk management, and accounting and settlement can be greatly compressed for digital credit transfers. The time compression enabled by digital technology and processes is such that clearing and settlement can and should be thought of as one continuous process. Properly designed and executed, clearing and settlement of digital payments will benefit all parties to the transaction, including not only end users, but banks as well. For banks, digital payments present an opportunity to better manage their credit risks by integrating real-time monitoring of customer balances with internal risk management processes.

As mentioned earlier, a versatile method of payment can be used for a wide variety of transactions between any combination of consumers (P2P, P2B, P2G, B2B, etc.). There are trade-offs between versatility and specialization, however, and not every method of payment needs to be or should be developed around meeting every conceivable need. For example, a file transfer method of payment that caters to recurring bulk transactions, such as corporate payrolls, provides specialized benefits that make it very valuable to a particular type of use and user. Also, prepaid cards may be especially well adapted for very small purchases whose only practical alternative method of payment is cash. But, there should be at least one method of payment available that is versatile enough for consumers to use ad hoc and for transactions that do not fit a particular mold.

Universal connectivity is a baseline requirement of any new digital payment scheme. This requirement is not uniquely associated with digital networks and is, in fact, a distinguishing feature of the check system in the United States (Board of Governors of the Federal Reserve System 2010b). Universal connectivity is an important inherited trait from checks that should be present in a digital payment system. Universal connectivity depends on an interbank clearing and settlement system linking all deposit account holders, and participation by each and every one of the account holding banks as a provider of the method of payment defined by the digital payment scheme.

Efficiency is determined by prices and operational standards

For consumers, payment system efficiency is determined in the first instance by the prices they are charged for services. An additional dimension of efficiency is the extent to which ease of use translates into concrete opportunities to integrate management of financial processes, accounts, and other records that are closely linked to payment.

Prices charged for consumer payment services are a function of their full cost of production and the market power that banks have over their customers. With regard to production cost, banks shoulder a share of the cost of managing the payment scheme and the infrastructure used to clear and settle a particular method of payment. They also bear the cost of internal deposit accounting and payment processing systems, and related back-end systems such as risk management, general ledger accounting, and the like. As deposit-taking and payment institutions, banks are information-intensive businesses and their production costs are therefore largely fixed costs (or should be largely fixed costs, if they are well-managed businesses). Accordingly, banks enjoy economies of scale and scope in their payment businesses that result in lower marginal costs as transaction volume increases. One would expect to see relatively low prices for digital payment instruments following scheme standards that support straight-through processing and being provided in a competitive banking environment, especially once the volume of payments grows. It is essential, however, that the scheme specify standards that extend end-to-end, so that banks are able to continue straight-through-processing to the end user customers.

While many banks provide payment services and there are indications of vigorous competition among banks in the payment services arena, competition among services providers is not perfect. In particular, not all payment schemes establish standards for the bank-to-customer component of clearing and settlement, which leads to inefficiency in the provision of payment services and opportunity to levy extra service charges that mask inefficiency. For example, operational standards for real-time Fedwire and CHIPS payments extend only to banks and not to end-user customers, which is one explanation for the very high prices that banks charge their customers for access to these two payment schemes (Biehl et al 2002). Also by way of example, while banks may compete vigorously for consumer account relationships, they also make it difficult for consumers to switch banks once these relationships have been established. This difficulty is again due to lack of standardization, this time in account numbering conventions and to industry practices that prevent consumers from retaining their account numbers when they change banks (unlike the portability of telephone numbers that benefits consumers in the telecommunications market). Factors such as these may help explain the high prices banks charge for real-time payments today.[6]

Payment schemes' owners and infrastructure operators also have monopoly power that can be used to set prices far above their production cost. There is abundant evidence of clearing and settlement pricing that is based not on production cost but on methods designed to extract very high returns for use of the infrastructure. Perhaps the most prominent example is ad valorem pricing for payment methods that essentially involve giving bank account holders direct access to their deposits and that do not entail bank credit, as in the case of debit cards.[7]

Smooth integration of payment-related information with business records is another important efficiency consideration. The timeliness and potential accuracy of digital payments are maximized when record keeping is synchronized bilaterally between the sender and receiver of payment, allowing both to complete their handling of a transaction in the same timeframe. For individuals, this amounts to maintaining a continuous record of account activity for both incoming and outgoing payments. Businesses further benefit from integration of payment and invoicing records, which allow close coordination of payment processes and invoicing processes.[8]

Clearing and Settlement Reference Model for Immediate Funds Transfer

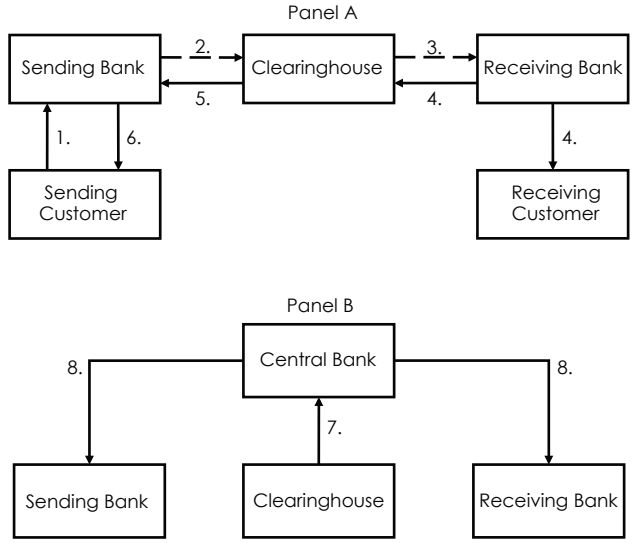
Having posited assumptions about consumer payment needs in the digital economy and reviewed public policy considerations for developing the payment system with the needs of the digital economy in mind, it is now possible to construct a reference model of a payment scheme that meets needs and addresses public policy considerations. The payment scheme should support payments that are immediate, final, and low cost, and that are priced to the consumer at production cost plus a reasonable markup. The scheme should also provide a versatile payment instrument that can substitute for check payments. Ideally, all banks should support the payment scheme by providing the scheme's method of payment as a service. The payment scheme would support a new type of payment instrument—call it Immediate Funds Transfer or IFT, as in "pay by IFT," akin to saying "pay by check." The IFT scheme is intended for any combination of consumer payments between individuals, businesses, and governmental entities.

The model described here is conceptually appropriate for immediate and final funds transfers. This model is fully operational and tested in a number of countries around the world (Summers and Wells 2011). In fact, cumulative evidence suggests that IFT is the predominant new type of payment system in development around the world, in both advanced and developing economies.[9] Experience shows that the IFT model is scalable and can support high volumes of transactions while meeting demanding operational quality targets including rapid end-to-end completion times and strong security. Further, experience shows that IFT can be produced at unit costs consistent with prices consumers are willing to pay for such payments. The clearing and settlement process on which the model is based is end-to-end and depends on scheme rules and standards, promulgated by a clearinghouse, that support straight-through processing and that are followed throughout the process by every entity playing an operational role.

The IFT clearing and settlement model is shown in Figure 1. Six parties play roles in clearing and settlement: the sending and receiving bank customers, their banks (assuming an interbank transfer), the clearinghouse, and the central bank. It is important to recognize at the outset that the clearinghouse role can

Figure 1

Clearing and Settlement Reference Model Immediate Funds Transfer*



There are six main steps in the end-to-end clearing and settlement process for customer IFT transactions depicted in Panel A, and two additional main steps in the interbank clearing and settlement process depicted in Panel B. These steps are as follows.

1. Sending customer transmits an IFT payment order to his/her/its bank

2. Once the sending bank accepts the payment order by authenticating its customer, performs a credit check (for sufficiency of funds or credit capacity), and assuming a satisfactory credit check, it then debits its customer's account and transmits the validated payment order to the clearinghouse

3. Once the clearinghouse accepts the payment order by validating the correctness of the clearing instructions (completeness of mandatory fields, correctness of receiving bank address, etc.), performs a credit check (to ensure that the sending bank's interbank net debit position is within limits), and provisionally records the payment order details and resulting interbank net debit and credit effects for the sending and receiving banks, respectively, it then transmits the payment order to the receiving bank

4. Once the receiving bank validates its receiving customer's account information and credits the receiving customer's account, it then notifies both the receiving customer and the clearinghouse that the payment has been credited (N.B. at this point final settlement has occurred for the end-user customers)

5. Once the clearinghouse removes the provisional designation from the record of payment order and interbank net debit and credit positions, it then notifies the sending bank that the payment is complete

6. Sending bank notifies its sending customer that payment is complete

7. Clearinghouse submits interbank settlement statement to the central bank reflecting net debit and credit positions resulting from customer IFT payments completed during the settlement period

8. Once the central bank acts on the settlement statement by making debit and credit entries to reserve accounts and thereby finalizes the interbank settlement of payments accumulating during the settlement period, it then notifies the sending and receiving banks and the clearinghouse

* This is a stylized IFT clearing and settlement model that is based in part on Faster Payments in the United Kingdom and Real-Time Clearing in South Africa.

be performed either by a privately owned and operated entity, or by the central bank. In the former case, the clearinghouse would provide the interbank clearing functionality and serve as settlement agent on behalf of its participating banks, calculating interbank net settlement positions and presenting settlement statements to the central bank at designated times. In the latter case, the central bank would provide both interbank clearing functionality and settlement: settlement would likely occur payment-by-payment, directly in the banks' reserve accounts, as is the case today for RTGS system payments. This paper is neutral on the question of the private versus public character of the clearinghouse. The IFT clearing and settlement model presented here assumes a private clearinghouse because this approach allows ready distinctions between final settlement of customer transactions using commercial bank money, and final settlement of interbank obligations arising from IFT payments using central bank money.[10]

In Figure 1, clearing and settlement of customer IFT transactions is shown in Panel A, and clearing and settlement of interbank obligations arising from customer IFT transactions is shown in Panel B. Movements of information and funds are illustrated using solid and dashed lines, respectively. The timing, sequence, and legal status of the operational processes shown in Figure 1 are critical to understanding settlement finality for the end users on the one hand, and for their sending and receiving banks on the other hand. Note in particular that the sending and receiving banks provide final settlement to their customers (see Panel A) before they themselves settle their interbank positions arising from the IFT clearing (see Panel B). Panel A depicts the end-to-end process whereby the sending customer of one bank originates an immediate funds transfer to the receiving customer of another bank, for which both customers receive final settlement in commercial bank money and immediate notification that the funds transfer has been completed. Panel B depicts the interbank settlement process for all IFT payments made by bank customers within a designated timeframe using central bank money.[11]

The processes illustrated in Panel A that result in finality of payment for the sender and receiver are operationally and legally binding on the sending and receiving banks. These processes will be detailed in the clearinghouse rules. The end-to-end process is continuous and immediate, and each party will be bound by operational performance requirements pertaining to each step, as is commonly the case for all joint undertakings of this nature. The entire end-to-end process, beginning with initiation of the payment order by the sender and concluding with the notification to the sender that payment is complete, will take no longer than one minute and probably be completed in seconds. While the speed of IFT clearing and settlement is demanding in comparison to traditional clearing and settlement timeframes, experience shows that the common time unit of measure for completing IFT transactions is seconds. Banks are required by agreement to provide final settlement to their customers within the time it takes for the round trip to be completed. The point at which an IFT payment becomes final is when the receiving bank credits the receiving customer account.

The processes illustrated in Panel B result in final settlement among the sending and receiving banks (while the stylized model includes only two banks, many banks would participate and all would be party to the interbank multilateral settlement). It is reasonable to think that banks will want to settle their obligations arising from IFT clearing in a distinct process that mirrors their settlement practices for other real-time payments. Interbank settlement of IFT payments can, and probably will, occur several times during the operational day.[12] Banks have the option of shortening the interbank settlement period as IFT schemes grow in terms of value processed, to the point of converging on immediate settlement of their IFT obligations. Further, oversight authorities will undoubtedly take an interest in the development of IFT, including the risk management implications of interbank settlement practices.

End-to-end clearing and settlement illustrated in Figure 1 can only be completed in the IFT timeframe with virtually instantaneous communication of information in each step of the process. It is not unrealistic to expect that the information flows will be both fast and inexpensive. It is worth noting, however, that communication processes between banks and their customers, and banks and the clearinghouse, need to be seamlessly coordinated. This is readily accomplished for the interbank communications which will take place over a shared communications facility that is coordinated by the clearinghouse. It is possible (but not necessary) that the sending and receiving banks share communications facilities for reaching their respective customers. Banks are likely to compete in the market for IFT services partly on the basis of the channels for access to deposit accounts that they provide to their customers.[13]

Is the IFT clearing and settlement process illustrated here likely to deliver services at a cost that is ultimately attractive to consumers? Based on experience with implementation of the model by banks in a number of countries, and by nonbank payment services providers in the United States, the answer is yes. Bank implementations of IFT schemes are almost always priced to customers on a per transaction basis, or through fixed fees charged for a package of account-related services. Using the per transaction fee as a basis for judging the order of magnitude cost and price that would be expected to result from the introduction of a de novo IFT clearing and settlement system based on what is observed in countries where IFT has been introduced, one would expect the price to consumers to range from 50 cents to $2.50 (Summers and Wells 2011). Prices in this range would be expected to fully cover operational expense, associated risk management costs, normal overhead allocations, and profits.

Payment System Governance and Innovation

The foregoing discussion shows that the U.S. payment system has yet to accommodate the shift in consumer behavior in the digital economy. It has also been shown that the United States is lagging in the development of consumer payment methods that are increasingly expected in the digital economy. The needed payment system response is illustrated with an IFT reference model that supports

payment connections for all combinations of consumers across all account holding institutions; IFT is up and running and is commercially successful in a number of countries. There are no evident prospects for lifting the present payment system in the United States into a new, IFT-like payment scheme.

Market acceptance, technology, and cost do not appear to be barriers to rapid adaptation of the U.S. payment system to the digital economy. The principal barriers involve coordination in planning and developing clearing and settlement infrastructure and related end-to-end payment schemes that threaten existing business models. The IFT model shows that the new clearing and settlement infrastructure requires seamless and impeccable end-to-end coordination in a real-time operational setting. This type of operational coordination is new to banking, longstanding experience with RTGS notwithstanding.

Further, public policy considerations call for explicit pricing of IFT payments based on production cost. This approach is consistent with utility pricing, and it challenges the current practice of ad valorem pricing of some payment methods used by consumers to access deposits (e.g., debit cards). Cost-based pricing would likely result in IFT transaction fees that are much lower (perhaps up to 20 times lower) than similar fees typically charged on bank wire transfers. Obviously, IFT would pose significant challenges to current wire transfer business models, especially because most wire transfers are made by banks on behalf of their customers and are relatively small (Biehl et al 2002). As well, IFT would challenge the business models of consumer payment networks that charge ad valorem prices for directly accessing deposit accounts.

Payment system development that is responsive to the needs of the digital economy and public policy considerations, along the lines of the IFT, will require clear-minded and far-sighted planning, cooperation in the development of payment schemes and clearing and settlement infrastructure, and vigorous competition among providers of IFT services. Is existing payment system governance in the United States capable of developing a broadly supported strategy responsive to the needs of the digital economy and fostering the degree of cooperation needed to devise and implement a new IFT payment scheme? That is the big question.

Governance lies at the heart of payment system development

Governance is about decisionmaking and the allocation of rights among stakeholders with shared interests. Effective governance allocates rights and allows stakeholders to influence decisions in ways that are, and that are perceived to be, fair, sensitive to the needs of each stakeholder group, and in line with the public interest. There is no single governance model for the payment system that is suitable across countries. However, the experiences of countries that have dramatically uplifted their payment systems with IFT offer some interesting case studies and lessons.

National government is the prime mover and enabler in establishing formal governance of the payment system in a number of other countries, including

Australia, Canada, the eurozone, and the U.K. National legislatures or government executive bodies such as the Treasury are moved to address contention among payment system stakeholders, acute consumer protection concerns, the inability of the payment system to innovate and adapt to changing consumer needs, or lack of competition. Commonly, governments act by forming a national commission to study and make recommendations to improve the national payment system, reporting to the legislature or the executive branch.

The recent experience of the U.K. is instructive, as the government's action was prompted by concern about lack of competition in the banking system, resulting in part in a failure to innovate by speeding up clearing and settlement of payments (Smee 2012). The U.K. is one of the countries where IFT has been successfully introduced. The report of a national commission ultimately led to the establishment of the U.K. Payments Council (Cruickshank 2000). The decision to formalize payment system governance arrangements in the U.K. was predicated on the idea that the payment system is part of the critical infrastructure supporting the economy and as such requires strategic planning. In addition, the decision was based on a perception that payment system practitioners, that is, scheme owners and operators, and users, were not communicating or cooperating well. Concerns about competition were reflected in the perception that there was insufficient innovation in the payment system, and in particular failure to speed up clearing and settlement times, despite increased use of electronic means of payment. New governance arrangements were envisioned that would result in commitment to innovation.

The U.K. Payments Council was established in 2007 with the mandate to develop a strategic plan and designate payment schemes. The Council's board includes independent directors who are expected to represent the public interest across user groups, not specialized interests such as corporations or individuals. The Council's business is conducted in a transparent manner, and it relies on consultative mechanisms to engage all stakeholders with an interest in the payment system. Subsequent to its establishment in 2007, the U.K. Payments Council issued a National Payments Plan in May 2008, which was updated in October 2011, and designated the Faster Payments scheme in May 2008. Faster Payments is the first new payment service in the U.K. in 20 years.

The U.S. payment system lacks national governance

Foundational to understanding today's payment system governance in the United States is awareness of its historical antecedents, notably the origins of the Federal Reserve System established in the 1913 Federal Reserve Act (Board of Governors of the Federal Reserve System 2005). Congress intended for the new central bank to play an operationally active and dominant role in the payment system of the time, in part by unifying clearing and settlement across the nation. At the time, the check was the predominant noncash means of payment and was used principally in business and banking transactions. The central banking system created by Congress included the Federal Reserve Banks, whose powers included the

provision of payment services, and the Federal Reserve Board, whose powers included supervision of Reserve Bank affairs and regulatory authority over the operational services provided by the Reserve Banks, including payment services.

Practically speaking, the Reserve Banks were designed to function as the national clearinghouse for checks. In today's terminology, the Reserve Banks were empowered to be check system operators, and the Federal Reserve Board and Reserve Banks together were scheme owners, as they issued, respectively, regulations and operating rules (aka standards) governing Reserve Bank check services. This governance prevails to this day and applies to all payment services provided by the Reserve Banks, including not only checks but wire transfer of reserve account balances (Fedwire) and the automated clearinghouse (ACH). The Reserve Banks have historically played a very significant operational role in clearing and settling checks, ACH items, and Fedwire funds and securities transfers. In essence, the Reserve Banks function as bankers' banks, providing interbank clearing and settlement services to commercial banks and other depository institutions, settling interbank payment obligations in reserve accounts.

Of course, much has changed since 1913. Notably, use of checks as a means of payment expanded well beyond banks and business to include individuals (that is, checks became a highly versatile and general-purpose method of payment). Later, changes in technology and banking structure allowed correspondent banks and private clearinghouses to assume a greater role in clearing and settling first checks and then newer payment instruments. The ACH was introduced as an automated clearing and settlement alternative to the check, and a variety of new methods of payment, such as payment cards, came into use. Electronic communications networks for payments, such as ATM networks and card authorization networks, came into being. During this time of innovation the Federal Reserve Board took a strong position prohibiting the Reserve Banks from expanding their clearing and settlement services beyond check and ACH.[14] In addition, nonbank providers, such as PayPal, began offering substitutes for bank payment services, and supervisory authorities allowed these nonbanks to offer such services without becoming chartered as banks.

In the decades following 1913, Congress directed the Federal Reserve Board to improve the effectiveness and efficiency of specific aspects of the clearing and settlement process for checks by granting it new regulatory powers extending to commercial banks. In exercising its new powers, the Federal Reserve Board issued regulations and supported Reserve Bank service enhancements that would assist commercial banks in upgrading their clearing and settlement practices. For example, under the Expedited Funds Availability Act, Congress directed the Federal Reserve Board to speed up availability of funds for checks deposited by consumers in banks (a congressional action prompted by public outcry over banks' practice of placing long holds on check deposits). The Federal Reserve Board did so by issuing regulations that include check availability schedules, which banks are obliged to meet, and by encouraging and supporting Reserve Bank operational enhancements

to speed up interbank clearing and settlement of checks. Similarly, under the Check Clearing for the 21st Century Act (Check 21), the Federal Reserve Board issued regulations that allow banks to further speed up check clearing and settlement by stimulating electronic clearing of checks. Again, the Board looked to the Reserve Banks to support the intent of Check 21 through operational improvements in electronic check clearing and settlement.

Public concern about the efficiency of clearing and settlement for debit cards led Congress to enact the debit card amendment to the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. Debit card, notably, is a relatively new method of payment which the Reserve Banks do not clear and settle. Accordingly, Reserve Banks operations do not provide a production cost benchmark against which debit card clearing and settlement efficiency can be measured, and the Reserve Banks are unable to enhance clearing and settlement by leveraging their national processing capabilities. The result is exclusive reliance on direct regulation of bank interchange fees by the Federal Reserve Board to achieve the intent of Congress, rather than reliance on the Federal Reserve System's operational and regulatory capabilities in concert, as was historically the case.

The above discussion of congressional intervention in the national payment system underscores four broad themes. First, it is Congress that traditionally acts to motivate significant reforms in the U.S. payment system. Second, Congress acts when there is a clear public concern about the quality or cost of payment services that the banking system is able or willing to provide on its own. Third, Congress looks to the Federal Reserve Board as the principal authority through which its intentions are to be implemented. Fourth, while regulation by the Federal Reserve Board and operational support by the Reserve Banks have typically been used together to improve payment system effectiveness and efficiency consistent with congressional intent, the case of debit card interchange fees suggests a new approach that relies solely on regulation.

This paper does not investigate the question of whether or how debit card clearing and settlement practices might be different if the Reserve Banks were involved. It is worth noting, however, that in its analysis of debit card fees and clearing and settlement practices, the Federal Reserve Board contrasted the check and debit card payment mechanisms and highlighted two important differences (Board of Governors of the Federal Reserve System 2010b). First, check infrastructure is universal whereas the debit card infrastructure is fragmented; the former depends on Reserve Bank clearinghouse services and a high degree of cooperation among all those sharing the infrastructure, whereas the latter depends on competition among a small number of private infrastructure providers. Second, checks are cleared at par (an intent of Congress when it established the Federal Reserve System in 1913) whereas debit cards are not cleared at par but rather are subject to ad valorem pricing—non-par clearing). Arguably, the Reserve Banks would never have allowed non-par clearing and settlement for interbank debit card payments.

To summarize, whereas the Reserve Banks initially functioned as the de facto national clearinghouse for interbank and consumer payments, their role has been greatly diminished as the Federal Reserve Board has largely limited their involvement to wire transfer, and improvements in check and ACH. This conclusion is illustrated by the decline in the share of consumer payments handled by Federal Reserve Banks, from close to 100 percent originally to no more than 20 percent today (which is to say, not more than one in five noncash payments is made using Reserve Bank clearing services).[15] As a consequence, the Reserve Banks' operational leverage to influence the production cost and pricing of clearing and settlement, and the speed and overall effectiveness of the clearing and settlement process, is now severely constrained. While the operational role of the Reserve Banks has shrunk, the regulatory role of the Federal Reserve Board has expanded with increased, although highly prescriptive, powers assigned by Congress. Congressional action in this area can be characterized as ad hoc and a response to constituents' "pain points."

As the national role of the Federal Reserve System in clearing and settling payments has diminished, no other public or private organization has emerged to represent the collective interests of the many stakeholders. While there are many payment-related organizations, they are either focused on a specific and narrow issue such as security or access channels, and/or they are advocates for trade groups with vested business interests in a particular payment scheme. National payment system governance motivated by public interest considerations has eroded. Today's payment system is characterized more by competition than cooperation, even with respect to clearing and settlement infrastructure. Amelioration of concerns about innovation in clearing and settlement should begin with renewal of public interest governance.

Payment system governance in the United States should be strengthened

What are the possibilities for strengthened governance that results in continuous improvement in clearing and settlement infrastructure, and that ensures that the benefits of such improvements are passed on to consumers? The following discussion evaluates potential public and private sector responses to a call for stronger governance of the payment system that is relied on by consumers, especially in light of needs of the digital economy, and assesses the role that government may need to play in the United States, analogous to the roles government has played in other countries.

It is appropriate to start by considering whether the Federal Reserve System is likely to step up to the leadership challenges facing the payment system in the digital economy. Such consideration needs to distinguish carefully between the roles of the Federal Reserve Board and the Reserve Banks, the former, as was said, being the regulatory authority. Also, the Federal Reserve Board effectively controls the extent to which the Reserve Banks become involved in clearing and settlement. Only the Federal Reserve Board has a legislative basis for reaching out to supply- and demand-side stakeholders to address broad payment system issues and concerns, and, as we have seen, this basis is fairly narrowly drawn.

The Federal Reserve Board states that the duties of the Federal Reserve System fall into four general categories: conducting monetary policy, supervising and regulating banking institutions, maintaining financial system stability, and "providing financial services to depository institutions, the U.S. Government, and foreign official institutions, including playing a major role in operating the nation's payments system" (Board of Governors of the Federal Reserve System 2005). In the context of this paper, this statement by the Federal Reserve Board is striking because it does not mention overseeing the payment system, developing payment system policy, or facilitating the effective and efficient functioning of the payment system as one of the Federal Reserve System's duties, except to the extent that the Reserve Banks provide operational services.

Notwithstanding that it excludes the payment system from its current list of duties, over 20 years ago the Federal Reserve Board issued a general policy regarding the Federal Reserve's role in the payments system, a policy which remains in effect (Board of Governors of the Federal Reserve System 1990). This 20-year-old policy does not clearly distinguish between the roles of the Federal Reserve Board and those of the Reserve Banks, but rather it refers to "the Federal Reserve." It states that assuring integrity, efficiency, and equitable access are core Federal Reserve responsibilities. Integrity is described as the smooth functioning of the banking and financial markets. Efficiency is described in terms of cost-saving technical innovations whose adoption can be promoted by incorporating them into Reserve Bank operations. Equitable access is described in terms of the availability of Reserve Bank services to all depository institutions. The policy statement emphasizes recovery of the Reserve Banks' costs as services providers and limits on expansion of Reserve Bank services.

An examination of the Federal Reserve Board's web site and its annual report (Board of Governors of the Federal Reserve System 2011) suggests that it has little appetite for engaging in issues facing consumer payments, unless the issues are directly related to the Reserve Banks' check and ACH services. This is in contrast to the Federal Reserve Board's keen and active interest in supervising and regulating systemically important payment institutions, an interest that is long standing and has recently been formalized in legal powers assigned by Congress in the Dodd-Frank Act.[16] Central bank best practice is to explicitly inform the public as to which payment systems and institutions fall within the ambit of their oversight, supervision, or regulation. The Federal Reserve Board identifies the key financial market infrastructures in which it is interested and these consist of only large-value systems.

The Federal Reserve Board has a Payments System Policy Advisory Committee whose purview includes "retail and wholesale payment systems and instruments" and "strategies to foster the safety, efficiency, and accessibility of the U.S. dollar payments system over the long term." The Committee's agenda and deliberations are not public, however. The only evidence of its interest in the "retail" payment system is an occasional public forum such as the ones cited earlier in this paper. The frequency and subject matter of these forums, and the limited

follow-up after the forums, further suggest that neither the Committee or the full Board have an ongoing interest in or commitment to public policy pertaining to consumer payments.

Members of the Federal Reserve Board occasionally speak on payment system topics. When they do, they tend to focus on systemically important payment systems (Bernanke 2011) or on checks and ACH (Ferguson 2003). The Federal Reserve Board is further signaling through the public appearances of its members that what matters to the central bank is systemic financial risk and the specific operational services provided by the Reserve Banks, but not the payment system broadly viewed.

As indicated earlier, the Federal Reserve Board has, or at least has had, considerable leverage to influence payment system developments through the Reserve Banks' operational services, which it supervises. This leverage has been used to great effect in modernizing and improving the safety and cost efficiency of the clearing and settlement services the Reserve Banks provide. In this connection, and in the context of this paper, the Federal Reserve System deserves enormous credit for the advances made in checks and ACH. As noted, however, checks and ACH have been outstripped by newer forms of payment, and the Federal Reserve Board has tightly restricted the expansion of Reserve Bank services beyond checks, ACH, and wire transfer. The Federal Reserve Board's concern is that new services would broaden Reserve Bank competition with the private sector. Rather than provide strong incentives to the Reserve Banks to innovate in clearing and settlement, the Federal Reserve Board seems to place almost exclusive weight on matching costs and revenues by service line as a determinant of success (Board of Governors of the Federal Reserve System 2011). The Federal Reserve Board seems satisfied with a strategy for Reserve Bank services that would have them keep a low profile and largely withdraw in an orderly way from clearing and settlement operations.

It can be concluded from the above discussion that the Federal Reserve Board is not interested in leading or guiding the development of clearing and settlement capabilities for payments in the digital economy. Moreover, the Federal Reserve Board is satisfied to give up the Reserve Banks' operational leverage as providers of interbank clearing and settlement services. Absent an engaged Federal Reserve Board role, is it likely that private organizations might step up to assume responsibility for organizing and leading national payment system governance? This, too, appears unlikely based on how prominent private organizations with an interest in payments are constituted and how they define their purpose and goals. The purposes and goals of three organizations that might naturally be considered for a national leadership role are reviewed below.

The American Bankers Association (ABA) is the largest and most prominent association of financial institutions in the country. The ABA's self-described purpose is to represent the interests of all banks regardless of size and location. The ABA has formidable analytical and policy development resources at its

disposal, judging from the range of carefully prepared position papers available on its website. The ABA devotes attention to topical payment system issues, such as the Dodd-Frank interchange fee legislation (and the Federal Reserve Board's rule writing to implement that law). Its work also reflects the long-standing concerns of its members about unfair competition from nonbanks in the payment system. The ABA is an industry association and is unlikely to take up public policy concerns about payment system development unless these concerns overlap with the business interests of its member banks. In any event, it is not clear that an industry association would have the instincts or capabilities to organize and lead a governance body which, to be successful, would need to include a broad range of stakeholders in addition to banks.

The Clearing House (TCH), which is still thought of by many as the New York clearing house, is another prominent private sector organization representing banks. It is also a major provider of wire transfer of funds (CHIPS), ACH (EPN), and electronic check (SVPCO) services to banks. The Clearing House makes significant contributions to payment system development, through management of its own services and through its policy analysis of regulatory proposals. Like the ABA, however, TCH's purpose is bank advocacy, and this advocacy is on behalf of a relatively narrow member base consisting of "the world's largest commercial banks." It, too, is not well constituted to develop and lead a broadly based payment system governance body.

Finally, the National Automated Clearinghouse Association (NACHA), which bills itself as The Electronic Payments Association, is a truly national organization that is the de facto scheme owner for the commercial ACH system.[17] Unlike the ABA and TCH, NACHA's membership is inclusive of all financial institutions that participate in the ACH, and it makes an effective effort to include the users of ACH services in decisions about ACH rules and the strategic direction of this payment mechanism. NACHA limits its activities to management of the ACH scheme and leaves operations to others. The foregoing qualities are characteristics that one would look for in a well-designed governance organization. However, NACHA's priorities are strongly focused on the success of the ACH network, which it describes as "the backbone for the electronic movement of money and data." While ACH may be a backbone, its rules and operational modalities are closely patterned after older payment paradigms including batch processing and delayed clearing and settlement. As an industry trade association that advocates and protects the interests of the ACH industry, NACHA is poorly positioned to lead payment system governance whose purpose is to match the pace of change in digital society, especially change that would be likely to disrupt the business plans of financial institutions and ACH operators and services providers.

It can be concluded from the above review of the purposes and goals of the ABA, TCH, and NACHA that these organizations are not well constituted to organize and lead national payment system governance. This is especially the case in

today's digital economy, where traditional payment system modalities and business models are subject to dramatic pressure to change. In particular, it is unlikely that private sector organizations that represent the interests of trade associations and business interest groups would be able to lead the development of new clearing and settlement arrangements along the lines of the IFT reference model described in this paper.

Congress holds the key to stronger payment system governance

The Federal Reserve Board and prominent private sector organizations appear unable to lead payment system development in the digital economy. This leaves direct governmental action as the only practical alternative for initiating needed changes in payment system governance. As we have seen, the typical approach taken by governments is to empower a commission with the mandate to analyze needs from a public policy perspective and then recommend actions to address public interest concerns. Such recommendations typically include incentives for active public interest governance of the payment system, and a major and possibly leading role for the private sector.

In fact, the U.S. Congress established such a commission in 1974, the National Commission of Electronic Fund Transfers (hereafter the Commission). The Commission's 1977 report played an important role in guiding the development of the U.S. payment system in the decades that followed (National Commission on Electronic Fund Transfers 1977). The report is a tome, and it is not the purpose of this paper to recapitulate its findings. Two aspects of the Commission report are particularly pertinent to this paper, however. First, the Commission articulated a consumer-centric vision for a new method of payment which, if introduced, would have been the foundation for a digital payment capability like IFT. Second, the Commission did not make any public interest governance recommendations, but rather it placed heavy reliance on the competitive marketplace, appropriately regulated, to lead the development of the payment system. Absent from the Commission's thinking about or analysis of the payment system is the concept of network, and the implications of network effects and incentives for cooperation among stakeholders. The omission of public interest governance recommendations and network considerations may have doomed its vision for future digital payments.

The Commission strongly encouraged development of a new, giro-like credit transfer system so that U.S. consumers and businesses would benefit from payment features available in Europe but not here. It accompanied this endorsement with recommendations that standard invoicing and billing procedures be incorporated into giro-like payments. The IFT systems springing up around the world are, like the IFT reference model illustrated in this paper, essentially giro designs updated to meet the needs of the digital economy. One can wonder whether an IFT vision would be realized in the United States today had the Commission also recommended new governance arrangements that are friendly to innovation.

The Commission's report was prepared at a time when today's technologies not only did not exist but were unimaginable (the Internet was not in the thinking of the commissioners and the concept of network, and the implications of network effects and incentives for cooperation among stakeholders is notably absent from the analysis). Also at the time, social interactions were much more narrowly conceived (there is no inkling of "connectedness" in the Commission's report). Thirty-five years is a long time, especially when change is measured by super-fast "Internet time," and a strong case can be made that we are overdue for a new national payment system commission in the United States. The new commission, however, would need to deliberate and make recommendations quickly if the payment system is to catch up with changing needs in today's digital society and economy.

Conclusions and Recommendations

Consumers in the digital economy, including individuals, businesses, and governmental entities, value a digital payment method that allows them to complete their transactions immediately, reliably, securely, and at acceptable cost. This method of payment, already in use elsewhere in the world and known as Immediate Funds Transfer (IFT), is described in this paper. An IFT is an immediate and final credit transfer whose completion is communicated to the sender and receiver of payment in a matter of seconds. A digital payment system such as IFT could and probably should also satisfy the long-standing need of consumers for a highly versatile method of payment that universally connects them through their accounts in banks, as does the check today. The National Commission on Electronic Fund Transfers envisioned IFT in its recommendations of 1977.

Despite a vision provided 35 years ago, and despite evidence of consumer demand dating back a decade or more, and notwithstanding successful commercial experience in a number of countries around the world, the U.S. payment system does not appear close to implementing IFT-like capabilities. Governance issues appear to be the primary barrier to innovation in clearing and settlement that would support immediate completion of digital payments in the United States. Effective governance will be guided by public policy considerations including financial stability, operational reliability and security, effectiveness, and efficiency, all envisioned in practical terms that are meaningful to end users of consumer payments in our digital society and economy. The lack of public interest governance is evidenced not only by the failure of the U.S. payment system to keep up with changes in the digital economy, but also by regressive developments such as a retreat from par clearing (taking the form of ad valorem pricing) and from universal clearing and settlement of payment instruments.

Governance must encourage a consumer-centric, end-to-end view of payment system development, cooperation in the adoption of end-to-end payment schemes and shared clearing and settlement infrastructure, and competition in payment services using the shared infrastructure. Unfortunately, neither the Federal Reserve Board nor prominent private sector organizations have either the

interest or the ability to lead payment system development into the digital age. For better or worse, the U.S. Congress appears to hold the key to stronger payment system governance today, as it did 35 years ago when it established the National Commission on Electronic Fund Transfers.

The following recommendations are intended as concrete action steps leading to upgraded payment services to U.S. consumers in the digital economy.

1. The Federal Reserve Board should clarify its role and that of the Federal Reserve Banks in the existing consumer payment system and its future development. This can be accomplished by issuing a new policy statement to replace that last issued by the Federal Reserve Board in 1990. The Federal Reserve Board's clarified policy should specifically describe the operational contribution it expects the Reserve Banks to make as providers of clearing and settlement services in the digital economy, if any, and its own role as overseer, if any.

2. The Federal Reserve Board and/or U.S. Treasury should engage the appropriate congressional committees about the need for a national commission on payment system innovation in the digital economy. The new commission should give priority attention to public policy goals and public interest governance of the U.S. payment system, with particular focus on the needs of consumers in the digital economy. The commission should take care to be well informed about consumer payment system developments globally and the possibilities that these developments hold for innovation in the U.S. payment system.

3. The Federal Reserve Banks should perform a benchmark assessment of implementing national clearing and settlement processes and infrastructure to support immediate completion of digital payments, along the lines of the IFT reference model described in this paper. The design assessment should be end-to-end, including interbank and bank-to-customer interactions, and should consider the possibility of centrally provided, standardized bank-side operational capabilities for connecting their customer accounts through a national clearinghouse.

4. The Federal Reserve Board should develop a special-purpose bank charter for providers of specialized payment services, allowing in particular for the inclusion of nonbanks that are payment system innovators and payment method providers in the nation's money and banking system for payments.

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ENDNOTES

[1]For example, see *fasterpayments.org.uk* for data on the adoption of Faster Payments as a new method of consumer payment in the U.K.

[2]There are two basic approaches to payment that are distinguished by their respective clearing and settlement processes, namely, credit transfers (so-called "credit push") and debit transfers (so-called "debit pull"). For credit transfer, clearing instructions and settlement move together, directly from sender to receiver. For debit transfer, clearing instructions move less directly from sender to receiver, then from the receiver to the sender's bank, entailing return item risk for the receiver and the receiver's bank, and ultimately trigger settlement in bank accounts.

[3]The Board of Governors of the Federal Reserve System and the Federal Reserve Bank of New York are represented on the Committee on Payment and Settlement Systems.

[4]In addition to focus group findings by the Federal Reserve Board cited earlier in this paper, other research identifies payment attributes that individual and business consumers consider important (see Foster et al 2011, and Association for Financial Professional 2010).

[5]An important practical question that is beyond the scope of this paper is how and to what extent immediate completion of payment affects information security. The answer to this question depends critically on the effect of speed on risk management and whether the underlying payment process is credit transfer or debit transfer. Arguably, a security model based on real-time risk management and strong control over key decision points can enhance security. Also, the credit transfer process presents an inherently easier security problem to solve than does debit transfer.

[6]Increasingly, the ease with which consumers can change their banking relationships is a public policy priority in a number of countries. A notable example is the U.K., where the Payments Council is adopting an account switching guarantee (complete within seven days) on the recommendation of the 2011 Independent Commission on Banking.

[7]In some cases involving two-sided markets the collective interests of payment system users may be best served if costs are not shared equally or proportionally. At the same time, however, efficient pricing does suggest that the total revenue extracted for use of a payment method should bear a reasonable relationship to the cost of production.

[8]The full processing efficiency gains of digital payments are enabled by standards that allow for straight-through-processing. The requisite standards include account number, reference number, and e-invoicing standards that can be integrated with digital payment systems. Full integration based on international standards

is well established in the Nordic countries and a priority undertaking in Europe (Leinonen 2009).

[9]The model underlies IFT schemes in developed economies where bank deposit money is most common, but also in developing financial economies where cash is the principal form of fiat money, for example, M-PESA in Kenya. It also underlies IFT services offered by nonbanks, such as PayPal and CashEdge.

[10]National IFT implementations around the world follow both the private and public (that is, central bank) clearinghouse approaches. For example, the United Kingdom and South Africa rely on a privately operated clearinghouse, whereas Mexico and Switzerland rely on the national central bank as the clearinghouse (Summers and Wells 2011). It is important to emphasize that in both cases, consumer settlement is in commercial bank money, whereas interbank settlement is in central bank money.

[11]Hypothetically, if the bank of the receiver of an IFT defaulted on a net debit obligation arising from the IFT settlement, the customer would still have final use of the funds deposited as a result of the transfer, but in a deposit account held with a distressed bank. If the bank of the sender defaulted, all payments accepted by the receiving bank and credited to the accounts of its customers would be available deposits received in the form of final funds transfers.

[12]Interbank settlement for Real-Time Clearing takes place once each hour and for Faster Payments at intervals of several hours.

[13]Most IFT implementations rely initially on existing communication channels such as ATM and online or Internet banking, and then progress and expand to mobile channels using smartphones. Mobile banking on smartphones that exploits telecommunications features such as SMS and email are considered to be a natural match with IFT.

[14]See, for example, Brimmer (1967). In this speech Governor Brimmer speaks to issues of clearing credit card slips and why the national check clearing system should not be burdened.

[15]It is estimated that the Reserve Banks' share of the total number of noncash payments processed in 2009, excluding wire transfer, is 19 percent, computed as follows using data from the Federal Reserve's 2010 payments study (Board of Governors of the Federal Reserve System 2010a). The Reserve Banks handled about 35 percent of all commercial checks (excluding checks converted to ACH) and about 58 percent of ACH items. The check and ACH shares of total noncash payments were 27 percent and 17 percent, respectively. Thirty-five percent of 27 and 58 percent of 17 total 19 percent. This analysis results from work in which I was engaged with colleagues in the Federal Reserve Bank of Chicago Financial Markets Group, serving there as a consultant.

[16]The Dodd-Frank Act for the first time gives the Federal Reserve Board

explicit authority to regulate and supervise systemically important payment systems and institutions. Unlike the case in a number of other countries, the new legislation is silent on the subject of oversight of consumer payment systems. It is likely that the Board and its staff influenced the thinking of the drafters of the congressional legislation, and assuming so, they apparently did not consider broader oversight powers, extending to consumer payments, to be significant.

[17]The U.S. Treasury determines the rules for government ACH payments.

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Facilitating Consumer Payment Innovation through Changes in Clearing and Settlement
Commentary

Richard Mabbott

Good morning. My credentials for being able to comment on Bruce's paper are that I was the program director for the U.K. payments industry, overseeing the build and implementation of our immediate funds transfer system.

Straight off the bat, I would like to say what Bruce has envisioned in his paper is eminently doable. We actually built one of these things in 2006-07. It has been live since early 2008, nearly four years, and it has run 24/7 without incident during that period.

Bruce's thesis or his contention it requires regulatory intervention to make this sort of thing happen certainly parallels what happened in the U.K. I can say, having worked in the industry for many, many years, without regulatory intervention the U.K. would not have the Faster Payment Service it has today.

A brief history of how we got here. Our Chancellor of the Exchequer at the time, Gordon Brown, who many of you might know went on to become our Prime Minister, commissioned Don Cruickshank, who was at that time a regulator in our broadcast media, to look into banking. The Cruickshank report came out in 2000 titled "Competition in UK Banking: A Report to the Chancellor of the Exchequer."

In very broad terms, what Cruickshank concluded was the payments system in the U.K. was a cozy cartel. Witness to that was the fact the industry never innovated unless it was made to. What is worse, the regulator preferred a small number of mature, stable banks rather than a "long tail" of free-wheeling entrepreneurial and potentially risky banks to regulate. So Cruickshank concluded the regulator was also part of the problem rather than part of the solution.

Cruickshank wanted to set up an Office of Payment Control. We have a history of such "offices" in the U.K. set up by the government to regulate monopoly industries—Ofcom for the communications industry, Ofwat for the water industry,

etc.—and he wanted Ofpay. But in the end the Treasury decided to put the issue with the Office of Fair Trading (OFT), which is the competition authority within the U.K. They set up a payments systems task force, which they chaired, to oversee implementing the recommendations of the Cruickshank Report. One of the first things the OFT wanted was faster payments and settlement.

The payments systems task force was inclusive. It included the banks and other stakeholders in the payments industry but was very much led from the front by public policymakers.

In May 2005, the OFT announced an agreement had been reached to reduce clearing times on electronic payments between banks following telephone or Internet instructions from customers. So this is very much about electronically originated payments.

What the payments industry then had to do was to report back six months later—i.e., November 2005—and say how we proposed to meet their requirements. Two years after that, we had to have a new service live with mass market reach. It was no good having the concepts sorted out or a pilot implementation—it had to be mass market. That is a pretty stringent timetable for anybody looking at a major development. It is fair to say the industry would not have innovated had it not been for this mechanism. We would not be where we are today. We would still be talking about it.

In those six months from May 2005 to November 2005 the industry debated two basic models. There was the so-called "ELLE," pronounced "Ellie," early for late/late for early, which was the low-cost option based on ACH. The idea here was that if you got the instructions into your bank before midday on a working day, the money would get to the beneficiary by the end of that day. And, if you got the instructions to your bank after lunch on a working day, the money would get there before midday the next working day. This was basically faster batch processing.

As it happened, our ACH in the U.K.—we only have one because we are quite a small country, an organization called BACS—had just finished a technology refresh. And although our ACH ordinarily works on a three-day cycle, they had already designed in the capability for one-day transfers. So they were keen to capture this business.

The alternative system we called Near Real-Time. Make no mistake, there is nothing near about it, it is genuine real time, but we are coy about saying that in public in case the odd bank goes down at 2 a.m. to do a system upgrade or whatever. The system runs 24/7. It is genuinely real time in the center. There are also technical reasons why the odd payment might get shunted-off onto a siding so that it does not happen in real time. Hence the formal position is "near real time."

Typically, what this means is the payer knows their payment was sent and it was either successful (i.e. they are told the payment has been made) or, if it was

unsuccessful, they are told the reason why it was rejected. They can then get in touch with their counterparty, find out what went wrong, and send it again. This is 24/7, where ELLE was very much working days only.

It is worth saying at this point, we have no history in the U.K. of public-sector involvement in the payments system infrastructure. They regulate it but they do not implement it. Therefore the choice between ELLE and Near Real-Time was down to the private sector. We had to make a decision of: "Are we going to do the minimum we can get away with that the regulator says we have to do" or "are we going to look to developing a new infrastructure for the future?"

It will not surprise you the conservative element wanted the lowest cost option and the more visionary went for the new infrastructure. I am here today because we went for the latter.

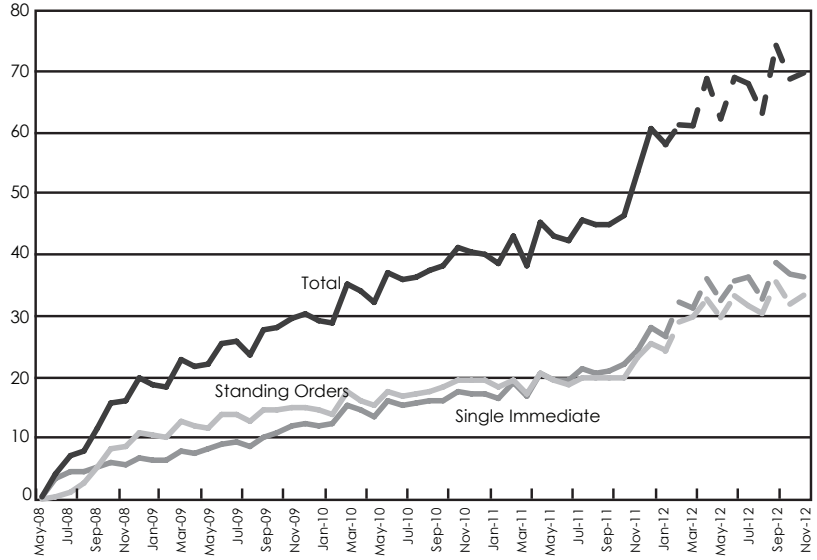
Since going live on May 27, 2008, to the end of February of this year, in round numbers we have processed 1.5 billion transactions—in dollar terms to a value of almost $1 trillion. We have operated 24/7 since we switched on, and we have not had any major incidents. The largest peak cycle we have had was over the holiday period this year. From the close of business on Friday, Dec. 30, through to the morning of Tuesday, Jan. 3, we processed 11.7 million payments to a value of $6.8 billion. Most of those payments were on the return to work on Tuesday morning, stemming largely from the annual peak in Standing orders at the start of January.

Chart 1 will give you some idea of growth in the system. Of the two lines at the bottom, which are very similar, the darker one of the two is what we call "single immediate payments." These are spontaneous payments made by customers paying other customers. That is really what immediate funds transfer is all about. The other line, which all but mirrors it, is "standing orders." These are pre-mandated, routine payments paid on a regular basis. One of the things our regulators said to us after they obtained our commitment to build Faster Payments was "Would we mind doing something about removing float on standing orders?" The easiest way to do that, if you have a real-time engine, is to put your standing orders over the real-time engine, which is what we did. In Chart 1, the top line is the total number of Faster Payments (i.e. predominantly the sum of the other two lines plus a small number of other extraneous payments types). This shows you the real growth rate. You will see that year-on-year there has been significant growth. The dotted line at the end is our projection for 2012 where we are predicting continued growth at an increased rate rather than any drop-off. In terms of "Do customers want this?" "Do customers like it?" The growth figures speak for themselves.

It is also worth mentioning pricing in the U.K. For consumers who are personal customers, if you keep your checking account in credit then banking is free. You do not pay a transaction fee on payments that go through the ACH. If you want to make a CHAPS payment, i.e. a real-time gross settlement payment, then it is liable to cost you quite a lot of money; on the order of £20 to £30.

Chart 1

Monthly Volumes (millions) for Faster Payments 2008-2012



When we looked to pricing Faster Payments, because the regulator said we had to develop such a system there really wasn't much work done on an industry business case as to whether Faster Payments costed-in or not; it was all cost.

We negotiated with our supplier a cost-plus contract for a term in excess of five years to run the system so we knew what it was going to cost to run it. What the commercial banks had hoped was that Faster Payments was going to be a premium service for customers. If personal customers wanted to make a Faster Payment, i.e. faster than the three-day norm for payments made through the ACH, then they should be willing to pay a small price for that. Banks were thinking in terms of £1 to £2.50.

Now the regulator is not allowed to impose pricing. That is competitive within the U.K. and we in the center were not allowed to discuss pricing, because that is against the Competition Act. But talking to people at the time that is the sort of figure they were thinking of. The commercial banks saw a chance here. By launching Faster Payments, people would pay for that premium service and thereby make a contribution to the cost of free current account banking.

Unfortunately, what the commercial banks had not reckoned with was our building society sector, which is similar to your savings and loan sector, who promptly gave Faster Payments away to their customers. If one bank gives it away, they all have to give it away. Faster Payments are thus free to personal customers in

the U.K. Commercial customers typically pay something in the order of £2.50 to £5 for a Faster Payment, where otherwise they would be paying something like £20 or £30 for a CHAPS payment. Personal customers get them free and commercial customers are getting them about a hundredth of the price they would pay for a real-time gross settlement payment. So why wouldn't they use the system?

I would like to tell you about the tiering that is in Faster Payments. We built the system around members. We went live with 13 members. Basically, each member bank has to build a system to send Faster Payments (i.e. acting on payment instructions received from their customers) and a different system to receive Faster Payments (which makes a real-time response back to the paying bank before crediting the beneficiary customer with the funds).

Figure 1 from left-to-right shows sending institution to receiving institution, and from top-to-bottom comprises three tiers.

The top tier is member-to-member. As I said, we went live with 13 banks. This is a push-credit system and the money is settled at the Bank of England.

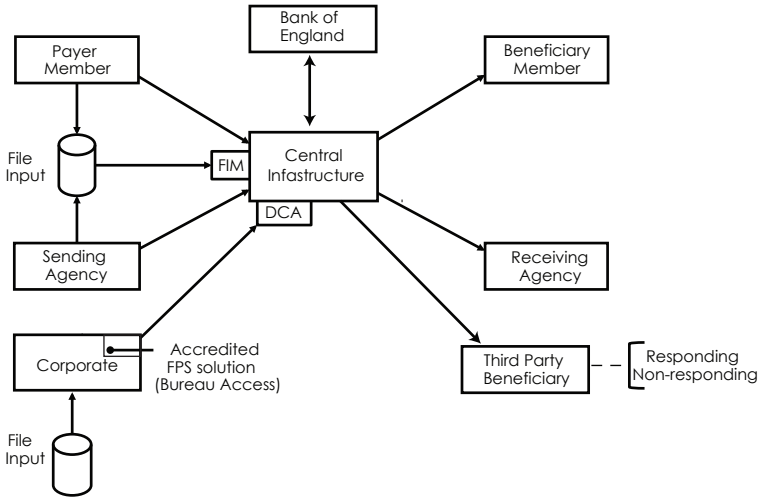
We have a second tier, which are agency banks. They effectively have to operate the same service as members, but they settle with their member bank rather than across the Bank of England. It is mandatory that you are there to receive payments 24/7 but it is the institution's own choice how long they are open for their customers to send. When we went live, 12 out of 13 members were open 24/7 for sending. One of them, because their Internet banking service was only open between 8 a.m. and 8 p.m., only permitted their customers to make Faster Payments during that period, but they have since rectified that. So Faster Payments are genuinely 24/7 for the banks that are participating in it. This is not business hours Monday through Friday.

We also have a third tier, which in the interests of time I will not go too far into, but it is basically for large corporate customers. The receiving side—the right-hand side of Figure 1—was primarily for credit card issuers and for large utilities receiving bill payments. An interesting thing about credit card issuers—I do not know if you have noticed—is that when you get your bill, the due date is almost always a Saturday. With Faster Payments you can pay them on a Saturday.

In tiering terms, banks can either be a member of Faster Payments, or they can be one of these directly connected agencies settling with a member rather than settling with the Bank of England. There is also a batch based file-input module for members and agency banks.

Outside of these three tiers, there are also indirect agency banks. These are banks that take a service either from a member or from a directly connected agency. They are not necessarily there 24/7, but they are available to the system to receive so that sending banks can route payments through to them. It was important that we had this additional routing mechanism because we needed mass market reach to satisfy the regulatory authorities at launch. They insisted that mass market was

Figure 1



anything over 95 percent of checking accounts. In the end, when launched with our 13 members we achieved in excess of 98 percent of checking accounts. The sort of people who are indirect agencies are correspondent banks in London, high net worth banks, boutique banks, that sort of thing—institutions you would not generally expect to be funding the payments infrastructure in the U.K. I will skip anymore about corporates and move quickly on to settlement.

The system uses deferred multilateral net settlement across accounts held by the members at the Bank of England, so that is exactly Bruce's model. The customer payment is end-to-end and in real time. You either know it happened or you receive a rejection but settlement for the successful payments is deferred until the end of the current settlement cycle when it is netted-off with all of the other Faster Payments made during that cycle.

We currently settle three times a working day. When the Bank of England first comes-up with the CHAPS system at 7:15 a.m., midday, and 3:45 p.m. before CHAPS closes down for the day. Settlement, however, is configurable and we can settle more than three times a day if required. Within reason we can do as many as we like.

The next settlement cycle begins before the previous cycle settles. So what we actually do at the end of a settlement cycle is draw a line and start the next settlement period, so there is continuous operation. There is no pause, no hiccup, and then behind the scenes we settle the net differences between the banks.

You will quickly realize, that means that the period from Friday at 3:45 p.m. to Monday at 7:15 a.m., is one long settlement cycle. We do not do much commercial business over weekends. It tends to be all personal customers and, therefore, there is not a huge risk in terms of the values outstanding.

The way the risk is controlled is through net sender caps on each of the members and a liquidity and loss-sharing agreement that all members put collateral into to protect against the loss of a member. If a member is unable to settle its obligations at one of these settlement cycles, then the failed member is blocked in the next cycle. The failed cycle is manually settled and the surviving members are recompensed after the event out of the collateral pledged by the failed member, which is held in trust by the Bank of England.

Faster Payments was designed and built during 2006 and 2007, so that was before the global financial crisis. We were all living in a very different world then. Many of us were perhaps a little complacent. It was designed and built to a very tight timescale set by the regulator and so we decided, prudently I think, to reuse existing concepts and proven components wherever practical. So the real-time switch is based on our ATM switch in the U.K. and the settlement process—the backend process—is based on some of our ACH processes.

What that meant was there really wasn't much choice over deferred multilateral net settlement, net sender caps and the liquidity and loss-sharing agreement. These were all components of the existing systems. That was the way we did things then. We talked about an RTGS settlement system but there was no appetite for the added complexity that would bring particularly the additional time it would take to deliver given the regulators' stringent timetable.

In terms of lessons learned, if we had our time over again (which you obviously still have) we would probably look much closer at the tiering diagram I put up. It is overly complex, it was not what we originally wanted; we wanted very low barriers to entry and that people were either members of the scheme or, if they did not want to be a member of the scheme, they were an indirect participant through a member. What we quickly found out, was if you were going to join the scheme it is fairly onerous running a 24/7 receiving system.

Those that wanted to avoid that cost were looking for a cheaper way of doing it and that is where some of the baggage from previous systems crept back in, which is where some of that tiering has come from.

We already have a commitment on the books to look at collateralizing or prefunding positions for second-tier participants before members make payments.

Facilitating Consumer Payment Innovation through Changes in Clearing and Settlement
Commentary

Neil Platt

I do not have any slides, but I do have some comments and I thank Bruce for the interesting paper. It is definitely very relevant to what we do. Before I launch into those, let me tell you a little bit about what we do and why I am here.

I am the general manager of the Payments business for CashEdge, which is now a division of Fiserv. Fiserv, as you know, is the global financial technology leader. At the CashEdge division, we operate the largest bank-centric digital person-to-person payments network, which is known as Popmoney. We call it a P2P network. This was formed by the merger of two networks—CashEdge's Popmoney network and Fiserv's ZashPay network.

Right now, CashEdge has been part of Fiserv for about six months and we have spent most of that time integrating the two networks. The combined network will be relaunched in June of this year. Essentially what Popmoney allows is consumers and small businesses to make payments to other consumers and businesses from within their online or mobile banking services. Payments can be made by entering recipients' ACH information, as well as by entering a recipient's email address or a recipient's mobile phone number.

We refer to each one of those as a token. We are currently adding to the number of tokens that consumers can transact on. In our own internal pilots, we are piloting debit cards to be able to send money directly to a debit card and Facebook ID to be able to send money to someone's Facebook ID. Those are not yet on the market.

I will not get into the whole logistics of how Popmoney works, but there are two important considerations to point out. One is that the recipient of a Popmoney payment does not need to be known to Popmoney or be signed up or part of the network already. By receiving that payment, the person becomes part of the network.

Second, the funds in Popmoney flow directly from the sender's account to the recipient's account. There is actually a clearing account in the middle, but the user experience—the sender-recipient account—is from my bank account to your bank account.

Unlike some other schemes, there is no notion of a Popmoney account that anyone who belongs to the service has. The only service you interact with is your own bank account. In some ways, the service I would describe using some of the terminology that Bruce introduced as both a universal service, because it can really touch any bank account, and end-to-end. It is from one consumer through to another consumer. And I use "consumer" in the same broad sense that Bruce used the term.

Today, in its current instance, the service relies on an ACH backbone and payments settle either overnight or in two to three days, based on risk and pricing considerations. I will talk more where we are moving the service, but as it exists now it is an ACH backbone and it is still in its formative stages.

The number of total payments that have been made are in the single-digit millions. It is available today—or will be starting in June—to customers of about 1,400 to 1,500 financial institutions, a number which is growing quickly. It reaches about 40 million online and mobile banking customers in the United States. To date, the 2 million transactions have touched—have been sent and received—from about 5,000 to 6,000 financial institutions in all 50 states. So it is growing very quickly. We expect within two years it will be available to over 80 percent of the banked population.

I am not going to talk a lot about the usage we see, but we are seeing some very interesting usage data. The most common use case is people using it to pay their rent. We also see a lot of shared expenses, like roommates sharing bills, and the interfamily payments, like children and parents paying each other.

The average size of a payment is in the mid-$300 range. I bring this up because, often in the total discussion of P2P payments and certainly the bank advertizing reflects this, the typical use case discussed is someone goes out to dinner and forgets their wallet. Then, it is more like a cash substitute. The use cases we actually see and the dollar value indicate that Popmoney is being used more as a check substitute than as a cash substitute at this point.

With all that background, naturally I found Bruce's paper to be very relevant and interesting. So I want to react to a couple of different items. As I was thinking about this, I feel like Bruce and we are approaching a similar problem in different ways. We have a very much bottom-up perspective, which is trying to solve a problem with the tools we have available and had not really considered the policy solution. So I will talk about that in a minute.

A couple of things I am going to react to: First, I want to explore the assertion

in Bruce's paper—the notion of what he referred to in the talk as "the future after the check." In the paper, Bruce says that "a strategic challenge is to combine the immediacy and finality of payment with the versatility and universality of the check."

Then I want to break that down into two pieces, because there are two important statements in there. The first is on the need for a digital replacement of the check. The second is the degree to which instant funds transfer, or IFT, is a necessary component of digital check replacement. Then, I will share what we at Fiserv are doing in working toward IFT in the absence of any changes we foresee in current clearing and settlement models in the market. Finally, I will share a very brief perspective on what the role of the federal government might be in helping overcome the challenge.

I will start with the easiest, which is the question of whether or not we need a digital alternative for the check and whether or not IFT is a necessary component of that alternative. From a consumer's point of view, there is a lot about checks that do in fact seem to be out of sync with our expectations in the digital age. They are slow. They require you to carry around this booklet of paper with you to make payments—and you better make sure you do not lose it. You need to somehow deliver the payment physically to the recipient of the payment, either through the mail—of course, that is a joke in our society, "the check's in the mail"—or otherwise deliver it.

On the deposit side, once you receive the check you are still not done with it. You typically need to go to visit an ATM or branch. Checks are prone to fraud. And, of course, the settlement of checks is not final, as anyone who has ever had a check bounce on them knows.

We look at the check system and we think, "There is a lot of low-hanging fruit here." There are a number of different ways you can improve on the check system and not all of them necessarily mean the digital replacement needs to have immediate settlement in order to be successful and adopted by consumers.

We think about Popmoney, even in its current ACH form, as being a replacement for checks. It improves upon many aspects of checks. It is easier to use. It is easier to deliver. As a recipient, it is automatically deposited into your bank account. It is less prone to fraud. And, even though it settles through ACH, it actually settles faster than checks. Like I said, the use cases and the dollar values seem to imply that it is being viewed as a check replacement in the market.

Now let me talk about "immediate." We have always found that "immediate" is a very loaded term in payments and in consumer payments in particular. We have done some primary consumer research on this and we continue to do it. Generally speaking, if you ask a consumer how soon they would like their payment, the answer is always "immediate." But, if you start to peel the onion and ask the next set of questions, you realize most use cases—but not all—do not actually require immediate settlement and people can accomplish what they are trying to with

settlement that is somehow delayed. Obviously, in all cases, sooner is better than later.

This becomes all the more true when you start to ask consumers about relative price-timing trade-offs. You want immediate, but what if immediate was $5 and next day was 50 cents? Oh well, in that case, maybe for some payments I would still want immediate but, for the majority of my needs, 50 cents next day is better than $5 immediate.

We believe, while immediate settlement is desirable, there is still a great deal of value to be provided through digital check replacement, which is what we think of as P2P payments. Even if the settlement is not immediate, it really just has to be better than the alternative, which, right now, is checks.

Let me pause there, because we do think immediate is better and, in particular, we think that immediate payments are better because they would open up more use cases and generally provide a better user experience. Right now, for example, maybe one of the reasons why we are seeing checklike use cases being promoted through Popmoney is because the experience of exchange and settlement is checklike.

We feel that, by having a cashlike alternative, we will be able to open up more use cases and it will become more useful to consumers, not only for cash exchange, but if you think about it cash is how consumers exchange money with immediate settlement. It also opens up some potential venues in commerce. Despite having said that, I do not think immediate is a necessary ingredient for a digital payments system. I want to be really clear, increasing speed of settlement and clearing is our number one product priority. The way we approach this is a little bit different than some of the things that have been discussed earlier today.

In the near term, we are working on accomplishing immediate and near-immediate transactions by moving transaction volume from the ACH network to the credit, debit and ATM networks. The problem is these networks are not universal. They are fast, but they are not universal. They have all sorts of complexities and interoperability issues between networks. We very much view our job as an intermediary, in effect technology providers. We piece the networks together, we make the technology work, and we help manage the risks. If you think about each network, each one has its own rules, its own fees, its own system with limits, and they are not necessarily that affordable for a consumer to transact over. So there are a lot of issues with it. Ultimately, and I will not talk so much about this, but everything we do is a debit transfer system and it is not a credit transfer system.

We view our role as being the equivalent of payments sausage makers. We take complex payments systems and we make them simple for consumers. We are already moving, like I said, toward faster P2P payments. As of April, we are already internally moving some portion of our payments over EFT networks and we have just started doing real-time payments internally. We are demoing that for our

clients next month, and we expect to be in the market with real-time payments by the end of the year.

But—and it is a big but—it will not be universal at first. In a sense, not all payments that we execute to and from all accounts will be moved in real time. It will be a gradual transition from a 100 percent ACH-based to a model in which more and more payments are executed in real time or near real time.

We have always, in fact, viewed the speed of payments through this incremental approach. It is not our intention that we necessarily have a big bang or sudden change in the model of payment processing and settlement, because of some regulatory action or change in settlement and clearing.

The paper goes on—and this is a transition from the last point—to outline the role potentially of the Federal Reserve Board in defining a national IFT system. I want to be careful with what I say here. It is obviously something that is interesting to us and I want to be clear this is not really my area of expertise and I do not want to be singled out as the private-sector guy who came up here in this roomful of regulators and public-sector people to offer a different opinion, although I suspect that may in fact be the case. We are very committed toward moving to real-time payments. As I said, it is our No. 1 product priority and it is what I spend most of my time working on.

In our search for solutions—it is not new for us, we have been working on this for years—we never really considered a solution coming out of a regulator or a similar industry body. This is what is particularly interesting about this discussion for me. This is a problem we have been trying to solve for a long time and we have never considered a solution with this, because frankly we work in a world where we are constrained by market realities. Our role is finding innovative ways to bring innovative payments products to market. We typically do not view government involvement as a lever that we have to play with. Not because we do not like it, but because we have very explicit market goals and our timelines are very tight.

I talked before about our need to introduce real-time payments into the market this year. In this particular case, I would say the Fiserv experience provides some evidence the private sector is actually moving toward solving the problem that Bruce has laid out. But it is being solved in a very incremental way. It is not a systemwide solution, but we are working on an answer to Bruce's assertion that strategic challenges to combine immediacy and finality of payment with versatility and universality of the check.

When I think about what we are doing now—and by "we" at this point, I will take a whole industry perspective, because Fiserv is not the only provider in this game—the industry is moving toward immediacy and finality, combined with versatility and universality of the check. That is the challenge we are stepping up to meet. We see steady progress being made. And, given we see progress being made

by the private sector, we might question the necessity of a regulator solution. It is certainly something we would be open to, but I think it is something we who are out in the forefront of this innovation would want to view cautiously and make sure that it were well-implemented, because obviously in the world I come from, with every regulatory change there is clearly some sort of potential downside you have to mitigate. Thanks.

General Discussion

Session 5

Mr. Brown: Thank you very much, Neil. I would like Bruce to make a couple comments.

Mr. Summers: I will make one comment and it is stimulated by what both Dick and Neil have said. Let me say that I respect both of these systems and I respect the energy, the thoughtfulness, and the entrepreneurship that have gone into both. My comment is along the lines of clarification, or crystallization if you will, about the role of the public-sector in achieving public policy in this space. In particular, U.K. Faster Payments is an example of what I would call "light touch" intervention. The role of public policy is not to define specific outcomes, notwithstanding that I specified such an outcome in the reference model presented in my paper, but I did so more by way of illustration. But the role of public policy is to say, "Here are desirable objectives we would like to see the payments system achieve."

And it is up to the private sector, then, to achieve those objectives. Some of them are very sensitive in that they have a bearing on business practices and even profitability. They have to do with affordability to the customer, which might challenge a pricing methodology or proposition. They might have to do with cooperation, working together more to define schemes and so on. I see public sector intervention not in an intrusive regulatory way, but as an in-touch overseer—oversight as opposed to regulation—to stimulate that working together where appropriate and to make sure we do not lose sight of the higher level public-policy objectives as the technical and business solutions are crafted, so we are getting where we want to be strategically with the payments system.

Mr. Brown: Thank you, Bruce. We are going to now open up the floor for questions for our panel.

Ms. Benson: First of all, thank you. It was a great paper and interesting comments. When I think about how consumers might use a service like this, I can see it would be used for person-to-person payments. One of the things we lose when we

move away from checks is the ability to make a payment to someone when you do not know their account details. That is a huge value. It is one of the reasons, by the way, that checks have remained pervasive in the B2B space. Let us move forward, then, and say OK, for a consumer using a service like this, it seems pretty clear the way around that problem is using a mobile phone number or something like that as the token. I am sure that is what Popmoney and many other services do.

In consumer bill payment in the United States, we have always had this terrible last-mile problem of getting the payment to the biller. The U.K., I believe, has done something with a sort code directory on that. I wonder if you could clarify how Faster Payments works to get the payment to the biller?

Mr. Mabbott: OK. There are two elements here. You referred to the biller's database that we are developing in the U.K. but we haven't got that yet. There is, however, already a culture in the U.K. that if you want to make payments using Internet banking or telephone banking then you will be asked for the sort code and account number of the beneficiary. The sort code for us is the branch office. It is the same as your transit routing code on a check. So there already is a culture, that if you want to make payments, you either know or seek out the sort code and account number of the beneficiary. That is how you would make a telephone banking payment or an Internet banking payment which goes through the ACH today. Translating that into just going faster, as with Faster Payments, isn't a problem.

As to bill payments, most of the Internet banking sites run by the banks will have pop-down menus. If you are trying to pay a utility bill it will help you get the right sort code and account number. Most utility bills in our country still have a detachable credit voucher at the bottom of the bill which, if you wanted to put it through the paper clearing, contains the account details of the utility anyway. So for bill payments, knowing the sort code and the account number you want to pay is not the problem.

If it is friends and family, then you do not mind trusting those relationships with your sort code and account number.

The gray area for us is if you want to be paid but you do not want to divulge your bank details to whomever is doing the paying. To that end we have also been looking at proxy systems and the favorite one is the mobile phone number. Here you could pay somebody using their mobile phone number instead of knowing their sort code and account number.

We are not there yet. Barclays launched its own service very recently. The U.K. Payments Council has ambitions to launch something similar before the end of this year, which will be an industry-run look-up database. If a bank quotes a mobile phone number, the database will disclose the beneficiary's sort code and account number back but not to you as the payer, only back to your bank, so sensitive account details are keep between the banks and not divulged to other customers.

Mr. Frankel: These were great presentations, all of them. I have a question for Richard. Is there anything in the governance, technology, or any other agreements that would prevent one of these creative innovators from putting some infrastructure on top of your engine to create a new retail payment card system or mobile phone application?

Mr. Mabbott: None, whatsoever.

Mr. Greene: Thanks again to all the panelists for a great discussion. My question is about security and whether we are better served by centralizing systems and having honey pot-type risks as I suspect may exist with Faster Payments. For instance, does Faster Payments enable faster fraud? Or whether distributed approaches, as we seem to have more fragmented here, are safer? The context of the question is there is a report this morning with a potential massive breach of security at MasterCard. So I would like thoughts from the panelists about the right way to have a secure payments system that is also IFT.

Mr. Summers: Maybe I will start the reply to the question. In general, security is a high-order question, a high-order issue to be addressed. The paper takes up security a little bit by discussing the trade-offs between credit-transfer and debit-transfer systems insofar as security is concerned, as well as the relevance of the concept of immediacy for security.

You have added another dimension to consideration of IFT-like payment schemes. However, I do not think the question of platform centralization versus decentralization it is specific to this topic. I faced this question in my own professional career. The side I come out on is a thoughtfully well-secured, consolidated environment buys a lot, as opposed to distributed platforms where the various components might not all have the capacity and the resources to provide the highest level of security for information assets. It is a question we will discuss forever. But the important question you raised here, Mark, is, Because fraud is scalable in an IT environment, what really defines confidence-building security in systems that are responsible for centralizing protection of our information assets and, in particular, our deposit money in banks?

Mr. Mabbott: In relation to Faster Payments, there is no honey pot. In the diagram I put up that showed the central switch and each of the members having to have a sending system and a receiving system (Figure 1), then security is distributed across the different components that between them make up that end-to-end process. And in this context, there is no substitute for the sending bank having a strong front door.

If the sending bank takes instructions from somebody purporting to be one of its customers who in fact is not—merely a fraudster masquerading as one—and acts on those instructions, then it has to take responsibility for the consequences.

During the development we tried to mandate that sending members should apply a minimum of two-factor authentication to accepting instructions from customers to make Faster Payments. Commercial pressures intervened however and we failed to get that mandated although many of the banks in fact implemented two-factor authentication on their Internet banking when taking instructions to make a Faster Payment. So there is no honey pot as such today.

If we go on to talk about further developments, such as the proxy database where we translate a mobile phone number into the beneficiary's sort code and account number, then, yes, that could be viewed as a potential honey pot.

Although we have yet to implement it in the U.K. we are alive to the danger and the developers are well-aware of the need for tight security on that database. The proxy database, however, is not Faster Payments.

Mr. Platt: I do not have a whole lot to add there. But I will just underscore we continue to see the weak link in the system as being the front door of the banks. Frankly, that is where we see all of the fraud come in now. It does not mean we will not be subject to other types of fraud or hacking in the future, but a lot of our attention is focused on working with our clients to help make sure they are only letting the right people in the front door.

Mr. Fortney: I appreciate all the comments. We have a lot of agreement with the desirability of a real-time payments system. I have one question, and I will address this to any of the panelists, but maybe Bruce or Richard may have a perspective on it. It sounded like in the U.K. you skipped this whole thing of, How are we going to rationalize the economic case for this? It sounded like it was a little more than a nudge and not quite a dictate, but it was enough to skip past the rationale there.

Bruce, you may be suggesting a similar process here. Let us just get Congress to dictate this. But assuming that does not happen, my question is whether or not there is a business case, for how could this be "sold?"

Mr. Brown: And before you answer, Bruce, I have an additional corollary question. The reality is you were talking about how the oversight committees in Congress have been soothsaying this or suggesting this some 20, 30, 40 years ago. Based upon those numbers, is it just "pie in the sky" that we should even think we will get any kind of an intervention from the Federal Reserve, the regulators, or Congress?

Mr. Summers: I will start and then turn to Dick and Neil. Let me clarify, I am not suggesting Congress play an active role beyond providing the impetus for the establishment of a national commission, another national commission that represents all the private-sector stakeholders in the payments system. For better or for worse, that is the role of Congress.

Then there is this question of incentives. In terms of the U.S. banking system, there is a cultural transition, there is a large investment cost, not just in central infrastructure, but maybe more importantly in the back offices of banks. The back

offices of banks are, by and large, antiquated. Banks cannot go on forever not keeping up with digital payments processing in their back offices.

Looking at international case studies, what I find is when the stakeholders through their governance arrangement finally decide to embrace a truly innovative approach or technology, that is a catalyst that leads to a breakthrough and causes the banks to upgrade their back-offices from batch processing to real-time processing.

You also see in the case studies banks attribute the cost of that upgrade to the specific innovation at hand. Let us say it is Faster Payments, something that has to happen and it has to happen soon. Faster Payments just happens to be the trigger that ignites the action taken by the banks to upgrade their back offices.

So, congressional intervention should be limited to sponsoring another national commission of private-sector stakeholders—and I would add public-sector stakeholders as well. Yes, there are costs, but at least in the U.S. context, lagging the digital economy in terms of servicers and technology platforms is a problem banks ought to step up to. Maybe something like this would be the trigger.

Mr. Mabbott: I would balk at saying that we skipped the rationale. We did not for instance build a Rolls-Royce solution and damn the cost. We had some serious debates about what we were going to spend the banks' money on. We also had some major challenges in terms of speed to market and universal reach.

What it eventually came down to was a debate between processing ever faster batches through an ACH versus breaking with that model because however fast you put batches through the ACH there is always going to be someone that wants you to process them faster. The way to avoid that is to go for a real-time solution.

So it came down to a debate between those who I characterized earlier as "conservative" who favored an ACH based solution and those who said we have an opportunity to do something new and innovative here. The government is going to make us do something, so let us at least capitalize on our investment while we are about it.

Mr. Platt: I would maybe have a slightly different perspective, which is probably caused by the short-term perspective under which we operate. We really do not look out more than 18 months, effectively, when we are doing our planning and thinking about what the next generation of payments is going to look like.

I am very interested in this notion of a "light-touch" intervention that Bruce referred to but, as someone who is in the guts of this every day, it is hard to imagine within my next two 18-month cycles that the settling and clearing environment is going to look much different than it does today. Much as we might actually like to see that, it is the skepticism that I referred to that is coming back here.

I am very interested in the U.K. story, though, which I had not heard before.

Mr. Williams: I would like to reflect on the universality of payments. I would like more information on bill payments in the U.K., like the lady from Glenbrook. But finally I have a question on end-to-end and how Bruce' model fits with Faster Payments.

On the clarification of the bill payments side, we are working with the Payments Council in the U.K. to create the central database of billers. As Dick says, you can use the sort code and account number to make that payment. But, from a consumer point of view, you actually want to pay Verizon, you do not want to pay necessarily with the transit routing number and the account number. Of course, what happens if Verizon decides to change banks or change accounting practice?

Finally, I would say is there are only two areas the Faster Payments scheme is deficient in comparison with Bruce's model. The first one is the notification of the recipient of the payment. That is not covered by the scheme rules. And the second one is, of course, not all the payments which are meant to be immediate actually occur in real time. If it is an agency bank, it only connects to its sponsoring bank every so often.

When we are talking about reconciling the payments that are coming into a credit card account, quite frequently the sender knows that payment has been received. But the business receiving the payment does not know about that until the end of the day when they get their statement. The real-time payment, then, lags four or five hours until that information is provided by the bank.

So the question is, Do we think we missed something? Was there an oversight in the definition of the scheme that said Faster Payments should inform the recipient the payment has been received?

Mr. Mabbott: In terms of the central infrastructure for Faster Payments, no, we did not miss that aspect. What we did was the minimum that required cooperation between the banks. So we allowed the maximum area for them to compete. There is absolutely nothing to stop banks launching services to tell recipients that they have received a Faster Payment. In fact, I believe some—Lloyds Banking Group, for instance—have already done that. You can usually opt-in for such services. I do not know about you, but I do know of anecdotes where people who have switched this on are desperate to switch it off again because their mobile never stops interrupting them. In that sense, this is in the competitive domain.

In terms of the agency bank point you raised, Jonathan, yes, you are right. If the Faster Payment is member-to-member, the service-level agreement says "if you receive a Faster Payment, you have to put it in the customer's account within two hours maximum." In actuality it is within seconds and if you are one of those people who move money from your checking account to a savings account, I know of numerous occasions where people have sent money to themselves and before they have logged-on to the savings account to check their balance, the money is already there. For the vast majority of payments, it happens in seconds—nothing like minutes or hours.

The reason we have agency banks in the system, however, is the regulator said we had to be able to reach over 95 percent of checking accounts. If we could not persuade second-line banks to join—the members of the Payments Council were bamboozled into joining—then the next best thing we could do was to make it possible for payers with member banks to send Faster Payments to customers at those second-line banks and thereby achieve our 95 percent reach. As I have said, we in fact reach over 98 percent.

The EU Payment Services Directive (PSD)—which many of you in this room will have heard of—also helps here. As of Jan. 1, 2012, the PSD imposed faster processing on EU banks and a lot of these agency banks have had to speed-up the process by which they receive payments through Faster Payments so the situation is improving all the time.

Mr. Summers: If I take Jonathan's question in the right way, I have tried to think entrepreneurially at the level of services provision. We talk about immediate funds transfer being a logical application for mobile. But, why does it have to be a mobile phone?

There was a day, not very long ago, when everybody carried something called a check register. We wrote checks and we kept our account balance up-to-date manually. It seems to me there is some opportunity for banks to think more specifically about what clients are enabled with, along the lines of the equivalent of a dedicated, mobile payment device and register that is electronic. A dedicated, mobile payment device has implications for security, too, as so you are not doing your value transactions on the same device you use for recreational applications. This is just by way of example, there are ways of taking an idea like this and being very entrepreneurial in terms of turning it into something that is attractive to consumers.

Mr. Anderson: If I may return briefly to the issue of security, there is potentially a tension for a regulator who gets involved in promoting a payments system, under the traditional regulatory role of looking after the interests of those customers who are less able to look after themselves.

A fundamental problem in the modern world is that a lot of computers are infected with malware and many of these are running the Zeus trojan, which tries to make payments through bank accounts. In the U.K., the proportion of infected PCs, as we have most recently measured it, is about 6 percent. I am afraid many people do not really put enough effort in trying to design systems which will still work, despite the fact that 6 percent of payment terminals are under the control of the bad guys. In the U.K., we see many hard cases where banks accuse complaining customers of being negligent or complicit, at least initially.

In the United States, I believe there is a problem with small and medium-size enterprises being dunned for ACH payments, because I understand that here if people do not spot a rogue payment within two days, it is no longer the bank's problem. It is the corporate customer's problem. Therefore, banks in the United States

apparently do not have enough incentive to crack down on this kind of thing.

My question, I suppose for Bruce, is this: If you were going to get Congress to give you the power to be a "light-touch" regulator to promote payments services, how do you manage the conflict between that and the role of upholding consumer protection?

Mr. Summers: So security is the top-level question. I will give a three-part or four-part response to Ross's important intervention here. First, to re-emphasize, I am suggesting "light-touch" intervention on the part of Congress or a regulatory authority to stimulate action in a public policy context where we have clear public policy objectives. But, do not pick winners and losers. Do not define security regimes. Leave that to the private sector.

Second, my paper hints at the kinds of design questions we should be asking from a security standpoint. In particular, the paper states that a credit-transfer system is inherently easier to secure than a debit-transfer system. I would also say that moving to immediate processing provides some opportunities for enhancing security, as opposed to a delayed settlement, batch-processing environment, if the notion is embraced within the banking system.

Third, I would like to re-emphasize a point related to something that Ross brought up for the first time yesterday. If you really want to be secure in your banking transactions, dedicate a device to banking and lock it in the cupboard. Do not use it for anything else. I adhere to that advice. The notion of a dedicated device for payments is consistent with my earlier suggestion about opportunities for banks to provide customers with access methods that are dedicated to their banking transactions and not shared with other types of riskier applications.

Mr. Mabbott: I ought to start off by saying by not being a central banker I have probably not been as precise in the terminology I have used when I talked about the regulator as perhaps I should have been. I have tended to lump all authorities together under the term regulator.

In the case of Faster Payments, it was the competition authorities that "leaned on" the payments industry to come up with faster clearing and settlement. It was not the banking regulatory authorities.

Now, Faster Payments, as an extant scheme, comes under the Bank of England's oversight. The Financial Services Authority also has a role in protecting customers' interests.

If banks are taking incorrect instructions masquerading as their customers' instructions and acting on them, then that is outside the perimeter of Faster Payments. In terms of a conflict between a regulator wanting to see an improved service and the security matters Ross raises, I do not see that particular conflict manifesting itself in the way the U.K. has established its Faster Payments system.

Ms. Hughes: Actually I have more of a comment, but it may prompt a reply, so we will see. We have a very good, but very long, stretched out track record in this country of causing people to take specific kinds of actions in this space. The Federal Reserve System was one, letting more institutions into Federal Reserve clearing and settlement was another, and more recently (remember I am a lawyer and not an economist) we had the Check 21 Act. And Check 21 is, in my opinion, a messy legal model, but a brilliant economic model, where Congress said, "Do this to allow more electronic transmission of information for clearing and settlement purposes and provide a solution." Although it is maybe not the most perfect one, it is an interesting solution for the small-bank holdouts—the 3 percent or 5 percent that you have not been able to reach in the U.K. with Faster Payments yet. We created an economic model that let them have paper if they insisted on paper, but let everybody else transfer electronically without specific bilateral electronic transfer agreements, which was really holding up the process.

So I am curious for the panel members, particularly those who are familiar with this system in the United States, whether you could conceive of a model that would create an economic opportunity—like Check 21 did in many respects—but which is not too heavy-handed, because it really is not very heavy-handed?

Mr. Summers: I could conceive of that model, but probably not on the fly. But I take the spirit of the question. We want to be collaborative and we want to be creative and we want to recognize the particular characteristics of our banking culture and our banking system. We have an ideal. We might not achieve the ideal overnight, but, if we can get real close to achieving it and then work on the residual over time, that is great. I would be hopeful about achieving the spirit of what you have to say.

Mr. Platt: I would echo that. One thing I feel has been in short supply in innovation in the banking industry, in general, is a consumer perspective. That is one thing we are very focused on.

For example, and here is where I will directly disagree with Bruce, the notion for us of asking consumers to maintain a separate digital device—a separate piece of hardware for transactions—is something we think has absolutely zero chance of succeeding in the market in the current environment. We need to rise to the challenges. Any regulatory, economic, or legal frameworks that attempt to solve this, really need to keep in mind what consumers are doing and adopt a consumer perspective. That is the genesis of the whole conversation. We need to improve the payments system to align with current consumer expectations about speed and immediacy of payments.