December 13, 2013

**RE: Payment System Improvement – Public Consultation Paper**

Dear Federal Reserve Banks,

Thank you for the opportunity to comment on your plans to improve the US Payment System, which is in great need of modernization. The opinions below are my own thoughts as of December 2013 and should not be attributed to any organization that I have been involved with or may be in in the future.

**Key messages:**

1. The Fed should focus its efforts on core payments systems vs. details of the end user experience. The creativity of the private sector is well suited to creating end user interfaces on top of payments infrastructure. Most high profile payments innovators (PayPal, Square, etc.) are some form of wrapper around ACH or card networks.

2. Significant improvement likely requires use of the regulatory powers of the Fed in order to achieve real change in core payments and universal coverage for any new solution.

3. The availability of a near real-time credit transfer payment system with good funds transactions, timely notification of completion, and universal coverage of US accounts will lead to a significant amount of private sector innovation. The constraints of the existing ACH system are a huge barrier to innovation by startup companies and other disruptors trying to build new consumer payment experiences on top of existing infrastructure.

4. The 10 year timeline proposed in this paper is far too long. There are a variety of private sector efforts to modernize core payments in the US from banks, networks, payment processors, startups and the developer community (e.g., cryptographic currencies) that are moving on a much faster timeline. The Fed risks being left behind in this process and/or failing to induce action if it focuses on such a long time horizon.

My responses to your specific questions are below. I would be happy to discuss my thoughts with you in further detail in the future if desired.

Regards,
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San Francisco, CA

## ***Questions from the Fed:***

### ***General***

***Q1****. Are you in general agreement with the payment system gaps and opportunities identified above?*

Yes!!!

***i****. What other gaps or opportunities not mentioned in the paper could be addressed to make improvements to the U.S. payment system?*

The paper seems to focus on improving credit transfers (payor initiated payments). There are similarly large structural challenges with debit transfers (recipient initiated payments). The ACH system is used heavily for debit transactions despite the fact that there is no authorization protocol within the ACH system. In the current system, it is not possible to directly verify that an account holder has provided authorization to debit an account such as a digital signature or authorization token. Instead we rely on indirect tools such as the reversal rights in the NACHA rules and Regulation E, indirect tests of account control such as trial deposits to manage fraud. A system of affirmatively (and verifiably) authorizing a third party to debit a bank account would also be very useful. NACHA's Secure Vault Payments system is an attempt at such a system but suffers from very limited coverage among both banks and merchants and weak economic incentives for participation. Hong Kong's PPS is another analogue with much broader adoption in its home market.

***Q2****. Are you in general agreement with the desired outcomes for payment system improvements over the next 10 years? Please explain, if desired.*

Yes, however the timeline is far too long.

***Q3****. In what ways should the Federal Reserve Banks help improve the payment system as an operator, leader, and/or catalyst?*

The Federal Reserve System needs to take a very proactive role in directing improvement of the core payments infrastructure of the US (principally ACH and Wire). This means active engagement from the regulatory and supervisory portions of the Federal Reserve and use of their powers. Federal Reserve Financial Services plays an important role in the US payment system but the regulatory and supervisory tools of the Fed to mandate and/or strongly encourage change will be critical to achieving real change, especially if ubiquity is an important outcome.

If the Federal Reserve System proactively addresses the challenges with the core payments infrastructure, I expect that the private sector would be able to address some of the stated goals / opportunities that relate to the end-user experience of payments such as making payments with mobile devices.

***Ubiquitous near-real-time payments***

***Q4.*** *In discussions with industry participants, some have stated that implementing a system for near real-time payments with the features described in the second desired outcome (ubiquitous participation; sender doesn't need to know the bank account number of the recipient; confirmation of good funds is made at the initiation of the payment; sender and receiver receive timely notification that the payment has been made; funds debited from the payer and made available in near real time to the payee) will require coordinated action by a public authority or industry group. Others have stated that current payment services are evolving toward this outcome and no special action by a public authority or industry group is required.*

*i. Which of these perspectives is more accurate, and why?*

I strongly believe that coordinated action by a regulatory authority (not merely an industry group) is essential for the implementation of a system for near real-time payments with the features described in the second desired outcome. Repeated failures of industry groups or the private sector to take action evidence the need for such coordination.

The August 2012 NACHA decision not to go forward with Same Day ACH is a very clear example of a failure of industry to act without regulatory intervention. There is generally too much inertia for industry groups to act without strong external forces.

Furthermore, there are complex incentives that result from the interaction between an improved credit transfer system and other payment related revenues that banks earn today. A real-time good funds credit transfer system threatens existing high-margin payment revenue streams (principally wire transfer fee and credit / debit card interchange) for banks and existing fee revenue for other industry participants like card networks or clearinghouses.

Potential disruptors have much better incentives but payment systems heavy reliance on network effects limits the ability of unilateral action by new entrants. PayPal is unambiguously the most successful private effort to improve domestic payments infrastructure in the past 15 years but it relied heavily on the ACH system to achieve ubiquity by essentially providing a "back door" to the US banking system.

Purely private efforts also often struggle from a conflict between a) the owner/creator(s) of a scheme's interest in developing something that benefits them and generates return on their investment and b) other participant's interest in using

a payment utility on a level footing. (examples in core payments include clearXchange, PopMoney, FIS Paynet).

In contrast to efforts for private action to improve core payments, the real successes in other countries such as SEPA (EU), TARGET 2(EU), BACS/Faster Payments (UK) have each been driven by regulatory pressure or mandate. I believe the Fed's own same-day ACH services has struggled in no small part because participation was optional rather than mandatory among financial institutions.

*ii. What other perspective(s)should be considered?*

I expect that many comments from industry will focus on the cost of implementation. However attention should also be paid to the deadweight economic losses created by inefficiency of the current system. These are real costs for consumers and businesses that use the payment system every day. In addition to these structural inefficiencies, the absence of real time information and lack of payment certainty also create large barriers to innovation in end-user payment experiences.

***Q5**. The second desired outcome articulates features that are desirable for a near-real-time payments system. They include:*

*a. Ubiquitous participation*

*b. Sender doesn't need to know the bank account number of the recipient*

*c. Confirmation of good funds is made at the initiation of the payment*

*d. Sender and receiver receive timely notification that the payment has been made*

*e. Funds debited from the payer and made available in near-real time to the payee*

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*i. Do you agree that these are important features of a U.S. near-real-time system? Please explain, if desired.*

I agree with outcomes a, c, d, and e.

I challenge outcome b: the assertion that the sender not needing to know the bank account number of the recipient is an important goal of core payments infrastructure.

I can see two potential reasons for this being contemplated as a desirable outcome:

A. A desire to make it not necessary to share bank account numbers in order to make a payment
B. A desire to make it not necessary to determine a bank account number in order to make a payment

Reason A is an almost uniquely American issue for bank account numbers. When I lived in Hong Kong for example it was is very common for businesses to put their bank account data on every invoice and for consumers to freely share their account numbers for P2P transfer use cases. Germany has similar customs. In the US, sharing bank account numbers presents some fraud risk because the ACH and check clearing systems allow for debiting any account without knowing any other information. There is no native authorization scheme as described above in Q1.i . If a modernized debit transfer system had a verifiable authorization, there would be no need to hide bank account numbers as bad actors couldn't do anything with that information.

Reason B is likely readily addressable by the private sector. If a ubiquitous system of transferring money to an account using an account number (or an account number plus additional identifiers like the ABA routing number) exists it is relatively easy for private sector entities to create services that associate bank account numbers with other identifiers such as an e-mail, phone number or business name. As long as payments are ubiquitously routable by a unique identifier, the consent or cooperation of the receiving bank isn't required to create such a system, which removes the most important network-effect barriers that plague most payments innovation. Systems like PayPal, Square Cash, Google Wallet Card, are examples of consumer services that create abstractions of bank accounts or card numbers that rely on the ubiquity of the underlying payment identifiers to create a consumer experience that does not require remembering account numbers. They can create these services because the system for routing a transaction to the underlying account number is ubiquitous and accessible.

*ii. What other characteristics or features are important for a U.S. near-real-time system?*

A. Some degree of backward compatibility. For example if a credit transfer in a new real-time system can fail-over to a traditional, slower ACH payment, if the receiving institution does not support real-time payments during a transition period, that is likely to ease transition to a new system. The IRD (Image Replacement Document) was an example of making Check 21 images backward compatible with traditional check clearing.

B. Modernization of message formats and metadata. ACH, cards network and wire transfer standards are based on 1970/80's file formats. They have very limited space for information about a payment. For example a card transaction allows for only a 22 character description which results in loss of

lots of information about a payment when it crosses the payment system. A system should support several kilobytes of Unicode text.

***Q6.*** *Near-real-time payments with the features described in the second desired outcome could be provided several different ways, including but not limited to:*

*a. Creating a separate wire transfer-like system for near-real-time payments that leverages the relevant processes, features, and infrastructure already established for existing wire transfer systems. This option may require a new front-end mechanism or new rules that would provide near-real-time confirmation of good funds and timely notification of payments to end users and their financial institutions.*

*b. Linking together existing limited-participation networks so that a sender in one network could make a payment to a receiver in another network seamlessly. This option may require common standards and rules and a centralized directory for routing payments across networks.*

*c. Modifying the ACH to speed up settlement. This option may require a new front-end mechanism or new network rules that would provide near-real-time confirmation of good funds and timely notification of payments to end users and their financial institutions. Payments would be settled periodically during the day.*

*d. Enhancing the debit card networks to enable ubiquitous near-real-time payments.*

*e. Implementing an entirely new payment system with the features described in the second desired outcome above.*

*i. What would be the most effective way for the U.S. payment system to deliver ubiquitous near real-time payments, including options that are not listed above?*

I believe that Option E, implementing a largely/entirely new system is the best solution if the regulatory authority of the Federal Reserve is available to induce change. Otherwise Option D is the most likely private sector solution.

*ii. What are the likely pros and cons or costs and benefits of each option? What rule or regulation changes are needed to implement faster payments within existing payment processing channels?*

Option A is desirable because is draws upon existing systems. However, there would some tradeoffs (often called "technical debt" in software development communities) from starting from an existing, outdated system. If any existing Federal Reserve system were to be used as starting point FedWire is the most relevant / useful starting point, but the marginal cost of transactions would need to fall by ~100x which may be more achievable with a new system.

Option B sounds infeasible because it requires too much coordination between the existing limited access systems which have rules and standards that are likely to be incompatible.

Option C seems challenging because the core messaging infrastructure of ACH is so basic (no concept of authorization, limited scope for messages, batch based structure)

Option D has some potential and some networks have tried to implement credit transfer functionality but is limited by inconsistent bank participation and issues with sharing card numbers because of their potential fraudulent use. It may also be preferable to have a system run by an industry utility instead of privately owned card networks.

*iii. Is it sufficient for a solution to be limited to near-real-time authorization and confirmation that good funds are on their way, or must end-user funds availability and/or interbank settlement take place in near-realtime as well?*

Near real-time authorization and confirmation are far more important than real time settlement.

*iv. Which payment scenarios are most and least suitable for near real-time payments? (B2B, P2P, P2B, POS, etc.)*

Most commercial, P2P, and bill payment scenarios are suitable for near real-time credit (payor initiated) payments. Retail POS and automated recurring payments are a better fit for debit (payee initiated) payments.

***Q7**. Some industry participants have said that efforts to make check payments easier to use, such as by enabling fully electronic payment orders and/or by speeding up electronic check return information, will incrementally benefit the payment system. Others argue the resources needed to implement these efforts will delay a shift to near-real-time payments, which will ultimately be more beneficial to the payment system. Which of these perspectives do you agree with, and why?*

I believe the focus should be on electronic payment systems not improving checks beyond Check 21.

***Q8**. How will near-real-time payments affect fraud issues that exist with today's payment systems, if at all?*

*i. Will near-real-time payments create new fraud risks? If yes, please elaborate on those risks.*

Near-real-time payments increases the value of stolen account credentials because an attacker can easily and quickly send money to themselves. Other countries that have real-time credit transfer systems often require much stronger multifactor authentication such as SMS or hard token authentication than is common in the US today.

***Q9**. To what extent would a ubiquitous near-real-time system bring about pivotal change to mobile payments?*

Virtually all mobile payment schemes in the US are some sort of wrapper around either A) ACH or B) credit / debit cards. Fraud and other frictions created by legacy payment methods are among the top issues I hear from startups that pitch me on investing in new mobile payments concepts as a venture capitalist. An new, modern payment system creates lots of opportunity for new innovation.

***Q10**.What would be the implication if the industry and/or the Federal Reserve Banks do not take any action to implement faster payments?*

*i. What is the cost, including the opportunity cost, of not implementing faster payments in the United States?*

The costs to US consumers and businesses are significant. US consumers and businesses spend much more on payments than other developed countries. The clearest contrast is with Europe after the implementation of SEPA where complex cross border payments are very cheap.

***Q11**. To what extent will the industry need to modernize core processing and other backend systems to support near-real-time payments?*

The industry will need to do some modernization. However wire transfers and debit cards are examples of near real-time systems that already work with existing core processing systems. The substantial majority of financial institutions in the US (especially small and mid-size institutions) rely on third party vendors (e.g., Fiserv, FIS) for their core systems. Structuring a new system as a mandate will drive those vendors to prioritize development of modifications needed for a new near-real-time payments scheme and sharing those costs across all clients. Making adoption optional may harm adoption by banks by placing much of the transition costs on early adopter institutions making the choice to be an early adopter more difficult.

***Q12**. Some industry participants suggest that a new, centralized directory containing account numbers and routing information for businesses and/or consumers, to which every bank and other service providers are linked, will enable more electronic payments. A sender using this directory would not need to know the account or routing information of the receiver.*

*i. What are the merits and drawbacks of this suggestion?*

I view this as a user interface issue rather than an issue of core payments infrastructure.

*ii. What is the feasibility of this suggestion?*

This can be implemented privately. It does not require regulatory coordination. If a ubiquitous system of transferring money to an account using an account number (or an account number plus additional identifiers like the ABA routing number) exists it relatively is easy for private sector entities to create services that associate bank account numbers with other identifiers such as an e-mail, phone number or business name. As long as payments are ubiquitously routable by a unique identifier, the consent or cooperation of the receiving bank isn't required to create such as system.

Systems like PayPal, Square Cash, Google Wallet Card, are examples of consumer services that create abstractions of bank accounts or card numbers that rely on the ubiquity of the underlying payment identifiers to create a consumer experience that does not require remembering account numbers. They can create these services because the system for routing a transaction to the underlying account number is ubiquitous and accessible.

***Electronification***

***Q13****. Some industry participants say that check use is an enduring part of the U.S. payment system and that moving away from checks more aggressively would be too disruptive for certain end users.*

*i. Is accelerated migration from checks to electronic payment methods a high-priority desired outcome for the U.S. payment system? (Accelerated means faster than the current trend of gradual migration.)*

No.

*ii. Please explain, if desired*

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Creating more functional alternatives will lead to lower check volumes. Reducing lower check volumes should not be a focus on its own.

*iii. If yes, should the Federal Reserve Banks establish a target for the percent of noncash payments to be initiated via electronic means, by a specific date? For example: "By the year 2018, 95% of all noncash payments will be made via electronic means."*

*iv. What is the appropriate target level and date?*

***Q14**. Business-to-business payments have remained largely paper-based due to difficulties with handling remittance information. Consumer bill payments also are heavily paper-based due to the lack of comfort some consumers have with electronic alternatives. In addition, many small businesses have not adopted ACH for recurring payments due to technical challenges and/or cost constraints. The payment industry has multiple efforts underway to address these issues.*

*i. To what extent are these efforts resulting in migration from checks to other payment types?*

*ii. What other barriers need to be addressed to accelerate migration of these payments?*

*iii. What other tactics, including incentives, will effectively persuade businesses and consumers to migrate to electronic payments?*

*iv. Which industry bodies should be responsible for developing and/or implementing these tactics?*

*Cross-border payments*

***Q15.** To what extent would the broader adoption of the XML-based ISO 20022 payment message Standards in the United States facilitate electronification of business payments and/or cross-border payments?*

It would be helpful.

***Q16.** What strategies and tactics do you think will help move the industry toward desired outcome for consumers and businesses have greater choice in making convenient, cost-effective, and timely crossborder payments?*

Consumer payments innovation in cross-border payments is hamstrung by the complex and heavily overlapping regulatory regime for money transmission in the United States. A complex patchwork of 48 different regulatory bodies with differing rules and procedures adds major costs to this industry. A federal charter or other means of multi-state authority for money transmission would be very helpful to pro-consumer innovation in cross-border payments. The concept of a passportable "Payments Institution" under the Payment Systems Directive in Europe is a great blueprint for what is needed in the US.

***Safety***

***Q17**. Payment security encompasses a broad range of issues including authentication of the parties involved in the transaction, the security of payment databases, the*

*security of software and devices used by end users to access payment systems, and security of the infrastructure carrying payment messages.*

*i. Among the issues listed above, or others, what are the key threats to payment system security today and in the future?*

Weak means of end user authentication (reliance on PANs, credit card AVS, trial deposits, weak passwords) are the biggest threat to payments security.

*ii. Which of these threats are not adequately being addressed?*

Many banks implement consumer multi-factor authentication for end user access through device fingerprinting and secret questions. These are not strong enough for a fraud environment where an attacker that takes over account login credentials can send money to an arbitrary account. Other countries that have real-time credit transfer systems often require much stronger multifactor authentication such as SMS or hard token authentication.

*iii. What operational or technology changes could be implemented to further mitigate cyber threats?*

A. Stronger Two Factor Authentication (e.g., SMS verification, OATH tokens, Push-based mobile authentication such as Duo Push or Entersekt, Yubikeys / FIDO Alliance) for both account login and transaction authorization. Solutions that use push notifications to smart phones seem like the most promising way to achieve the dual goals of security and usability.

B. Tokenziation to reduce reliance on PANs or bank account numbers as secrets for debit transaction authorization and reduce risk of storage of payment credentials by third parties.

C. EMV reduces reliance on PANs for card present retail transactions.

***Q18**. What type of information on threat awareness and incident response activities would be useful for the industry?*

*No comments*

***Q19**. What future payment standards would materially improve payment security?*

*No comments*

***Q20.** What collaborative actions should the Federal Reserve Banks take with the industry to promote the security of the payment system from end to end?*

*No comments*

***Other***

***Q21.*** *Please share any additional perspectives on U.S. payment system improvements*

I interact extensively with high growth technology companies in Silicon Valley. Software developers that are new to the payments system are constantly shocked to learn how basic and outdated the software protocols are that run such important and high value parts of the economy. The technology community has invested in creating alternative payments infrastructure including distributed ledger systems such as Bitcoin and Ripple largely out of deep frustration with the status quo. While the media has recently focused on the price volatility and AML issues around Bitcoin, there are fundamental payment technologies in Bitcoin's distributed ledger. Ripple in particular is an extremely advanced payment system that is worth further study by the Fed.