



## Risks in Faster Payments

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**Abstract:** The purveyors of payment systems have long had the means to reduce intermediation time for retail payments. Japan’s Zengin moved first—as far back as 1973—but for years, little else followed. That has all changed. Now, payment system purveyors that have established the means to effect retail payments in seconds talk of it as a marquee achievement. Those that haven’t yet launched such a system are generally in pursuit of it, with few failing to name it as a primary goal. As more countries implement faster payment schemes, the question of what the United States will do gets increasingly pressing. This paper uses a variety of sources to determine how conditions in the United States compare to those of 15 other countries that have either deployed a faster scheme or have made plans to do so. It then draws out various risks that attach to the initiative and contrasts domestic circumstances with the parallel circumstances in other countries. The paper also provides a practical approach to understanding the highlighted risks, describing implications and suggesting options for addressing the challenges.

The views expressed here are the author’s and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. This working paper is not associated with the work of the Faster Payments Task Force. Any remaining errors are the author’s responsibility.

## I. Introduction

Payments may never have enjoyed more attention than now. From virtual money to biometrics, chips, and mobile payments, there is no shortage of payment news.

The speed at which one can pay or be paid is on the list of hot payment topics. While the United States has moved toward making payments within a day, many countries have stood up “real-time”<sup>1</sup> payment schemes, or will launch them soon.

As for what’s being said about real-time schemes, it would be infeasible to count all the articles, white papers, pamphlets, and blogs that have been written on the subject. Discussion ranges from whether, why, or how to implement the speedier payment schemes all the way to recounting progress of those that have already moved forward.

Despite all that has been written and said, the risks associated with faster payments—from establishing to maintaining them—have not received much ink. This paper explores some of these risks, considering them against a backdrop of what is known about existing or contemplated models. The objective is to offer a baseline understanding of the risks so that all involved can better evaluate and manage them as the work to advance a faster payment scheme in this country moves forward.

The paper is organized into sections that break down the most notable risk categories. Section II focuses on the traditional, or core, risks in payments: settlement, operations, and security. Section III considers other risks, risks that are unique to the United States.

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<sup>1</sup> For purposes of this paper, real-time or “faster” payments are defined as retail, interbank, demand-deposit account (DDA) payments that are confirmed as successfully sent and received (from payers and payees, respectively), with funds available for use by the payee in minutes or seconds. Interbank settlement may not coincide with messaging or funds availability to the payee.

## II. Core Payment System Risks

### *Settlement*

#### Overview

Intermediated payments essentially have two parts. The first is messaging—the instruction that delineates who is to be paid, by whom and in what amount. The other part is settlement, which is the event that finishes a payment. It is the actual transfer of funds, the account entries directed by the messaging components that record and reflect the transfer of ownership of value from payer to payee.

Settlement is commonly the slowest aspect of any payment scheme. Excluding real-time gross settlement (RTGS) systems,<sup>2</sup> most payment schemes offer settlement across windows of one to three days.<sup>3</sup> While messaging may occur in real time (or near real time) and give users a feeling of virtually instantaneous payment, the settlement—actual adjustments to the accounts of payers and payees—occurs later. Cash transactions and some isolated exceptions notwithstanding, except where retail, faster-payment schemes have been deployed, retail transactions do not typically enjoy same-day settlement, much less immediate or near-real-time settlement.

By definition, any delay in settlement introduces some degree of risk, as goods, services, or money has been afforded one party prior to payment becoming final. The other party has only the “promise” of payment. As a consequence, until settlement is complete, at least one of the counterparties involved in any retail

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<sup>2</sup> In general, with RTGS systems, messaging and settlement occur simultaneously, message by message. The systems are typically operated by central banks that facilitate final, irrevocable settlement in central bank funds. Commonly referred to in the United States as “wholesale payments,” RTGS systems predominantly exist to facilitate the movement of select, high-value transactions that require immediate clearing and settlement. They are not generally suitable for retail payments, primarily because of the transaction costs and processing limitations inherent in most current RTGS systems.

<sup>3</sup> Depending on the retail payment instrument used and the timing of a transaction—for example, a check exchanged on the Friday of a three-day weekend—settlement between payer and payee accounts could extend longer.

transaction is exposed to risks. These include monetary loss owing to theft or fraud, liquidity risk,<sup>4</sup> credit risk, or even Herstatt risk.<sup>5</sup>

### Differences in Settlement Approaches for Faster Payment Schemes

Even without an in-depth understanding of payments and settlement, it is easy to determine that the aforementioned risks—to the extent that delays in the settlement cycle create or exacerbate them—are reduced as that cycle shrinks. From three days to one day to same day, all other things being equal, the noted risks decrease as the time intervals for settlement decrease.

In terms of faster payment schemes that have already been deployed, there are two primary ways of attending to settlement. It can occur coincident with (or very close to) the messaging, or it can occur at some point later.

Table 1 provides a summary of account posting and settlement timeframes for some of the systems that have been deployed around the globe.<sup>6, 7</sup> All of the systems facilitate messaging within moments, and the overwhelming majority of them assure that account posting occurs in less than 60 seconds. However, settlement ranges from immediate, or “real time,” to the next day.

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<sup>4</sup> Liquidity risk in this context is intended as a *funding* or cash flow issue—that is, the strain that may result from needing to replace goods before payment has been received to fund the resupply or just to support the enterprise. Funding liquidity is most commonly an issue for small businesses at almost any time and can become particularly acute during financial downturns or crises. In the case of crises, the footprint of businesses affected by slowed or strained cash flow may expand to include virtually any business interest.

<sup>5</sup> Herstatt risk is similar to domestic interbank credit risk—the risk that arises when a counterparty pays out funds before itself receiving payment—but indicates the circumstance in an international or cross-currency scenario.

<sup>6</sup> Mazursky notes real-time payments as a reality in more than a dozen countries, while Lodge indicates the existence of more than 35 faster payments systems around the world.

<sup>7</sup> Clear2Pay has described 15 faster payment systems, detailing their account posting and settlement speeds. Its 2014 report guided the selection of the countries considered in this paper (Clear2Pay 2014).

**Table 1: Various account posting and settlement schemes**

Country	Account posting	Settlement speed
<b>Brazil</b>	< 1 minute	Continuous net settlement (every 5 minutes)
<b>China</b>	< 20 seconds	Deferred net <sup>8</sup> (various scheduled)
<b>Chile</b>	< 10 seconds	Deferred net, 3X daily
<b>Denmark</b>	Immediate/Real-time	Deferred net, 6X daily
<b>India</b>	Immediate/Real-time	Deferred net, 3X daily
<b>Japan</b>	Immediate/Real-time	End of day-net
<b>South Korea</b>	Immediate/Real-time	Next day (deferred net – 11:30 a.m.)
<b>Mexico<sup>9</sup></b>	< 1 minute	Within seconds; priority queuing
<b>Poland</b>	Within seconds	Immediate/Real-time
<b>Singapore</b>	Within seconds	Deferred net, 2X daily
<b>South Africa</b>	< 1 minute	Deferred net, hourly
<b>Sweden</b>	Within 15 seconds	Deferred net, multiple/day
<b>Switzerland</b>	Immediate/Real-time	Within seconds; priority queuing
<b>United Kingdom</b>	Within two hours	Deferred net, 3X daily
	Message confirmation <15 seconds	
<b>Australia<sup>10</sup></b>	Immediate/Real-time	Immediate/Real-time

Sources: Guo, Kauffman, et al. (2015); Clear2pay (2014, 15–43); BIS 2014; analysis of central bank website information

### Considerations Associated with Varying Settlement Approaches

As table 1 illustrates, real-time or near-real-time payments do not necessarily mean real-time or near-real-time settlement. Arguably, any delay in settlement implies increased risk.<sup>11</sup> If this is taken as a given, with all other things being equal, the ideal faster payment scheme would have settlement coincident with messaging.

<sup>8</sup> Deferred net settlement is transaction settlement on a net basis at the end of a predefined cycle or time period.

<sup>9</sup> At the Faster Payments Imperative Conference in October 2015, the Banco de Mexico noted that in a 2013 sample, average end-to-end processing time was 13.7 seconds. (PYMNTS.com and NACHA sponsored the conference.)

<sup>10</sup> Australia is scheduled to implement an immediate-clearing, immediate-settlement system in 2017.

<sup>11</sup> Conversely, speed in settlement can mean less time to scrutinize or determine transaction risk and can give occasion for fraud. Consideration of this general circumstance is covered later in the paper, in the subsection entitled “Faster Payments and the Impact on Fraud.”

The practical reality is that all things aren't equal. In response to a *Take On Payments* blog post earlier this year, reader Tom Hay put some of the issues in this context:

As someone who was heavily involved with the design of settlement for UK Faster Payments I can confirm that several options were considered before choosing the Deferred Net Settlement model, with exposure limits enforced per bank. Real-time settlement imposes a huge load on RTGS systems which were designed to handle low volumes of high value transactions, not high volumes of low value. It also adds significant complexity to ensuring integrity across the sending and receiving bank systems, the message switch and the RTGS system, as well as adding a delay to message processing and introducing a potential single point of failure. Banking is about determining acceptable risk levels, not completely eliminating risks. Risk experts must work closely with their technical colleagues to create a system design that balances settlement risk management with system performance, integrity and cost (Hay 2015).

Choosing an approach that delays settlement and nets transactions should result in a smaller number of transactions to settle, thus reducing settlement costs. In turn, this also may keep ongoing operating and use costs low. From the perspective of standing up a system quickly and also minimizing construction costs, a netting system may be preferable to building a real-time settlement engine. Finally, a one-by-one transfer/settlement scheme may fundamentally complicate or overload a network—particularly if the faster payment service facilitates a high volume of low-value transactions. Taken together, there are many reasons for the various approaches to settlement across the models that have been presented (Greene, Rysman, Schuh, and Shy 2015).

Yet it seems worthwhile to point out that a modification in the speed of retail payment messaging without a parallel modification in the accompanying or supporting settlement system could be suboptimal. One-third of the schemes studied for this paper chose to harmonize settlement and messaging for their faster

schemes.<sup>12</sup> In its contemplation of this issue, the Reserve Bank of Australia explained its thinking and conclusions.

The Board believes that an adequate solution for real-time payments will require a new system, based on real-time clearing of payment instructions. To complement this, the Reserve Bank is prepared to contemplate establishing a system for real-time settlement of retail transactions....

Real-time payments require at a minimum real-time clearing, the capability for real-time posting...and the ability for participants to provide credit. The latter constraint can be removed if real-time settlement is available.... This implies a reduction in settlement risk for participants compared with a deferred-settlement system. A second benefit of the removal of the need to provide credit would be to facilitate participation by entities that would not be in a position to provide credit (RBA 2012, 15–16).

It is evident that the delay in settlement creates tradeoffs between the cost of real-time settlement and credit risk as well as other issues that need to be considered (Greene, Rysman, Schuh, and Shy 2015, 10). In the final analysis, the choice to not build an immediate settlement engine as a function of rolling out a real-time retail payment system may be practical, especially when we consider mitigating measures against the risks inherent in a deferred- or delayed-settlement scheme.

Straightforward measures such as transaction dollar caps, aggregate dollar thresholds, or prefunding exist to reduce related risks. Some or all of these as well as other risk-mitigating measures have been employed in every faster scheme where settlement is not immediate.

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<sup>12</sup> While Brazil's settlement model is technically not immediate, it represents a hybrid approach where settlement is frequent and ongoing. Consequently, its settlement model was judged as essentially corresponding with messaging. Similarly, Sweden's settlement model was described as immediate in some sources but not all.

## ***Operational Risk***

### Overview

“Operations” may be defined as the people, processes, and systems required to perform a task, the practical things that lead to the production of a good or service. The success or failure of an enterprise can often be traced back to the relative effectiveness of operations.

For the purpose herein, “operational risk” relates to the potential failure of people, processes, or systems—excluding cybersecurity, which is covered separately.<sup>13</sup>

### Real-Time Schemes and Their Effect on Operational Risk

Faster payment schemes are unlikely to eliminate much of what may be considered customary, operational risk. At the same time, they may introduce new risks. The new systems and processes will have to coexist and integrate with legacy payment complexes that are largely batch environments. Often, these environments do not seamlessly knit together or “talk” with one another. Imran Ali, payments manager for Europe, Middle-East, and Africa (EMEA) at Citigroup, highlights some of the applicable issues this way:

There are...challenges for banks, foremost among them being the overlaying of single real-time payments on to an existing batch processing infrastructure.... Processing single payments [affects] the infrastructure, from channel to payment processor, including general ledger, sanctions and anti-money laundering (AML) systems, reporting databases, customer accounts payable/receivable...and reconciliation (Ali 2013).

Ali’s list captures the essential operational challenges. However, financial institutions have repeatedly demonstrated competence and general success when it comes to grappling with these core matters— from the first check systems that were overlaid against cash processing to card, ACH, and wire—with due consideration to

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<sup>13</sup> Numerous sources define operational risk this way, but they typically *include* cybersecurity.

the other evolutionary if not revolutionary changes legacy payment schemes have undergone over time. Some of the changes have been nontrivial and include the introduction of automated teller machines (ATMs) and high-speed check processing (extending through to image capture and remote deposit capture for checks) to established payment schemes. Financial institutions have also modified legacy systems to accommodate the introduction and stabilization of online as well as mobile banking platforms. Rather than attempt to break down and discuss each of the risk elements that have repeatedly been experienced and conquered, it seems prudent to focus on what may be considered unique in the context of faster payments and as a consequence, arguably, the chief challenge looking ahead to faster payments in the United States.

### Mitigating a Unique Operational Risk with Real-Time payments

Ali also called out what appears to be different about a potentially new, faster payment scheme as compared to the evolution of legacy payment schemes.

24x7 coverage [will be] required outside of traditional payment operating hours.... Being unavailable for a few minutes can cause several hundred payments to fail and the consequences of any downtime becomes even more serious.

Operating in a 24x7 environment also impacts how banks perform end-of-day batch jobs. With real-time payments flowing uninterrupted banks can no longer afford the luxury of having downtime to process end-of-day runs, which have to be done while still processing payments from customers. This requires banks to run two processing sites...live...enabling them to switch from one site to another if downtime on one infrastructure is required (Ali 2013).

What seems to be consistently taken as a given, if not a necessity, is that any broad-based U.S. real-time (or near-real-time) scheme must necessarily be a 24/7/365 proposition. Part of that seems owing to the words themselves—“real time” or “near

real time” doesn’t say “except for payments that occur outside of business hours,” or “excluding weekends.” Some have noted 24/7/365 availability as being “ideal”<sup>14</sup> or as parameters that ought to define “fast.”<sup>15</sup>

A 24-hour operation that doesn’t afford downtime, that will be required to operate continuously while moving ever-increasing volumes, is largely unique in the context of banking and legacy payments. Ceaseless operations of the nature being considered are not only more demanding and less forgiving on their face, they are arguably countercultural across a swath of payment franchises in the U.S. banking world. In that way, this change could differ from the advances that have come before. In spite of the many changes banking has experienced, it has not fully dealt with this issue. The industry may have come to be overly reliant on the occurrence of natural downtimes that still exist in many operations and that are used for maintenance, repair, and cross-scheme assimilation. That prompts the question: should planned downtime in a faster payment scheme be dismissed? In its study of the potential for advancing a faster payment scheme, the Reserve Bank of Australia reported that some commenters outlined a number of complexities that could result from the extended operation of payments systems, including the effect on available maintenance and housekeeping times for financial institutions. They acknowledged the issue, adding they did not anticipate anything “insurmountable” in this regard (RBA 2012, 9).

Given the number of faster payment schemes that function continuously, this seems a fair conclusion. On the other hand, the overwhelming majority of these systems are quite young and have not been tested—over time or as a heavily used platform. Regardless, there is no arguing that planned downtime serves as a mitigating action to the risk a continuous operation poses if it is a luxury that can be permitted. Moreover, a faster system could also facilitate a faster bank run.

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<sup>14</sup> Clear2Pay’s “Flavours of fast” says “Ideally, a payment system would operate...24 hours a day, 7 days a week, 365 days a year” (2014, 13).

<sup>15</sup> Greene, Rysman, Schuh, and Shy note: “Thus, the following four parameters may be included in the definition of ‘fast:’ 1. The ability to process (or at least originate and clear) transactions 24/7/365” (2015, 8).

Planned downtime, or the notion that downtime occurs as a natural thing, might be a useful tool in the context of slowing or halting the occurrence of a run.

Table 2 may suggest the hardship and expense associated with systems that operate 24/7/365. It also may suggest a deliberate risk mitigation measure built into some faster payment schemes. Interestingly, the table is split. About half of the listed schemes offer a full 24-hour, 7-day window that has no apparent, noteworthy exceptions. The other half indicate the use of built-in downtime, either fully across the scheme, by bank, or, as in the case of the Swiss, with a distinct exception for transactions occurring outside of “operating hours.”

**Table 2: Operating windows from selected fast payment schemes**

Country	Operating hours	Full 24/7 - Free from conditions/exceptions? (Y/N)	Year established
Japan	0830-1640	N	1973
Switzerland	24x7x365	N	1987
South Korea	24x7x365	1615 cutoff for “same day” transactions Y	2001
Brazil	0730-1700	N	2002
Mexico <sup>16</sup>	22x7	N - Varies; 0600-1800 a required minimum	2004
South Africa	24x7x365	N - Varies; full window, full service not offered by all FIs	2006
Chile	24x7x365	Y	2008
United Kingdom	24x7x365	Y	2008
China	24x7x365	N - Varies; full window not offered by all FIs.	2010
India	24x7x365	Y	2010
Poland	24x7x365	N - Varies; full window not offered by all FIs.	2012
Sweden	24x7x365	Y	2012
Denmark	24x7x365	Y	2014
Singapore	24x7x365	Y	2014

Sources: Guo, Kauffman, et al. (2015); BIS; Clear2Pay (2014.); various central bank websites

<sup>16</sup> At the Payments Imperative Conference (October 2015), Mexico indicated banks will be required to gradually extend hours for all low-value payments to reach 24x7.

As a general rule, faster payment systems have gradually moved forward—to continuous operating windows, less-restrictive dollar thresholds, or less restricted access—eventually evolving to the current models, with less restrictive operating parameters in place. However, as table 2 shows, a number of schemes retain vestiges of restrictive elements as compared to others. Such an approach (ramping down restrictions over time) may be prudent in the United States, particularly given the conditions here. None of the extant systems have had to contend with anything comparable to what a U.S. system would face, either in terms of the range of possible participating institutions<sup>17</sup> or potential volume levels.

### Concluding Thoughts on Operational Risk

Operational risk is complex. Almost everyone across any given financial institution enterprise wrestles with it as a broad, ongoing issue. In speaking about operational risk in February 2015, the assistant director for quantitative risk management at the Federal Reserve’s Board of Governors, David Lynch, noted that “for some kinds of risk—particularly those for which incidents are unpredictable or rare—the agency lacks agreed-upon methods for counting and assigning costs to incidents. Without those basic metrics, developing useful models for banks and supervisors to rely on to identify and hedge those risks is very difficult” (Heltman 2015).

In that same presentation, Lynch noted the importance of data to making risk decisions. While his topic was not focused on real-time payments, the basic thinking is applicable. A lack of widespread, extended experience with all of the faster schemes makes it impossible to draw firm conclusions about the likelihood of failure(s) or the resultant impacts on a nation’s commerce or economy.

Consequently, it may be beneficial to reassess consumer demand, particularly for full service across a 24-hour window or seven days a week, taking care to balance presumptive or implied demand against the cost and the relative risk of serving

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<sup>17</sup> Refer to table 5.

such demand.<sup>18</sup> While several sources report that the 2014 McKinsey study commissioned by the Federal Reserve Banks found that 70 percent of consumers preferred instant or one-hour payments—and were willing to pay for them—the cost, and therefore the price that will be required to support a robust, ubiquitous, 24x7x365 service in the United States, remains unclear. Demand could fall short of expectations if the prices necessary to support the ultimate service exceed current thinking, among other reasons. High demand for faster payments, as judged by volume levels wherein uptake supplants other payment choices or schemes, is not a trend that has emerged in any scheme that has been launched. In arguably the most successful scheme, the United Kingdom’s Faster Payments, consumers generally pay nothing for the service. And while faster payments have grown rapidly there, Faster Payment volumes have not appreciably eaten into other payment options aside from an isolated ACH payment use case.<sup>19</sup> Moreover, the usage experience there may conform to the economic notion of a “free good” being overused. If so, true demand may be distorted.

Surveys of consumer demand were not readily available in most of the countries studied. However, Japan, which has one of the longest-running faster payment services but has not yet introduced 24/7 services,<sup>20</sup> showed outcomes well under the Federal Reserve’s survey results. According to the 56th Opinion Survey of the “General Public’s Views and Behavior,” conducted by the Bank of Japan (December 2013), about 60 percent of respondents were “likely” or “somewhat likely” to prefer real-time bank transfers on weekends, holidays, and weekday nights. In a breakdown of demand, the same survey showed that for such things as online shopping purchases and business remittances, “demand” barely reached 20 percent, and in some cases was less than 10 percent (RPSG 2014, 6–7). The demand for

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<sup>18</sup> The Federal Reserve Banks have already completed initial consumer research and published summary results on end-user demand:

[fedpaymentsimprovement.org/wp-content/uploads/enduser\\_demand\\_summary.pdf](https://www.fedpaymentsimprovement.org/wp-content/uploads/enduser_demand_summary.pdf)

<sup>19</sup> The use case is standing orders or “standing” instructions an account holder gives a bank to pay a set amount at set times. This ACH use case in the United Kingdom has migrated almost completely from their Bankers’ Automated Clearing Services, or BACS, platform to Faster Payments.

<sup>20</sup> Though Zengin, Japan’s fast retail payment scheme, is not currently a 24/7 option, Japan has announced plans to supplement Zengin with a new platform that, together, will allow such. Japan’s aim is to have 24/7/365 retail payment support available by 2018.

faster payments was highest for rent, insurance, and utility payments, and also for payments to friends and relatives.

The extent to which any use case would drive ongoing, high demand in this country, particularly in the absence of a good understanding of the cost and resultant prices, is unknown. Properly discerning between presumptive versus real demand, with due consideration for the most important operating window needs, could prevent overbuilding, optimizing among system availability, risks, and costs. Since it isn't possible to identify and rank, with certainty, the risk/demand tradeoffs for a continuously running system (versus one with planned downtime but that still serves the overwhelming majority of needs), it may be prudent to start cautiously and ramp up the offering over time. This ramping up would include everything from operating hours to dollar thresholds, with steps being taken as experience is accrued and as true consumer demands and needs become more clear. It would also be in keeping with the path some have followed.

## ***Security***

### Overview: Cyber Risk

The words “security” and “cyber risk” convey different meanings to any number of prospective readers, making it useful to offer a contextual definition. In this context, “security” is focused on those things related to the safety of information systems and processes. “Cyber risk” means the risk of harm, disruption, or damage—everything from outright financial loss to embarrassment—accorded to organizations from some type of failure of their information technology systems.<sup>21</sup>

Security concerns are commonly categorized as operational risks, but any more the discussion and reckoning of security seems too important to be lumped in with other concerns. Expansive computing power is everywhere—in offices, in homes, and on handheld phones. Moreover, this power is available to all. Payment systems are

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<sup>21</sup> This paper's definition for *cyber risk* comes from the Institute of Risk Management: last accessed on December 25, 2015, [their.org/knowledge-and-resources/thought-leadership/cyber-risk/](http://their.org/knowledge-and-resources/thought-leadership/cyber-risk/).

inexorably linked to these same computing devices. Consequently, it is little wonder a recent survey on risk trends yielded the following:

61% of risk managers believe the probability of a high-impact event in the global financial system has increased during the past six months....

Cyber risk remained the number one concern globally.... Added one respondent, “Cyber risks appear to be multiplying while controls to address these risks may not be able to keep up with the continually escalating threats” (DTCC 2015).

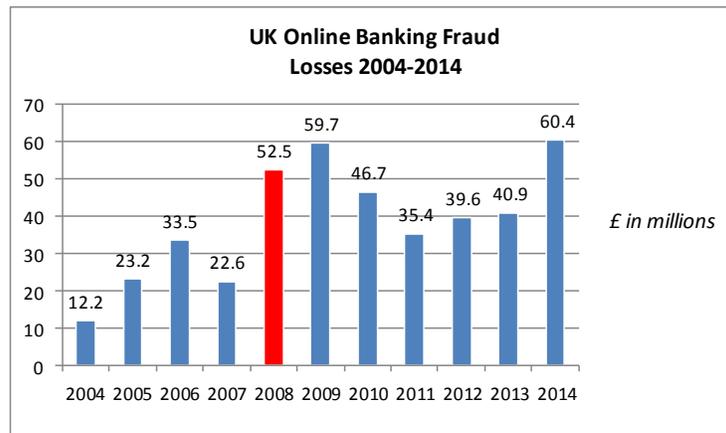
Additionally, while data are often cited as a key to combating fraud or at least positioning to deal with it better, the necessary data elements can be hard to come by, as the team working on the Federal Reserve strategy noted in its recent exploratory paper.

Several barriers to the collection and sharing of payment security data were observed during the course of this study. Observed barriers include the proprietary nature of data; concerns about reputational risk, legal risk and privacy implications; and the tradeoffs between cost and benefits of collecting data that can help participants avoid fraudulent activity (FRB 2015, 33).

### Faster Payments and the Impact on Fraud

Many have speculated that faster payments will mean faster fraud. Even though several countries have rolled out faster payment schemes, it is difficult to get hard data to identify the relative degree of fraud attributable to the new schemes. One of the more comprehensive data sets showing fraud losses before and after the implementation of a faster payment scheme is from Financial Fraud Action UK. Their results are reproduced in the following chart.

## UK Online Banking Fraud Losses 2004–14



Note: The red bar indicates the year faster payments were implemented.

Source: FFA (2015, 23).

None of the faster payment schemes makes fraud data publicly available that are specific to the faster scheme alone. Even if such were available, the relative newness of faster payment schemes in most countries would make trends questionable and conclusions premature.

That said, general observations about the trends available in the United Kingdom show that at the launch of the United Kingdom's faster payment scheme in 2008, online banking fraud increased 132 percent from the previous year. The 2009 level was 14 percent higher than that in 2008. Following a downward trend in 2010–11, online fraud trends have steadily advanced, with the series showing its highest level yet in 2014.

It is impossible to judge the extent to which the faster scheme itself is pivotal to any trend. However, it seems reasonable to conclude that a new scheme will offer new security challenges. It also seems prudent to keep things in perspective. One observer summed things this way:

We can expect some increase [in fraud] to occur as online banking use becomes more common, but the problem for banks is that online transactions did not previously need to be completed so quickly— if you had days to check

for fraud then detection systems did not need to be so evolved.... [Yet] online banking fraud is just a tiny fraction of the amount being sent through the system daily (Bungey 2015).

### Mitigation and Resolution: Is There a Singular, Imperative Control?

It is hard to find an approach to the range of security considerations associated with a faster payment scheme that is more comprehensive than the “effectiveness criteria” outlined by the Secure Payments Task Force.<sup>22</sup> Not only does it identify a comprehensive strategy for design and judgment, but it also represents a collaborative effort. Collaboration is key since there is no single purveyor of knowledge and information related to the matter. Successful coordination among the range of stakeholders is critical to ensure that payments systems are as optimal in function as possible and that they have the best chance of being effective in guarding against fraud and misuse.

Yet it is unrealistic to think that the perfect system can be designed. Instead, it is instructive to probe the various mitigation options to fraud and security concerns that threaten any payment system and to identify imperative controls when possible.

A review of systems already in place suggests that one of the more prudent mitigating controls for a faster payment scheme may be a dollar threshold. Corroborating evidence of this assertion is widespread. The Federal Financial Institutions Examination Council has noted “monetary limits,”<sup>23</sup> among other things, as an important and appropriate control for protecting against error and fraud. For its implementation of same-day ACH, the National Automated Clearinghouse Association (NACHA) established a \$25,000 dollar threshold per

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<sup>22</sup> The effectiveness criteria (draft) developed by the Secure Payments Task Force is available at [images.frbcommunications.org/Web/FederalReserveBankofChicago/%7B07a4d669-37af-4adf-b851-577afa335707%7D\\_Faster\\_Payments\\_Task\\_Force\\_Draft\\_Criteria\\_Stakeholders.pdf](https://images.frbcommunications.org/Web/FederalReserveBankofChicago/%7B07a4d669-37af-4adf-b851-577afa335707%7D_Faster_Payments_Task_Force_Draft_Criteria_Stakeholders.pdf). Security controls are detailed on pp. 15–22.

<sup>23</sup> As detailed in the [Information Systems Audit and Control Association’s \(ISACA\) FFIEC’s Retail Payment Systems IT Examination Handbook](http://www.isaca.org/Groups/Professional-English/it-audit-tools-and-techniques/GroupDocuments/retail.pdf), last referenced on December 30, 2015, <http://www.isaca.org/Groups/Professional-English/it-audit-tools-and-techniques/GroupDocuments/retail.pdf>.

transaction. In its “Faster FAQs” about the new same-day rule, NACHA explains that the dollar threshold is because “faster velocity of payments is expected to introduce risks that must be managed and mitigated. A per transaction dollar limit is one way to mitigate risk.”<sup>24</sup>

The proper or perfect limit must be judged according to circumstance. Not surprisingly, dollar thresholds are readily evident among the various faster payment schemes in use around the world. However, although almost all publish a threshold, thresholds range widely. Some operate with very high limits while others have established much lower, restrictive limits. Table 3 presents several countries and their threshold choices.

**Table 3: Dollar limits of select fast payment schemes**

Country	Dollar limit/Threshold (approximate) <sup>25</sup>
<b>Brazil</b>	\$252,000
<b>Chile</b>	10,000
<b>China</b>	7,700
<b>Denmark</b>	73,000
<b>India</b>	75
<b>Japan</b>	825,000
<b>South Korea</b>	\$100–300 retail (corporate threshold is \$850,000)
<b>Mexico</b>	NA
<b>Poland</b>	25,000
<b>Singapore</b>	7,000
<b>South Africa</b>	\$16,000 (after “business hours,” holidays and weekends (\$1,600))
<b>Sweden</b>	Varies among banks
<b>Switzerland</b>	NA
<b>United Kingdom</b>	\$250,000; varies by bank

Sources: Clear2pay (2014, 15–43), central bank or service provider websites

<sup>24</sup> Taken from NACHA’s Same Day ACH: FAQ page, last accessed December 30, 2015, [nacha.org/system/files/resources/Same-%20Day-ACH-FAQ-2015.pdf](http://nacha.org/system/files/resources/Same-%20Day-ACH-FAQ-2015.pdf).

<sup>25</sup> Thresholds presented in dollars are approximations based on currency exchange rates in late December 2015.

Highlighting some notable differences among the listed schemes, India's established limit of \$75 is applicable for transactions without end-to-end encryption in use; otherwise, banks may set their own thresholds. In other words, they've accepted two approaches for deploying faster payments and established differing risk mitigation strategies to make the service broadly accessible. In the case of South Korea's Hofinet system, varying threshold amounts exist. Corporate senders have a threshold approaching \$1 million; consumer retail transactions are far more restrictive, falling in a range of between \$100 and \$300 per transaction.<sup>26</sup>

A review of the progression of the United Kingdom's Faster Payments service (FPS) to its current cap of \$250,000<sup>27</sup> is easily traced and seems useful.

At launch in May 2008, FPS had 10 member banks and began with a formal, published cap of £10,000 (\$15,000). The cap increased to £100,000 two years later with the presumptive purpose of allowing the new scheme time to stabilize and for overseers to observe uses, trends, and issues before risking large numbers of large-value transactions.

The thresholds have continued to rise as confidence and experience with the new system has progressed. Importantly, the scheme continues to enforce a threshold and it also allows banks themselves to make individual choices about the limits. Most institutions take advantage of this flexibility. It is common for institutions to distinguish between personal and corporate transactions as well as for differing payment types such as standing orders, single immediate payments, or future-dated payments. There are also distinctions made among origination methods (in person, phone, or online). The two tables in the appendix illustrate the range of

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<sup>26</sup> There are workarounds and exceptions. In an interview with the *Wall Street Journal*, Kim Dae-hoon, chief executive of LG Group's IT Unit, said LG's Mpay service had received "certification for highest security clearance from the financial regulator, meaning it can be used for transactions without limitations...[aside from] user's credit-card limits.... Without such an approval, the...systems were required to limit purchase[s] to levels below 300,000 won (US\$284). Anyone wishing to buy something that is more expensive usually has to go through the complicated process of receiving online authentication before the purchase" (Lee 2014).

<sup>27</sup> As of January, 2016, the current limit set within the UK faster payments service is £250,000 or about \$370,000. Banks may still set their own limits, and they vary widely among the different institutions. Few honor the maximum allowable limit for any and all transactions and circumstances. For the most recent offerings, see the Faster Payments website: [fasterpayments.org.uk/consumers/how-much-can-i-send](http://fasterpayments.org.uk/consumers/how-much-can-i-send).

circumstances that have been considered illustrating an awareness of varying risks depending on circumstance. They also suggest differing risk appetites and judgments among participants vis-à-vis their customer base.

The cap rules that were established for FPS are explained below:

FPS has several features which are designed to mitigate...settlement risks.<sup>28</sup> First, maximum transaction values have been set by the scheme at £10,000 for SIPs [single immediate payments] and FDPs [forward-dated payments] and £100,000 for SOPs [standing order payments] with individual members maintaining the authority to set lower limits. If a customer attempts to make a payment that exceeds any of the respective limits, the payment is blocked by the member. Second, Net Sender Caps (NSCs) apply to each member of FPS. These are designed to limit the amount of settlement risk members can bring to the system by limiting the maximum net debit position members can accrue (BOE 2009).

Another perspective is offered by Bailey Reutzel in his *American Banker* piece, “Lessons from the U.K.’s Colossal Payments Overhaul.”

When Faster Payments launched, the founding member banks proceeded cautiously.... At the beginning, banks allowed payments up to five pounds (about \$8) to move over the rails. Banks then set their own values according to their risk appetite. (Reutzel 2015).

The UK history indicates deliberate decisions pertaining to dollar thresholds. They served as a means to make distinctions about the relative riskiness of different users and channels, and they remain a tool to mitigate potential harm to the scheme.

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<sup>28</sup> The thresholds somewhat obviously limit risks owing to error and fraud as well. It is noteworthy that members were given “authority to set lower limits,” which, coupled with the tables in the appendix, seems to clearly speak about choices owing to differing customer bases and, in general, to varying risk tolerances among institutions along with their intent to manage these risks. These certainly include but are not limited to settlement (BOE 2009).

To determine whether or not a real-time payment scheme in the United States will provide real-time delivery of payment messages while keeping fraud in check, it seems that the outcome may hinge, at least in part, on how real-time payments are rolled out. Rather than presuming that all the technology and protections are in place with nothing missed, the path the United Kingdom and others have chosen suggests it may be prudent to advance with any new system in a progressive way—first accumulating real information and real experience before more fully opening up the service. Systems will always have to be constantly evaluated to determine if they are keeping pace with or if they can keep pace with fraud threats that may emerge. That will involve observing the system deliberately, but also looking at and continuously delving into experiences and learnings from those that have gone before. Given that there will be unknowns with any new scheme, if the chosen examples are any indication, it may be right to roll out a faster scheme with well-considered borders and constraints to assess what the issues and affects will be here.

### **III. Other Risks**

#### Overview

For payment schemes to thrive and endure, message conveyance must be reliable and secure and the associated transfer of funds (settlement) must be effective. This working premise set up discussion of the core risks—settlement, operations, and security—that have been covered thus far.

Moving beyond the three core matters, there are at least two other risks that should be considered. First is that the United States has no public authority with broad power over payments systems. This represents a fundamental difference in the U.S. banking landscape compared with countries that have implemented a faster payment scheme. Second is that coordinated, broad-ranging efforts to develop a faster payment scheme may take time and energy away from more significant changes in payments—in other words, there is the opportunity cost. Each will be considered in turn.

#### The U.S. Banking Environment—Context

The financial institution (FI) landscape in the United States is vastly different from any other country's. Table 4 may provide a useful illustration to frame the U.S. circumstance and facilitate further consideration of issues.

**Table 4: Key elements of payment environments: Summary (select nations<sup>29</sup>)**

Country	Number of financial institutions (FIs)	Multiple FI regulatory/supervisory agencies?	Ability of FI overseer(s) to mandate/build faster system? <sup>30</sup>
Australia	147	No <sup>31</sup>	Yes
Brazil	179	No	Yes
Chile	21	No	Yes
China	1,374	No	Yes
Denmark	80	No <sup>32</sup>	Yes
India	416	No	Yes
Japan	303	No	Yes
South Korea	20	No	Yes
Mexico	54	No	Yes
Poland	37	No	Yes
Singapore	49	No	Yes
South Africa	21	Yes	Yes
Sweden	100	No	No
Switzerland	251	No	Yes
United Kingdom	208	No	Yes
United States	12,064	Yes	No

Sources: World Bank (2012); "The Global Banking Resource" (query of banks, credit unions, and savings institutions as of February 1, 2016), BIS (2014), various central bank websites

<sup>29</sup> In this table, the number of FIs and supervisors/regulators (from the Global Banking Resource and the 2012 World Bank survey, respectively) consider conventional banking to be commercial banks and savings institutions that provide basic banking services to consumers and businesses. The table excludes capital market intermediaries, security broker-dealers, investment banking, and others that may be considered FIs in some contexts.

<sup>30</sup> The values in this column reflect the author's review of material from the BIS's CPSS Red Book or information available from central bank websites (BIS 2014). In some cases, the responses may oversimplify aspects of or circumstances in any given country.

<sup>31</sup> Australia has a single supervisory agency for deposit-taking institutions. FIs with no depositor funding (investment banking) are subject to other regulatory control.

<sup>32</sup> The Danish Central Bank (DN) and the Danish Financial Supervisory Authority coordinate to regulate the Danish financial markets. The DN is responsible for the payments system.

Referring to the table, the first issue that stands out is the sheer number of different financial institutions (FIs) to coordinate among in the United States as compared to other countries. Although an argument can be made that not all FIs need to be on board to accomplish the goal of offering a faster payment service in the United States, most argue otherwise. In particular, the Federal Reserve’s “Strategies for Improving the U.S. Payment System” repeatedly calls for ubiquity in any faster payment solution (FRB 2015). The “Effectiveness Criteria” of the Faster Payments Task Force reinforces the theme (FPTF 2016). Thus, the number of institutions to bring on board in the United States implies a challenge here that hasn’t been faced elsewhere. The United States has 10 times as many FIs as the second largest country (China) and between 29 to just over 600 times as many FIs as any other country on the list. The full implications of this issue could vary depending on the final approach taken to move ahead with faster payments. However, the expansiveness of the U.S. market suggests that coordination across the range of issues—from cost and timing to competition and service—could be nontrivial, and in any case is unlikely to parallel the experience of others.

In addition to the difference in numbers of institutions involved in U.S. banking versus that of other countries, the oversight structure in the United States also stands out as unique—it is more fragmented compared to other countries. This has implications for both the development of a faster payment scheme and the ongoing administration of it. However, the chart does not singularly or fully illustrate governance issues in payments. Payment policy matters are often carved out of conventional regulatory and supervisory regimes with some or all of the governance delegated to specially commissioned bodies of experts or oversight groups. The following examples may be useful in getting a clearer picture of the landscape, highlighting two key governance differences in the U.S. circumstance versus that of other countries.

### The Role of Public Authority

Looking deeper into the regulatory landscape of various countries is insightful. For example, the “Payment Systems Regulator” (PSR) is responsible for the payment

systems industry in the United Kingdom. PSR governance involves coordinating across several regulatory regimes and competition authorities both within and outside the United Kingdom. These include the Bank of England, the Prudential Regulation Authority, the Financial Conduct Authority, and the Competition and Markets Authority. In this light, the number of bodies involved with UK payment governance may not appear vastly different from the United States.

Importantly, the PSR has strong regulatory and competition powers specific to payments that include giving directions, taking targeted actions, and setting standards.<sup>33</sup> They can singularly impose requirements regarding system rules across the banking landscape in the United Kingdom, and they can amend agreements relating to payment systems, including fees and charges. They can also investigate behavior that isn't consistent with their directions, taking action when they judge behavior of the market or participants to be counterproductive to their (PSR's) intent. Their policy statement includes an insightful summation of the extent of their power noting a desire to collaborate, while also noting the extent of their authority.

Our approach is collaborative but where evidence shows the payment systems industry is failing to deliver greater competition, more innovation and greater benefits for businesses or consumers, then we won't hesitate to apply our powers (PSR 2016).

Another example is in Australia. The Reserve Bank of Australia attends to payments and expresses a light touch when it comes to imposing change in the payment system, as the following passage notes.

The Bank's objectives and approach to regulation of the payments system are shaped by its governing legislation, along with the intent of the legislators....

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<sup>33</sup> While the PSR is new, established in 2015, faster payment change in the United Kingdom was driven by a body with a similar circumstance. The "Faster Payments" initiative was rooted in the Office of Fair Trading's mandate to the UK banking industry to develop a new domestic payments capability. The UK Payments Council, no longer in existence, was tasked with implementing the Faster Payments Service. The PSR appears even more empowered than predecessor entities—to mandate and move change in payments for the United Kingdom as it may choose.

The Bank is required to control risk and promote efficiency and competition in the payments system. However, there is a presumption in favour of self-regulation by the industry, with the Bank only intervening where the industry is unable to address a public interest concern. This means that in practice the Reserve Bank has imposed regulation in a relatively narrow range of payments system activity (RBA 2016).

This passage strikes a tone reminiscent of the Federal Reserve's approach to payments oversight. However, the Australian central bank holds a similar advantage to the United Kingdom and in contrast to the U.S. circumstance. Where Australia's central bank found it useful to be more involved than just through consultative or collaborative power, they moved accordingly. Following the failure of the country's privately sponsored faster payment initiative, "Me and My Bank Online" (MAMBO), Australia's central bank explained a change in course while conducting a review of innovation in the payments system.

As has been stated on a number of occasions during the course of this Review, the Reserve Bank's focus is...where decisions are not just in the hands of a single player. Innovations of this nature have proved difficult to achieve.... [T]he difficulty of achieving cooperative innovation also constrains the innovative solutions that can be built upon common systems by individual players on a proprietary basis.... [A]ddressing these issues has the potential to unlock significant future innovation, resulting in ongoing improvements to the efficiency of the payments system.

The conclusions outline a change in approach by the Payments System Board.... In recognition that there are impediments to the payments industry collectively delivering solutions that would be valued by businesses and consumers, the Board intends to be more proactive in setting...its expectations for the services that the payments system should be able to offer in the future. The Board believes that this will help to overcome some of the

coordination problems that have been evident in the payments system over the years (RBA 2012, 1).

Even though the Payments System Board in Australia has continued to stick very close to its overarching principle of taking a light touch when it comes to imposing regulatory mandates on the payments system, it has the power to dictate outcomes and has indicated that the follow-up initiative to MAMBO would not be permitted to fail.

While the Board is optimistic that the approach...is likely to lead to better cooperative outcomes, it acknowledges that there is the possibility that the industry will still not be able to reach agreement.... Given that the strategic objectives determined by the Board are matters that the Board considers to be in the public interest, it would then need to consider whether there is a case for meeting the objectives by other means. For instance, it might seek to establish infrastructure itself, or use its powers under the *Payment Systems (Regulation) Act 1998* to require the objectives be met (RBA 2012, 21).

It is clear that the Australian Reserve Bank can compel progress and results and is “prepared to provide more detailed guidance where it considers it necessary” (RBA 2012, 21).

The National Bank of Poland (NBP) uses express power for establishing payment solutions, leaving open the source from which solutions may originate but remaining clear about its absolute authority in the space.

The President of the NBP may issue recommendations (e.g. to modify the operational rules of the system) and decisions (e.g., on authorizing the operation of a system or on closing it),...

The provisions of Art.17 of “the Act<sup>34</sup>” stipulate that an entity intending to operate a payment system shall apply to the President of the NBP for the approval...

[T]he National Bank of Poland assesses the operational rules of the system, in terms of their compliance with Polish law and ensuring efficient and safe operation of the system.

Should, as the result of the assessment, the NBP state that the system does not comply with the...requirements, the...NBP refuses to grant their approval for the operation of the system (NBP 2004).

In general, central banks (or specially designated entities) in other countries enjoy the power to compel change in one fashion or another, as the three preceding examples illustrate. This is not to say every faster payment initiative in every country has been mandated; however, the usefulness of an empowered, centralized rulemaking body cannot be overstated.<sup>35</sup> Importantly, those that have implemented faster payments schemes have had one entity that has been able to promulgate the rules for the system and build a core infrastructure or coordinate or compel the building of it.

The vastness of the U.S. FI market coupled with the possibility that any number of different stakeholders may not see things the same makes it reasonable to point out the general circumstance about the lack of distinct authority in the United States as a potential risk to the effective implementation of faster payments here. Despite the fact that the United States has an abundance of financial sector regulators, none currently have the ability to mandate a faster payment solution. Even as things may advance, those helping drive the change at the moment are not clearly

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<sup>34</sup> Act on the Settlement Finality in Payment Systems and Securities Settlement Systems and on the Rules of Oversight on These Systems (Dziennik Ustaw No. 123/2001, item 1351, as amended) of August 24, 2001.

<sup>35</sup> Sweden is an example of a nation that implemented a faster payment scheme without a central payment authority having binding tools to compel the change. The Riksbank (Sweden’s central bank) indicates it exerts control through communication and (“moral suasion”) where it believes there are deficiencies in safety or efficiency. However, progress to move to a faster scheme remained stalled until the Swedish Finance minister threatened legislative action.

empowered. No one can compel results, nor can they singularly resolve conflicts or control plans, rules development, or processes. Although the Federal Reserve is currently leading the effort, it has no controlling authority and cannot assure an outcome. It has highlighted this fact repeatedly.

For some years, members of the public have told us with increasing frequency and intensity that they see the United States falling behind other nations in the speed and security of our payment system. We hear all the time that the Federal Reserve should do something about this. But, despite our multiple roles, the Federal Reserve does not have broad authority to simply restructure or redesign the payment system (Powell 2015).

All of that said, the United States' forward progress to date has been positive and results seem promising. Nevertheless, it bears pointing out that the governance footing of advocates for a faster scheme in the United States is noticeably weaker than those countries that have gone before. Many of these schemes would arguably not be at their current stage without a central authority's ability to mandate the change or at a minimum, hold the specter of a mandate or other pressure over the market.

#### Governance: Clear Authority for Rulemaking

Participants in a payment scheme need to know what to expect. They also need to know from whom to expect it. The answer to this matter revolves around rules—to whom they apply, in what manner they apply and who actually applies them. In order for a ubiquitous, faster payment scheme to take hold and be more than just a novelty, a strong rule set with a good understanding of how it will be administered will be essential. How the rule construct will evolve for faster payments in the United States is unclear at this stage.

In the places where faster payments have evolved, there does not appear to be an analogue to U.S.-style federalism, where agencies such as the Consumer Financial Protection Bureau (CFPB), the Federal Reserve, the Federal Deposit Insurance

Corporation, the Office of the Comptroller of the Currency, and the Federal Trade Commission share oversight responsibilities with state bodies, such as state attorney generals and state banking authorities. How rulemaking and administration may evolve could get muddier still with bodies such as NACHA and the Electronic Check Clearing House Organization (ECCHO). Each body has long promulgated payment rules specific to their members, relative to ACH and check, respectively. Both NACHA and ECCHO have shown an interest in the evolution of rulemaking relative to faster payments.

There is no intent to suggest that there hasn't been or won't be ongoing cooperation among the various supervisory and rulemaking bodies and overseers. However, in point of fact, there are multiple entities that could end up as part of the equation since governing rules are under no particular or singular regulatory (or other) body. That increases the risk of confusion or even failure to properly align prospective parties. For example, the Federal Reserve's Faster Payments Task Force has laid out the basic legal and governance issues.<sup>36</sup> Meanwhile, the CFPB asserted a degree of authority in the space by being the first regulatory body to publish faster payment "principles."<sup>37</sup> In some ways, this unfolding of events highlights the fact that how rulemaking will advance and apply over the longer run in the United States is uncertain.

Without substantial effort to avoid it, rules and regulations could emerge that are contradictory in nature or simply suboptimal in terms of how they need to be traversed. At a minimum, the challenge relative to this aspect of governance could delay or prolong the effort. In the worst case, it could scuttle the effort.

What it all seems to suggest is that the issue of rulemaking may need to be elevated and emphasized in importance. In the end, effective coordination and strong governance is as crucial as anything on the list and could arguably be the most challenging of the points that have been discussed. A credible, well-established

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<sup>36</sup> See [fedpaymentsimprovement.org/wp-content/uploads/fptf-payment-criteria.pdf](https://fedpaymentsimprovement.org/wp-content/uploads/fptf-payment-criteria.pdf).

<sup>37</sup> The CFPB released its "Consumer Protection Principles: CFPB's Vision of Consumer Protection in New Faster Payment Systems" on July 9, 2015. [files.consumerfinance.gov/f/201507\\_cfpb\\_consumer-protection-principles.pdf](https://files.consumerfinance.gov/f/201507_cfpb_consumer-protection-principles.pdf).

system of governance that brings a strong rule set with clear legal underpinnings is necessary to help promote certainty and confidence, both of which are essential for a payment system's success.

### Conclusion: The U.S. Preference for Private-Sector Solutions?

The opportunity cost of pursuing faster payments can be considered in the context of eras of money described in *The History of Money* by Jack Weatherford (1997).

Weatherford suggests that today's free market systems were made possible by the advent of coins, which were followed by paper money, then modern banking and finance. In describing the current state of money he noted the following:

A new struggle is beginning for the control of [money]... We are likely to see a prolonged era of competition during which many kinds of money will appear, proliferate, and disappear in rapidly crashing waves. In the quest to control the new money, many contenders are struggling to become the primary money institution of the new era (Weatherford 1997, 266).

The combination of “company points” and product offerings of a large online merchant like Amazon effectively makes them an emerging alternative economy, and it has implications for what happens to money at some point (Castronova 2014, 69–70). In talking about Amazon and a host of other virtual currency circumstances, conditions, and issues, Edward Castronova said:

A profusion of little currencies creates pressure to move value among them. In Facebook's case, this pressure spurred the creation of its behind-the-scenes digital value transfer system. We will probably go from having many small independent currencies to “ecosystems” of transferable currencies, and from there to global systems of virtual transfer (Castronova 2014, 196).

While more is known about the current state of money than Weatherford could have known when he speculated on things at the turn of the century, it is still uncertain just how money may evolve and the pace at which it will or may change. What is known is that money is indeed changing. Technology has not only made it easier to

move money, it has made it easier to invent money. The following passage provides context and adds more recent specifics.

Between September 2010 and August 2011, I directed a National Science Foundation-funded research team devoted to surveying the development of emerging economic institutions in the gray area between the virtual and the real. We did case studies of some important products in internet space and sent research assistants on exploratory missions into more than two dozen online media systems. One result stood out: every single one of these places had an internal market with its own currency. Every one of those currencies could be exchanged against the U.S. dollar, either in a reasonably robust market or through direct sales with a reputable company. The global metasystem of digital value transfer is...waiting to leap into public view (Castronova 2014, xvii–xviii).

At the moment, one of the focal points in payments is making platforms faster. A lot has gone into that around the world and much more seems yet to come. A risk in this endeavor is ending up with an industry focus that is too narrow—platforms or transfer schemes only. It could cause key payment participants to end up missing an important change—in money itself—as opposed to the mechanisms and processes for moving it. Castronova goes to the heart of what some in the industry are looking at in the context of “faster.”

It seems ideal to have just one form of money so that everyone knows how to speak about the value of things. Money is like a language—the entire system runs faster when we all speak the same language (Castronova 2014, 64).

Perhaps one of the more important conclusions to consider in the realm of “what instead” or “what next” deals with a reckoning of technology and how fast it moves. It is also where many viewpoints merge in terms of their consultation about the future.

The social change induced by technology has become chaotic in both the colloquial and the technical sense.... Something will happen, but we don't know what. Rather than guess the future, then, the best approach is simply to be flexible. Flexibility, response, and adaptation in the face of currency change [is key] (Castronova 2014, 128).

As work progresses to reach consensus on what to improve in the extant payment mechanism and how to do it, it seems worthwhile to pay close attention to what is happening with money, or what could happen. Nothing should stop the efforts directed at improving the current systems for facilitating exchange. However, the singular pursuit of a faster scheme that envisions world monetary systems continuing to be based on the things they've been based on for centuries could cause us to overlook or miss the next evolution of money. It would have been of little use to invest in improving the systems for speeding the exchange of cowrie shells or yap stones as the turn was made toward paper money and banking. The more flexible and agile the underpinning system(s) and the more there is an eye to what is happening that could change the game, the better.

## IV. Appendix

### Personal account transaction limits (FPS)<sup>38</sup>

Personal	One-off and forward dated payments			Standing orders		
	Branch	Phone	Online	Branch	Phone	Online
Bank of Scotland	£25,000	On request	£25,000	£99,999	£99,999	£99,999
Barclays UK	Personal £25,000	Personal £15,000	Personal £50,000	Personal £25,000	Personal £15,000	Personal £50,000
	Premier £50,000	Premier £50,000	Premier £50,000	Premier £50,000	Premier £50,000	Premier £50,000
Citibank	£100,000	£100,000	£25,000	£100,000	£100,000	£25,000
Clydesdale	£100,000 <a href="#">*A*</a>	£5,000	£25,000	£100,000	£100,000	£100,000
Co-operative	£100,000	£100,000	£20,000	£100,000	£100,000	£20,000
first direct	£10,000	£10,000	£10,000	£10,000	£10,000	£5,000
Halifax	£25,000	On request	£25,000	£99,999	£99,999	£99,999
HSBC	£10,000	£10,000	£10,000	£10,000	£10,000	£5,000
Lloyds	£25,000	On request	£25,000	£99,999	£99,999	£99,999
M&S Bank	£10,000	£10,000	£10,000	£10,000	£10,000	£5,000
Nationwide	£9,999	£10,000	£10,000	£9,999	Not permitted	£10,000
Natwest	£20,000	£20,000	£20,000	£99,999.99	£99,999.99	£99,999.99
Northern Bank Ltd T/A Danske Bank	£100,000	£25,000 daily	Online £25,000 daily Mobile £10,000 daily	£100,000	£100,000	£100,000
Royal Bank of Scotland Including Ulster Bank	£20,000	£20,000	£20,000	£99,999.99	£99,999.99	£99,999.99
Santander UK plc	£100,000	£100,000	£25,000	£100,000	£100,000	£100,000
Yorkshire Bank	£100,000 <a href="#">*B*</a>	£5,000	£25,000	£100,000	£100,000	£100,000

\*A\* and \*B\*: Applies only to payments made between Clydesdale Bank and Yorkshire Bank. In addition to the per-transaction limits listed here, most types of accounts have a daily limit on the total amount you can send.

<sup>38</sup> [fasterpayments.org.uk/about-us/transaction-limits](http://fasterpayments.org.uk/about-us/transaction-limits), last viewed on January 1, 2016.

### Business/ corporate account transaction limits (FPS)<sup>39</sup>

Business/ Corporate	One-off and forward dated payments			Standing orders		
	Branch	Phone	Online	Branch	Phone	Online
Bank of Scotland	N/A	On request	£99,999	£99,999	£99,999	£99,999
Barclays UK	Business £25,000	Business £15,000	Business £50,000	Business £100,000	Business £100,000	Business £100,000
	Corporate/FI £250,000	Corporate/FI £250,000	Corporate/FI £250,000	Corporate/FI £250,000	Corporate/FI £250,000	Corporate/FI £250,000
	Corporate / FI – via Direct Corporate Access (DCA) £250,000					
Citibank	£250,000	£250,000	£250,000	£250,000	£250,000	£250,000
Clydesdale	£100,000 *A*	£10,000	£100,000	£100,000	£100,000	£100,000
Co-operative	£100,000	£100,000	£20,000	£100,000	£100,000	£20,000
HSBC	£10,000	£10,000	£250,000	£10,000	£10,000	£250,000
Lloyds	N/A	On request	£99,999	£99,999	£99,999	£99,999
Natwest	£100,000	£100,000	Business £20,000– £30,000 Corporate/FI £100,000	£99,999.99	£99,999.99	£99,999.99
Northern Bank Ltd T/A Danske Bank	£100,000	£50,000	£100,000	£100,000	£100,000	£100,000
Royal Bank of Scotland Including Ulster Bank	£100,000	£100,000	Business £20,000 - £30,000 Corporate/FI £100,000	£99,999.99	£99,999.99	£99,999.99
Santander UK plc	N/A	£100,000	£100,000	N/A	£100,000	£100,000
Yorkshire Bank	£100,000 *B*	£10,000	£100,000	£100,000	£100,000	£100,000

\*A\* and \*B\*: Only applies to payments made between Clydesdale Bank and Yorkshire Bank and vice versa. In addition to the 'per transaction' limits listed here, most types of account have a daily limit on the total amount you can send.

<sup>39</sup> [fasterpayments.org.uk/about-us/transaction-limits](http://fasterpayments.org.uk/about-us/transaction-limits), last viewed on January 1, 2016.

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