Sept. 7, 2011

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Immediate Funds Transfer: A Central Bank Perspective
Immediate Funds Transfer Symposium, Federal Reserve Bank of Chicago
Chicago, Illinois

I am honored to be asked to speak at this conference. I have had a longstanding interest in payment economics, particularly the economics of payments systems innovations. From that perspective, the topic of this conference ─ immediate funds transfer ─ is intriguing because what it represents ─ low-cost, real-time funds transfer for all ─ sounds like payments system nirvana.

I would like to use my remarks today to review some of the thinking that I and others ─ mostly others ─ have devoted over the years to the role of the central bank in the payments system, particularly in regard to payments innovations. I also would like to emphasize that these remarks are my own and the views expressed are not necessarily shared by my colleagues in the Federal Reserve System.[1] Central banks have a natural interest in the development and evolution of payments systems. In fact, one could legitimately say that payments systems are central to central banking. The processes by which payments get made, cleared and settled represent the mechanics of monetary exchange, and the characteristics of these systems can affect the transmission of monetary policy to economic activity and inflation.[2] Related, most payment arrangements achieve finality through the transfer of central bank liabilities, whether in the payment of cash at the point of sale or in the transfer of reserve balances between the banks of the payer and payee. Indeed, the historic origin of central banks is as public sector intermediaries for the clearing and settling of payments, such as bills of exchange ─ central banks are essentially nationalized clearinghouses.[3]

The Federal Reserve's interest in the payments system has long been organized around its three-fold goal of efficiency, integrity and accessibility. To an economist's ear, the first two of these sound more like a single goal of economic efficiency more broadly defined. Integrity is an attribute of a payment instrument or process, and the public policy objective, in this regard, should be that payments embody a socially efficient degree of integrity ─ that is, the degree of integrity that maximizes the social benefit net of social costs.[4] In the central bank lexicon, the term "efficiency" is often construed more narrowly as the minimization of resource costs. The goal of accessibility, in turn, suggests a public policy concern for the *distribution* of costs and benefits among payments system participants and intermediaries. In the history of the Fed's involvement in payments, this has taken the form of shielding small depository institutions from too large a share of the common costs associated with clearing and settlement systems. (Common costs are those that are not attributable to particular users or sets of users.) This aligns with the Fed's founding purpose of realigning, in favor of "country" banks, the governance of how financial crises are resolved.

The importance of common costs and the distributional questions they raise are the result of the technological nature of payments systems. At their most basic, these are systems that communicate and process information ─ instructions regarding the transfer of bank balances, to be precise. The dramatic innovations in information processing and communication technology that we have seen in recent decades have made payments practices feasible that not too long ago were utopian. People can now carry around with them their own personal connections to universal communications networks, creating the possibility of retail payments initiation using mobile devices. Computational advances have allowed settlement systems ─ for instance in the CHIPS or CLS services ─ that economize on both central bank balances and counterparty credit in making "wholesale" payments. The immediate funds transfer services that are the topic of this conference take advantage of newer technologies to create a payment service that blurs the traditional distinctions between "wholesale" and "retail" payments.

Immediate payments also can be thought of as an attempt to move payments further away from their batch processing history. Gathering many payment instructions into a single file for communication and processing made sense in a world where there were economies of scale in batch size. But the evolution of technology has reduced the fixed cost associated with individual communication packets, which makes batch processing less compelling as a means of economizing on the resource costs of payment clearing and settlement. For example, I am told that a majority of the ACH files presented to the Federal Reserve contain just a single item.

When technological progress makes possible new ways of initiating, clearing or settling payments, delay in the realization of the anticipated improvements is sometimes taken as evidence of market failure and as a motivation for the involvement of the central bank. Indeed, it is common to hear payments systems referred to as "public goods." Clearly they are not. Public goods have the technological characteristic that they are *provided jointly* to many users and, crucially, are *not excludable*, meaning that one cannot easily prevent enjoyment of the benefits (or costs) of provision. Payments systems are provided jointly to many users, but a user's participation can easily be prevented, so they are *club goods*, not public goods. The efficiency case for government intervention in markets for club goods is much harder to make, and intervention tends to be motivated by considerations related to the allocation of joint or common costs.

It's also common to hear talk of "barriers" to adoption of payments improvements, a word choice that suggests forces inhibiting the market from moving in an obviously superior direction. The stubborn persistence of checks as a dominant means of payment in the U.S., even as electronic alternatives became increasingly available, was a widely-cited example for many years, as was the persistently slow adoption by the banking industry of electronic means for clearing and processing paper checks. The dramatic change we have seen on the processing side came about after changes not just in the costs of handling and storing check images, but also in the legal rights surrounding check presentment. This suggests that check collection may have been reasonably efficient, in the broader economic sense, given the legal regime in place prior to the Check 21 legislation. It also suggests that central banks should be on the lookout for opportunities to use their good offices to advocate for legislation that removes legal barriers to private sector efforts to improve the economic efficiency of the payments system.

In the history of efforts to speed up payments through electronification, much of the perceived benefit has stemmed from the reduction in float. But the value of float ─ the forgone interest, that is ─ represents a transfer from the payee to the payer, and without explaining what keeps trading parties from taking this into account when voluntarily agreeing on their payment arrangements, it's hard to see float as a source of market failure.[5] When payment instruments do not accrue interest while in the process of settlement, there is a socially wasteful incentive to attempt to speed up payments to minimize forgone interest. Perhaps in the past the cost of calculating and crediting interest on payments being cleared may have exceeded the social cost associated with inefficiently "chasing float." One under-appreciated side benefit of the current exceptionally low level of interest rates is that it minimizes the inefficiency associated with chasing float.

I believe we should be cautious about assessments of the private adoption of innovations, both in the payments arena and elsewhere; they are much more complicated than is implied by the language of "public goods" or "barriers." For example, the popular understanding of the Fed's original entry into the business of clearing checks holds that the banking industry's fragmentation was a barrier to the creation of an efficient, nationwide check clearing system. I believe the record shows, though, that the evidence for inefficiency of pre-Fed check clearing is weak, and that the Fed's entry was motivated by the desire to reduce the burden of the higher reserve requirements associated with Fed membership. My sense is that the effects of our entry had more to do with re-allocating the common costs of clearing checks, especially checks drawn on small banks outside of major cities, than it did with payments system efficiency per se.[6]

As I noted earlier, general-use immediate funds transfer seems to represent a natural evolutionary response to recent technological advances, and as such, would appear to offer an obvious improvement. From that perspective, non-adoption might be interpreted as a failure of the payments marketplace. But this is a tricky conclusion to draw. The private value of alternative payment methods and practices to end users (for instance, buyers and sellers in commercial transactions) is very hard to identify and measure. Even harder is identifying the reasons, and quantifying the extent to which, social costs and benefits deviate from private costs and benefits. The failure of many proposed payments innovations in the mid-1990s offers a valuable lesson in the risks of pre-judging the viability of an innovative payment arrangement.

What can the central bank do to further the goal of payments innovations that promote economic efficiency? Central bank obligations play a special role in the payments system because they are free of credit risk. Certainly, a central bank should ensure the integrity and cost efficiency of the core interbank settlement functions it performs. Settlement on the books of the central bank can be a key part of any new payment service or process, so effective provision of this service is vital. It's also important that this core central bank service not create competitive inequities among competing private sector networks. That is, a central bank should strive to ensure that access to settlement promotes the contestability of markets. The Fed's net settlement service for private clearing networks is a good model for such a universally accessible settlement process, which levels the playing field among potential competitors.

If a central bank plays an expanded operational role ─ clearing retail payments, for example ─ it should ensure that these activities also contribute to economic efficiency. Although such roles are distinct from the core central bank roles related to currency and reserve balances, they may

be justified if there are complementarities that make it more efficient to bundle clearing and settlement with the maintenance of central bank account balances. But a question worth asking is whether technological advances that have clearly reduced the cost of communications between financial entities have reduced these complementarities and made it easier to separate the various functions that make up the payments system. And if so, does this create greater opportunities for more of those clearing functions to be handled outside the central bank?

A central bank should also take care that the processes by which its own clearing services access central bank settlement services are neither artificially advantageous nor disadvantageous relative to the settlement terms it provides to private clearing networks. For example, settlement of Federal Reserve check and ACH transactions bypasses the controls of the net settlement service through which private competitors are required to settle. Such disparities have the potential to affect the terms of competition among public and private networks.

Because the nature of payments is such that barriers to effective competition could arise among private participants, payment services markets are always likely to attract the attention of competition policy authorities. Even if it does not have primary responsibility for enforcing pro-competitive policy in payments markets, the central bank is likely to be an important public sector source of expertise in payments. Because the payments system represents the mechanics of monetary exchange, the central bank needs to be well informed about developments and practices among all payments system participants.

The same technological and network characteristics that create potential market power problems create challenges for payments systems operated by the central bank or other public sector entities. In much of its payment services activity, the Fed has relied on the cost recovery rules mandated by the Monetary Control Act as a tool to ensure that its provision of services is consistent with overall economic efficiency. While this has been a largely effective policy, a central bank's role as a provider of services can create particular challenges for the promotion and adoption of payment innovations.[7] A public sector provider of services needs to take care that the terms under which it serves customers, particularly in those market segments for which it may have a competitive advantage, do not distort the evaluation of the potential net benefits of new products or processes. Moreover, such a provider should scrupulously avoid using a competitive advantage in a legacy market to subsidize entry into an emerging market.

Finally, we shouldn't forget that payments innovation incentives can depend critically on the central bank's performance of its most central role ─ the maintenance of price stability. This is especially true of innovations intended to reduce the time between initiation and settlement of a payment. In an environment with high inflation and thus high nominal interest rates, the value of float can have a powerful effect on the payment choices of individuals and intermediaries. Speeding up payments may yield benefits associated with the reduction of risk, but speeding up payments simply to reduce the transfer associated with float represents socially wasteful investments in innovation ─ the modern counterpart of the classic textbook account of the "shoe leather" costs of inflation. So it seems appropriate ─ and certainly consistent with my personal views on monetary policy ─ to end on this note: Perhaps the most important thing a central bank can do to promote efficient payments innovation is to provide an environment of stable prices, so that the payments system decision makers ─ like other economic decision makers ─ can better judge the true costs and benefits of alternative choices.

[1] I am grateful to John Weinberg for assistance in preparing this speech.
[2] Jeffrey M. Lacker and John A. Weinberg, "Payment Economics: Studying the Mechanics of Exchange," Journal of Monetary Economics, vol. 50, no. 2, pp. 381-387.
[3] Charles Goodhart, "The Evolution of Central Banks" (Cambridge, MA: The MIT Press, 1988).
[4] For a discussion of the economic notion of efficiency as applied to the Fed's payment system goals, see Edward J. Green and Richard M. Todd, "Thoughts on the Fed's Role in the Payments System," *Federal Reserve Bank of Minneapolis Quarterly Review*, Winter 2001, vol. 25, no. 1, pp. 12-27.
[5] Jeffrey M. Lacker, "The Check Float Puzzle," *Federal Reserve Bank of Richmond Economic Quarterly,* Summer 1997, vol. 83, no. 3, pp.1-25.
[6] Lacker, Walker, and Weinberg, "The Fed's Entry into Check Clearing Reconsidered," *Federal Reserve Bank of Richmond Economic Quarterly*, Spring 1999, vol. 85, no. 2, pp. 1-31.
[7] Lacker and Weinberg, "Can the Fed be a Payment System Innovator?" *Federal Reserve Bank of Richmond Economic Quarterly*, Spring 1998, vol. 84, no. 2, pp. 1-25.