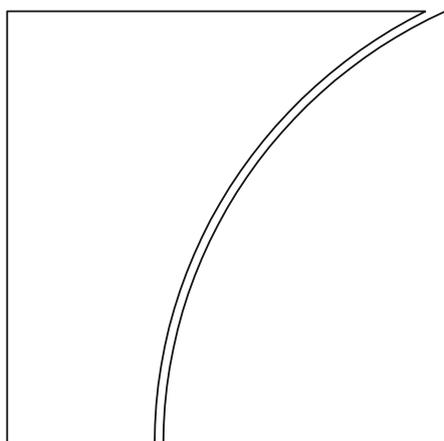


Committee on Payments and Market Infrastructures



Fast payments – Enhancing the speed and availability of retail payments

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Acronyms and abbreviations

24/7	24-hour and seven-day
AML	anti-money laundering
ATM	automated teller machine
B2B	business-to-business
B2P	business-to-person
CFT	countering/combating the financing of terrorism
CPMI	Committee on Payments and Market Infrastructures
CPSS	Committee on Payment and Settlement Systems (now CPMI)
DNS	deferred net settlement
e-money	electronic money
EU	European Union
FMI	financial market infrastructure
IOSCO	International Organization of Securities Commissions
ISO	International Organization for Standardization
IT	information technology
KYC	know your customer
P2B	person-to-business
P2G	person-to-government
P2P	person-to-person
PFMI	Principles for Financial Market Infrastructures
POS	point of sale
PSP	payment service provider
RTGS	real-time gross settlement
SEPA	Single Euro Payments Area

Executive summary

Over the last decade, fast retail payment services have been deployed (or are being developed) in many jurisdictions. Fast payments can be defined by two key features: speed and continuous service availability. Based on these features, fast payments can be defined as payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time *and* on as near to a 24-hour and 7-day (24/7) basis as possible.

Because these types of service are significant innovations in the market for retail electronic payment services, and as their deployment may require substantial changes and investments in retail payments infrastructure, the Committee on Payments and Market Infrastructures (CPMI) launched a study to investigate their development and importance. This report, prepared by the CPMI Working Group on Retail Payments, characterises fast payments, takes stock of the different initiatives in various jurisdictions (see Annex 2 for a high-level summary), analyses supply and demand factors that may foster or hinder their development, details the main benefits and risks they may bring about and, finally, analyses potential implications for different stakeholders, with a particular focus on central banks.

The emergence of fast payments in many CPMI jurisdictions, as well as the apparently accelerating rate of new proposals and implementations, reflects important developments in the demand for and supply of such payments. Advances in information technology, including the spread of advanced mobile communications devices, have lowered costs for end users and payment service providers, making the provision and use of fast payments increasingly viable. In addition, these advances have served to alter end-user expectations for the speed and convenience of payments. On the one hand, investment costs, and the need for coordinated action by industry participants to achieve a critical mass of end users and sufficient scale of transactions may impede the implementation of fast payments. On the other, implementation has been favoured by competitive pressures, as well as action by authorities, including some central banks. The scope and timing of implementation, as well as the characteristics of specific services, schemes and systems, vary across CPMI jurisdictions, indicating that different environments and needs may continue to influence when and in what form fast payments emerge.

The Working Group found that fast payment services have the potential to generate benefits for various stakeholders and for society in general, provided that risks are properly managed.

The clearest benefit of fast payments from an end-user perspective is the ability to complete time-sensitive payments quickly, wherever and whenever necessary. Fast payments may also provide broader benefits for end users; although many of the additional benefits are not unique to fast payments, the implementation of fast payments is usually associated with the development of new infrastructure, which may be designed with these potential benefits in mind. As a result, the implementation of fast payments may accompany or provide the basis for service enhancements and value added services. Overall, the speed and enhanced service availability of fast payments, as well as any new functionalities, may meet the new expectations and needs of end users that rapid changes in technology, such as the spread of advanced mobile communications devices, have evoked. Taking this into account, fast payments are of strategic importance for the long-run modernisation of the payment system.

Fast payments generally do not introduce new types of risk beyond those identified in previous reports as relevant for retail payments. However, the extent to which fast payments exacerbate some risks may warrant attention. Any incremental risks associated with fast payments need to be appropriately and effectively mitigated. An area that merits particular attention is the management of financial risks between payment service providers (PSPs) when settlement between PSPs is deferred; because a fast payment provides immediate final funds to the payee, deferred settlement between PSPs implies an extension of credit from the payee's PSP to the payer's PSP. Various measures can be taken to mitigate credit risks due to deferred settlement, and some fast payment implementations involve real-time settlement between PSPs, avoiding this risk altogether.

From the perspective of end users, fast payments will likely provide new and more flexible capabilities for making retail payments quickly and with finality. As schemes, systems and PSPs make these capabilities available to the general public, there may be a need to focus on transparency and education with respect to new capabilities and risks, as well as rights, responsibilities and protections. The introduction of fast payments may also warrant a review of the adequacy of security arrangements, fraud mitigation mechanisms and, in some jurisdictions, consumer protection frameworks.

The implementation of fast payment services is a complex endeavour involving many stakeholders. Fast payment services can be offered along a spectrum of models from several competitive and interoperable systems, working under one or various schemes, to more centralised approaches where a single infrastructure clears and settles various payment methods serving various use cases. Because of this complexity and the strategic importance of fast payments, a number of key considerations may arise:

- (i) A coordinated effort by many or most PSPs in a jurisdiction, resulting in interconnection between those PSPs and existing or enhanced core clearing and settlement systems, may improve the likelihood of achieving a large network of end users in a jurisdiction. Broad coverage of end users is important to realising the benefits of these payment services, which have strong network effects, and, as a result, may increase the likelihood that a fast payment implementation will be successful.
- (ii) Implementation costs may materialise in the short run whereas potential benefits for PSPs may only be reaped in the long term and could be difficult to quantify. For this reason, PSPs and other stakeholders should be encouraged to evaluate the potential benefits of fast payments (such as the scope for improving their service offerings and anticipating customer needs, or the prospect for future innovation based on fast payment platforms and functionality) over a long time horizon and to consider adopting a strategic view of the implementation of fast payments that takes such long-run factors into account

The complexity of implementation increases in the case of cross-border initiatives. Especially in this case, harmonised procedures and rules as well as technical and operational standards could facilitate the interoperability of different fast payment implementations.

Central banks and other authorities may play a critical role in fostering the modernisation of payment systems in order to meet the public policy objectives of safety, efficiency and meeting end-user needs and expectations. Central banks, in particular, may contribute to the development and implementation of fast payments in their traditional roles as catalysts for change, as well as operators and overseers of payment systems, to the extent that fast payments contribute to meeting these public policy objectives. The role of central banks as operators of real-time gross settlement (RTGS) systems and providers of other types of settlement service is particularly relevant. Even if the central bank is not directly involved in the operation of a retail infrastructure processing fast payments, the provision of settlement services (via the RTGS system or other specialised settlement services) may be critical for the implementation of fast payments. Central banks should consider their role in this respect and determine what changes, if any, are warranted in their operational services in order to foster the long-run development of safe and efficient fast payments. Central banks should also consider other implications for financial stability, monetary policy or the potential impact on other payment instruments, including cash, although it is likely that any implications of fast payments in these areas will only be significant if and when fast payments gain substantial traction.

1. Introduction

The retail payments landscape has changed rapidly in recent years. Involving relatively low-value transfers between individuals, businesses and public authorities, retail payments play an important role in the financial system and the economy as a whole. Central banks have a keen interest in the efficiency and safety of retail payment systems and instruments because of their importance for the financial system's effectiveness and stability. Reflecting the general interest of central banks in retail payments and the specific importance of innovations for the efficiency and safety of retail payment systems, a previous CPSS and CPMI¹ report provided an overview and analysis of innovations in retail payments and identified a number of important developments and trends across different jurisdictions.²

One such development involves improvements in the speed and convenience for end users of retail payments. Enhancements to payment speeds, driven by demand for real-time or near-real-time retail payments, is a notable trend across jurisdictions. In addition, internet banking, mobile payments and other technological developments have increased the flexibility and convenience of making retail payments.

Since that earlier report, the trend towards increased speed and convenience for retail payments appears to have accelerated. As shown in Table 1, the number of CPMI jurisdictions with services, schemes and systems that allow end users to conduct real-time or near-real-time payments on a nearly continuous basis has more than doubled since 2010. Proposals and initiatives in additional CPMI jurisdictions for the provision of retail payments with these features suggest that this number may increase substantially in the coming years.

Reflecting these developments, the CPMI asked the Working Group on Retail Payments to examine innovations related to speed and operating hours for retail payment systems along with related issues, with a particular emphasis on the importance of these innovations for end users, PSPs and central banks and, more broadly, their importance for demand and supply in the retail payments market. This report presents the Working Group's analysis.

The report views the end-user experience as central to these developments, with the ability to complete a payment almost immediately and at nearly any time as defining characteristics of a "fast payment" from the end-user perspective. Arrangements to provide such payments may vary; the report identifies a number of dimensions in which the provision of fast payments differs across CPMI jurisdictions and discusses some of the factors behind these differences and their implications. Similarly, the decision to implement fast payment capabilities in a jurisdiction depends on numerous factors that may vary between jurisdictions, including some factors that may encourage implementation, such as improvements in information technology and changes in end-user expectations, and those that may hinder it, such as initial investment costs and challenges with coordination across industry stakeholders.

The report further finds that, just as the timing and nature of implementation varies across CPMI jurisdictions, so too does the involvement of the central bank. In broad terms, central banks can take three roles in the payment system: a catalyst role, an oversight role, and an operational role (see Annex 1 for more details). As catalysts for change, some central banks have actively encouraged and facilitated the development of fast payments, particularly when coordination challenges might otherwise hinder their emergence. As overseers of payment systems, central banks may need to consider certain issues related to fast payments, notably credit, liquidity and operational risks. As operators and providers of payment services, central banks in CPMI jurisdictions have taken various approaches, ranging from little operational involvement with no changes in central bank operations to the full provision of clearing and settlement infrastructure to enable continuous real-time or near-real-time payments for end users. Intermediate cases, in which a central bank has made or plans moderate or more significant changes in operations to

¹ The Committee on Payment and Settlement Systems (CPSS) changed its name to the Committee on Payments and Market Infrastructures (CPMI) on 1 September 2014. References to reports published before that date use the Committee's old name.

² CPSS, *Innovations in retail payments*, May 2012.

support fast payments, also exist. The approach taken by central banks as catalyst, overseer and operator varies across CPMI jurisdictions, and various factors may influence the choice of approach. Fast payments may raise additional issues, such as fraud prevention and consumer protection, that may be of interest to central banks and are of broader interest to industry stakeholders and various authorities.

The report concludes that fast payments have the potential to yield benefits to end users, industry participants and society, but may also alter some risks relative to existing payment methods, including risks for both end users and providers of fast payments, that need to be properly managed. In some cases, the risks and investment costs of fast payments, along with coordination problems, may inhibit their implementation, but there is clear evidence that these challenges are being addressed in many jurisdictions. Moreover, under a more strategic perspective, such payment capabilities may serve an important role in upgrading and modernising a jurisdiction's payment system.

Fast payment implementations in CPMI countries^{1, 2}

Table 1

Existing fast payment implementations in CPMI countries

Country	Implementation	Year commenced ³
Korea	Electronic Banking System (EBS)	2001
South Africa	Real-Time Clearing (RTC)	2006
Korea	CD/ATM System	2007 ⁴
United Kingdom	Faster Payments Service (FPS)	2008
China	Internet Banking Payment System (IBPS)	2010
India	Immediate Payment Service (IMPS)	2010
Sweden	BiR/Swish	2012
Turkey	BKM Express	2013
Italy	Jiffy – Cash in a flash (Jiffy)	2014
Singapore	Fast And Secure Transfers (FAST)	2014
Switzerland	Twint ⁵	2015
Mexico	SPEI	2015 ⁶

Proposed fast payment implementations in CPMI countries

Country/geographical area	Implementation	Proposed year of commencement
Australia	New Payments Platform (NPP)	2017
SEPA ⁷	Various implementations based on SEPA Credit Transfer instant (SCTinst) scheme including	2017
Netherlands	Instant Payments	2019
Belgium	Instant Payments	TBD
Saudi Arabia	Future Ready ACH (FR-ACH)	2017/18
Hong Kong SAR	TBD (name to be determined later)	2018
Japan	Zengin Data Telecommunication System	2018 ⁸
United States ⁹	TBD	TBD

¹ Tables and boxes in this report include initiatives that meet the definition of fast payment implementation in this report (see Section 2.1 for definitions and concepts related to fast payments). ² Throughout tables in the report, TBD refers to details of a fast payment implementation that have not been finalised by stakeholders and authorities. ³ The commencement date refers to the year at which an implementation provided full fast payment functionality, including near-24/7 service availability. In some jurisdictions, this date may differ from the date when a service or system initially commenced operations. ⁴ The CD/ATM System has provided near-real-time payments since 1988 with operations on a near-to-24/7 basis (00:05-23:55) since 2007. ⁵ At the time of publication, the two providers offering fast payment services in Switzerland – Twint and Paymit – were in a merging process. Post-merger specifications of the new service (expected to be called Twint) had not been published. All references to Twint, thus, reflect the state of the Twint and/or Paymit service as of end-September 2016. ⁶ The SPEI began conducting near-real-time payments in 2004 with operations on a 21/7 basis for mobile payments since March 2015 and on a 24/7 basis since November 2015. ⁷ See Box F for details on pan-European instant payments in euros. As described in that box, the expectation is that clearing infrastructures supporting the SCTinst scheme shall be interoperable to enable pan-European reach for instant payments in euros. ⁸ The Zengin System has provided real-time payment service between 08:30 and 15:30 on business days since 1973. ⁹ In April 2016, payment industry stakeholders developed more than 20 proposals detailing various end-to-end fast payment solutions for the United States. These proposals were submitted for assessment against a set of effectiveness criteria developed by the Faster Payments Task Force, a diverse group of payment industry stakeholders brought together with the mission of identifying safe, ubiquitous, faster payment capabilities for the United States, as part of the Federal Reserve's *Strategies for Improving the U.S. Payment System* initiative. Results of the assessments are scheduled to be published in 2017. For further details on the initiative, see Box E.

2. Fast payments: Key definitions and concepts

2.1 Definitions

Definition of a fast payment

Traditionally, it has taken a day or more (even weeks in the case of some cross-border transactions) after initiating a cashless retail payment until the funds reached the payee. Frequently, the initiation and processing of transactions has been limited to specific times during the day. These two limitations of traditional payments, payment speed and service availability, are the main features that fast payment initiatives aim to change. Combined, these improvements provide end users with rapid availability of final funds on a nearly continuous basis and can, therefore, be used to define more formally the concept of “fast payments”. For the purposes of this report, a **“fast payment” is defined as a payment³ in which the transmission of the payment message and the availability of “final” funds to the payee occur in real time or near-real time on as near to a 24-hour and seven-day (24/7) basis as possible.**

This definition adopts the perspective that a fast payment ensures a credit of final funds to the payee. For the purposes of this report, final funds are funds received such that the payee has unconditional and irrevocable access to them. This approach provides strong certainty of payment to the payee.⁴ Further, it implies that other potentially rapid outcomes, such as an immediate notification to the payee of incoming funds that will only be accessible later, would not qualify as a fast payment.

In different jurisdictions, the terms used for fast payments may vary, although the underlying meaning could still be the same. Other common terms for these services are “instant,” “immediate,” “real-time” or “faster” payments. As a result, the terminology in this report may not reflect exactly the prevailing terminology in a specific jurisdiction (as an example, the preferred term in the European Union (EU) is “instant” payments), but the services in that jurisdiction may still fulfil the general definition above.

Just as terminology may differ, the characteristics of fast payments may also vary by jurisdiction. Hence, the definition is not intended to be precise in relation to the specific speed and service availability that qualifies as a fast payment, in order to accommodate small differences in interpretation (eg a service in one jurisdiction may aim to perform end-to-end payments in under five seconds, whereas a service in another jurisdiction may allow 15, 20 or 30 seconds). Borderline cases may exist for which it will be difficult to determine whether a payment service can be considered fast.⁵ Some systems may have initially commenced operations outside this definition but have since developed such that they now meet the “fast” criteria. This report does not aim to determine when such borderline cases fulfil the fast payment concept described above; this interpretation is left to the national authorities and stakeholders.

Clearly, however, not all improvements in retail payments will yield fast payments under the definition in this report, even though they may increase speed and service availability. Increasing the end-to-end speed from several days to a single day, or even a few hours, could undoubtedly be a service improvement, but does not necessarily raise issues or meet needs that are substantially different from traditional services. The same can be said of modest increases in service availability that clearly fall short of the above definition of a fast payment.

³ “Payment” is defined as the payer’s transfer of a monetary claim on a party acceptable to the payee. See CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

⁴ Clearly, as discussed later in this report, credit risk for PSPs can increase with such rules in certain circumstances unless this risk is mitigated by appropriate risk controls.

⁵ For example, Interac e-Transfer in Canada is a service primarily for person-to-person payments. The service, which has operated since 2001, is available 24/7 and typically provides funds to the payee within 30 minutes, but may enable more rapid payments in some circumstances. In addition, the payee must affirmatively accept the payment, which can yield a somewhat slower payment experience.

In addition, services may exist that satisfy one aspect of a fast payment, but not both. For example, a service may enable a near-real-time transfer of funds to the payee, but only during standard business hours and days. Alternatively, certain services, such as those associated with payment cards in some CPMI jurisdictions, may provide rapid processing of payments at any time, but without near-real-time provision of final funds to the payee. Neither of these arrangements would qualify as providing fast payments under the definition in this report.

As an additional note, given the key focus of fast payments on the rapid receipt of funds by the payee at any time, the definition does not include other end-user elements that are part of many fast payment implementations. In particular, the definition does not require notifications about the status of a payment to the payer, the payee or both, but such notifications may often accompany a fast payment because of their value for end users. Similarly, the definition does not include a rapid debit of funds from the payer's account as a central feature of a fast payment experience from the end-user perspective despite it being an important risk management consideration for many systems. These and other characteristics will be addressed, where relevant, at various points in the report.

Clearing and settlement of fast payments compared with traditional payments

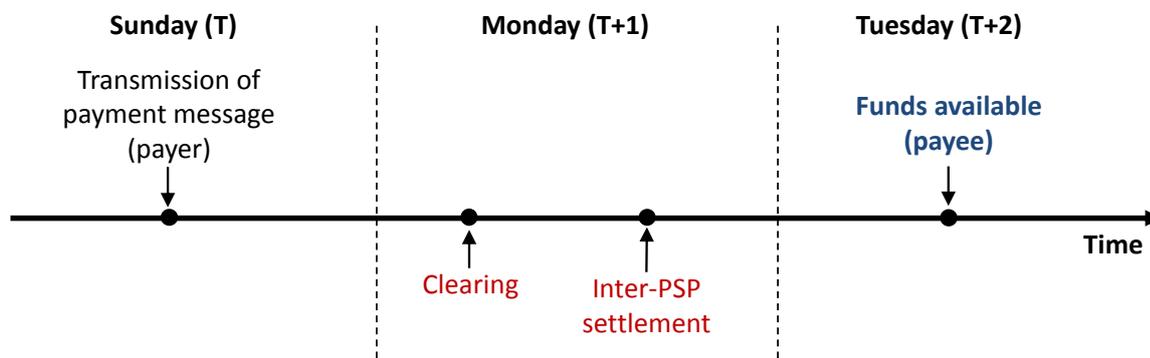
The definition of fast payments in this report focuses on speed (ie rapid funds availability) and service availability from the point of view of the end users of a payment system.⁶ However, an end user conducts cashless payments through the use of **a payment service provider (PSP), which this report defines broadly as any entity that provides payment services to end users**. In many instances, PSPs are banks and other financial institutions that offer accounts to their customers, although various types of non-banks may be involved in different aspects of fast payment processing and may also serve as PSPs in some arrangements (eg payment institutions and e-money institutions in the EU).

As described in previous CPMI reports and discussed in more detail in Chapter 4, a payment through PSPs involves a number of steps. In broad terms, these steps will include the clearing and settlement of payments between the PSPs of the end users. Clearing is defined in the CPSS glossary⁷ as *the process of transmitting, reconciling and, in some cases, confirming transactions prior to settlement, potentially including the netting of transactions and the establishment of positions for settlement*. Settlement between PSPs then involves the transfer of funds associated with a payment between the PSPs of the payer and payee.

⁶ End users include individuals, small and medium-sized businesses, corporates and government entities.

⁷ See CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

A traditional payment initiated during the weekend



A fast payment processed during the weekend

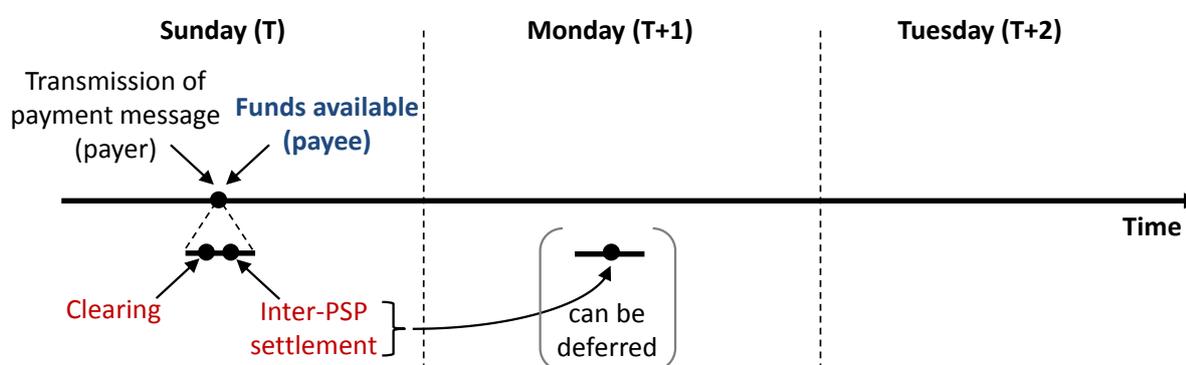


Figure 1 illustrates some of the key differences between traditional (ie non-fast) and fast payments for a hypothetical payment initiated by the payer over the weekend.⁸ As shown in the first panel of this figure, traditional retail payments typically involve delays in the clearing or settlement of payments (or both), with the payee not receiving final funds until the completion of those steps. In many traditional payments, payment orders are collected and cleared in batches, which introduces delays as individual payment orders are not acted upon until the next batch clearing. Moreover, the times at which clearing and settlement may take place are often limited to certain days or business hours. Thus, for the weekend payment in Figure 1, the traditional payment message is not acted upon (ie is not cleared or settled) until the subsequent business day with available funds to the payee delayed until a still later time. Even if a traditional payment provides rapid and nearly continuous operation of certain aspects of clearing, as is the case with many payment card schemes, the payee typically does not receive funds until inter-PSP settlement occurs, often a day or more after the initiation of the payment. While this could reflect legacy batch processing activities, the delay in providing funds to the payee in traditional payments ensures that the payee's PSP does not bear credit risk by advancing the funds to its customer.⁹

⁸ For purposes of illustration, Figure 1 makes assumptions about the timing of certain events in a traditional payment, but the timing of these events may differ in practice. For example, although the figure depicts funds availability to the payee on Tuesday (ie T+2), some traditional payments may provide available funds on a different date, possible including on Monday (ie T+1) after the completion of clearing and inter-PSP settlement. Similarly, the timing of certain clearing activities may differ from the timing depicted in the figure.

⁹ In some situations, the payee's PSP may provide a rapid provisional credit of funds to the payee in a traditional payment. However, even if funds are available to the payee prior to settlement between PSPs in a traditional payment, those funds may not be final and, therefore, could be revoked if the payment is not settled between PSPs.

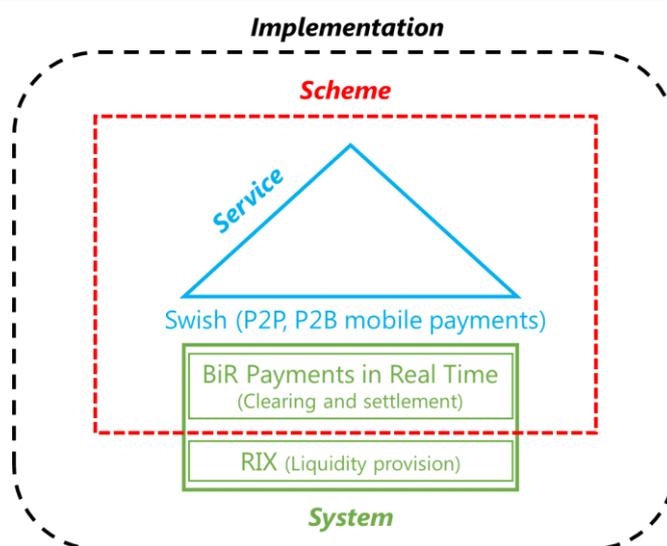
The conduct of a fast payment has a number of implications for clearing and settlement between PSPs, which differ from arrangements for traditional retail payments. As illustrated in the second panel of Figure 1, a fast payment yields final funds to the payee almost immediately and at any time, including for the weekend payment in this example. From the PSP's perspective, this outcome requires that certain activities associated with clearing, discussed in more detail in Chapter 4, occur in real time or near-real time and on a continuous basis for each payment order such that delays present in traditional payments do not arise. In addition, a fast payment may also involve immediate settlement of payments between PSPs on a continuous basis. Thus, for the fast payment in Figure 1, both activities for PSPs that can generate delays in traditional payments may occur rapidly, including over the weekend.

However, it is important to highlight that a fast payment might be completed from the end-user point of view (ie with the availability of final funds to the payee) and still require settlement between the end users' PSPs. That is, in contrast to many traditional payments, the settlement of transactions between PSPs need not necessarily be completed before the payee has final funds. Certain financial risks between the PSPs in the transaction inherently arise for fast payments in which settlement between PSPs is only completed after the funds have reached the payee. As will be explained in more detail in subsequent chapters, there will be a need to manage the financial risks in this sort of arrangement.

Definitions related to the implementation of fast payments

In order to fully describe the arrangements that enable fast payments, the definition of a fast payment can be complemented with the concepts of fast payment scheme, system, service and implementation (see Figure 2 for an illustration of the concepts based on a fast payment implementation in Sweden).

- A ***fast payment scheme can be considered as a set of procedures, rules and technical standards governing the execution of fast payment orders***. A single scheme may encompass one or more systems in which PSPs participate. In addition, a scheme may govern other aspects of fast payments, such as security, processing or technical requirements.
- A ***fast payment system is defined as an infrastructure focused on clearing and/or settlement of fast payments for its participants***.
- PSPs participate in the fast payment system and provide ***fast payment services, defined as actual offerings or products that allow end users to conduct fast payments***, to their end-user customers.
- A ***fast payment implementation or deployment in a jurisdiction involves a fast payment scheme (or schemes) and an associated fast payment system (or systems) such that PSPs are able to provide fast payment services to end users***.



This figure is an illustration of the concepts of fast payment scheme, system, service and implementation for the fast payment implementation in Sweden. It should be noted that implementations may vary between different jurisdictions and that scheme boundaries in particular may differ depending on the specific implementation.

Various arrangements might serve to implement fast payments. The scheme and the system might be separated or they might be integrated in a single entity that provides rules for the system as well as clearing and settlement for all or a group of PSPs. Similarly, clearing and settlement functions might be combined in a single entity or might be separated between one entity (or entities), such as a clearinghouse, providing clearing services and another entity, such as a commercial bank or central bank, providing settlement services.

In specific cases, an individual PSP may provide services only to its own customers. These so-called closed systems typically clear and settle transactions only on their own books. In some circumstances, these closed systems may provide fast payments under the definition in this report. As a result, closed systems will be addressed, where relevant, in this report, although for reasons discussed below, the report mainly deals with open systems and schemes that enable payments between end users of different PSPs.

2.2 Important additional characteristics of fast payment implementations

Fast payment deployments are often not limited to the two features of rapid final funds availability and continuous service availability, but also include additional important characteristics. It is useful to separate these characteristics into those with particular implications for end users and those with implications for PSPs and system operators, although this categorisation inevitably involves some overlap.

Characteristics relevant for end users

Fast payment implementations exhibit various features that may influence the value of fast payment services for end users. While not an essential part of fast payments according to this report's definition, the importance of these features should not be underestimated, as a simple increase in speed and service availability might not yield widespread benefits unless accompanied by one or more of the following features.

Coverage or reach of fast payment services, systems and schemes

As in other industries with strong network effects, fast payments are only useful to users to the extent that they can reach other users. Many fast payment implementations aim to provide universal or almost universal coverage in a specific jurisdiction. Achieving a high coverage of potential users depends on various factors, such as (i) the decisions of individual PSPs regarding participation in one or more fast payment systems or schemes, (ii) the access criteria imposed on PSPs by a fast payment system, (iii) the percentage of the population that have payment accounts at PSPs offering fast payments and that choose to adopt the service, and (iv) the ease with which different systems interoperate for the exchange of fast payments (see Box A for a case study of coverage).

Open systems with a broad base of PSPs offering services to their customers, ultimately linking the customers of those PSPs, may, in principle, be positioned to offer wide and potentially universal coverage for fast payment services. In contrast, closed systems, in which an individual PSP provides services only to its own customers, often have limited coverage because both the payer and payee must be direct customers of the same entity and must typically maintain balances with that entity. However, a closed system could offer wide coverage if a large percentage of end users have accounts with it.¹⁰

It should be noted that wide coverage, possibly measured by the percentage of PSPs that participate in a fast payment implementation or the share of payment accounts held by those PSPs, may enable a large and comprehensive network of end users but does not guarantee such a network for purposes of actually conducting fast payments if end users choose not to adopt the service. Instead, the adoption decisions of end users, which depend on the attractiveness of a fast payment service from their viewpoint in addition to the underlying coverage, will determine the ultimate size of the fast payment network. In addition, neither coverage across PSP customers nor the resulting end-user network are static; the participation decisions of PSPs, the adoption decisions of end users, and the choice of PSPs by end users can change over time.

¹⁰ In some emerging economies where end-user access to mobile telecommunications services is high and access to traditional financial services is low, closed systems operated by telecommunications companies have provided fast payment services with broad coverage. mPesa in Kenya and Tigo Money in El Salvador and other countries are two such examples.

Case study – Coverage

A key element to the successful adoption of new payment services is how far wide coverage can be achieved within a market. Being able to quickly expand the reach of fast payments, so that the vast majority of account holders are able to receive and send payments, is a key part of the overall delivery of fast payment services.

Italy – In Italy, the fast payment solutions recently launched in the market have not yet achieved a critical mass. Many banks (85% in terms of deposits) offer fast payment services; however, the percentage of actual users and payment transactions is still quite low.

Advertising campaigns have proved to be helpful in promoting these services and in building towards a critical mass. However, Italian banks have reported that one of the main obstacles encountered so far has been to convince the customer that the new service is a value added one; this is particularly difficult in a country, like Italy, where efficient electronic payments solutions are already available, often through internet and mobile connections. An easy and convenient activation process is also viewed as a key factor in achieving a widespread adoption of the new fast payment service and in fostering the customers' shift from traditional payment methods to the fast payment service. In Italy, this aspect has been dealt with by PSPs in different ways, as the legislative framework allows for different options. As observed so far, the less complex the activation process, the quicker the diffusion of fast payment services among customers of PSPs.

To increase the uptake, information campaigns have been initiated by PSPs, and recent projects to extend the use of those services to person-to-business (P2B) and person-to-government (P2G) transactions represent a significant incentive to increase their adoption. PSPs offering them are confident that their use will significantly increase in the near future.

United Kingdom – Ubiquity was a key part of the delivery of the overall Faster Payment Service (FPS) when it launched in 2008. Because the United Kingdom has a concentrated current account market, getting to a position where 95% of account holders were reachable was relatively straightforward, achieved by just the 10 Direct Participants opening up their customer channels to offer FPS.

At that point (early 2010), the more than 400 PSPs that were not Direct Participants largely continued to offer services to their customers that excluded FPS; at that time, they saw little reason to offer the service to their customers. This position (5% gap in coverage) persisted until these PSPs were required to meet the terms of the Payment Services Directive on T+1 processing, which came into effect at the end of 2011. This regulatory requirement led to all PSPs becoming addressable in FPS, albeit on an indirect basis, which does not always provide all the features (ie payments in real time and 24/7) that direct participation offers.

United States – In its 2013 public consultation paper¹ on payment system improvement, the Federal Reserve stated that ubiquitous payment systems best serve the public interest because the more members of society who can be reached with a payment system, the more value the system is to each other member. The challenge, however, is coordinating payment systems to achieve ubiquity, and for the United States, this is especially difficult because of the breadth of the payments landscape.

Acting as a catalyst for change, the Federal Reserve convened the Faster Payments Task Force (FPTF).² The mission of the FPTF is to identify effective approach(es) for implementing a safe, ubiquitous, faster payments capability in the United States. To do this, the FPTF developed effectiveness criteria for assessing effective faster payment solutions, which include a criteria category for ubiquity.³ Ubiquity is defined by the FPTF as "a payment system that can reach all accounts to ensure that a payer has the ability to pay any entity", and the ubiquity criteria category includes several criteria by which to assess ubiquity in faster payment solutions.

¹ See: https://fedpaymentsimprovement.org/wp-content/uploads/2013/09/Payment_System_Improvement-Public_Consultation_Paper.pdf.

² See Box E. ³ See <https://fedpaymentsimprovement.org/wp-content/uploads/fptf-payment-criteria.pdf>.

Coverage may also involve a cross-border dimension, because end users in one jurisdiction may wish to exchange payments with end users in other jurisdictions. Some current regional initiatives, such as the initiative for instant payments in the EU, involve cross-border considerations. However, current fast

payment initiatives usually cater to the needs of individual jurisdictions. If these initiatives mature or expand, there may be an increased expectation that these services will be extended across borders, in regional or even global initiatives. As a result, potential cross-border coverage may be an important consideration even if domestic coverage is a focus of many current fast payment implementations.

Access channels and devices

Continuous service availability, understood as the capability to pay and receive funds at any time, is not very useful unless the initiation of a payment can be done through access channels and devices that are easily accessible by individuals and other entities. Such initiation allows not only paying “anytime”, but also paying “anywhere/anyhow”. Computers and mobile phones as access devices and the internet as an access channel are especially suited for communication between end users and their respective PSPs for fast payments. Some use cases, such as impromptu one-time person-to-person (P2P) or person-to-business (P2B) payments, may benefit more than others from the use of mobile devices and the internet as access channels.

Current access channels					Table 2
Country	Implementation	Online ¹	Mobile ²	Physical channels ³	Other
Korea	EBS	✓	✓		IVR ⁴
South Africa	RTC	✓	✓	✓	
Korea	CD/ATM System			✓	
United Kingdom	FPS	✓	✓	✓	Phone
China	IBPS	✓	✓	✓	
India	IMPS	✓	✓	✓	IVR ⁴
Sweden	BiR/Swish		✓		
Turkey	BKM Express		✓		
Italy	Jiffy	✓	✓		
Singapore	FAST	✓	✓	✓	
Switzerland	Twint		✓		
Mexico	SPEI	✓	✓ ⁵	✓ ⁶	

¹ Online includes traditional, often static home or office computer devices that access online banking services via the internet. ² Mobile includes mobile banking, mobile wallets and mobile payments, which can be made using SMS, USSDs or apps. ³ Physical channels include, for instance, bank branches, ATMs and banking agents. ⁴ Interactive Voice Response via a mobile and/or telephone. ⁵ Not applicable to mobile wallets. ⁶ Bank branches, and one bank ATM operator allows its own customers to initiate SPEI transactions.

As with other features of a fast payment implementation, access channels may change over time. Thus, although Table 2 considers access channels that are currently available to conduct fast payments, additional access channels may emerge in a jurisdiction as PSPs and infrastructure operators alter their service offerings in response to end-user demand. For example, SPEI in Mexico has expanded to include mobile access channels over the last decade. Similarly, other implementations that focus at present on mobile access channels could potentially incorporate additional access channels. This was the case for IMPS in India, which began as a mobile banking channel, but later expanded to include other channels, such as internet banking, ATMs and bank branches.

Use cases

The value of fast payments to end users depends on the variety of use cases that a fast payment implementation supports. These use cases may depend on features of a particular fast payment implementation, such as limits on transaction value, access channels and devices, and general coverage as

well as coverage across specific types of end user. In addition, the viability of different use cases depends on how the features and pricing of fast payments compare with those of alternative payment methods, as well as the value that end users place on speed and service availability in different payment situations.

Many current fast payment implementations consider P2P payments to be the primary use case, reflecting the potential substitution of fast payments for cash or cheques in interactions between individuals. In some implementations, such as BiR/Swish in Sweden or BKM Express in Turkey, P2P payments are currently the primary use case. However, in other implementations, such as IBPS in China or RTC in South Africa, fast payments target a broader range of use cases, including P2B, business-to-business (B2B) and business-to-person (B2P) payments. Some implementations, such as FAST in Singapore or the forthcoming FR-ACH in Saudi Arabia, envisage that fast payments could potentially substitute for legacy payment methods in a wide variety of transactions. Moreover, the breadth of potential uses cases may expand over time as end users become familiar with the functionality and capabilities of fast payments and as PSPs innovate to meet additional payment needs.¹¹ Expansion in use cases is important for both end users and PSPs to realise the potential benefits of fast payments.

Instruments

The types of instrument supported by fast payment implementations are very much interrelated with the use cases described above. In principle, a fast payment implementation could be built upon different payment instruments, such as credit transfers, direct debits, payment cards or e-money products. However, most current implementations are based on the use of credit transfers. This approach possibly reflects the emphasis on P2P payments, as credit transfers provide a straightforward means of conducting impromptu payments between individuals. In a few cases, such as IBPS in China or the forthcoming FR-ACH in Saudi Arabia, fast direct debits are also possible. It might be expected that fast payment deployments that aim to cover a wide range of use cases and to substitute for traditional services will gradually expand the type of payment instruments processed beyond basic credit transfers to include instruments that could be better suited for certain P2B or B2B transactions.¹²

Payment cards typically provide a quasi-fast payment experience for some users, as there is generally immediate communication between the PSPs of the payer and payee and a rapid posting to the payer's account (eg a rapid debit of the payer's account for a debit card transaction). Thus, from the point of view of the cardholder, paying with a card (especially a debit card, which uses the payer's own funds) might resemble a fast payment. However, these payments, would normally fail to meet the definition used in this report, as the funds are usually not available immediately and with finality in the account of the payee (ie the merchant). However, it is, in principle, possible to design a fast payment scheme based on the use of payment cards, as demonstrated by BKM Express in Turkey.¹³

Value added services and service enhancements

Speed and continuous availability can provide benefits to payers and payees, improving, for example, cash flow and liquidity management or supporting quicker and easier reconciliation processes. These benefits and others are explored in Chapters 3 (factors influencing the development of fast payments) and 5 (benefits of fast payments). For end users to fully reap these benefits, however, some additional services are normally combined with the increased speed and continuous service availability that characterise fast

¹¹ For example, BiR/Swish in Sweden has expanded to address P2B payments, including point-of-sale transactions in some cases.

¹² In some fast payment implementations, certain services, such as Zapp in the United Kingdom, have incorporated a "request-for-payment" functionality in which a payee (eg a merchant) can send transaction information to the payer (eg a consumer), who can then initiate a corresponding fast payment to complete the transaction. This feature allows a fast payment implementation based on credit transfers to mimic some of the functionality of debit transfers and card payments, particularly for point-of-sale transactions.

¹³ BKM Express is a fast payment implementation that is governed by BKM, the entity that operates the switch system, conducts clearing and coordinates settlement of card payments in Turkey. BKM Express enables fast payments for any individual who has a credit or debit card that is issued by participant PSPs.

payments. An example of these value added services is the capability of fast payment messages to include additional information that enables the integration of the payment message with electronic reconciliation processes to facilitate recordkeeping about the underlying transaction. Additional examples are discussed in Chapter 3 (see Box D).

As they become available, new technology and service capabilities may build on fast payment capabilities and enable additional payment, banking and information services that are not yet available in the marketplace. The choice of appropriate message formats and technical standards is likely to be important in providing sufficient flexibility for PSPs and other service providers to develop value added services and innovations adaptable to end-user needs.

Characteristics relevant for PSPs and system operators

Various characteristics of a fast payment implementation have particular implications for PSPs and infrastructure operators. Four such aspects that differ across current implementations are (i) the type of settlement between PSPs, (ii) the degree of openness of the fast payment implementation, (iii) the national or cross-border character of the implementation, and (iv) the degree to which the implementation involves new or existing infrastructure.

Type of settlement

All fast payments, as defined in this report, involve almost immediate availability of final funds to the payee. As noted previously, the settlement speed between PSPs may vary from one implementation to another. In particular, some systems involve real-time settlement between PSPs whereas others rely on deferred settlement processes.

In fast payment systems with real-time settlement, the credits and debits between the different actors in the payment chain are carried out sequentially at a high speed. This means that the payer's PSP sends the funds to the payee's PSP before the latter credits the funds to the payee. In this type of arrangement, transactions are settled on a gross basis (or with extremely short settlement cycles in cases where netting is carried out).

In fast payment systems with deferred settlement, inter-PSP settlement takes place after the payee's PSP has credited the funds to the account of the payee. This type of arrangement typically requires credit extension among PSPs and usually allows for the bilateral or multilateral netting of positions between the participating PSPs prior to settlement.

Both types of system are suited for the provision of fast payments to end users, but the implications of the two configurations (and variants thereof) for the participating PSPs and for the fast payment system servicing the PSPs differ in terms of efficiency and financial and operational risk. Because settlement is a key aspect of fast payment deployments, settlement design issues are analysed separately in Chapter 4.

Inter-PSP settlement model

Existing fast payment implementations in CPMI Countries

Table 3

Country	Implementation	Inter-PSP settlement model
Korea	EBS	Deferred net
South Africa	RTC	Deferred gross
Korea	CD/ATM System	Deferred net
United Kingdom	FPS	Deferred net
China	IBPS	Deferred net
India	IMPS	Deferred net
Sweden	BiR/Swish	Real-time
Turkey	BKM Express	Deferred net
Italy	Jiffy	Deferred net
Singapore	FAST	Deferred net
Switzerland	Twint	Deferred net
Mexico	SPEI	Real-time

Proposed fast payment implementations in CPMI countries

Country/geographical area	Implementation	Inter-PSP settlement model
Australia	NPP	Real-time
SEPA	Various implementations based on SEPA Credit Transfer instant (SCTinst) scheme including	TBD
Netherlands	Instant Payments	Deferred net
Belgium	Instant Payments	Deferred net
Saudi Arabia	FR-ACH	Deferred net
Hong Kong SAR	TBD	Real-time
Japan	Zengin Data Telecommunication System	Deferred net
United States	TBD	TBD

Openness of the system or scheme

The simplest fast payment implementation involves a single provider processing a transaction between two end users that are its direct customers. In this type of arrangement, the transfer of funds is simplified because the payment can be settled with credits and debits on the books of the single provider. As noted at the end of Section 2.2, such arrangements are often called closed (or closed-loop) systems. An example of such an arrangement in the banking industry involves “on-us” transactions in which the payer and payee hold accounts with the same bank. In contrast, open systems and schemes are characterised by a multiplicity of PSPs offering payment services to their customers. These systems and schemes define the necessary rules and procedures for the transmission of information, clearing and settlement between the participating PSPs.¹⁴

¹⁴ In some cases, rules may be defined at a higher level by a scheme that encompasses more than one system.

Closed systems with the properties of a fast payment system have been operating for some time, but do not raise quite the same issues as open initiatives in relation to efficiency, financial or operational risks, or the potential implications for central banks. For this reason, this report focuses primarily on open systems, acknowledging at the same time that closed initiatives can, in principle, fulfil the basic requirements in the general definition of a fast payment and may raise certain issues, such as consumer protection issues, that also arise for open systems.

Open arrangements further vary in the participation criteria they apply, which could be based, for example, on the risk profile of the various types of participant or their operational capabilities. Some systems may limit participation to banks, whereas others might admit other types of licensed non-bank PSP (eg payment institutions in the EU). In addition, fast payment systems may involve tiered participation arrangements under which some PSPs (ie indirect participants) do not have direct access to clearing and/or settlement facilities but rely on services from other PSPs (ie direct participants) to conduct fast payments.

As shown in Table 4, participation arrangements vary across existing fast payment implementations in CPMI jurisdictions. In all jurisdictions, implementations include bank (ie deposit-taking) participants, but the nature of bank participation varies with some implementations allowing direct or indirect participation by banks in various combinations of clearing and settlement. Some implementations also allow participation by non-banks, although non-bank participation in settlement is generally indirect with either direct or indirect participation in clearing arrangements.¹⁵

Country	Implementation	Banks				Non-banks	
		Direct	Direct	Indirect	Indirect	Direct	Indirect
	Participation in clearing	Direct	Direct	Indirect	Indirect	Direct	Indirect
	Participation in settlement	Direct	Indirect	Direct	Indirect	Indirect	Indirect
Korea	EBS	✓	✓	✓	✓	✓	✓
South Africa	RTC	✓					
Korea	CD/ATM System	✓	✓	✓	✓	✓	✓
United Kingdom	FPS	✓			✓		✓
China	IBPS	✓			✓		
India	IMPS	✓			✓	✓	✓
Sweden	BiR/Swish	✓	✓			✓	
Turkey	BKM Express	✓					
Italy	Jiffy	✓	✓	✓	✓		✓
Singapore	FAST	✓					
Switzerland	Twint	✓					
Mexico	SPEI	✓					

¹ For the purposes of this table, the term “banks” is used to refer to banks and other financial institutions that accept deposits. The term “non-banks” is used to refer to any entity involved in the provision of retail payment services whose main business is not related to taking deposits from the public and using these deposits to make loans.

¹⁵ SPEI in Mexico is an exception that allows direct participation in both clearing and settlement arrangements for non-bank participants.

Cross-border arrangements

As noted previously, fast payment implementations may involve national and cross-border initiatives, depending on the region in which the fast payment service operates. Although this characteristic has implications for end users, it also has notable implications for PSPs and infrastructure operators.

Certain closed systems can support cross-border payments, including payments that may qualify as fast payments in some circumstances. The ability to conduct transactions within a single entity may facilitate cross-border functionality, but challenges in other dimensions (eg coverage) may nevertheless limit their use for fast cross-border payments.¹⁶

National implementations often rely on a single or a limited number of open infrastructures linking local PSPs. To provide fast payment services across several jurisdictions, cross-border systems or interoperable national systems would be needed. These initiatives could develop by defining new schemes and building new infrastructures or by interlinking existing schemes and infrastructures. An early identification and use of appropriate international technical and operational standards could greatly facilitate the interconnection of systems at a later stage.¹⁷ Multinational initiatives will further have to address the exchange between different currencies as well as settlement in different currencies.

Current efforts to deploy fast payments in the SEPA area are a notable example of an initiative to implement this type of service in a multinational context, albeit without the increased complexity of handling payments in different currencies, as the initiatives are focused on euro-denominated payments. See Box F for further details.

New or existing infrastructure

Fast payment implementations can vary based on how far they involve new or existing infrastructure, which may have implications for the feasibility and cost of an implementation, as well as its breadth of use cases. A fast payment service could be offered to serve a single use case or as an additional product, particularly for payments via mobile devices (see Box C), that is provided via existing payments infrastructure to the extent possible. An example of this approach is BKM Express in Turkey. Alternatively, fast payments could involve a fundamental renewal of the payments infrastructure in a jurisdiction, such that many or most payments in that jurisdiction could be conducted using fast payments. Examples of this approach include the existing systems in Korea and Singapore and the planned systems in Australia and the Netherlands.

The nature of a fast payment implementation has implications for how PSPs bring the service to market, the breadth of use cases in a jurisdiction, and the advantages for end users. The single use case or additional product approach based on existing infrastructure may be cheaper and simpler to implement in the short run, but may limit the potential future transaction volume in a jurisdiction when the existing infrastructure is not flexible enough, as volume may level off once the maximum volume for the specific access channel or processing mode is reached. An implementation based on new infrastructure might be more costly and take more time to implement, but may enable greater transaction volume in the long run, with greater benefits across a wider variety of end users and transactions.

¹⁶ As discussed in a recent CPMI report, digital currencies, often based on distributed ledgers, may allow value to be transferred between users across borders. In some cases, this ability may yield speed and service availability similar to more conventional fast payment initiatives, although digital currencies may face other challenges in their adoption and use, as described in the earlier report. CPMI, *Digital currencies*, November 2015.

¹⁷ In this regard, the application of the ISO 20022 messaging standard is a notable feature of some recent fast payment implementations. ISO 20022 is the standard for financial messaging created by the International Organization for Standardization (ISO). In 2015, the ISO 20022 Registration Management Group created the Real-Time Payments Group to document and harmonise adoption of the ISO 20022 standard in fast payment implementations with a focus on potential cross-border functionality.

3. The development of fast payments

The emergence of fast payments in multiple CPMI jurisdictions, as well as an apparent acceleration in the rate at which they are being proposed and implemented, reflects important developments in the demand for and supply of such payments. As a result, central banks, other authorities and payment industry stakeholders are paying considerable attention to the development of fast payment services and have been involved in their development to varying degrees. In some cases, central banks or other authorities have been actively involved in commencing and encouraging initiatives to implement fast payments. At the same time, the lack of universal deployment in CPMI jurisdictions and variation in the timing of implementation indicate the importance of various factors in decisions to implement fast payments. This chapter seeks to identify and analyse key demand and supply side factors that may encourage or hinder the implementation of fast payments in a jurisdiction.

3.1 Fast payments in the context of the broader payment system

The attributes of various traditional methods of payment underscore the importance of payment speed and convenience for end users, although those methods exhibit notable differences in speed and service availability relative to fast payments. Historically, payment by cash has provided a paramount example of a fast payment (in legal tender) at any time of the day with immediate funds availability to the payee, but only for face-to-face transactions. Real-time gross settlement (RTGS) systems can provide rapid settlement of payments between PSPs that participate in those systems. However, RTGS systems typically have limited hours of operation, and rapid availability of funds for end users may depend on the system's rules or local regulations and banking practices. In some use cases, payment cards enable the initiation of face-to-face and remote transactions at any time, as well as the rapid exchange of payment information between PSPs, but cards do not generally provide rapid availability of final funds to the payee and usually have restrictions on the types of end user who can accept card payments. For end users of the same PSP (eg the same bank), rapid payments may be possible through credits and debits on that PSP's books, but this fast payment functionality does not extend to counterparties with accounts at other PSPs. Finally, in some CPMI jurisdictions, other legacy payment systems, including those for cheques and batch-processed electronic payments, have experienced service enhancements through earlier or more frequent settlement between PSPs or other process changes, such as remote image capture for the deposit of cheques. However, incremental improvements to legacy systems do not typically yield the full speed and service availability associated with fast payments.

These limitations of existing payment methods reflect the fact that most CPMI jurisdictions have not historically had infrastructure and arrangements (ie systems and schemes) to conduct fast payments as defined in this report. As a result, the need to establish new systems or schemes, or to significantly adapt existing ones, has been a fundamental obstacle to the deployment of fast payments.

From a broad perspective, it is important to note that, in a small number of CPMI jurisdictions, retail payment systems with some fast payment capabilities have existed for 10 or more years. In some cases, these systems have not provided the full functionality associated with more recent fast payment implementations, such as the ability to conduct and complete payments outside standard business hours and days. In specific instances, systems were established, or existing systems were altered, to allow rapid payments between end users on a nearly continuous basis. These early examples underscore that factors specific to each jurisdiction may influence whether a jurisdiction implements fast payments, as well as the scope and timing of those implementations. Although the deployment of fast payments appears to be accelerating across CPMI jurisdictions, reflecting some general forces discussed in the following sections, differing environments and needs may continue to influence the scope and timing of consideration and adoption of fast payments.

Early implementation of payment systems with some fast payment capabilities

The concept of fast payment systems is not new. Several countries including Japan, Korea, Mexico and Switzerland have provided retail payment services with some fast payment capabilities for years; they continue to enhance these services to meet the demand of end users.

Japan – The Zengin Data Telecommunication System (Zengin System) was established in 1973. It is an online network system that centrally carries out processing of domestic funds transfers between financial institutions.

After the implementation of same-day settlement in 1993, the system allows near-real-time payments between end users. That is, when transaction data are received from a member bank, the funds are deposited in the recipient member's account and made available to the recipient member's customers on an almost real-time basis during operating hours (ie from 08:30 to 15:30) on business days. The current generation of the system, which started operation in 2011, has such features as enabling real-time gross settlement for fund transfers of JPY 100 million and above.

Korea – Launched in 1988, the CD/ATM network was designed to facilitate bank customers' cash withdrawals, funds transfers and information inquiries through its terminals regardless of customers' main banks. While there were some initial restrictions on availability, improved technology has made the network accessible on a 24/7 basis since 2007. Moreover, the scope of participants has been expanded and protocols have been standardised, allowing end users to access CD/ATM via mobile phone authentication since 2007.

In addition, the Electronic Banking System (EBS) was established in 2001. EBS was designed to overcome the limitations of CD/ATM network by combining an existing Automated Response Service (ARS) Network with intermediary electronic banking functions such as internet, phone and mobile banking services. By adopting more advanced information technology, end users can access these services anytime and anywhere, and payments are immediately processed 24/7. In line with the EBS's improvements in security and risk management, the Bank of Korea linked BOK-Wire+ with EBS to mitigate settlement risk in 2016. By directly linking the two systems, large-value fund transfers exceeding KRW 1 billion are automatically processed via BOK-Wire+, and those under that threshold are handled by EBS.

Mexico – In 1995, the Bank of Mexico developed and deployed SPEUA, a large-value payment system that allowed participating banks to include information to identify the payee and payer in the payment messages. Increased demand for SPEUA required its modernisation; thus, the Bank developed a new payment system, SPEI, which went live in August 2004.¹ Better system design, more bandwidth and protocols that are more suitable for straight through processing have enabled SPEI to process many more transactions. The capacity of SPEI allows the processing of low-value transactions; currently, 89% are below MXN 50,000.

In addition, to provide a better service to end users, the Bank required participants to process SPEI payments faster: (i) since 2011, processing requirements ensure that almost all real-time² payment instructions are processed end to end in less than 60 seconds (in practice, average end-to-end time is around 14 seconds); and (ii) since May 2015, processing requirements for mobile payment instructions have ensured that almost all such instructions are processed in less than 15 seconds and on a 24/7 basis.³

Switzerland – Swiss Interbank Clearing (SIC), the RTGS system for the Swiss franc, was launched in 1987. SIC settles both large-value and retail payments individually on a real-time and gross basis with finality almost 24 hours a day. Despite these properties, SIC does not meet the criteria for a fast payment system as defined by this report for the following reasons: (i) SIC operates from 17:00 CET on the calendar day before the value date (T-1) and closes at 16:15 CET on the value date (T), (ii) it is closed during weekends, and (iii) retail customers usually receive funds at T+1 because real-time availability of funds to end users is not part of the SIC rules. However, SIC plans to move its closing time from 16:15 CET to 18:15 CET by 2017, allowing an additional two hours of possible same-day settlement for end users.

¹ SPEUA stopped operating in August 2005. ² SPEI processes payrolls and other deferred payments that should be credited by 08:30 on banking days. ³ Starting in November 2016, this requirement will also apply to low-value payment instructions.

3.2 Advances in information technology as a fundamental driver of fast payments

As described in previous CPSS and CPMI reports, technological developments are one of the key exogenous factors behind retail payments innovations. In the case of fast payments, advances in communications and computing technology have lowered costs, changing both the demand and supply sides of the market, so that the provision and use of fast payment services are increasingly viable.

Generally, no single technological innovation or type of innovation seems to underlie most implementations of fast payments. As discussed in Box C, the emergence of mobile communications and computing technologies may be the closest precipitating development in some instances, but fast payments and mobile technologies are by no means necessarily or exclusively linked. Instead, fast payments arguably reflect the cumulative effect of investments in the required information technology by end users, PSPs and infrastructure operators, as well as the general availability and cost of new technologies. In some CPMI jurisdictions, those investments may have reached a point where the establishment of systems and schemes for fast payments is the next logical step in the evolution of a jurisdiction's broader payment system.

Information technology and the demand for fast payments

Technological innovations have revolutionised many activities for end users. The connectivity and functionality associated with computers, extensive telecommunications networks, security procedures and, more recently, sophisticated mobile devices allow end users to exchange messages, place orders, obtain digital content and engage in various other activities in near-real time. Moreover, these technologies are often available around the clock so that end users can enjoy fast services at any time of the day or night. A letter by post may have once required days to be delivered, but now electronic mail, instant messaging services and social network applications allow end users to send and receive messages in seconds and at negligible cost, regardless of the time of day or location of the sender and receiver. Notably, these developments are a worldwide phenomenon, occurring in various ways in both advanced and emerging economies.

The same technological developments that have altered end-user activities in other areas may have also affected demand for fast payments. As described in the report on *Innovations in retail payments*, changes in end-user behaviour, often due to technology, have been behind many retail payment innovations. These technological developments do not exclusively affect demand for fast payments; however, improvements in information technology may have affected demand for fast payments in a number of ways.

First, technological innovations may have reduced costs to end users of adopting and conducting fast payments and improved the prospect of achieving the critical mass of end users needed to make fast payment services viable. Advances in technology have cut the costs of devices such as computers and mobile phones. Today, many end users have cell phones or other mobile devices that can be used to make fast payments, which may have reduced costs for end users of adopting fast payments (ie the costs of signing up for a fast payment service). The ability to use devices and channels that are already accessible for other purposes, as opposed to relying on less convenient channels such as bank branches, may also lower usage costs (ie the costs of conducting fast payments) for end users who adopt a fast payment service.

Second, technological innovations that have transformed the end-user experience associated with many activities may have also altered expectations of end users with respect to the speed and convenience of payments, thereby increasing demand for fast payments. The ability to conduct other activities, such as sending and receiving electronic messages and most other digital content (eg music, films, images) almost immediately and at any time may have generated a fundamental shift in end-user expectations, particularly among young users, who may view rapid and flexible communication as a basic norm in conducting financial transactions. Similarly, end users may desire their payment experience to match the speed and availability of their experience with many underlying transactions.

Special role of mobile devices in the demand for fast payments

End-user expectations for a mobile experience – the ability to rapidly interact anytime and anywhere with anyone – have increasingly extended to payment activities. In fact, many recent fast payment implementations integrate fast payments into mobile technology. In some jurisdictions, fast payments are available exclusively through mobile technologies. Some fast payment services seek to facilitate adoption and use by linking bank accounts with mobile phone numbers, eliminating the need for end users to exchange and enter potentially long and sensitive account information.

India – In India, there are over 1 billion mobile subscriptions. Leveraging this high mobile density, many PSPs utilise mobile payment apps to link underlying payment instruments, such as bank accounts or mobile wallet accounts, with mobile phone numbers for fast payments via the Immediate Payment Service (IMPS), India's fast payment system. To include users with non-smartphone devices, an interoperable platform based on the USSD channel connecting all the telecom service providers in the country has also been implemented. The subscribers use a single code *99# to access this service to make P2P payments via the IMPS.

In addition, the Unified Payment Interface (UPI) system is being developed to bring a complete interoperability for merchant payments as well as P2P payments in the IMPS. The UPI will enable users to link their bank accounts with their mobile phone numbers through an application provided by the service providers and obtain a virtual address which can be used for making and receiving payments.

Sweden – The Swish payment service exemplifies the central role of mobile devices in fast payments. The development of Swish and the underlying infrastructure BiR started in 2010. It was decided at an early stage that Swish should be built with a focus on smartphones. One reason was the (justified) expectation that smartphones would be widespread by the time Swish was launched. Every subscriber to Swish assigns a mobile phone number to a bank account.

In order to make payments via Swish, a payer enters the payee's mobile number manually or by using the smartphone's contact list and authorises the payment through the Mobile Bank ID app, which is connected to the Swish app. Both the payer and the payee receive notification through the Swish app during the payment process.

United Kingdom – Since Faster Payments was launched, the United Kingdom has seen a steady increase in the number of people who have smartphones. Recent studies have estimated that 60–70% of UK adults use smartphones, with a growing proportion of these downloading and using mobile banking apps provided by their PSPs. This change in consumer behaviour has resulted in a large increase in the number of Faster Payments being made by consumers using mobile devices outside traditional business hours.

As well as this use of smartphones to initiate Faster Payments, the launch of Paym in 2014 has simplified the user experience, because senders of payments no longer need the account details of the beneficiary to initiate a Faster Payment (instead, the mobile phone number of the beneficiary is used as a proxy). The payer either keys in the mobile number or selects from their phone address book the person they wish to pay. The participant then looks up this number against the central infrastructure and receives back the name associated with the proxy and the payment information. The name, but none of the payment information, is provided back to the paying end user, and at this point, the end user can decide to proceed with the payment or not. A mobile application is also in development that would work with existing banking software to let consumers pay merchants using Faster Payments. This would include the ability to pay at a terminal using a smartphone and near-field communication.

Information technology and the supply of fast payments

Technological developments have also lowered the cost of producing fast payments and supported their implementation. Advances in communications technology facilitate interaction between end users and PSPs, enabling the provision of services to end users on a real-time and continuous basis. Rapid and continuous communication among PSPs, infrastructure providers and other participants has also been enabled by improvements in information technology.

Advances in communications and computing technology have implications for payment system suppliers beyond the implementation of fast payments. Indeed, other payment system developments rely on information technologies similar to those used in fast payments. For example, developments related to financial technology (ie fintech) firms and markets, including distributed ledgers and blockchain technology, reflect the effects of information technology on the supply of payments and other financial services.¹⁸

As noted at the beginning of this section, the decision to implement fast payments may partly reflect the cumulative effect of previous investments in information technology, rather than any particular innovation uniquely applicable to fast payments. The calculations underlying this decision may involve both private opportunities for PSPs and social opportunities for the broader payment system resulting from the application of information technology to fast payments.

Opportunities for payment system improvement through the application of information technology to fast payments

From a private perspective, the application of information technology to fast payments provides an opportunity for PSPs to upgrade their services for end users. Unlike investments in traditional payment services, which tend to involve incremental change, the use of information technology for fast payments may allow PSPs to provide highly modernised services. In addition, the ability to exploit links between fast payments and other services, through service enhancements or value added services, may provide an opportunity for individual PSPs to take advantage of investments in fast payments to offer other enhanced services to customers, as described in Box D.

¹⁸ The CPMI has set up a working group to study developments associated with various digital innovations including fintech.

Service enhancements and value added services in fast payments

Fast payment implementations may incorporate additional functionalities beyond speed and enhanced service availability. For example, some fast payment systems allow additional data to be included with the payment information. By allowing enhanced remittance information to be attached to a payment instruction, this functionality could facilitate reconciliation and straight through processing for businesses, among other services.

In general, the nature and implications of such service enhancements can be difficult to predict, as they depend on innovations beyond fast payment functionality. However, since many fast payment implementations involve some degree of new infrastructure, that infrastructure may be designed so that PSPs can incorporate fast payment functionality and other services at relatively low cost.¹ As a result, fast payments may accompany or provide a springboard for additional innovations.

Some examples of current and proposed service enhancements and value added services are:

Australia – The proposed design for the New Payments Platform (NPP) consists of: (i) a basic infrastructure, (ii) overlay services, and (iii) a fast settlement service.

- The core of the NPP will be the Basic Infrastructure (BI), a central underlying hub that will connect participating institutions, allowing payment and settlement messages to flow between participants.
- Overlay services: the BI will be capable of supporting various tailored commercial payment services that participants can choose to make available to their customers. The first service planned, known within the NPP project as the “Initial Convenience Service”, will let end users immediately transfer funds to and from accounts via their mobile phone or tablet, or via the internet.

Mexico – Through its website, the Bank of Mexico provides several free service enhancements and value added services for SPEI’s end users:

- Transaction tracking: this service allows SPEI’s end users to track the processing status of their payments if they provide (i) the sending and receiving institutions, (ii) the processing date and (iii) either of two tracking values: one generated by the payer (a seven-digit reference number) or another generated by the payer’s institution (a 30-alphanumeric-character tracking identifier).
- Electronic Payment Receipts (CEPs): the payee’s bank must generate digitally signed electronic receipts that indicate if a transaction was credited to the payee’s account. To obtain the CEP, end users must provide: (i) the processing date, (ii) reference number or interbank tracking identifier, (iii) identity of the sending and receiving banks, (iv) payee’s account number and (v) transaction amount.
- Validation of CEPs: this service allows validation of the digital signature in a CEP as well as a validation that the information contained therein were generated by the payee’s institution and that the related transaction is authentic.

Singapore – In 2014, the FAST implementation put in place a key infrastructure component towards realising Singapore’s vision of reducing the use of cash and cheques. As fast payments will have an increasing impact on the payment ecosystem, the financial industry will need to enhance and develop solutions that leverage FAST. One such solution is to overlay the current infrastructure with value added services.

- To transfer funds through FAST, the customer currently needs to enter the recipient’s bank account number. To increase customer convenience, the Association of Banks in Singapore plans to implement a scheme to allow FAST participating banks’ customers to transfer funds using the recipient’s mobile number, e-mail addresses, social network account, or even national IDs.
- The debit transfer capability of FAST can open up new possibilities for merchants. For example, once a direct debit mandate has been set up between a retailer and a customer, the customer need not initiate any payment at the POS while the retailer can safely release the goods upon receipt of funds through FAST.

¹ Service enhancements are illustrative of potential economies of scope in the production of fast payments and other service features, under which the joint production of multiple products or services involves lower cost than their separate production.

From a social perspective, fast payments may provide an opportunity for the broad payment system to incorporate the enhanced payment characteristics that information technology enables. Fast payments may allow an emerging economy to leap-frog intermediate generations of perhaps obsolescent technology. For an advanced economy, there may be an opportunity to reduce investment in incremental changes to traditional systems, thereby focusing resources on more substantial and strategic improvements to the overall payment system. However, as discussed in the next section, each market participant typically considers the private costs and benefits that will arise from a fast payments initiative. As a result, consensus for economy-wide improvements does not always exist, and coordination to implement fast payments on a large scale may be difficult to achieve. In such circumstances, public actors may take an active role as coordinators and catalysts in order to overcome market coordination issues.

3.3 Potential obstacles related to the implementation of fast payments

Although developments in information technology underlie the emergence of fast payments, various issues may influence whether and when implementation actually occurs in a jurisdiction. At a general level, the prospect of a demand for fast payments that allows recovery of the initial investment will influence the incentives of PSPs and infrastructure operators. Coordination by both end users and PSPs in their adoption decisions can facilitate the implementation of fast payments, but challenges with coordination at both levels may exist for various reasons.

Costs, demand and the business case for suppliers

Cost and demand considerations

As noted in Section 3.1, the infrastructure and capabilities to conduct fast payments have not historically existed in most CPMI jurisdictions. Consequently, the implementation and operation of fast payments often involve investment costs for PSPs and infrastructure operators. These include investments in infrastructure for communication, clearing and settlement of fast payments, as well as upfront investments by PSPs to alter internal systems for round-the-clock processing of payments in real time or near-real time. Implementation of fast payments may further require investments by PSPs to facilitate instant and continuous communication with end users.

Various factors affect the magnitude of these costs. In particular, costs may vary based how far existing infrastructure can adapt to fast payments and how much new infrastructure is required.¹⁹ Pre-existing methods of communication between PSPs, such as networks for exchange of payments, and between PSPs and end users, such as computers and mobile devices, may mitigate investment costs associated with the provision of access channels and devices for fast payments. Coordination and cooperation among PSPs further influence costs by allowing the use of shared infrastructure, although coordination among PSPs may involve challenges, as discussed in the next subsection.

Depending on their magnitude, these investments can give rise to substantial economies of scale. As with other retail payments, the existence of fixed costs imply that the average cost of a fast payment declines with the number of payments processed. If demand for fast payments is too low, or if end-user demand is too sensitive (ie elastic) with respect to fees, these economies of scale imply that suppliers would be unable to offer fast payments at competitive prices and still recoup their investments.

In the light of investment costs and the resulting economies of scale, end-user demand is a key consideration for fast payments, albeit one that will vary by jurisdiction, type of end user or use case. Alternative ways of making payments are available to end users in CPMI jurisdictions, each with differing characteristics, including speed, convenience, security and cost. Moreover, end users, which include

¹⁹ Closed systems may be able to develop fast payment capabilities without costs associated with communication, clearing and settlement between PSPs, although closed systems may have other challenges, such as limits on their coverage, and costs associated with funding and defunding accounts through other financial market infrastructures.

individuals, small and medium-sized businesses, corporates and government entities, may differ in their evaluation of payment options.

The ability of fast payments to meet end-user needs in a variety of use cases is an important determinant of overall demand for fast payments. For P2P payments, existing alternatives may be fast but inflexible in important ways (eg cash, which requires face-to-face interaction) or particularly slow or inconvenient relative to fast payments (eg cheques). Consequently, end-user desire for a rapid, flexible and convenient alternative for P2P payments may serve as an important source of demand for fast payments. For P2B or B2B transactions, existing alternatives in most jurisdictions may not provide a convenient or cost-effective means of making time-critical payments. In other P2B or B2B interactions, such as recurring or scheduled payments, end users may find cheques or batch-processed credit or debit transfers to be acceptable. Moreover, a high penetration of payment cards in a jurisdiction may serve as a barrier to demand for fast payments especially if consumers view cards as providing sufficient flexibility, speed and convenience in many P2B transactions. From the perspective of merchants, cards may have certain attractive features, such as integration of other value added services with existing POS systems, but may be less attractive in other dimensions, such as transaction costs and the time lag for the crediting of the funds.

The business case for suppliers

These considerations – the investment and operating costs of fast payments, and the probable demand for fast payments and its variability – enter into the evaluations of individual PSPs regarding the business case for fast payments. The implementation of fast payments generally requires action by individual PSPs, and those actions depend on the private calculations of PSPs about their individual benefits and costs arising from fast payments.

One particular issue for these private calculations concerns the potential effect of fast payments on other costs or revenue streams for PSPs, which may result from the substitution of fast payments for existing payment products. If fast payments primarily substitute for cash, this may provide PSPs with new revenue streams and may reduce their cash-handing costs and revenues. Similarly, substitution of fast payments for cheques may generate cost savings for PSPs if processing of cheques is more expensive than for electronic payments. Alternatively, if fast payments substitute for payment cards or wire transfers, revenue from those services would be affected. In addition, PSPs may further experience changes in float revenue due to substitution away from slower payment methods. The size of these effects will depend on the payment methods for which fast payments substitute, as well as initiatives, directives and regulations in some jurisdictions, such as regulation of interchange fees for card payments.

Individual PSPs in a number of CPMI jurisdictions may perceive that narrow business case calculations are highly uncertain or do not favour implementation of fast payments. PSPs may view expected revenues as too low or variable to offset the costs associated with fast payments, particularly if end-user demand is uncertain or highly elastic with respect to potential fees for fast payments. Reductions in costs associated with substituted payments may also not be fully considered. The need for coordinated action by a number of PSPs in order to provide a viable service may have added to complications. In a situation where upfront investment costs are potentially large but revenue effects are uncertain, PSPs may consider fast payments to be a weak business proposition.

However, the deployment or proposed deployment of fast payments suggests that, at least in some jurisdictions, PSPs have increasingly begun to perceive a positive net benefit from fast payments. This determination may reflect certain features of a particular implementation, such as particularly compelling use cases for fast payments or an implementation model that lowers initial costs. Importantly, PSPs may also evaluate potential benefits of fast payments over a longer time horizon, such as the ability to increase their service offerings and improve customer loyalty, or the prospect for future innovation based on fast payment platforms and functionality. Some of these benefits may be uncertain or difficult to quantify; however, PSPs may also consider a more strategic view of fast payments that takes such long-

run factors into account. Finally, actions by authorities may influence the decisions of individual PSPs about the need to upgrade a jurisdiction's payment system, including by helping address coordination issues.

Key coordination issues

The prospect of coordination may also influence whether a jurisdiction implements fast payments and, if so, what model of implementation occurs. On the demand side of the market, end users must implicitly coordinate their decisions about whether to adopt a fast payment service in order to allow the realisation of network effects. On the supply side, coordination provides a collective means of encouraging end-user adoption, defraying certain implementation costs or reducing uncertainty about whether and when other PSPs will make the necessary investments.

As noted in the report on *Innovations in retail payments*, retail payments, including fast payments, exhibit positive network effects, in that the value of a payment service to an end user increases with the number of other participating end users. End users have already incurred adoption costs for existing payment methods, which consequently have a large installed user base. In contrast, reflecting their novelty, fast payments involve some adoption costs for end users (eg installing and learning to use a service or adapting record-keeping processes). As noted previously in this chapter, other developments, such as the diffusion of mobile devices, have likely reduced adoption costs relative to the past, but these costs may nevertheless be important, especially among certain consumer groups (eg older individuals, who may have well-established payment habits or may not have adopted online or mobile technology).

On the supply side, decisions by PSPs may be needed not only to enhance their own payment services, but also to establish (or enhance) inter-PSP payment systems in order to provide fast payments. These investments generally require coordination among PSPs and may also influence the prospect for implementation of fast payments. As identified in the report on *Innovations in retail payments*, coordination by suppliers facilitates innovations such as fast payments in a number of ways.

First, coordination increases the potential coverage of a fast payment implementation by serving to connect the account holders of multiple PSPs, which may provide increased network effect benefits if end users choose to adopt a fast payment service. Indeed, adoption by end users may depend, in part, on the prospective pool of counterparties with whom they would be able to conduct fast payments. A coordinated effort by many or most PSPs in a jurisdiction, resulting in interconnection between those PSPs, may improve the likelihood of achieving a large network of users and, as a result, the likelihood that a fast payment implementation will be successful.

Second, coordination reduces implementation and operational costs associated with fast payments. Each PSP will incur some individual costs as it looks to update its internal systems to provide and process fast payments. If each PSP had to individually build clearing and settlement infrastructure to conduct fast payments with other PSPs, the costs for any individual PSP would likely be prohibitive. The use of shared infrastructure for production (eg clearing and settlement) of fast payments avoids replicating these costs with transactions between multiple PSPs conducted using the same investments. The implementation of common procedures, rules and technical standards (ie a common scheme) may reduce the costs of communication between multiple systems. In this way, economies of scope in production are realised.

The importance of these coordination issues is evident in the fact that many fast payment implementations involve a collective effort by a jurisdiction's payments industry. In theory, a single PSP may be able to unilaterally implement fast payments in a setting where most end users hold accounts or have some other relationship with that PSP, potentially for other reasons.²⁰ A single PSP (ie a closed system) can avoid costs of interconnection by providing fast payments only to its own customers, although the importance of this advantage depends, in part, on the ability of such an arrangement to achieve

²⁰ The provision of fast payments by telecommunications companies (eg mPesa) provides a specific example, particularly in emerging economies with high penetration of mobile telecommunication services.

sufficient coverage to take advantage of network effects in demand. In practice, however, the potential benefits of extensive coverage and shared investments have led to fast payments in most jurisdictions being implemented as open systems with interconnection between PSPs and, consequently, coordination among them.

However, coordination among suppliers may involve challenges, particularly in a jurisdiction with heterogeneous PSPs, which could result in a market failure in which fast payments are not implemented despite the social benefits. Each potential provider will likely consider its private expected return on investment in fast payments, based on its perception of costs and benefits. In some situations, individual PSPs may fear that they will not generate a sufficient return on their investment in a cooperative effort. In other instances, individual PSPs in a particular market may try to set their own standard as the market standard, leading to a diversity of coexisting and potentially incompatible standards and, thus, to a suboptimal outcome from an end-user perspective. Such coordination failures could result even if PSPs, and society overall, would benefit in aggregate from collective investments in fast payments.

3.4 Forces related to the implementation of fast payments

The previous sections of this chapter identified improvements in information technology as a fundamental driver of fast payment innovations and discussed some potential obstacles to the implementation of fast payment services. In the light of these factors, several key forces appear to have influenced the implementation of fast payments.

Competitive pressures

Competition for market share is an important general force behind innovations in modern economies. Such forces may spur the development of fast payments in some jurisdictions. This may involve actions by both non-traditional PSPs and traditional PSPs (ie the banking industry).

In some settings, entry by closed systems and non-banks, which look to meet end-user demand for speed and convenience through innovations outside the traditional banking industry, has generated competition for payment services. This competition may involve fintech firms, which look to provide services through innovative information technologies, such as distributed ledger and blockchain technologies.²¹ Although these innovations may face initial challenges associated with coverage, they may be able to target specific use cases, utilise existing infrastructure or leverage certain technological advantages (eg communication capabilities) in order to yield some of the enhanced functionality of fast payments.²²

In turn, these innovations may generate competitive pressures on banks and other traditional PSPs to enhance the speed and convenience of their own payment offerings. Even if the short-run business case for fast payments appears uncertain, or if coordination by PSPs is difficult, traditional PSPs may consider a more long-run strategic view of the implementation of fast payments, as should be the case in evaluating the positive net benefit. In this view, the private and collective investment in fast payments can serve to address challenges from non-traditional PSPs. Without such changes, traditional PSPs may ultimately find themselves supplanted by new entrants in the market as providers of fast payments or other similar payment services.

²¹ Although developments related to fintech often operate outside of the traditional banking industry, banks and other traditional financial firms have begun looking at ways to adopt fintech innovations.

²² Provision of payment services through telecommunications companies may be one potential source of competition for more traditional PSPs.

Actions by authorities

Actions by authorities, including some central banks, have influenced the development of fast payments in various jurisdictions. Although authorities may have some ability to affect the demand for fast payments, many of these actions have related to the supply side of the market. In many cases, these efforts serve to encourage the implementation of fast payments through open systems when coordination problems among PSPs might otherwise complicate or prevent their implementation. These actions may serve to spur industry action in the light of other implementation barriers or to guide a more socially desirable outcome, such as a fast payment implementation with a broad coverage of end users.

In different CPMI jurisdictions, authorities have played this role in various ways. As a catalyst for industry action, authorities may identify gaps, inadequacies or development opportunities in existing payment arrangements and promote corresponding upgrades and industry action. Some authorities further encourage and facilitate coordination among industry participants. In some situations, authorities may have specific regulatory authority to induce change or to address market failure through changes to governance, oversight and regulation of the payment system. Finally, authorities may themselves enable fast payments through the direct provision of clearing and/or settlement services.

Actions by authorities in specific jurisdictions

Central banks and other authorities can influence the development and deployment of fast payments, depending on their legal powers and the specific roles they play. Some examples of actions taken by authorities are:

Australia – In 2012, the Reserve Bank of Australia published the conclusions of its “Strategic Review of Innovation in the Payments System”. The Bank identified certain features of payment systems that were valued by end users, such as timeliness, accessibility, reliability and ease of use, and integration, which coordination problems had prevented the market from providing. The Payments System Board (PSB), which is responsible for the Bank’s payment system policy, set out a series of strategic objectives for the payment system. These included: (i) payments with close-to-immediate funds availability to the recipient; (ii) the ability to make and receive low-value payments outside normal banking hours; (iii) the capacity to send more complete remittance information with payments; and (iv) easier addressing of retail payments (eg through information other than an account number for the payee).

The PSB identified target dates for the objectives and sought industry feedback. In response, the industry formed a committee to develop a proposal for a fast payment system. To facilitate those deliberations, the Bank published a set of “Core Criteria” that any proposed system would need to address. This process culminated in the New Payments Platform (NPP) proposal, which was presented to, and welcomed by, the PSB in February 2013. The NPP is scheduled to commence operations around the end of 2017.

Mexico – The Bank of Mexico operates and regulates SPEI and strives to promote improvements for participants and end users. Some examples of these improvements are: (i) processing fee reductions for SPEI participants: the Bank of Mexico reflects the marginal costs of the operations in the processing fees; in order to recover its costs, the Central Bank charges participants a monthly fixed fee;¹ (ii) monitoring to prevent potential pricing distortions for end users that might hinder the use of electronic payments; (iii) reductions in processing time frames, requiring participants to process SPEI payments faster; and (iv) service schedule extensions, requiring participants to process end users SPEI payments instructions from 6:00 to 17:30 on business days for payments initiated through internet banking and on a 24/7 basis for mobile payments.²

United Kingdom – In March 2004, a joint government-industry body known as the Payments Systems Task Force was created to resolve outstanding competition problems in the payment system in advance of any legislation. In May 2005, the Task Force announced that agreement had been reached to reduce clearing times for phone, internet and standing order payments. This committed the payments industry to develop a system that would be able to clear automated payments on the same day they were initiated, if made before the cut-off time, on working days.

The banking industry response to this regulatory catalyst was to recommend a more ambitious target: delivering a near-real time service, available 24/7. This response, proposed in December 2005, recognised end-user expectations would continue to evolve, and while there was then no pressing demand for a real-time 24/7 service, the clear direction of travel (increasing internet access, developments in technology etc) would lead to this becoming a necessity. As of 2016, after almost eight years in operation, Faster Payments now processes over 115 million payments a month, with an average value of £850. Innovative use cases beyond the original P2P intent of regulators have developed: (i) the payment of utility bills, (ii) credit card repayments, and, increasingly, (iii) salary and supplier payments.

United States – In January 2015, the Federal Reserve, through its “Strategies for Improving the U.S. Payment System” paper,³ encouraged payments stakeholders to join together to improve the payment system. The paper communicates desired outcomes for the payment system and outlines the strategies and tactics the Federal Reserve will pursue, in collaboration with stakeholders, to achieve these outcomes, which include: (i) speed; (ii) security (iii) efficiency; (iv) international payments (cross-border); and (v) collaboration.

Two of the strategies called for the creation of task forces focused on fast payments and payment security. The task forces provide a way for private sector participants to collaborate to create new approaches that will serve the public. In 2015, the Faster Payments Task Force established 36 “Effectiveness Criteria” related to ubiquity, efficiency, speed, safety and security, legal and governance to evaluate faster payment approaches, and during 2016, the task force undertook an assessment of fast payment solutions submitted by the industry against these criteria. It will lay out its thinking on opportunities and challenges for implementing fast payments in the United States in a report scheduled to be released in 2017.

¹ The monthly fixed fee charged by the Bank of Mexico is based on the annual cost of providing SPEI’s service for the following year considering the overall operation and maintenance costs, provisions for new investment projects, and software and hardware renewals. The annual cost of SPEI is distributed among participants according to their participation in the system during the previous five years. ² By the end of 2016, all low-value payment instructions initiated in electronic channels will be processed on a 24/7 basis. ³ See <https://fedpaymentsimprovement.org/wp-content/uploads/strategies-improving-us-payment-system.pdf>.

3.5 The organisation of fast payments provision in a jurisdiction

An important issue is how the payments industry organises the provision of fast payments. This may take various forms across CPMI jurisdictions.

First, there may be just a single system in a jurisdiction. This could be either a closed system, potentially operated by a non-financial entity such as a telecommunications company, or it could be an open system with participation by banks and other non-bank entities. Such a single open system may cater to the requirements of fast payments of various schemes or services by providing clearing and settlement infrastructure.

Second, multiple systems may operate in a jurisdiction. These could again involve closed or open systems. In either case, a key issue for network effect benefits is the degree of interoperability across systems. One possible structure could involve the co-existence of incompatible systems. An alternative structure could involve interoperable systems that enable the exchange of payments by end users when their PSPs participate in different systems.

The structure for providing fast payments in a jurisdiction may depend on various factors. The centrality of the banking industry in the market for payment services may influence whether implementation focuses on banks. For a jurisdiction with a bank-centric payment system, the banking industry's structure and the degree of heterogeneity across banks may influence whether open arrangements emerge and, if so, the number of open systems. Heterogeneity among PSPs may give rise to coordination challenges, which may further influence system interoperability.

The organisation of fast payments will generally affect the level of coordination and the nature of competition. A single open system requires a high degree of coordination in order to exploit economies of scope in production (ie through shared infrastructure) and network effects in demand (ie through increased coverage) with competition largely occurring for end users at the PSP level. Multiple incompatible open systems could introduce inter-system competition for PSPs with a somewhat lesser degree of coordination, but may involve some duplicative investments in infrastructure and may face limits in terms of coverage (eg individual systems could fail to achieve a critical mass of end users). Multiple interoperable systems could enhance coverage while maintaining inter-system competition, but would require an additional degree of coordination to enable the exchange of payments across systems. Finally, closed systems could provide inter-system competition for end users without requiring coordination (by definition) but with potential limitations in terms of coverage.

Pan-European instant payments in euros

Cross-border fast payments implementations or the interoperability of national implementations facilitates the provision of fast payment services across jurisdictions. Current efforts to deploy fast payments in the Single Euro Payments Area (SEPA) (referred to as “instant payments”) are probably the most notable initiative of this kind in a multinational context, albeit focusing on a single currency – the euro.

The Euro Retail Payments Board (ERPB) – the European stakeholder forum chaired by the European Central Bank and fostering the development of an integrated, innovative and competitive market for retail payments in euros in the European Union – has agreed that at least one instant payment solution in euros shall be available to all PSPs in the EU.¹ To accomplish this aim, a “layered approach” has been taken, so that instant payments would be delivered based on different layers belonging to the competitive and cooperative space:

- *a scheme layer, consisting of a set of agreed rules and technical standards for executing instant payment transactions, as a basis for “end-user solutions” (ie service proposals to end users such as mobile payment solutions) to be cooperatively or competitively developed on the market; and*
- *clearing and settlement layers, consisting of arrangements for the processing of instant payment transactions between PSPs and the corresponding discharge of the underlying obligations.*

Scheme layer

To facilitate the development and rollout of pan-European instant payments in euros, the ERPB has invited the European Payments Council (EPC), representing European PSPs, to develop a scheme for instant credit transfers. The scheme is based on the EPC’s current SEPA credit transfer (SCT) scheme and is called SCTinst. The scheme makes use of XML ISO 20022 standards, taking into account the progress made by the ISO 20022 Real Time Payments Group (RTPG) on the messaging. The scheme also includes rules such as the maximum processing time or the maximum amount per transaction. The EPC is expected to open the scheme for voluntary adherence by PSPs from November 2016. The scheme will be ready for use by November 2017, and will provide the underlying rules and standards for PSPs offering “end-user solutions” for instant payments in euros at the pan-European level.

Clearing and settlement layers

The Eurosystem is fostering work and industry dialogue so that the clearing and settlement layers can support SCTinst and ensure pan-European reach.

The Eurosystem has defined a specific set of expectations for infrastructures offering clearing services for pan-European instant payments in euros, in particular as regards their access policies, interoperability and risk mitigation:

- A PSP adhering to the SCTinst scheme must be able to reach, and be reached by, any other scheme participant in the EU. Where there is more than one clearing infrastructure, it shall be enough for a PSP to participate in only one infrastructure and be reachable at the pan-European level. This requires infrastructures to adopt fair and open access policies vis-à-vis both PSPs and other infrastructures. In particular, infrastructures should not impose participation or registration obligations on users of other infrastructures.
- Infrastructures must ensure interoperability in line with the SEPA Regulation. Interoperability has two dimensions. Business interoperability involves bilateral (or multilateral) agreements between clearing infrastructures, covering their mutual obligations in processing transactions – on an equal footing – on behalf of their participants. Technical interoperability entails using standards developed by international or European standardisation bodies or by the industry, and adoption of procedures for the efficient and safe clearing and settlement of transactions between infrastructures.
- If and when deferred net settlement (DNS) is applied to instant payments between PSPs, the payee’s PSP makes the funds available to the payee before receiving them from the payer’s PSP. In order to mitigate the consequent credit risk, infrastructures are expected to put in place appropriate and enforceable measures (eg pre-funding, cash guarantee funds and/or securities guarantee funds). This applies equally in the case of interoperability of infrastructures.

The Eurosystem has called on the clearing industry to define requirements for settling instant payments and the related risk mitigation. As a market infrastructure operator, the Eurosystem will take such requirements into consideration to support the settlement of instant payments. In particular, work is ongoing with the involvement of clearing infrastructures and PSPs towards a single procedure for settlement of pan-European instant payments via the TARGET2 RTGS, a single model for risk management and a way forward for a common access policy. In parallel, the Eurosystem will launch and closely monitor an investigation with market participants on the necessity of extending settlement operating hours for a subset of its regular settlement services up to 24/7/365 to allow for real-time settlement of instant payments.

Against this background, national initiatives are being undertaken (eg in Belgium and the Netherlands) based on the harmonised SCTinst scheme.

¹ The ERPB is a stakeholders' forum in which the demand side (consumers, businesses and public administrations) and the supply side (banks and other PSPs) of the European retail payments industry gather to discuss strategic issues on the creation of an integrated, innovative and competitive market for euro retail payments in Europe. In addition to the members, five national central banks (NCBs) representing the Eurosystem and one NCB representing the non-euro area NCB community take part in the meetings on a rotational basis as active participants, in the sense of participating and contributing to the discussions, but without taking a position when a final conclusion or consensus is adopted. Furthermore, the European Commission is invited to join the ERPB as an observer. For information on the ERPB see: www.erpbeu.

4. Clearing and settlement issues in fast payment systems

In Chapter 2, the type of settlement (real-time or deferred) was briefly described as one of the fundamental features that can help characterise the various types of fast payment implementation. This chapter delves deeper into the description and analysis of the different clearing and settlement methods. In doing so, the approach will slightly diverge from the one followed in Chapter 2, where the analysis focused on the description and development of fast payment services mostly from an end-user point of view. This chapter, however, will concentrate on the clearing and settlement processes between PSPs. This change in focus is justified by the importance of clearing and settlement methods from a central bank's perspective. Although both real-time and deferred clearing and settlement arrangements can support fast payments to end users, the various clearing and settlement methods between PSPs result in diverging consequences in terms of risk and efficiency for the various actors involved. This chapter focuses on two main types of clearing and settlement model used in fast payment systems and explores their implications for risk and efficiency.

4.1 Fast payments processing models

In order to provide fast payments for end users, all fast payment arrangements need an immediate interaction between the PSPs of the payer and payee.²³ The payer's PSP needs, at least, to notify in close to real time the payment details to the payee's PSP, so that the latter can immediately credit the funds to the payee's account.²⁴ This immediate transmission of the payment details is a necessary step to completing the transaction, but it is not sufficient. The payment is sometimes also subject to netting and has to be settled between the PSPs providing the services, which involves a clearing and settlement arrangement and a settlement agent. These last steps may or may not be carried out in close to real time, and the different approaches provide the basis for a classification of fast payments according to the clearing and settlement methods. Below, the necessary steps to complete the clearing and settlement processes between PSPs in a fast payment are first explained, and then a description of the two main models is laid out.

A fast payment is normally initiated when the payer submits a payment order to their PSP (directly or, in some cases, through intermediaries).²⁵ Immediately, the PSP's internal processing takes place, validating and authenticating the payment, and verifying the availability of funds (or sufficient credit lines) in the payer's account. The payer's account is typically debited immediately, and the clearing and settlement processes between the payer's and the payee's PSPs begin. The main steps involved in these processes are the following:

- **Transmission** of the transaction by the payer's PSP. This initiates the clearing and settlement processes between the PSPs and involves submitting the necessary transaction details to a fast payment system for clearing. In order to provide a fast payment, this transmission has to take place in close to real time as soon as the payer's PSP receives the payment instruction from the payer and completes its internal processing.

²³ As noted previously, in case of closed systems, or even in open systems when payer and payee share the same PSP, the transmission and settlement of the payment is simplified as the same entity can directly debit the payer and credit the payee in its own books.

²⁴ Actual fast payment implementations may have some latency in certain activities such that, as shown in Table A of Annex 2, payment speed is not always technically real time.

²⁵ This assumes that a push transaction (ie a credit transfer) is used for the fast payment. Pull transactions (initiated eg with a request for credit transfer) may also be possible for fast payments, although the stocktaking carried out by the working group shows that, currently, most fast payment implementations are based on push transactions.

- **Notification**, which is issued by the fast payment system to the PSPs of the payer and the payee, confirming that the payment order has been received and verified and is or will be settled. This notification allows the PSP of the payee to credit the funds to the account of the payee. Again, the notification has to be issued and processed in close to real time. The notification can also be transmitted by both PSPs to their respective customers (payer and payee) in order to advise that the payment has been successfully processed (to the payer) and funds are available (to the payee).
- In some cases, transactions are also subject to **netting**, understood as the offsetting of obligations between or among participating PSPs in the arrangement, thereby reducing the number and value of payments needed to settle a set of transactions.²⁶ Netting can be done on a bilateral basis between each pair of participating PSPs or multilaterally. This process can be done in close to real time or it can be deferred.
- All the above steps (transmission, notification and netting) are usually referred to as **clearing**, which, as noted in Chapter 2, is defined in the CPSS glossary as the *process of transmitting, reconciling and, in some cases, confirming transactions prior to settlement, potentially including the netting of transactions and the establishment of final positions for settlement*.²⁷ Most of the activities included in the concept of clearing in a broad sense have to be performed in close to real time in order to provide fast payments to end users (with the possible exception of netting). For this reason, it is sometimes stated that fast payments require fast clearing of transactions.
- Once the clearing phase is completed, transactions have to be settled between the participating PSPs, either on a gross or a net basis. **Settlement** in the account(s) maintained by the PSPs or the operator of the system in the books of a common settlement agent (commercial or central bank) determines the discharge of the obligations derived from the fast payment transaction between the sending and receiving PSPs. This final step can be done in close to real time or it can be deferred.

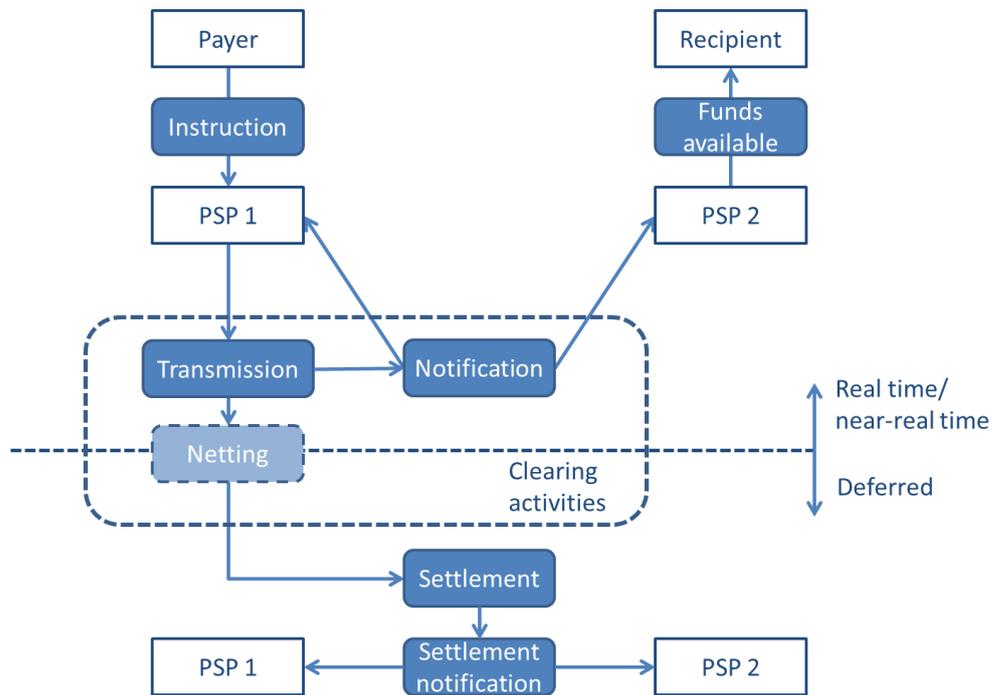
The main criteria for classifying fast payment systems according to their clearing and settlement methods are the speed of settlement between PSPs (deferred or in real time) and whether netting occurs prior to settlement. Based on these two factors, two main categories can be identified.

Model 1 – fast payment system with deferred settlement

In this case, transactions are transmitted, confirmed and notified in close to real time to the PSPs involved, but the inter-PSP settlement takes place after the payee's PSP has credited the funds in the payee's account. That is, the discharge of individual payment obligations between the payer and payee are clearly separated from the discharge of the obligations between participating PSPs. The fast payment system in charge of the clearing processes will generally calculate, in close to real time, the multilateral net debit or credit position of each participating PSP after each individual payment is processed. The legal offsetting of the individual transactions in the net position may occur in close to real time or be deferred to a point before settlement takes place, corresponding to different cut-offs during the operational day. The multilateral net positions between the participating PSPs may be settled once or multiple times per day. Settlement may take place in a dedicated infrastructure or in a system also used for other purposes in which participating PSPs hold accounts, such as the local RTGS system.

²⁶ See CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

²⁷ See CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

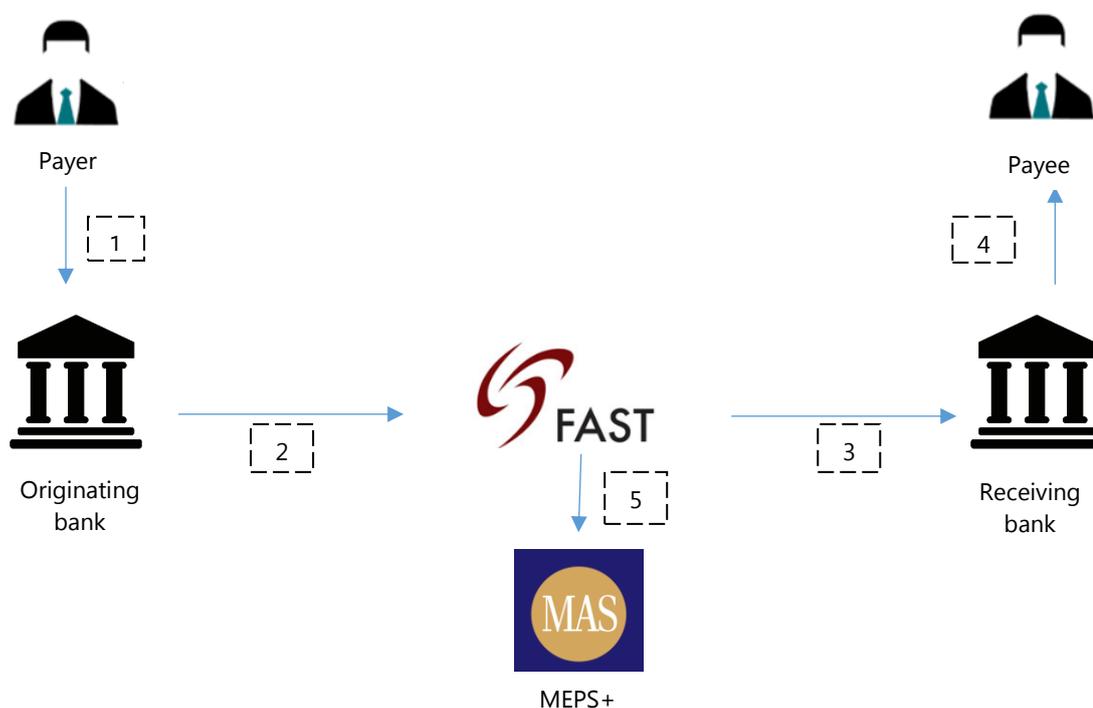


Some fast payment systems that follow this model are IBPS in China, IMPS in India, Jiffy in Italy, the EBS and CD/ATM System in Korea, FAST in Singapore, RTC in South Africa, BKM Express in Turkey, FPS in the United Kingdom, and the forthcoming FR-ACH in Saudia Arabia.

In theory, several variants of this model are possible. For example, netting or settlement could be bilateral between each pair of participating PSPs, instead of multilateral. Also, deferred settlement could take place without netting, in which case each participating PSP would send the aggregate amount of outgoing payments and receive the aggregate amount of incoming payments even if net liquidity is used for settlement. This last variant is not commonly observed, as netting (be it bilateral or, most frequently, multilateral) allows for savings in the liquidity required for settlement and is thus usually applied in fast payment systems that defer settlement. IBPS in China is an example of a system that involves bilateral netting, whereas IMPS in India, Jiffy in Italy, EBS and CD/ATM System in Korea, FAST in Singapore, BKM Express in Turkey, and FPS in the United Kingdom involve multilateral netting.

FAST in Singapore

FAST (Fast and Secure Transfers) was launched in March 2014. It allows for the secure and near-instantaneous electronic transfer of Singapore dollar funds between bank accounts held in the 20 participating banks in Singapore. FAST is available 24 hours a day, seven days a week, and customers can make interbank fund transfers of up to SGD 50,000 per transaction, subject to their daily or monthly withdrawal limits. Customers are able to initiate a FAST transaction through multiple channels, such as internet banking, ATMs, and mobile devices, as offered by their banks.



The payment flow for a FAST transaction is as follows:

1. The payer initiates the funds transfer to the payee's bank account. The funds are debited immediately from the payer's bank account.
2. The payer bank sends the transaction to FAST for clearing.
3. FAST, which is operated by the Banking Computer Services Pte Ltd ("BCS"), validates and routes the payment message to the payee bank.
4. The payee bank validates the bank account number and credits the payee's account immediately.¹
5. FAST clearing obligations of all participating banks are transmitted by BCS to MEPS+ (Singapore's RTGS system operated by the Monetary Authority of Singapore) for interbank settlement on a multilateral net basis twice per working day.

¹ Availability of final funds to the payee.

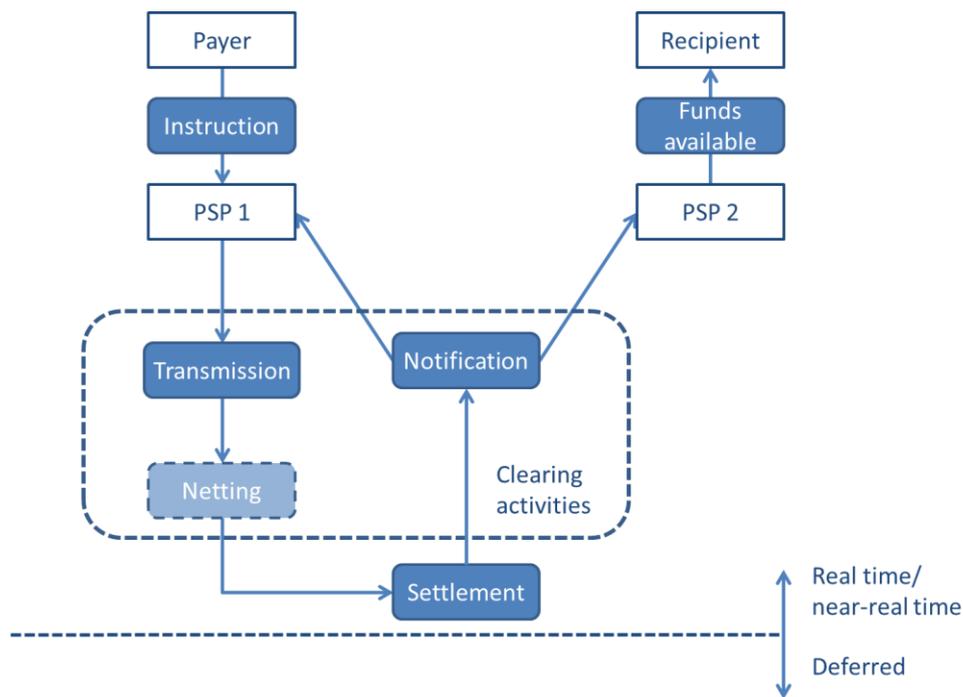
Model 2 – fast payment system with real-time settlement

In this case, the credits and debits between the different actors in the payment chain are carried out and settled sequentially at a high speed, including inter-PSP settlement. This means that the payer's PSP sends the funds through the fast payment system to the payee's PSP before the latter credits the funds to the payee. In this model, transactions are transmitted, confirmed, settled and notified in close to real time to

the PSPs involved. The model has two variants: with or without netting before settlement. If there is no netting, each individual payment obligation between end users generates an obligation of equal amount between the participating PSPs, which is settled on a gross basis. If there is netting, it is applied to a high number of very short settlement cycles so that settlement can take place in close to real time. The netting phase in some models might be used to send the settlement agent a limited amount of information (eg just the total amount to be settled) instead of the original payment messages with the details of the transaction (comprising, for instance, payer and payee identities, purpose of the payment, and other information).

Model 2 – Real-time settlement

Figure 4



Some fast payment systems that follow the first variant of this model are BiR in Sweden and the pending NPP in Australia. The proposed implementation in Hong Kong SAR also intends to use this model. SPEI in Mexico is an example of the second variant, which includes a brief netting cycle prior to settlement.

SPEI in Mexico

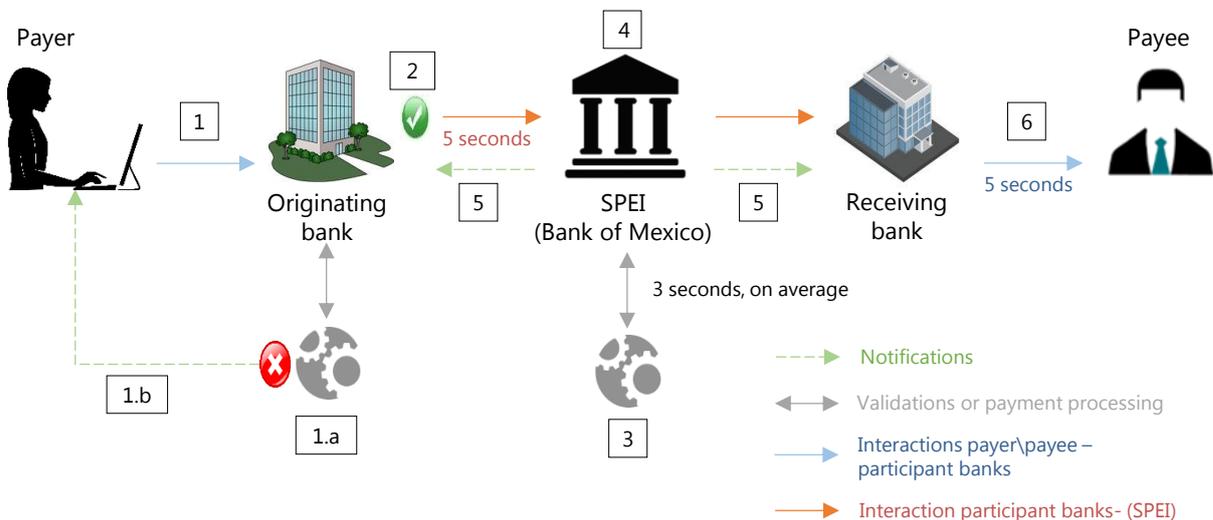
The Bank of Mexico is the owner and operator of SPEI, the Mexican fast payment system. SPEI clears operations every few seconds, and the results are settled immediately on participants' SPEI cash accounts.

Since November 2015, all mobile payments instructions in SPEI have been processed on a 24/7 basis and in short time frames. Originating banks must send to SPEI the payment instructions originated by their clients (payers) within five seconds after they make validations and accept payment instructions, and SPEI settles almost all payments instructions among participants within five seconds. In addition, receiving banks must post payments to beneficiaries' (payees') accounts within five seconds after they receive the corresponding settlement notice from SPEI. By the end of 2016, the 24/7 and short processing time frames will also apply to all SPEI low-value payment instructions initiated through electronic channels.

The process for fast payments through SPEI is as follows:

1. The payer sends the payment instruction to their bank.
 - a. The payer's bank validates, among other things, the identity of the payer and resource availability in the payer's account. Additionally, it executes antifraud procedures before initiating the payment.
 - b. If any of the validations fails, the payment instruction is rejected, and the payer is notified.
2. If validations are successful, the payer's bank debits the payer's account and sends the payment instruction to SPEI. This happens within five seconds after the payer's bank accepts the payment instruction.
3. The payment instruction is queued for clearing. The settlement process takes, on average, three seconds and almost all payments are settled within five seconds.
4. The SPEI account of the payer's bank is debited, and the payee's bank is credited.
5. The payer's bank and the payee's banks are informed that the payment was settled.
6. The payee's bank has to credit the payee's account within five seconds from the moment it receives the central bank's settlement notification.

Fast payments in SPEI



Institutional design and other features of clearing and settlement

The above two models for clearing and settlement are intended to illustrate the main approaches to fast payments as observed in practice, but these simple models do not cover all of the complexities that might

arise. Instead, fast payment implementations may involve a variety of institutional arrangements related to clearing and settlement, and may further exhibit various detailed characteristics associated with those activities. This section describes some of the variants of institutional arrangements and other characteristics.

- A system could apply different settlement approaches at different times or for different types of transaction. A system could, for instance, use the local RTGS system to process fast payments with real-time settlement (model 2) during the opening hours of the RTGS system, but defer settlement (model 1) during the night or on weekends and holidays, when the RTGS system is closed. Other systems could settle payments above a given threshold in real time, but apply deferred net settlement (DNS) to payments below the threshold (this is the case, for example, of the Japanese Zengin system).
- In implementations with deferred settlement (model 1), a number of possible arrangements can exist for the timing and structure of clearing and settlement. First, as previously noted, payments between PSPs may be conducted on a gross basis or be subject to netting, which can, in turn, occur on a bilateral or multilateral basis. Second, the timing of inter-PSP settlement may vary across implementations. One possibility would be for settlement to occur on the same day that the transaction is initiated, but with some delay. This arrangement could involve settlement at predetermined times, such as once every hour, or once every day at the end of the business day. Alternatively, settlement could be based on accumulated positions, so that a transfer is automatically triggered once the value of pending transactions exceeds a threshold. Another possibility would be for inter-PSP settlement to occur at a specified time after the initiation of the fast payment. This arrangement could occur on a routine basis, for example, if inter-PSP settlements are always scheduled to occur the day following the initiation of the fast payment, even if the payment is initiated during normal business hours. Alternatively, this type of settlement may occur if a fast payment is initiated after the settlement infrastructure is closed at the end of the day or during weekends and holidays.
- The settlement agent's identity and the status of funds used for settlement could differ across implementations. For example, the institution that provides inter-PSP settlement could be a private institution, such as a commercial bank, that conducts settlement in commercial bank money. Alternatively, it could be a central bank that conducts settlement in central bank money. Hybrid arrangements could include a privately owned special purpose institution that conducts settlement in commercial bank money that is fully backed by funding in central bank money, as is the case for BiR in Sweden.

Such hybrid arrangements may allow real-time inter-PSP settlement of fast payments during times when other settlement facilities (eg the central bank RTGS system) are closed. In this case, participating PSPs could transfer balances before the close of the central bank (or as a routine matter) to the account of the private sector settlement institution, which could hold that account at the central bank. During the period when the central bank is closed (or as a routine matter), settlement between PSPs could be conducted by transferring balances between the PSPs' accounts at the private sector settlement institution. Various issues may arise in such an arrangement, including the criteria that the central bank may apply to the settlement institutions that are allowed to hold such accounts at the central bank and the methods for addressing liquidity constraints for participants PSPs that may arise when funds cannot be added to the account of the private sector settlement institution.

- In some fast payment implementations, there may be tiered participation arrangements.²⁸ Conceptually, tiered arrangements would imply that the chain of PSPs between the end users could be longer. In tiered systems, some PSPs providing fast payment services to end users would

²⁸ Tiered participation arrangements in payment systems occur when some PSPs (indirect participants) rely on the services provided by other PSPs (direct participants) to gain indirect access to the services of a clearing and/or settlement infrastructure.

not have direct access to the fast clearing and/or settlement system, and would thus require the cooperation of a direct participant for submitting payments to the infrastructure. This is a normal feature in many large-value and retail payment infrastructures, but it may create additional challenges for fast payment implementations due to the speed at which payments need to be transmitted between PSPs and the introduction of an additional clearing and settlement layer between the PSP providing services to the end customer (the second tier) and the PSP directly participating in the fast payment system (the first tier).

- There might be more than one fast payment infrastructure servicing PSPs, and these infrastructures could potentially interoperate to increase the coverage provided to their respective participants. The interoperability of fast payment systems raises challenges that are similar to those described above for tiered systems: ensuring the transmission speed with longer payment chains (involving PSPs and several fast payment systems) and, depending on the specific setup, an additional clearing and settlement layer (between infrastructures), which may increase operational risk. These types of issue are likely to appear in fast payment implementations that cover several jurisdictions.

4.2 Implications of different models of settlement for fast payments

The settlement models described in the previous section have differing implications with regard to efficiency and risk. Even though efficiency and risk issues are described in Chapter 5 in relation to all actors involved in the processing of fast payments, this section elaborates on the efficiency and risk implications directly related to the settlement methods, focusing on financial risks and liquidity management between the PSPs.

Implications of deferred settlement models

The deferral of settlement generates credit exposures between the PSPs of the payer and the payee. The PSP of the payee credits the funds related to a fast payment in the account of its customer before receiving the funds from the PSP of the payer. There is thus an implicit credit extension until final inter-PSP settlement from the payee's PSP to the payer's PSP with the consequent credit risk that needs to be managed. Deferred settlement models are normally based on the multilateral netting of the fast payments exchanged between the PSPs participating in the system, where the net obligations between PSPs correspond to the exchange of multiple individual transactions and remain open until they are settled (typically in central bank money). In contrast, individual fast payments involve the provision of irrevocable and unconditional funds by the payee's PSP to the payee. This de-linking of the posting of payments to the payee and the settlement of the net positions between PSPs arising from those payments makes it infeasible to reverse fast payments (without the cooperation of the payee) if a PSP does not have enough funds to satisfy its net settlement obligations in the settlement system.

The time interval by which settlement is delayed may also affect the size of the positions, which could potentially accumulate over time. This can create issues especially when the fast payment system delays settlement several days (eg when the system operates during weekends or bank holidays and only settles when the RTGS system opens in the next business day). Frequent interbank settlements may help to reduce the maximum positions that can build up and shorten their duration. Alternatively, if the settlement system can receive and process ad hoc settlement requests, the fast payment system could automatically trigger a settlement process whenever the maximum debit position of a participant reaches a given threshold.

The ability to conduct settlement may, in turn, depend on the availability of the settlement infrastructure, such as the local RTGS system or other settlement system, particularly outside normal business hours. This can be a reason to modify the opening times of the local RTGS system or other settlement system. Another approach would be to use an alternative settlement mechanism, such as the services of a commercial bank, during the period that the local RTGS system or other settlement system is

closed, although settlement in commercial bank money is riskier than settlement in central bank money, which is the safest settlement asset.

In addition to the timing and frequency of inter-PSP settlement, some of the measures that can be implemented to limit or mitigate the credit risk associated with deferred settlement are the following:

- Limits to the maximum value of individual fast payments that can be processed. This type of measure does not strictly limit the maximum net debit or credit position that can be established between two PSPs participating in the fast payment system. However, a relatively low limit would typically reduce the likelihood that large net positions arise between participants. An example of limits to the maximum transaction value is FAST in Singapore, in which individual transfers are limited to SGD 50,000 per transaction. In India, the transaction value limit for IMPS is set to INR 200,000. Limits could be a function of the intended or predominant use case and may change over time based on experience with the system. For example, the value limit for FPS in the United Kingdom was initially GBP 100,000, but increased to GBP 250,000 to meet growing demand for fast payments from large corporate users. In FPS, individual participating banks can set their own value limits for their consumer and corporate customers.
- Loss-sharing agreements can also be implemented. These agreements detail, ex ante, how the surviving participants would cover the loss created by a defaulting participant. For example, IMPS in India, EBS and CD/ATM system in Korea, have devised loss-sharing agreements that would apply to surviving participants.
- Limits on the maximum net debit or credit positions that can be established between participants, or to the maximum gross aggregate positions. These limits could be bilateral (between pairs of PSPs) or multilateral, and they may be established and controlled by the system or managed on a bilateral basis between PSPs. In the absence of additional measures, these limits do not provide coverage against credit risk, but ensure that the maximum risk that can arise in the system is capped. Examples include IMPS in India, Jiffy in Italy, EBS and CD/ATM System in Korea, and FPS in the United Kingdom.
- Collateralisation of the debit positions, either with securities or cash collateral, to ensure that resources are available to support settlement. Examples include IBPS in China, IMPS in India, EBS and CD/ATM System in Korea, FAST in Singapore, FPS in the United Kingdom, and the forthcoming FR-ACH in Saudi Arabia. Collateralisation can be partial or total, depending on whether the posted collateral is intended to cover the net debit position of the largest participant (ie "cover one"), the net debit positions of all participants (ie "cover all") or some intermediate case (eg "cover two"). Although collateralisation can serve to mitigate the credit risk associated with deferred settlement, issues may still arise related to the ability to access and realise such collateral if needed to support a settlement cycle, particularly outside normal business hours. When collateral other than cash is used, consideration should be given to its credit, liquidity and market risks.
- Prefunding of positions by individual participants, by means of cash coupled with operational controls that keep positions from exceeding prefunded amounts, is designed to allow full mitigation of the credit risk associated with deferred settlement. The assumption is that settlement positions will be covered by the prefunded cash in the event of an insolvency. Fast payments are then settled against a payment capacity collateralised with funds deposited with a trusted party (typically the local central bank).²⁹

²⁹ In such an arrangement, individual transactions are processed on condition that the payment capacity of the sending PSP is sufficient. The transaction amount is subtracted from the sending PSP's payment capacity, whereas that of the receiving PSP is increased by the same amount. Mechanisms are generally put in place for PSPs to adjust their level of prefunding, as necessary, to allow for more efficient liquidity management. Such mechanisms typically rely on an interface with the local RTGS system.

These measures are not mutually exclusive, as fast payment implementations may apply a combination. A fast payment implementation could, for example, establish limits to the maximum net debit positions for participants and, at the same time, establish a mechanism to collateralise (in part or in full) these positions (eg FPS in the United Kingdom), or combine limits on the net debit positions, collateralisation and loss-sharing agreements (eg EBS and CD/ATM system in Korea).

The main advantage of these types of model is that participants do not need to provide liquidity continuously (except to support potential cash collateral requirements and prefunding), but only at designated settlement times, and only for the net debit positions. Liquidity management may thus be simplified for participating PSPs, and methods for accessing intraday liquidity may be available to support settlement during normal business hours. However, if inter-PSP settlements occur outside normal business hours (eg at night or over the weekend) when the RTGS and interbank markets are likely to be closed, the provision of additional liquidity to support settlement can be an important challenge for fast payment systems. As a result, even though deferred settlement arrangements may only require liquidity at designated settlement times, the management of liquidity may be an important consideration, particularly to the extent that a fast payment system with deferred settlement looks to conduct inter-PSP settlements outside normal business hours.

Moreover, measures to limit or mitigate credit risk may complicate the operation of a fast payment system with deferred settlement. When the maximum limits are binding, the fast payment system may reject further transactions sent by a PSP that has reached its maximum net debit position or exhausted its collateral. Rejections will be immediately apparent for end users, which may negatively affect the reputation of participating PSPs and of the fast payment service. This problem may become particularly pronounced during periods when the interval between settlements grows, such as over the weekend for systems that only conduct settlement on business days, because of the possible build-up of positions and the resulting increased likelihood that a maximum limit may be reached.

Various measures may serve to alleviate the possibility that risk limits become binding and generate rejection of payments. More frequent settlements, including over the weekend when possible, may prevent the build-up of positions that breach risk limits. Alternatively, the system could implement mechanisms to allow participants to provide additional funds or collateral to guarantee any excess position beyond the limit. However, a participant may not be able to access additional funds or collateral, or a means may not be available to post those funds or collateral, particularly outside normal business hours. As a result, the posting of additional collateral may be warranted before weekends or holidays as a precaution against the possibility that an extended interval between settlements could cause risk limits to be breached.

Implications of real-time settlement models

Real-time settlement implies that the PSP of the payee credits the funds to its customer only after settlement between PSPs has taken place. As a result, this settlement model avoids credit risk between participating PSPs. Thus, the various risk mitigation measures described for the deferred settlement model are unnecessary – the structure of the real-time settlement model itself serves to mitigate credit risk.

The consequence, however, is that PSPs continuously require sufficient liquidity to ensure the settlement of fast payments. On the one hand, if the fast payment system is used to process mainly low-value payments, the liquidity requirements may be relatively modest. On the other hand, the need for adequate liquidity on a continuous basis may complicate the liquidity management processes of PSPs, especially outside normal business hours. In the absence of sufficient liquidity, end users may see their payments rejected, with a consequent negative impact for the PSPs and the system as a whole.

In the light of this possibility, various processes for PSPs to manage and access liquidity may serve to support the settlement of fast payments during normal business hours.

- Liquidity management may involve transferring balances from other accounts held by a PSP, such as an account used to conduct payments in the local RTGS system, to the account or accounts

used to settle fast payments. These transfers may occur automatically under criteria established by individual PSPs or the system operator in order to replenish funds in a fast payment settlement account that have been depleted by fast payment activity, thereby avoiding the prospect of rejected payments.

- When settlement is done by a central bank, liquidity support may further be directly linked to the intraday liquidity facilities implemented in the local RTGS system.

Outside normal business hours, reallocation of liquidity across a PSP's accounts may not be possible.³⁰ In this case, PSPs and system operators may consider alternative methods to manage liquidity.

- PSPs and system operators may find it prudent to transfer supplementary funds to settlement accounts for fast payments before periods when additional liquidity cannot be accessed, such as prior to a weekend.
- The settlement agent, such as the central bank, may allow funds in other accounts held by PSPs, which are not being used for payments outside normal business hours, to be transferred, in whole or in part, to the settlement account for fast payments at the end of a given business day. For example, the proposed design for the settlement of NPP transactions in Australia – the Fast Settlement Service (FSS) – involves separate platforms so that the existing core RTGS service and the FSS will be able to process and settle payments independently of one another. During the operating hours of the core RTGS service, participants will manage the distribution of their settlement balances between their FSS and core RTGS. Outside the operating hours of the core RTGS service (eg overnight and on weekends), it is expected that an NPP participant's entire settlement balance will be available for FSS settlements.
- PSPs may also consider liquidity agreements or specialised liquidity transactions that settle within a fast payment system and provide a rapid redistribution of liquidity among PSPs within the system and ease liquidity strains.

Nevertheless, because fast payment systems operate on a close to 24/7 basis, the possible need for liquidity provision to the participants in a fast payment system may raise questions about the adequacy of the RTGS system's operating hours and associated liquidity facilities, the possibility of using alternative mechanisms, and associated risk controls for settlement (or deferring settlement) when the central bank or RTGS system is not open. Issues related to central bank operations as they relate to fast payments are discussed further in Section 6.2.

³⁰ Outside normal business hours, issues associated with liquidity shortfalls and the associated need for liquidity management in real-time settlement arrangements for fast payments are not dissimilar from issues related to net debit caps and the management of collateral in deferred settlement models.

5. Benefits and risks of fast payments

5.1 Benefits of fast payments to different parties

Fast payments may benefit participants in a jurisdiction's payment system in various ways. These benefits may accrue to different parties, such as individuals, businesses, government entities or PSPs, depending on their role in a fast payment, and in some cases may involve an offsetting cost to another party. Key benefits may arise due to the speed and service availability inherent in fast payments, while others may result from the particular features of a fast payments implementation. In addition, fast payments may generate broader benefits as part of an overall upgrade to a jurisdiction's payment system.³¹

The magnitude and significance of these benefits may vary by jurisdiction. Factors such as the functionality of payment alternatives, characteristics of the population, the payment needs of different parties and other features of the economy may affect the relative importance of certain benefits across jurisdictions or among payment system participants within a jurisdiction. Moreover, the specific model of implementation in a jurisdiction may yield benefits that reflect the environment and needs of that jurisdiction.

In addition, the realisation of these benefits depends, in part, on the breadth of use cases for fast payments in a jurisdiction. A fast payment product or service with a single use case may generate some benefits, but those benefits may be limited to a targeted group of end users or specific types of transaction. In contrast, a flexible and broadly accessible service or system may yield benefits across a wide variety of end users and transactions.

Benefits to end users of speed and service availability

The clearest benefit of fast payments is the ability to complete time-sensitive payments at an adequate speed and whenever necessary. If a payer must send funds to a payee before some other activity takes place (because of factors such as counterparty risk or liquidity constraints for end users), fast payments can expedite that activity and relax constraints on when it can be performed.

The party to whom these benefits accrue may depend on the nature of the transaction and whether the provision of final funds has more relative importance for the payer or the payee. From the payer's perspective, certain traditional payments, such as card payments, may yield nearly immediate debits to the payer's account. In other cases, however, the payer may experience specific benefits from a fast payment. If certain outcomes for the payer, such as the receipt of goods or services, are conditional on the payee receiving payment, then fast payments may allow the payer to meet that obligation sooner and at any time. This could also allow the payer to avoid late fees or cessation of service in certain bill payment settings.

Unlike for payers, in many instances, traditional payments have not typically generated a similarly rapid outcome for the payee. As a result, if the payee is waiting to be paid after providing a good or service, a fast payment provides the required funds sooner and with fewer constraints on when those funds can arrive, which allows the payee to use those funds for other activities. For example, a business that requires payment before the delivery of goods or services would no longer need to delay delivery, to the benefit of both the business and its customer. Similarly, fast payments may speed up government

³¹ At a general level, the relationship between benefits and risk associated with different ways of conducting payments can be considered through a benefit-risk frontier, which characterises the various combinations of benefits and risk that can be obtained with existing technology. Such a framework based on the relationship between costs (the opposite of benefits) and risk is developed in A Berger, D Hancock and J Marquardt, "A framework for analyzing efficiency, risks, costs, and innovations in the payments system", *Journal of Money, Credit and Banking*, vol 28, no 4, November 1996, pp 696–732. See also J Chapman, J Jafri, S Chiu and H Perez, "Public policy objectives and the next generation of CPA systems: an analytical framework", Canadian Payments Association, Discussion Paper, no 2, September 2015 for a review of payment systems in Canada and an analysis of whether a shift has occurred in the benefit-risk frontier using a number of different metrics for benefits and risks.

payments to benefit recipients, last minute payroll from businesses to employees, or emergency payments at any time, allowing recipients to consume goods and services sooner than they could otherwise.

A further implication of fast payments in time-sensitive transactions is the possible substitution of fast payments for other payment alternatives, which may generate benefits to some parties to a transaction. Fast payments may provide an alternative to cash in some settings for which no viable alternative previously existed for rapid payments (eg impromptu one-time P2P payments). This may reduce end-user exposure to theft and reduce handling costs associated with cash and other paper-based payments. In some CPMI jurisdictions, payment cards may enable time-sensitive commerce through a payment guarantee, but cards often involve substantial transaction fees for merchants. As a potential alternative to cards, fast payments may alter costs of transactions to merchants and may increase competition for P2B transactions. Beyond substituting for cash or cards in time-sensitive payments, fast payments may provide an alternative to cheques in a variety of transactions, such as high-value B2B transactions.

The rapid receipt of funds may also provide convenience benefits to end users and improve their cash management. For individuals and households, fast payments may improve budgeting and tracking of expenditures and income. Fast payments may further allow payments to be planned and executed more flexibly. For businesses, including corporates and small and medium-sized enterprises, fast payments may provide more efficient cash flow and liquidity management. For instance, the experience with fast payments in India, Mexico, Sweden and the United Kingdom illustrates the importance of speed and convenience for end users. As shown in the graphs in Annex 3, both the volumes and values of fast payments in these countries have increased rapidly over time.

Additional benefits to end users of fast payments

The features of a particular fast payment implementation may have broader implications for end users beyond enhanced speed and service availability. It should be stressed that these benefits are not unique to fast payments, but could result from various types of retail payment innovation. Nevertheless, because implementation of fast payments typically involves some degree of new infrastructure, it may be possible to design that infrastructure with these potential benefits in mind. Moreover, the combination of speed and service availability with other functionalities may magnify these additional benefits, such as the ability to receive enhanced remittance information faster than in the past.

Some possible benefits could include:

- Enhanced remittance information, which may improve reconciliation and integration with internal processes for business end users, allow substitution of fast payments for cheques in B2B payments and increase the efficiency of e-invoicing and e-billing;
- Faster check-out processes at the physical point of sale in some fast payment implementations;
- Improved ability to conduct cross-border payments, particularly if fast payments are interoperable across systems and jurisdictions; and
- Improvements in financial inclusion if a fast payment implementation is structured to enable transactions for unbanked or underbanked individuals in the light of the potential for fast payments to (i) serve as a close substitute for cash with many of the same advantages (eg immediate reusability) that could be valuable for the unbanked or underbanked and (ii) act as a gateway product towards other financial services.³²

³² A CPMI and World Bank Group report notes that improvements in national financial infrastructures may result in customers not previously served by PSPs becoming an attractive market segment. See CPMI and World Bank Group, *Payment aspects of financial inclusion*, April 2016.

Benefits to payment service providers

As suggested by the focus of fast payments on the end-user experience, many benefits of fast payments may ultimately accrue to end users. However, PSPs may also stand to gain from fast payments. These benefits reflect some of the factors that may encourage the implementation of fast payments, as discussed in Chapter 3.

Although PSPs may incur initial implementation costs, fast payments may generate cost savings for PSPs in the longer term. These savings may reflect reduced investment costs for the maintenance and upgrade of legacy systems. Moreover, the variable cost of managing fast payments may be lower than the cost of other payment methods, such as cash and cheques.

Fast payments may further provide potential income generation for PSPs from innovations in financial services and products offered to customers. To a significant degree, these profit opportunities may involve the realisation of “latent” demand, as unforeseen applications and other use cases may materialise once a fast payment solution is in place. Fast payments may also enable cross-selling of additional financial products to customers, using the fast payment functionality.

From the perspective of PSPs, the potential revenue streams from fast payments would have to be weighed against the effect on revenue from other payment products for which fast payments might substitute. For example, fast payments may affect float income for PSPs and may impose a float cost on payee PSPs to the extent that funds are available for end users before inter-PSP settlement has occurred.

Broader benefits of fast payments

Fast payments may also generate benefits for society as a whole, beyond those that accrue to end users or PSPs. For example, if fast payments are structured to enable or facilitate innovations that incorporate fast payment functionality, fast payments may serve as a catalyst for future innovations in a jurisdiction’s payment system. It is difficult to predict what such innovations might be, but examples might include “instant commerce” or innovations related to e-invoicing and e-billing that incorporate fast payment functionality.

More generally, fast payments may serve as a crucial component in upgrading or enhancing a jurisdiction’s overall payment system. For developed markets, PSPs and infrastructure and technology providers may consider the opportunity to adopt modern technology rather than incurring costs to maintain and adapt legacy systems. For emerging markets, fast payments may let them leap-frog older technologies. For both developed and emerging markets, fast payments may provide an opportunity to move away from paper-based payments, such as cash and cheques, towards potentially more efficient electronic payments.

5.2 Impact of fast payments on risk

Fast payments are, in essence, a specific type of retail payment. As with other retail payment services, actors involved in fast payment transactions on both the demand and supply sides face various types of risk. In the past, the CPMI has conducted detailed analysis of risks in payment infrastructures and retail payment services, including in the CPSS-IOSCO Principles for Financial Market Infrastructures (PFMI) and other documents.³³ Taking into account previous work by the Committee, this chapter does not aim to provide an in-depth analysis of risks in fast payments. Rather, the aim is to determine how the novel features of fast payments alter the risk profile of these transactions for various actors compared with that of traditional retail payments. Conventional payment services will thus be taken as a baseline against which

³³ The PFMI provides a basic description of risks in financial market infrastructures, including payment infrastructures (see, in particular, PFMI, Chapter 2). Risks in retail payments have also been described in CPMI, *Clearing and settlement arrangements for retail payments in selected countries*, September 2000. More recently, risks in retail services were reviewed in CPMI, *Innovations in retail payments*, May 2012, and *Non-banks in retail payments*, September 2014.

fast payments are compared. This chapter further considers mitigating measures that could be adopted to manage any risk that might be exacerbated by the speed and continuous availability of fast payments.

The main risk categories considered are those mentioned in Chapter 2 of the PFMI: legal, credit, liquidity and operational risk. Particular attention is paid to security risks (a component of operational risk), particularly fraudulent activity, due to the potential importance that security plays for the confidence end users have in fast payments and retail payments in general. Security risk can be defined as the risk that an actor's assets are compromised following an unauthorised use, loss, damage, disclosure or modification of those assets, originating from both internal and external sources, and is highly interrelated to operational risks in an actor's IT systems and processes. An additional area that deserves special attention is reputational risk, which is the risk of losing revenue or customers resulting from negative publicity or loss of confidence (whether based on fact or generated by misperceptions). Reputational risk depends on ethics, safety, security and quality of service, and may lead to increased operating, capital or regulatory costs for either a given actor or the broader payment system.

Risks can be analysed from the perspective of different parties to a fast payment, including end users, their PSPs, the fast payment infrastructure and the settlement institution (be it a central bank or other institution). The analysis in this chapter will consider each of these different parties in turn.

Although this chapter focuses on the risks that arise within fast payment implementations and how they differ from traditional services, fast payments can also have an impact on risks external to the fast payment system. For example, fast payments may change the way in which bank runs occur, or even exacerbate them, as depositors may choose to use fast payments to transfer funds rather than queuing at a bank branch and physically withdrawing the funds. These other issues related to fast payments are analysed in the final chapter of the report.

Credit risk

Credit risk in fast payment services does not normally arise between the payer or the payee and their respective PSPs; the payer's PSP would normally require funds to be present in the payer's account in order to initiate a fast payment, and the payee's PSP will immediately credit the funds with finality in the payee's account. Should the payer's PSP allow payments to be made on credit, this would normally be a consequence of a bilateral agreement between the service provider and the customer (ie an agreement beyond the mere provision of fast payments, such as the provision of overdraft capabilities) and the credit risk would be managed by the PSP.

As discussed in Chapter 4, credit risk may arise between PSPs in the fast payment system depending on the settlement model. If settlement takes place in real time, before the PSP of the payee credits the funds in the account of its customer, credit risk does not arise between PSPs. If settlement is deferred, the PSP of the payee will advance the funds of its customer before receiving them from the PSP of the payer. In this case, as explained in Chapter 4, the credit risk borne by the payee's PSP can be managed, for example, through limits (to the aggregate net positions of PSPs), frequent settlement cycles, loss-sharing agreements, collateralisation and/or prefunding arrangements. Should a default occur, these mechanisms would put a limit to the maximum net debit position that could arise and provide resources to cover the shortfall and, in the case of prefunding, potentially remove this risk.³⁴ The main difference between fast payments and other payment services is that, in the former, the payee's PSP would normally be unable to block or recover the funds from the payee, because they have been credited irrevocably, and the payee may have used them immediately for other transactions. For this reason, reversing the underlying transactions between payers and payees is not feasible if problems arise in the inter-PSP settlement.

³⁴ Credit risk between PSPs in DNS systems and their mitigation measures are well known and have been analysed by the CPMI on many occasions (eg the PFMI explain in detail how credit risk could be mitigated in this type of system).

Credit risk does not normally affect the fast clearing and settlement systems themselves as they are not party to obligations in the transaction.

Liquidity risk

For payers, liquidity risk would not be different in fast payments as compared with other payment services. As mentioned above for credit risk, the payer's PSP would normally require funds to be present in the payer's account before a fast payment is initiated. For payees, liquidity issues are mitigated in fast payments, because the funds are available immediately and with finality, whereas in other types of service the funds would be paid later or, in some cases, conditionally, so that the payment could be reversed subject to certain conditions.

Irrespective of the settlement model, and as in any other payment system, liquidity risk arises in the fast clearing and settlement system, because the participating PSPs require liquidity to ensure inter-PSP settlement. In fast payment systems with real-time settlement, liquidity needs are continuous, and payments could be rejected if the payer's PSP lacks funds for settlement. The main difference from other types of system is that the liquidity needs extend beyond normal business hours due to the continuous settlement. As discussed in Chapter 4, this might require procedures to ensure that sufficient liquidity is available in advance, such as through supplementary funding to the fast payment settlement accounts of PSPs, so that it can be reallocated among fast payment PSPs through inter-PSP liquidity agreements, or can be provided by the central bank or some other institution, sometimes via the local RTGS system. In fast payment systems with deferred settlement, depending on the degree and type of netting, value limits and timing of settlement, liquidity needs could be mitigated as participating PSPs would require funds to cover only the net debit position at a specific settlement time. Additionally, liquidity would not be needed continuously, but only at the end of each settlement cycle. However, as discussed in Chapter 4, liquidity risk may arise in fast payment systems with deferred settlement, particularly if they conduct inter-PSP settlement cycles outside normal business hours. Some of the tools that can be used to ensure that sufficient funds are available for settlement are the prefunding of these positions, liquidity or collateral pools, or an agreement with a liquidity provider. The adequacy of these tools to support, when applicable, settlement cycles outside normal business hours may be an important consideration in a fast payment system with deferred settlement.

As with credit risk, liquidity risk does not normally affect the fast clearing and settlement system itself, although the system normally provides the tools that help participating PSPs manage this risk.

Legal risk

Fast payments, like other retail payment services, need to be supported by sound legal arrangements according to their specific design, operation and use. The legal framework needs to clearly determine the applicability of laws and regulations in order to avoid losses or disruptions related to the lack of or unexpected application of the legal framework. The legal framework needs to establish, and provide legal protections around, when, inter alia, payments are final and when the funds are legally transferred from sender to receiver. This clarity is needed to allocate responsibilities between the payer and the payee vis-a-vis their respective PSPs and also to understand the respective responsibilities between PSPs, as well as between PSPs and the central clearing and settlement system. PSPs also need clarity on the rules and regulations that apply when they process fast payments. These rules could be general (ie not specific to fast payments), but the speed that characterises fast payments could make it more challenging to fulfil some of the requirements. Legal frameworks should also provide a sound basis for protecting the netting and settlement arrangements.

It is especially important in fast payments to design rules and procedures allowing post-transaction resolution of fraudulent or erroneous transactions. The related customer liability aspects must also be considered. Even though all these issues affect retail payments in general, clarity, awareness and legal certainty are especially important for fast payments as they are new implementations.

Operational risk

The speed and continuous availability of fast payments have an impact on operational risk. Due to their speed, any operational incident that results in the delay or interruption of fast payment services could be immediately observable by end users. A service interruption may arise, for example, from a cyber-attack on fast payment infrastructure. If an incident is caused by capacity problems, conventional systems might have recourse to delaying processing in order to adapt their processing capabilities to the high demand. Delays in processing, however, are not easily accommodated in fast payments, as a processing delay will not allow the provision of an immediate payment experience to end users. As a result, the impact of an operational incident might thus materialise much earlier than in traditional retail payments, in which a service interruption or slowdown might go unnoticed, given that the clearing and settlement process takes a substantial amount of time.

Additionally, as end users grow accustomed to fast payment services, they may choose to send their payments on the payment's due date rather than a few days in advance, as they expect the sender to receive the funds immediately. As a result, if a fast payment system is unavailable due to an operational incident, end users would be immediately affected and could incur penalties for late payment or have insufficient funds for other transactions.

Continuous availability on a near-24/7 basis is very demanding in terms of operational reliability for participating PSPs and the fast payment system itself. Even though some models do not require settlement arrangements to operate on a 24/7 basis, these arrangements need to ensure the utmost reliability when needed. This reliability can be a challenge, especially outside normal business hours.

The impact of an operational incident could in principle be mitigated by measures similar to those used in other non-fast payment deployments: rigorous processes for the identification and mitigation of operational risk, including cyber-resilience, redundancy and business continuity arrangements to ensure the timely recovery of the services in the event of a major disruption.³⁵ Timely communication and information to stakeholders in case of operational incidents should be part of these operational risk management processes.

Fraud risk

Fraud risk is a subtype of operational risk that merits further discussion due to its potential importance in fast payments. Fraud could encompass various situations, including: (i) the manipulation of the payer or payee by a fraudster, resulting in the issuance of a payment instruction by the payer acting in good faith, (ii) the initiation of a payment instruction by a fraudster (who has fraudulently obtained the payer/payee's sensitive payment data) or (iii) the modification of an attribute (such as the account number, transaction amount, name of payee or payer) of a genuinely issued payment instruction intercepted by the fraudster. These fraud types might affect all actors in the payment chain, including end users, PSPs and the fast payment system, and they are common to both fast and traditional retail payments. However, taking into account the end-to-end speed and, in particular, the immediacy of funds availability, fast payment services may be a more attractive target for fraud than traditional retail payments. If funds are immediately and unconditionally available to the payee, a fraudster could attempt to quickly withdraw the funds before the fraud is detected, and measures to reverse or recall fraudulent fast payments may have limited effectiveness. In general, robust security and anti-fraud measures will be important to mitigate risk.

Most of the measures applied in traditional systems to mitigate fraud risk (whether ex ante measures to detect fraud, such as security screening or ex post measures, such as SMS alerts for users) might be used to help detect and manage fraud cases in fast payments. Some of these measures may take

³⁵ Regarding cyber-security, financial authorities and international financial organisations have highlighted the relevance of developing a robust cyber-resilience framework in order to maintain the functioning of services of FMIs, even after a cyber-attack. CPMI-IOSCO has released the report, *CPMI-IOSCO Guidance on cyber resilience for financial market infrastructures*, which provides FMIs with guidelines for developing and enhancing their cyber framework, focusing on the recovery of critical services within two hours after the incident occurs.

advantage of the information that accompanies fast payments; many fast payment systems have detailed information about the sender, recipient, time of transaction and geographic references, which can enhance payments analysis to detect fraud. At the same time, however, these measures could be less effective due to the small time lapse between payment initiation and execution. For this reason, fast payment schemes may face challenges in being able to complete the necessary security screening on payments while at the same time meeting end-user expectations for speed.³⁶ Depending on the scheme design and/or regulation, participant PSPs, scheme operators and/or the clearing and settlement infrastructure could be required to perform security screening, possibly based on common guidelines, to ensure timeliness and comparable standards for all payments in a fast payment implementation. Screening could be performed quickly and automatically, but the management of payments identified as suspicious might require interventions that could slow the process. Limits on the amount of individual transactions are a potential mitigating measure to cap the exposure of payers and intermediary institutions to fraudulent operations. Such limits would also make the fast payment deployment less attractive for fraudsters.

Finally, the scheme may need to define a legal process for addressing completed payments that ultimately prove to be fraudulent or erroneous. Robust dispute and error resolution processes, including clear rules to allocate responsibilities between the actors involved in a transaction, are important to allow post-transaction resolution of fraudulent or erroneous transactions.

Reputational risk

Financial or operational problems experienced by any entity involved in the processing of fast payments could lead to reputational impacts for that entity or for the scheme as a whole. This type of risk affects mainly the clearing and settlement arrangements and the PSPs participating in the scheme. In some instances, it could also affect end users, as consumers or merchants might also suffer reputational damage if their payments are delayed due to a fast payment scheme malfunction. In general terms, however, these reputational risks in fast payment schemes are similar to those faced by traditional retail payment schemes. But expectations in relation to the system's speed and time availability may lead to a quicker materialisation of the reputational risk in the event of a service degradation. Reputational risk might also affect the central bank or other authorities, if they have given the fast payment initiative their strong or explicit support, and especially if they have an operational role.

³⁶ In some instances, end users may be willing to sacrifice some level of speed or service availability in order to better track payments activity and mitigate the risk of fraud. For example, in Korea, concerns about a rise in telecommunications fraud led to the introduction in October 2015 of the "delayed transfer system" under which a payer can delay the timing of otherwise fast payments for a certain period of time set in advance by the payer.

6. Issues related to fast payments

This final chapter considers a number of issues related to fast payments. Whereas in previous chapters, this report considered more conceptual issues, such as drivers of and barriers to fast payments (Chapter 3) as well as their benefits and risks (Chapter 5), this chapter examines a number of issues and considerations that may arise in implementing them. Because these issues may be relevant for different parties, depending on their roles and responsibilities, the chapter begins with a discussion of some issues that are generally relevant for stakeholders and authorities, which may include central banks. The chapter then considers some issues that may specifically arise for central banks given their potential role in the development, operation and oversight of fast payments.

6.1 Issues generally relevant for stakeholders and authorities

The implementation of fast payments, and in particular their two key features, speed and continuous service availability, may raise a number of specific issues that warrant consideration by a jurisdiction's stakeholders and authorities. The significance of these issues may vary by jurisdiction based on the features of a fast payment implementation or characteristics of a jurisdiction. Industry stakeholders, including operators of fast payment systems and schemes and participant PSPs, may need to consider these issues as they establish the details of a fast payment implementation. Various authorities in a jurisdiction, including central banks in some cases, may need to consider these issues as they evaluate how a fast payment implementation relates to existing regulations and public policy objectives.

Value date

The continuous service availability of fast payment services and systems raises issues related to date conventions (ie value dates). In traditional payments, date conventions can be defined by reference to limits on the operating hours of the underlying infrastructure.³⁷ That is, the opening and closing times for the system can be used to assign payments to certain value dates, subject to any adjustments related to night-time operations or time zone issues. Because most traditional systems do not operate outside business hours, at night or on weekends, payments submitted after the closing of a system can be assigned a value date of the next business day.

In contrast, fast payment systems operate continuously, with individual payments being initiated and, from an end user perspective, completed at any time on any day. Without actual opening and closing times, there is a need to clearly define the beginning and end of a value date with the corresponding assignment of individual payments to specific days. Value dates are typically important for legal, accounting, risk management (including settlement), reference, and other purposes. In addition, differences in date conventions applicable to end users and those applicable to PSPs may need to be considered in implementations where settlement among PSPs is deferred, possibly to the next business day following a weekend.³⁸ Finally, date conventions in fast payments may need to take into account the conventions that apply in other systems (eg the local RTGS system) connected to a fast payment system either directly or indirectly (eg for settlement), as described in Box I for SPEI in Mexico.

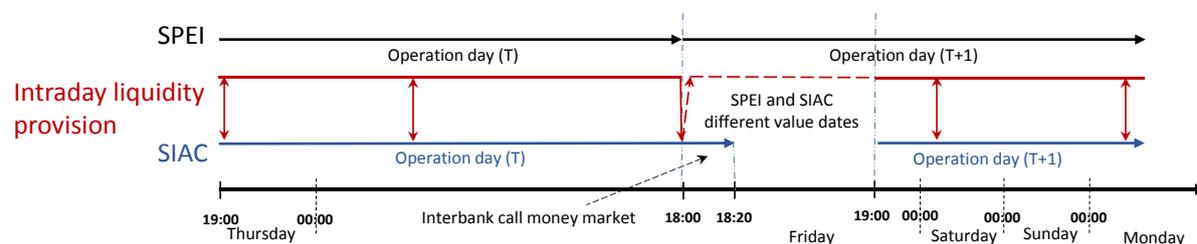
³⁷ For batch-processed payments, limits on operating hours could involve discrete times at which payment orders are processed.

³⁸ In the EU, the Payment Services Directive stipulates that the amount should be credited to the payee's account by the end of the next business day (ie T+1) at the latest, and the PSP of the payee is then required to value-date and make available the amount to the payee's account the same day (again, T+1). This regulation is based on the traditional payment process in which inter-PSP settlement precedes the customer's receipt of funds. In fast payments, the availability of funds to the payee (and the related possibility of re-using them) may precede the receipt of funds by the payee's PSP.

Value dates and liquidity provision in SPEI

SPEI in Mexico operates on a 24/7 basis and begins and ends its operations for value date purposes at 18.00 every banking day. SPEI is connected to SIAC, which is the central bank system for managing liquidity facilities and banks' current accounts at the Bank of Mexico. The SIAC banking day begins at 19.00 and ends at 18.20 of the next business day. Thus, there is a window of time during which payments in SPEI and SIAC are being conducted with different value dates. The Bank of Mexico does not allow transfers between SIAC and SPEI during this time period to avoid mixing funds with different value dates.

To achieve a 24/7 operational schedule, the Bank of Mexico implemented a mechanism to provide liquidity to participants during the time window mentioned. The mechanism works as follows: every banking day, at 18.00, SPEI closes day "T" and the Bank of Mexico transfers the balance from participants' SPEI accounts to their SIAC accounts. Then, a few seconds later, SPEI opens with zero balances. The Bank of Mexico immediately extends fully collateralised credit¹ to participant banks in their SPEI accounts, according to the banks' standing instructions, and payment exchange resumes. The credit is registered in participant banks' SIAC accounts when the latter opens at 19:00 ("T+1").



¹ The amount requested through a bank's standing instruction or the amount that can be covered with available deposits that the bank maintains at the Bank of Mexico, whichever is the lesser amount.

Money laundering and terrorist financing

As with other payment methods, an issue for fast payments is the extent to which they could be used to engage in illicit activity, most notably money laundering or terrorist financing. In most cases, the requirements on anti-money laundering (AML) and countering the financing of terrorism (CFT), including know your customer (KYC) and transaction screening requirements, will apply in the same way to providers of fast payments as to any other type of payment provider. Moreover, as electronic payments (in contrast to cash), fast payments typically contain significant information about a transaction, including information related to the identities of the parties involved, their respective PSPs and other transaction-specific information, which can provide PSPs, operators and authorities with useful information to detect, deter and penalise illegal activity.

At the same time, the speed, availability and accessibility of fast payments may be particularly attractive to parties engaged in illegal activities who wish to rapidly access illicit funds. Their ability to do so depends, in part, on the capabilities of PSPs, operators and authorities in detecting and responding to suspicious activities. While automatic screening processes for traditional payments may be applied to fast payments, the high speed of fast payments implies that the time window for addressing suspicious transactions is very brief. In traditional payments, delays in the payment process, particularly within the internal processes of a PSP, may provide a time interval for addressing suspicious transactions without affecting the end-user experience. In fast payments, however, no such time interval exists, and any intervention would inevitably degrade the end-user experience, including for transactions that are ultimately deemed legitimate.

More generally, stakeholders and relevant authorities may need to consider whether and how existing transaction monitoring and screening capabilities can be adapted for fast payments and whether

additional capabilities may be required. Certain design features, such as value limits for transactions, may help to further reduce the vulnerability of a fast payment service to illicit activities. However, these various measures may also influence the attractiveness of fast payments for legitimate end users by yielding a slower payment experience (in the case of certain forms of screening and transaction monitoring) or affecting the usefulness of the service for making certain types of payment (in the case of value limits).

Factors relevant for troubled banks and the resolution of insolvent banks

Fast payments may introduce a number of issues related to banks (or other financial institutions) that participate in a fast payment system and may be at risk of failing or being likely to fail. The general issues are not novel, and the experience with many fast payment implementations (eg current volumes and values) suggest that fast payments are not currently a first-order concern when dealing with troubled banks. Nevertheless, the speed and continuous availability of fast payments may introduce some factors that warrant consideration by industry stakeholders, bank regulators and supervisors, and other relevant authorities.

First, fast payments may introduce a new channel by which retail depositors can withdraw funds in response to real or perceived concerns about a bank's solvency. In the past, the possibility of mass withdrawals by retail depositors in response to concerns about a bank's viability was somewhat constrained to certain time periods or channels (eg during business hours and at bank branches), often with limits on withdrawal amounts through some channels (eg at ATMs).³⁹ The continuous availability of fast payments through easily accessible channels, such as online or mobile services, may loosen these constraints, allowing rapid withdrawal (or transfer) of funds at any time, including at night or over the weekend, when such withdrawals were previously not possible. In the light of this possibility, supervisors may need to evaluate processes for monitoring a troubled bank's condition on a more continuous basis. In addition, supervisors, in conjunction with infrastructure operators, may need to consider suspending a troubled bank's access to a fast payment system or limiting its activity, while also recognising that such actions may generate additional concerns about the bank's condition among depositors and other market participants. In the light of this latter possibility, supervisors may need to ensure that appropriate communication procedures are in place so that any actions are properly understood by depositors and the public.

Second, fast payments may affect the management of resolution procedures for a financial institution in resolution. In general, resolution procedures may aim to provide for continuity of critical operations and reduce the risk of "hard-stop" failures. Existing resolution practice has arguably tended to encourage managing arrangements until the weekend, which provides a crucial time window to exercise resolution powers, where necessary, and take measures to stabilise the resolved financial institution, thus avoiding contagion to other firms or markets. Fast payments with continuous operation potentially complicate this practice since, from a retail payments perspective, there is no "weekend" during which authorities can take action. In practice, it is likely that any institution prior to entry into resolution will need to be assessed to determine if it is necessary to exercise resolution powers to stabilise the firm and enable continuity of access to the fast payments system, if the institution would need to have limits on its fast payment activity, or if the institution should be temporarily suspended from participation in a fast payments system. The intention of these actions is to provide continuity so issues related to transfer may be less prevalent. Authorities will thus likely need to carefully consider the procedures they need to follow and policies on how and when to exercise their powers.

There will need to be legal clarity on a range of issues, including: (i) how the payment system's rulebook aligns with the resolution regime and whether it sets expectations for how the payment system would treat a firm in resolution; (ii) finality of payments undertaken prior to a possible resolution; (iii) legal status of payment instructions issued but not completed due to the resolution; and (iv) the powers of

³⁹ Large withdrawals during RTGS system operating hours to transfer final funds to another financial institution via RTGS systems have been widely possible for many years.

authorities to take suspension and resolution actions, whether to temporarily suspend or to enable continuity of payments during resolution action to stabilise a firm.

Consumer protection

Fast payments may introduce a number of important issues related to consumer protection, which are relevant for both industry stakeholders and authorities responsible for applying and enforcing consumer protection regulations and statutes. In general, consumer protection can involve three components: the legislative and regulatory framework in a jurisdiction, the rules and standards of a fast payment scheme, and the service agreements between end users and PSPs.⁴⁰ These components and their interrelationships may need to be evaluated in the context of fast payments.

The speed at which fast payments are executed, with final funds provided to the payee, may raise particular challenges related to consumer protection against fraud or errors. Certain attributes, such as the type of payment (ie credit push or debit pull), the nature of payer authentication and customer-determined parameters on potential payments (eg a list of approved payees), may make erroneous or unauthorised payments less likely. Other attributes, such as value limits at the system, PSP or end-user level, may help mitigate the negative effects of errors or fraud. Finally, timely notifications about payment status can provide end users with information about their fast payment activity to help identify and address errors, fraud or other problems (eg insufficient funds or incorrect payee information) as quickly as possible.

Even with such safeguards, fraudulent and erroneous activity may occur. Because funds are transferred in real time or near-real time, challenges may arise when cancelling, reversing or recalling any fraudulent or erroneous transactions. In some cases, a consumer protection regime may incorporate "guarantees" or "indemnities", to be provided by a PSP to its consumer customers, that address cases of fraud, error or similar problems. The consumer protection regime may also incorporate dispute resolution mechanisms to address issues where, for example, facts, rules and responsibilities are in question.

One way to address problematic transactions from an operational point of view could involve a subsequent fast payment to return the funds from an initial (final) transaction, possibly initiated by the original payee at the request of the original payer through a process provided by fast payment PSPs. However, such a process depends on the willingness of the original payee to return the funds, which may be low in some instances, such as in the case of fraud. Another method to address erroneous transactions could involve a recall feature in the fast payment system or scheme. A recall is initiated by the payer's PSP, typically in response to an investigation request by the payer, and consists of an "in-scheme" process allowing for the return of funds according to a predefined procedure. The PSPs of the payer and the payee retain, in this process, the option of rejecting recall requests that they consider unjustified. Moreover, depending on the national legislation and/or the contractual agreements between the payee and the payee's PSP, the effective return of the funds following a recall may be subject to the payee's authorisation. Because in case of fraud, it may ultimately be difficult, if not impossible, to obtain a payee's authorisation to return the funds, particular attention may be needed to address the problem of how to manage the risk of fraud in fast payment systems.⁴¹

In such approaches, it is necessary to carefully analyse proposals in order to maintain the finality of transferred funds. If finality is not maintained, then the willingness of PSPs to make funds available for use in near-real time could be affected as could the willingness of end users to use fast payment systems to make certain kinds of payment that rely on finality properties.

Regardless of the approach for handling fraud or errors, industry stakeholders would need to consider any positive or negative effects of policies and procedures at the PSP and/or scheme levels on

⁴⁰ Agreements between PSPs and their customers are relevant for the terms and conditions, as well as protections offered to individual customers of PSPs.

⁴¹ In addition, sufficient funds may not exist in the payee's account if the payee has already withdrawn or spent funds from a fast payment.

consumer protection and, ultimately, the end-user experience. For PSPs, schemes and system operators, adequate consumer protection is not merely a matter of regulatory compliance, as consumer protection measures may serve to encourage end-user adoption and use of fast payments by increasing end-user comfort with fast payments and decreasing the likelihood of a negative end-user experience. Relevant authorities, including central banks in some cases, may further need to assess whether a fast payment implementation includes adequate measures and functionalities to meet policy and regulatory objectives related to consumer protection.

Particularly given the novelty of fast payments in many jurisdictions, transparency related to certain information for end users is essential to enable them to benefit from fast payments. This includes information about fees, data privacy practices and the conduct of transactions (eg value limits, authorisation methods and potential payees). In addition, information about end-user rights and obligations when using a fast payment service, such as fraud and error resolution protections, may allow end users to properly assess the true cost of fast payments, their riskiness and the unwanted consequences of potential misuse. Finally, in the light of the novelty of certain features of fast payments for end users, educational efforts may help end users better understand the information provided to them about fast payment services, as well as the broader implications of fast payments for end users.

Legal and regulatory framework

Authorities may need to assess more broadly the treatment of fast payments under local payment laws and regulations. As discussed in Section 5.2, fast payments may raise various legal risks depending on a particular jurisdiction's legal framework. The preceding discussion noted some of the potential issues, such as the status of fast payments for financial institutions in resolution and consumer protection issues related to the allocation of liability for fraud or errors. On a more general level, authorities may need to consider whether and how existing payment law and regulations apply to fast payments or influence their development. For example, in the EU, the SEPA regulation requires that the SEPA credit transfer/direct debit message contains all information related to the payment order end-to-end. If fast payments in the EU rely on SEPA schemes, they would have to comply with all of the technical and business requirements in SEPA regulation. Moreover, given the importance of a rapid final credit to the payee in a fast payment, authorities may need to evaluate whether any finality rules in a fast payment system are supported by the jurisdiction's legal framework (in situations where the transaction is not settled simultaneously between PSPs). For example, this could be the case of the EU's finality directive, which states that all orders entered in the payment system before the opening of insolvency proceedings are final and have to be settled (if funds are available).

Competition in payments markets and the openness of fast payment systems

As noted in Section 3.4, fast payments have emerged as a retail payment innovation due, in part, to competitive considerations for PSPs. At the same time, fast payments may introduce new competitive dynamics in the payments market, which are relevant for stakeholders and may be of interest to authorities. In some instances, fast payments may serve as an additional avenue for competition among PSPs, leading to cheaper and more efficient payment services. The possibility of leveraging fast payment functionality to meet end-user demand for speed and convenience may foster innovation by PSPs and increased competition over prices and service characteristics. Indeed, some fast payment implementations have been designed to encourage competition and innovation.⁴² To the extent that fast payments substitute for traditional payment methods, such as payment cards, these competitive forces may also affect pricing and innovation for those traditional payment methods.

⁴² In Australia, where the NPP is being developed in response to strategic objectives on payments innovation set out by the Reserve Bank of Australia, the Real-Time Payments Committee established by the Australian Payments Clearing Association identified the multi-layered infrastructure design of the NPP as promoting competition and innovation in payment services.

The competitive implications of fast payments may depend on the structural characteristics of the implementation in a particular jurisdiction. As described in Section 3.5, the provision of fast payments can be organised in a number of ways, with differences based on the number of fast payment systems, the degree of system interoperability, and the openness of systems to different types of participant. As noted in that previous discussion, the number and interoperability of systems may influence whether competitive effects of fast payments primarily arise at the PSP level, as would occur with a single system, or also at the system level, as could occur with multiple systems.

The openness of systems may also influence the nature of competition between banks and non-banks.⁴³ A fast payment implementation focused on banks may allow banks to retain the payment relationship with their customers and, hence, let bank accounts continue to play a central role in payment systems. Such an arrangement could enable banks to avoid being disintermediated by non-bank entrants. On the other hand, arrangements open to some form of participation by non-banks may yield additional competition for fast payment services, without requiring non-banks to develop potentially limited fast payment solutions (eg closed systems with limited coverage of end users). Meanwhile, although certain financial risks may arise regardless of participation by non-banks, participation by non-banks and associated potential regulatory differences between banks and non-banks may lead to differences in risk mitigation measures in fast payments, and hence to the likelihood that risks will materialise.⁴⁴

In the light of the potential implications for competition and risks, stakeholders and authorities may need to consider the openness of a fast payment implementation, including openness to non-banks and more general forms of participation (eg indirect participation in clearing and/or settlement). Central banks may need to specifically consider how access to central bank accounts and services affects the openness of a fast payment implementation. Such an evaluation could further consider how participation by various types of entity or different forms of participation might affect the fast payment experience for end users, as well as the broader risk and efficiency of fast payments.

6.2 Issues for central banks

Issues stemming from central banks' role in the payment system

Central banks can have various roles in the payment system: a catalyst role, an oversight role and an operational role (see Annex 1). The implementation of fast payments in many jurisdictions raises issues related to the various roles of central banks and the policies they could pursue.

Catalyst role

As catalysts for change, central banks use their influence, knowledge and analytical capabilities, normally in cooperation with other authorities and industry stakeholders, to facilitate the achievement of desired public policy outcomes, such as the deployment of fast payments.

In particular, central banks may help address coordination issues in implementing fast payments. The ability to reap the potential benefits that could be obtained by the general adoption of fast payments may require significant cooperative steps by the industry as a whole. As noted in Chapter 3 and in the previous subsection, fast payments can be provided by incumbent PSPs (eg banks) or new entrants. In practice, it can often be a mix of the two. Incumbents may lack incentives to incur the costs associated with developing a fast payment offering, but inaction might in the long term lead to a loss of market share to new providers. New entrants in turn may find it difficult to reach the point where they can benefit from economies of scale and network effects. End users may thus be faced with a fragmented market and

⁴³ In an earlier report, the CPMI considered the types of non-bank involvement in retail payments, as well as drivers and potential implications of that involvement. See CPMI, *Non-banks in retail payments*, September 2014.

⁴⁴ The CPMI report on *Non-banks in retail payments* discusses some of these risks, with particular emphasis on operational risk, fraud risk and consumer protection issues, and legal risk.

multiple competing fast payment implementations (or lack of such implementations), which could be a suboptimal outcome from the perspective of safe and efficient payment systems.

In addition, central banks may contribute to the debate on fast payment implementation by adopting a more strategic, long-term perspective and taking into account potential positive externalities. For example, the implementation of fast payments can be a strategic project for the payment industry as a whole in which, absent a central bank perspective, short-term individual costs might be more apparent than long-term benefits. The catalyst role might also be particularly useful to foster the use of common technical and business standards when the market is excessively fragmented. The adoption of common technical and business standards might be particularly important for cross-border fast payment initiatives.

Finally, as users of retail payment systems or providers of payment services to other parties, central banks may be able to help realise economies of scale and network effects in fast payments. For example, most central banks act as banking agents (and thus as paying agents) for the government and various public bodies. The payment systems and instruments used by a government and the central bank on its behalf may help provide the critical mass that can lead to the widespread use of a particular system, such as a fast payment system.

Some recent examples of central banks acting as catalysts for change in relation to the implementation of fast payments are described in Chapter 3 (see Box E on experiences from Australia, Mexico and the United States and Box F on the development of pan-European instant payments in euros). These actions by central banks have resulted from a number of considerations related to the implementation of fast payments. Even though a large majority of CPMI central banks acknowledge that the central bank may play a catalyst role in relation to fast payments, not all CPMI central banks have actively played this role or have done so with the same degree of involvement.

In general terms, three high-level approaches can be identified. It should be stressed that these approaches may pertain only to fast payments, rather than reflecting the policy stance of a central bank with respect to its activities as catalyst in the broader payment system. Moreover, the role of the central bank as catalyst for fast payments may not be static and may not necessarily end once a fast payment implementation is realised. Instead, the catalyst role with respect to fast payments may evolve based on conditions, circumstances and experience in a jurisdiction.

- Low degree of involvement: some CPMI central banks (eg Turkey and Russian Federation) have not actively promoted fast payments in their role as catalyst for change. In some cases (Turkey), this may reflect the fact that the implementation of fast payment services could be accomplished by private sector actors without external support, guidance or coordination from the central bank. In the Russian Federation, the development of fast payments had not been considered by the Central Bank of the Russian Federation before 2016. Currently, the Bank is conducting research on new financial technologies for different topics including fast payments.
- Moderate degree of involvement: a second group of CPMI central banks, such as the Swiss National Bank and Sweden's Riksbank, which have traditionally been less involved in retail payment issues, have adopted an intermediate approach. While not pursuing a specific strategic policy objective to develop a fast payment system, both central banks have a mandate to secure and facilitate the operation of cashless payment systems. They are thus open to facilitating the dialogue of market participants and providing analytical resources and guidance when necessary.
- High degree of involvement: some central banks consider the implementation of fast payments a strategic policy objective in the field of retail payments, for example to modernise the country's payment infrastructure and bring it onto a par with that of other economies, contribute to payments innovations, improve the general speed of payments, coordinate efforts in order to prevent fragmented solutions or facilitate financial inclusion and enable faster remittances. These central banks serve as catalysts in various ways by, among other things, developing strategic goals, communicating expectations to the market, conducting analysis about relevant issues, and creating or steering groups for the various stakeholders with the aim of helping to overcome

potential coordination issues between different types of provider. The Eurosystem or the central banks of Australia, Mexico or the United States could be mentioned as examples of this approach. In some cases, such as Mexico, the role as catalyst has been combined with, and seems to reinforce, strong operational support. In Australia, as well as having undertaken a strategic review that helped catalyse the New Payments Platform (NPP), the central bank will have a key operational role as provider of the NPP's Fast Settlement Service (FSS). The central bank is also a participant in the NPP, reflecting its role as provider of some banking services to the government. In the case of the Eurosystem, the role of the central banks as catalysts for change has been fundamental in launching the SEPA instant payments project and provide momentum. With regard to the operational services that the central banks could provide, the Eurosystem will launch and closely monitor an investigation with market participants on the necessity of extending settlement operating hours for a subset of its regular settlement services up to 24/7/365 to allow for real-time settlement of instant payments.

In view of the various issues described above, a central bank might wish to consider adopting a comprehensive and long-term perspective to analyse the impact of developing fast payments in its jurisdiction. In view of these issues and the various approaches identified, it may also wish to consider developing a comprehensive and consistent strategy to promote the most efficient outcome in relation to fast payment deployments in accordance with its mandate. To implement such a strategy, a central bank should determine the most appropriate type of involvement, which could include helping to organise a cooperative framework for the different stakeholders (eg authorities, various types of provider and representative from the demand side) and creating the necessary bodies.

Oversight role

The oversight function seeks the safety and efficiency of payment systems. As analysed in previous chapters, fast payments can provide various benefits and increase efficiency for both PSPs and end users but, at the same time, they raise certain risks that need to be managed. Most of these risks are similar to those present in other retail payment systems, although the speed and continuous availability of fast payments may change the risk profile of fast payments compared with that of traditional retail payments.

An area that may deserve special attention by central banks from an oversight perspective, because of both its importance and the changes fast payments introduce relative to traditional payments, is the management of financial risks in fast payment systems that rely on deferred settlement arrangements. As discussed in previous chapters, the deferral of settlement generates credit exposures between the PSPs participating in the fast payment system, while the receiving PSP has to advance final funds to its end customer in order to ensure payments are processed with the required speed at the customer level. The combination of these two effects – the first being common to all deferred settlement systems, and the second being a defining characteristic of fast payments – suggests that financial risk management may warrant particular attention in order to ensure the system's smooth functioning. Liquidity risk management in the case of deferred settlement is a further consideration in this respect, particularly for fast payment systems that conduct settlement cycles outside normal business hours.

Central bank oversight, depending on the importance of the specific system and the policies applied in a particular jurisdiction, can be instrumental to ensure that a fast payment system working under a deferred settlement arrangement has sufficient liquid resources to cover the default of one or several participants.⁴⁵ Some fast payment systems based on deferred settlement have chosen to operate on a "cover all" basis, so that the net debit positions of all participants are prefunded with cash at all times, with the intent of eliminating credit exposures between participants. In other cases, this approach has not been chosen, taking into account the limited volumes involved in new implementations and the fact that a strict cover-all approach could represent a deterrent for potential new entrants.

⁴⁵ Central banks could alternatively encourage real-time settlement arrangements to eliminate credit risk, although this position may require changes to central bank services, as discussed subsequently in relation to the operational role of central banks.

Similarly, real-time settlement systems eliminate credit exposures, but may also raise traditional issues related to liquidity risk management. Further, real-time settlement with limited liquidity during off hours may increase the probability that retail payments will remain unsettled or even be rejected, even though a bank is solvent, if it does not have sufficient off-hours liquidity to complete settlements. Liquidity risk mitigation and management could be very important in such systems.

Central bank approaches to oversight may have important implications for fast payment implementations. In their oversight of systemically important payment systems, central banks apply the PFMI as the common global minimum standard. In the case of payment systems that lack systemic importance, as may be the case for fast payment systems as for many other retail payment systems, the oversight mandates and standards applied by central banks in the CPMI jurisdictions differ; some central banks have a clear responsibility in this area, whereas others limit the scope of their oversight to systemically important payment systems. Some central banks apply some or all of the PFMI to retail systems. Others do not. It is likely that many fast payment systems, at least in their initial stages, will fall into the category of retail payment systems without systemic importance. Nonetheless, as stated in the text of the PFMI, all financial market infrastructures, including all payment systems, are encouraged to observe the PFMI.

In view of the issues noted in this subsection, central banks might wish to consider whether existing oversight is appropriate in the light of emerging fast payment systems, adequately addresses the risks posed by fast payment deployments, and is useful in promoting the efficiency gains they may bring about. Central banks may wish to especially consider risks associated with clearing and settlement in fast payment implementations based on deferred settlement and whether strict risk control measures (eg "cover-all" clauses) or real-time settlement systems should be promoted in some instances if justified by the importance of the specific fast payment system, inter alia, given its overall transaction volume and associated risks. A central bank could also consider whether, in its jurisdiction, the oversight framework allows for a level playing field in relation to the oversight of the different initiatives and providers. Across jurisdictions, central banks might wish to consider whether existing oversight frameworks and policies as applied to fast payment implementations allow for the development of a level playing field globally. This aspect will become increasingly important if and when international deployments gain traction.

Operational role

Central banks are usually the operators of the core large value payment infrastructure in each jurisdiction: the real-time gross settlement (RTGS) payment system. Additionally, central banks may provide other types of specialised settlement service (beyond the scope of the RTGS system), including services for conducting settlement of retail payment systems. They also provide the only risk-free settlement asset (central bank money) and normally establish and operate mechanisms to provide intraday liquidity (usually against collateral or at a certain cost). The direct operation of retail payment systems by central banks is less widespread, although in some jurisdictions, central banks have a long history of operating such systems, sometimes in competition with privately operated systems.

RTGS systems and other settlement systems have extended their operating hours in the past few decades, but few of these systems operate continuously on a 24/7 basis, as might be needed for certain fast payment implementations. In some cases, RTGS systems have been adapted to offer some limited functionalities for longer periods of time (eg to facilitate night-time settlement in central bank money for other systems with pre-reserved liquidity). The RTGS opening hours usually determine when financial markets are open to settle transactions. When the RTGS system is closed, interbank payment transactions typically cannot be settled, and there may be limited or no practical channels for obtaining liquidity against collateral from the central bank.

The implementation of fast payment systems that provide final funds to the payee on a 24/7 basis raises issues related to central banks' services and, in particular, whether the operational involvement of central banks in payment systems might change as a result. These issues are relevant even if the central bank is not directly involved in the operation of retail payment systems, because the services mentioned

above (ie final settlement in central bank money in the RTGS system or specialised settlement system, as well as liquidity provision mechanisms) might be important for the smooth functioning of the fast payment system.

In addition to the types of service provided by the central bank, access criteria to those services is also relevant for the implementation of fast payments. Central banks may need to specifically consider how access to central bank accounts and services affects the openness of a fast payment implementation. In an implementation that involves settlement in central bank money, or requires additional central bank services (eg clearing), broader direct access to central bank accounts and services may enable broader participation in the provision of fast payments. Where this approach is legally possible and can successfully address policy issues, this approach could enhance competition. Such changes, however, may have implications in different areas, including the potential disintermediation of banks as deposit-takers and providers of payment services, and issues related to the regulation and supervision of non-banks. Enhanced indirect access by non-banks to central bank accounts and services might also be possible in some jurisdictions where, for example, banks with direct access to central bank accounts sponsor efficient settlements by non-bank PSP customers.⁴⁶

Central banks may wish to consider analysing the different levels of operational involvement that might be required from the central bank, access criteria for these services, and the potential changes that might be required in the central bank's own systems in order to support those levels of operational involvement, including their costs and benefits. In order to facilitate discussion on these issues, the next section includes a description of several simplified high-level scenarios that highlight the main options for central banks in providing operational support for fast payment implementations.

High-level scenarios for central banks' involvement

Focusing on the potential level of operational support, several scenarios can be identified. First, a central bank could decide not to implement any changes in the central bank services provided, so that a fast payment system would rely on pre-existing services (ie those already provided to existing retail systems). In many cases, this implies allowing the settlement of fast retail payment systems using existing settlement facilities, including the RTGS system or an existing specialised settlement system. In the scenarios discussed here, the "business as usual" scenario is assumed to correspond to the provision of central bank settlement services to a fast payment system akin to those for traditional retail payment systems. Other central banks may decide to offer a higher level of support, which could involve the provision of modestly enhanced settlement services that accommodate the special requirements of a fast payment system but do not significantly change the operating hours or functionality of central bank systems. A still higher level of support could involve the provision of settlement services on a 24/7 basis or possibly the operation of a fast payment system as a system operator. Depending on the initial range of central bank services provided, the options described above entail different changes in the services provided. Central banks may also consider their approach to liquidity provision as part of the overall level of support provided for settlements of fast payment systems.⁴⁷ For the sake of completeness, a total lack of involvement by a central bank in settlement for fast payment systems may be considered as a potential option. In this case, the central bank would not provide any service at all to fast payment systems. This arrangement would diverge from the types of service that are usually provided to existing retail payment infrastructures and

⁴⁶ For example, a bank's account would be credited or debited with settlement amounts from the fast payment service, and the bank would retain full responsibility for managing its account at the central bank. However, the non-bank might transmit settlement data directly to the central bank with the agreement of the central bank and the sponsoring bank in order to conduct timely and efficient settlements.

⁴⁷ Depending on the model applied by the central bank, the provision of liquidity as lender of last resort beyond normal business hours may also require the availability of collateral services in order to pledge collateral as guarantee for the provided liquidity. This issue has to be considered throughout this section whenever the provision of liquidity beyond normal business hours is contemplated.

would imply that the fast payment system operates in a completely independent manner and settles in commercial bank money.⁴⁸

The four high-level scenarios identified are described below and summarised in Table 5.

Scenario 1 ("Business as usual")

In this scenario, a central bank would aim to offer fast payment systems the same kind of support it currently provides to other retail payment systems without changing the operating hours of the RTGS system, other specialised settlement services or liquidity provision mechanisms. Thus, the RTGS system or specialised settlement system may support the final settlement of the fast payment system, as it does for other retail payment systems, and may act as liquidity provider, but only when the RTGS system or specialised settlement system is open.

If the fast payment system settles on a deferred basis, it is likely that settlement cycles will be restricted to business hours during weekdays. During weekends, bank holidays and beyond business hours, the net debit positions of participants might grow. If the clearing and settlement system works on a prefunded basis, or if it has binding limits on the net debit positions of PSPs, payments might be rejected if the limits are reached outside of normal business hours, as participants will not be able to access additional liquidity. Alternatively, settlement cycles beyond normal business hours could take place in commercial bank money. If the fast payment system works with real-time settlement, the scenario would require settlement in commercial bank money during times when the RTGS or other specialised settlement system is closed.

A central bank could opt for the approach in Scenario 1 for various reasons. In some cases, it could be perceived that no changes are required as the size of the fast payment system may be very small and, thus, the financial risks associated with the deferral of settlement or settlement in commercial bank money are not significant enough to warrant changes in central bank operations.

This approach may alternatively be viewed as a solution that allows industry stakeholders to proceed with fast payment projects with satisfactory risk management, but without reliance on changes in central bank services. Presumably, central banks would reserve the option of changing their initial approach if the scale of fast payment systems and associated risks warrant such a change.

In Italy, for example, the Jiffy fast payment service was implemented by market providers without requiring changes in retail clearing and settlement systems or in the RTGS system. Jiffy involves a technical platform that connects all participating PSPs and supports instant message-switching among participants for the registration of credit/debit positions originated by instant payment transactions. This allows PSPs to provide fast crediting and debiting of the end users' current accounts. Each fast payment is then processed as an ordinary credit transfer (SEPA credit transfer, SCT) in the first available time slot. The netting phase, operated in batches, and the settlement phase are operated by any of the infrastructures and payment systems in the SEPA area that support the processing of credit transfers executed according to European standards. Limits on the maximum value of fast payments as well as caps on participant exposures mitigate the credit risk arising among participants due to deferred settlement.

Similarly, in India, it was considered possible to provide fast payments without necessitating changes to central bank operations while still deploying tools to adequately manage risks. In India, IMPS involves interbank settlement on a deferred net basis in the RTGS system operated by the central bank, with multiple cycles during the operating hours for the RTGS system. Liquidity support from the central bank is available only during the RTGS system operating hours. For transactions taking place on weekends and holidays, when the RTGS system is not operating, settlement takes place on the next working day. However, the credit risk exposure is addressed through appropriate risk management processes, including a settlement guarantee mechanism that also determines the exposure limits of the members.

⁴⁸ This situation could apply, for example, if closed systems are the only providers of fast payment services.

Scenario 2 ("Moderate support")

In this scenario, a central bank could offer some limited functionalities in the RTGS system or specialised settlement system to support the settlement of fast payments beyond normal business hours. The central bank might also provide liquidity facilities, for example, through the definition of rules that allow a fast payment system or its participants to use central bank money or assets maintained at the central bank to fulfil reserve requirements during off-hours, without affecting operations in a substantial way. Some changes to intraday or overnight liquidity facilities might also be tailored to use by participants in fast payment systems.

One option in this respect would be the provision of limited settlement facilities in the RTGS accounts or other accounts during nights and/or weekends. These facilities could be used to support the settlement cycles of fast payment systems that employ DNS. Another option would be the provision of an account to a fast payment system operator (or possibly a set of accounts to participants in the system) in which liquidity in central bank money could be blocked overnight and during weekends in order to guarantee settlement, allowing the fast payment system (with either deferred or real-time settlements) to operate independently when the RTGS system is closed by mirroring the liquidity available in the RTGS accounts or other accounts. However, the liquidity available in these arrangements might not be sufficient to ensure all transactions are settled, and the central bank may wish to consider establishing a mechanism to offer liquidity provision mechanisms during nights and weekends to provide additional liquidity if necessary. This scenario admits various alternatives that have differing degrees of complexity and cost.

Some central banks may opt for the approach in Scenario 2 on the basis that it allows for better risk controls and supports settlement risk reduction better than the previous scenario. In particular, it may allow for the elimination of credit exposures altogether if real-time settlement between PSPs is supported or if settlement is prefunded with central bank funds. However, this approach possibly requires fewer changes, and thus lower adjustment costs, related to central bank services, as compared with scenarios 3 and 4 below.

Sweden has followed this approach. The Riksbank created a special fiduciary account in RIX for Bankgirot (a clearing house), which operates the fast payment system BiR. RIX is the central bank's RTGS system.⁴⁹ Bankgirot registers the transfers it receives via RIX in the appropriate participant's settlement account in BiR. A positive balance on the fiduciary account provides liquidity in BiR, even outside the RIX operating hours. The sum of funds on all settlement accounts in BiR is always equal to, and backed by, the funds in central bank money in Bankgirot's fiduciary account, which eliminates credit risk. This setup required some changes in the central bank's system and in the agreement that all participants in RIX have to sign.

Scenario 3 ("24/7 RTGS or special settlement services")

In this scenario, a central bank makes considerable efforts to support the adoption of fast payments in its jurisdiction and the management of risks in fast payment systems. This could include extending operating arrangements for settlement services it provides, such as extending the operating times of the RTGS system or establishing a special settlement service available 24/7, along with arrangements for liquidity provision so that the smooth functioning of the system is assured. This could be an effective way to support settlement in central bank money of fast payment systems with either deferred or real-time settlement.

⁴⁹ Bankgirot is licensed as a clearing house by the Swedish Financial Supervisory Authority, and the fast payment system BiR is a notified settlement system in line with the EU Settlement Finality Directive. Bankgirot clears and settles BiR transactions but is not a party to the transactions. It offers settlement accounts to banks for the purposes of clearing and settlement of fast payments. As a licensed clearing house, Bankgirot can participate directly in RIX and thus hold accounts at the Riksbank. One of these is a fiduciary account held for the benefit of participants in the BiR service with the sole purpose of enabling settlement of fast payment transactions on a 24/7 basis. The fiduciary account structure helps ensure that, in the unlikely event of an insolvency of Bankgirot or a participating bank, the funds of the participants are protected and that potential counterparty credit risk in the BiR system is controlled.

Central banks could opt for this approach when the financial risks associated with deferred settlement or settlement in commercial bank money are perceived to be substantial (especially in consideration of possible increases in the volume and values of transactions) or as a result of their coordination or leadership of joint public-private efforts to modernise the retail payment ecosystem. However, this approach is likely to involve investments to upgrade or develop systems and is likely to require some arrangements for greater availability of central bank staff from an operational perspective.⁵⁰

The actions taken by the Reserve Bank of Australia in relation to the proposed NPP provide an example. The Reserve Bank of Australia played a catalyst role in establishing the broad direction of the industry's efforts. It also undertook to build the NPP's settlement component, the Fast Settlement Service, to allow transactions to be settled individually on a 24/7 basis, in near-real time. The Reserve Bank of Australia has also subscribed as a project participant, with the expectation that its Banking Department will use the NPP infrastructure.

Scenario 4 ("Central bank as fast payment system operator")

In this scenario, a central bank would provide not only settlement, but also clearing services, offering a maximum level of support for fast payments. This would likely involve developing a specific clearing system or a clearing module for fast payments that works continuously within the RTGS system. Further, to support the capability for real-time settlement in central bank money, a central bank may also provide full operation of the liquidity provision mechanisms. This scenario is likely to be associated with the failure of the market to provide fast payment services, but may also be the result of a collective decision by the different stakeholders.

An example of this approach is Mexico, where the central bank implemented changes in SPEI, the RTGS system owned, regulated and operated by the central bank, so that it could be used as a fast payment system for end users. This approach was chosen to promote the use of electronic payment systems, in the light of end-user needs for a fast interbank payment system. An additional consideration was that SPEI had excess processing capacity that could be leveraged for the fast payment implementation. The Bank of Mexico further implemented a mechanism to provide liquidity to SPEI participants on a 24/7 basis (see Box I).

Summary of the scenarios

The likely implications for each of the four scenarios are summarised in Table 5, ordered in terms of increasing central bank involvement. It should be emphasised that these scenarios provide stylised examples for purposes of exposition. The actual situation in each jurisdiction may vary, representing a continuum of options for consideration rather than a limited number of clear-cut scenarios. Scenario 2 in particular seems to admit a wide range of alternatives that could be implemented.

⁵⁰ As noted previously, central banks have been gradually lengthening daily RTGS system hours over time in response to wholesale market issues, although weekend operations are generally considered a novel development.

Summary of scenarios

Table 5

Scenario 1 <i>"Business as usual"</i>	Scenario 2 <i>"Moderate support"</i>	Scenario 3 <i>"24/7 RTGS or special settlement services"</i>	Scenario 4 <i>"Central bank as fast payment system operator"</i>
<p>Settlement in central bank money is only possible during the RTGS system opening times.</p> <p>In fast payment systems with <i>deferred</i> settlement, settlement cycles will likely be restricted to business hours during weekdays; payments might be rejected if binding net debit limits are reached, as participants will not be able to access additional liquidity.</p> <p>In fast payment systems with <i>real-time</i> settlement, this scenario would require settlement in commercial bank money during the off-hours of the RTGS system.</p>	<p>Limited functionalities are available to support the settlement of fast payments beyond normal business hours.</p>	<p>Real-time settlement in central bank money is possible on a 24/7 basis. Additional liquidity can be provided at all times.</p> <p>Can support both <i>deferred</i> or <i>real-time</i> fast payment systems.</p>	<p>Does not necessarily entail the development of a new system, but requires a significant adaptation of the RTGS system or a specialised settlement system.</p> <p>Building a new system is a possibility.</p> <p>Requires a significant adaptation of the RTGS system <i>and</i> the development (or significant adaptation) of a separate clearing infrastructure.</p> <p>Building a new system is a possibility.</p>

It is important to highlight that these scenarios are not static, as central bank involvement usually changes over time. This involvement might be reduced in case of small deployments or during the initial stages of a wider project, but may intensify if and when one or more projects gain traction. In the EU, for example, the project to develop a pan-European scheme for instant payments in euros is under way and the extent of central bank operational support is being determined, as the Eurosystem will launch and closely monitor an investigation with market participants on the necessity of extending settlement operating hours for a subset of its regular settlement services up to 24/7/365 to allow for real-time settlement of instant payments.

Other issues for central banks

Fast payments may raise additional issues for central banks beyond the three traditional roles in payment systems as catalysts for change, overseers and operators. Some of these additional issues, such as those related to the provision of liquidity beyond the current normal business hours, have been discussed in the previous section because they were closely intertwined with the operator’s role. This section briefly describes other potential considerations related to fast payments in areas that are usually within the central bank’s mandate. The importance of these issues will depend on the degree of adoption of fast payments and the types of payment processed by the fast payment implementation: if fast payments coexist with cash and other types of payment and remain an instrument for mainly low-value transactions, the impact on other areas such as financial stability, monetary policy and reserve management is likely to be negligible.

Competitive impact of fast payments on cash

In most CPMI countries, the provision of currency (ie cash or banknotes) is the responsibility of the central bank or other government agency. Cash in particular is fast and available 24/7, although only for proximity payments. Depending on the relative costs, transaction limits, convenience and use case, payments that are currently made with cash could migrate to a fast payment system.

Given that many P2P payments and a large portion of P2B payments in retail settings are conducted in cash,⁵¹ a fast payment system designed for these use cases could reduce the market share of cash, as is the case with other electronic payments. While the central bank's bank note production and distribution costs could fall as a result, so would seigniorage revenues. Moreover, if the impact of fast payments on the use of cash was significant, economies of scale in the production and distribution of cash could decline, increasing unit costs and affecting its availability and convenience, particularly in remote areas. However, cards and other payment instruments also compete with cash, and the incremental impact of a fast payment system on cash use could be much lower than the overall change due to competition from all types of non-cash payment. In general, the use of cash would become less convenient and more expensive in relative terms for the market. For example, a recent report from Sweden's Riksbank noted that one of the key issues from this trend is the growing number of points of sale refusing to accept cash. The report estimates that, as cash use diminishes, the costs related to cash processing are expected to rise.⁵²

Competitive impact of fast payments on the RTGS system

The need to consider changes in the RTGS system to facilitate the implementation of a fast payment system has been discussed earlier in this chapter. The impact, however, can also work in the opposite direction: a successful fast payment implementation could impact the RTGS system in several ways.

In many countries, the RTGS system is currently an option for fast payments, although the speed is only guaranteed for interbank settlement, and the availability is limited to the system's operating hours, which are typically not 24/7. Even though RTGS fees in most jurisdictions are comparatively high for retail payments, many RTGS systems process significant volumes of customer payments, many of which are relatively low-value compared with interbank payments.⁵³ This could be taken as evidence that end users require fast, final and irrevocable payments for certain use cases and are willing to pay a higher relative cost for these attributes.

A fast payment system adapted to the type of payments currently processed in the RTGS system (eg relatively high value limits, serving B2B or P2B use cases) would have the additional advantages of continuous availability and high end-to-end speed (ie beyond interbank settlement). As a consequence, a significant share of customer payments currently processed in the RTGS system may migrate to a fast payment system should this channel become available. As a result, the volume of transactions processed

⁵¹ A recent survey found that cash is the predominant payment method for consumers in all seven jurisdictions surveyed, accounting for 46% to 82% of transactions: see J Bagnall, D Bounie, K Huynh, A Kosse, T Schmidt, S Schuh and H Stix, "Consumer cash usage: a cross-country comparison with payment diary survey data", Federal Reserve Bank of Boston, Working Paper, no 14-4, May 2014. A study by the Reserve Bank of Australia noted that, while cash remained the most-frequently used payment method, its estimated share of the number of household transactions in Australia had fallen from 69% in 2007 to 47% in 2013: see C Ossolinski, T Lam and D Emery, "The changing way we pay: trends in consumer payments", Reserve Bank of Australia, Research Discussion Paper, no 5, June 2014.

⁵² B Segendorf and A Wilbe, "Does cash have any future as legal tender?", *Riksbank Economic Commentary*, no 9, 2014. Similarly, a study by the Reserve Bank of Australia found that, although cash remains one of the least costly payment methods at point of sale, the estimated resource cost of cash transactions in Australia had increased between 2006 and 2013 from \$0.37 to \$0.48 per average-sized transaction, reflecting the decline in its use: see C Stewart, I Chan, C Ossolinski, D Halperin and P Ryan, "The evolution of payment costs in Australia", Reserve Bank of Australia, Research Discussion Paper, no 14, December 2014.

⁵³ For example in 2014 in Canada, approximately 61% of LVTS payments made were for values under CAD 50,000. In 2013, the median value of Fedwire payments was approximately USD 19,900: see *Assessment of Compliance with the Core Principles for Systemically Important Payment Systems*, Federal Reserve Board, 2014. In the United Kingdom in 2015, the median value of a CHAPS payment was GBP 7,000: see *CHAPS Statistics*, CHAPS, 2016.

in the RTGS system could fall, which could in turn affect the cost recovery objectives of the central bank or other entity operating the system. The decline may lead to an increase in fees for remaining interbank payments or the need to subsidise the RTGS system.

The impact may depend on the settlement model chosen by the fast payment implementation. For example, a fast payment implementation based on DNS could potentially shift a large number of transactions from the RTGS system to the fast payment implementation and would bring no additional volumes to the RTGS system, beyond a few payments to settle the multilateral net debit positions between participants in the fast payment system. The impact of a fast payment implementation based on real-time settlement is less obvious, as every transaction in the fast payment system could result in a settlement payment within the RTGS system or in a specific module designed for this purpose. As technology evolves, transaction-by-transaction settlement of retail payments in the RTGS system will likely become more cost-effective, which could lead to an increase in volume. The risk and efficiency trade-offs of DNS versus RTGS may narrow as larger volumes are processed in a single system. For example, the design of the Australian NPP envisages that every transaction will be settled individually, in real time, around the clock at the central bank, given that the Reserve Bank of Australia's Fast Settlement Service is designed to provide real-time settlement even out of hours.

Implications for monetary affairs and financial stability

The overall implications of a fast payment system for monetary policy and financial stability will depend on its relative importance within the broader payment system. Volume, value and design considerations, including risk controls, are important considerations. The impact of this type of system should be manageable insofar as the fast payment system is limited to retail size payments. Nevertheless, consultations with the relevant experts in monetary policy areas and ongoing analysis of the final design of a system are desirable to avoid unintended consequences for monetary policy implementation.

Most CPI central banks require banks to fulfil reserve requirements, and the balances held to satisfy those requirements are usually remunerated (at least partially). In addition, balances held to satisfy reserve requirements are usually measured based on end-of-day balances in the banks' accounts at their respective central bank. Most fast payment implementations do not require participating banks to open a special account for the settlement of fast payments, as settlement takes place through the RTGS accounts or other existing settlement accounts. As a result, and because fast payments operate on a 24/7 basis, at a minimum, the beginning and end of the value date must be clearly defined for existing central bank accounts used for settling fast payments and for holding reserves. Among other things, central banks may need to review the rules and processes for reserve maintenance in the case of continuous central bank operations, including the weekend. Central banks may also need to consider if procedures and requirements need to be adapted to a context in which banks' reserve balances may vary even during off-business hours.

Some CPI central banks (eg Australia, Canada and Sweden) do not impose reserve requirements, but direct participants in the RTGS or other payment systems may hold funds overnight in settlement accounts. These accounts cannot be negative (ie institutions may have to borrow funds at a policy rate or possibly a higher rate to meet any shortfall and ensure final settlement). Again, a fast payment system working on a 24/7 basis would require updates to forecasting tools and liquidity management processes to ensure these activities reflect the impact of the faster payment service. As a consequence, the impact of fast payments on monetary policy implementation and the banking system's overall liquidity may raise some uncertainties for participants and central banks that would need to be addressed.

Central banks may also need to consider whether any new settlement practices or systems would affect the demand for or supply of the balances that depository institutions place with their central banks, requiring an adjustment to monetary policy operating frameworks. On the supply side, if a settlement system requires depository institutions to shift balances into a separate entity's account, such transfers could result in increased volatility in end-of-day reserve balances. This volatility in reserve supply may be

an important consideration for monetary policy implementation, particularly for central banks that rely on being able to exert tight control over the supply of balances to achieve a target interest rate.⁵⁴

On the demand side, the mechanisms underlying a fast payment system – in particular the settlement between PSPs – may interact with bank behaviour in interbank markets and change the demand for reserves at certain times during the day. For example, one issue is that, if an institution expects that its reserve account could be drained by settlement activities that occur after the “end of the day”, the institution may need to hold higher balances at the close, possibly increasing the aggregate structural demand for balances. Another issue is that fast payment flows could prove difficult to anticipate, which could lead to some money market volatility. Furthermore, in some situations, additional collateral needs might affect the liquidity and yield of securities accepted to guarantee fast payments. To address such issues, banks that are persistently concerned about the level and timing of funding obligations might seek to continuously hold higher balances that could work as a buffer against volatility. In principle, contracts between PSPs could also be designed to smooth flows of funds across settlement points or between the settlement of fast payment systems and other systems.

Central banks also have a number of tools at their disposal to limit such volatility, should it materialise. For example, the extent of this volatility could depend on central bank policies for the provision of intraday and possibly overnight credit. In addition, settlement times and their relationship with end-of-day cut off times could be crucial to reduce the possible volatility in money markets.

Overall, payments and settlements of fast payment systems have to date been small relative to the flow of payments and settlements regularly managed in wholesale payment systems and related markets, and adverse monetary consequences have not been reported. Careful design and management by PSPs, working with fast payment system operators and involving analysis and advice from treasury management experts and other relevant staff, can help to avoid undesirable reserve management and monetary developments and to probe for unintended consequences. These efforts are particularly important if special design issues, operating conditions or monetary arrangements present unique issues in a particular jurisdiction. Central banks can also play an important role by continuing to monitor and analyse payment and settlement designs and flows involving fast payment systems as well as their effect on markets. As appropriate, central banks may also choose to engage PSPs and fast payment system operators in dialogue about relevant reserve management and monetary issues.

Considerations that could generate possible implications for financial stability have been discussed in Chapter 5. Specifically, as is the case with any payment system, risks, particularly financial and operational risks, must be well managed to prevent and mitigate the systemic or system-wide impact of participant defaults or operational issues. The need for risk management is particularly important given the 24/7 operating hours and the speed at which payments are processed. Moreover, a successful system will likely have very broad coverage in terms of PSPs and end-users. As the number of use cases and volume and value increases, the system could become more central to the financial system and could become of systemic importance.

Fast payment systems are often interdependent with other, often systemically important, financial market infrastructures such as for settlement or pledging of collateral. A service that provides cross-border payments would also raise considerations related to interdependencies with infrastructures in other jurisdictions that could broaden the financial stability implications.

If appropriate risk management measures are not in place to prevent and mitigate these concerns, an outage in a significant fast payment system, or a default, could quickly lead to significant disruption in the broader financial system and the real economy. Even a short-lived problem could undermine confidence in the system itself or the broader payment system. Risk management must therefore be continuously assessed and enhanced as needed to reflect the growing importance of the

⁵⁴ The risk of interest rate volatility would not be a concern for “floor” systems of monetary policy implementation. A floor system of monetary policy implementation is a system in which the supply of reserves is abundant and intersects the flat portion of the demand for reserves.

system. In this regard, a more strategic outlook may be considered in order to adopt higher risk standards at the outset in the light of these risks and in anticipation of the potential for increasingly significant volumes and centrality. The implications for recovery and resolution plans and tools must also be considered in the light of the 24/7 nature of a fast payment system.

Settlement of a fast payment system outside the central bank could also have financial stability implications. For instance, the possibility of payments migrating from an RTGS system operated by the central bank to a fast payment system of this type may raise concerns in this area. Some payments, such as large-value interbank transfers, that, from a financial stability perspective, should preferably be settled in central bank money could instead be settled in commercial bank money which, *ceteris paribus*, would increase settlement risk and may give rise to financial stability concerns.

On the other hand, the possibility to make urgent payments outside the central bank's RTGS could, in certain scenarios, have positive effects for financial stability. Large banks operate on a 24/7 basis and, if banks were able to make certain large payments outside the operating hours of the central bank RTGS system, this might allow them to manage certain risks (eg operational or financial risks), particularly outside normal business hours.

The overall impact of a fast payment system on monetary policy and financial stability will depend on the relative importance of these aspects, and possibly others, in its jurisdiction. The impact of this type of system should be manageable insofar as the fast payment system is limited to low-value retail payments. Most central banks judge that the influence of this type of system on monetary policy and financial stability is limited for the time being.

7. Conclusions

The last few decades have seen substantial innovation in retail payment markets. Improvements to the speed and convenience for end users of retail payments is one area where notable innovations have taken place or are emerging in CPMI jurisdictions and elsewhere. At present, systems, schemes and services to provide fast retail payments to end users exist in a number of CPMI jurisdictions, and initiatives and proposals in various jurisdictions suggest that the trend towards implementation of fast payments will likely continue.

As seen in the examples discussed throughout this report, fast payment implementations differ markedly across jurisdictions, and these differences will likely persist as new implementations emerge, given the varying conditions, needs and public and private objectives across jurisdictions. Fast payment implementations are driven by advances in computing technology, related cost declines and changes in end-user expectations for fast delivery of any sort of information content including payments. As such, in many jurisdictions, fast payments are relatively novel for end users, PSPs and authorities. Over time, experience gained through current and future fast payment implementations, along with additional research and analysis, will serve to inform industry stakeholders and policymakers about the importance and implications of different features and implementation models.

In conclusion, while barriers to implementation may exist, fast payments have the potential to generate benefits to end users, industry participants and society that encourage implementation and adoption, most notably the ability to complete time-sensitive payments quickly. The implementation of a fast payment system can catalyse the modernisation of the country's overall payments infrastructure. At the same time, fast payments may involve certain risks that need to be appropriately managed. The evidence suggests that these challenges are being addressed in a growing number of jurisdictions, and practices to manage those risks may evolve as experience with fast payments increases. The implementation of fast payments may reflect the effect of important market developments, such as the diffusion of mobile technologies, on the demand for and supply of payments with increased speed and convenience, and may also reflect a broader vision of upgrading and modernising a jurisdiction's payment system. Because of the complexity of fast payments implementations, there might be a need to (i) consider the coordination of the overall effort of the different stakeholders and (ii) adopt a long-term strategic approach. Central banks and other authorities can play an important role in coordinating industry stakeholders and encouraging or facilitating such an upgrade.

Annex 1: Roles of central banks in the payment system

Central banks have an important interest in the safe and efficient functioning of retail payments, due to the key role retail payments play in the financial system and the real economy. Reflecting this interest, central banks have traditionally been involved in various ways in this area. Even though the responsibilities and mandates of central banks in relation to retail payments differ across CPMI jurisdictions, in general terms these responsibilities are usually discharged by exercising the traditional roles central banks play in relation to payment systems: as catalysts for change, overseers or operators. Table A presents the roles in which different CPMI central banks are engaged.

Roles of the central bank in the payment system						Table A
	Provision of banking services	Provision of settlement services	Provision of clearing services	Payment system oversight	Catalyst for fast payments	
Australia	✓	✓		✓	✓	
Belgium		✓		✓	✓	
Brazil		✓		✓	✓	
Canada	✓	✓		✓	✓	
China	✓	✓	✓	✓	✓	
ECB	✓	✓		✓	✓	
France		✓		✓	✓	
Germany	✓	✓	✓	✓	✓	
Hong Kong SAR		✓	✓	✓	✓	
India	✓	✓	✓	✓	✓	
Italy	✓	✓	✓	✓	✓	
Japan	✓	✓		✓	✓	
Korea	✓	✓	✓	✓	✓	
Mexico	✓	✓	✓	✓	✓	
Netherlands	✓	✓		✓	✓	
Russia	✓	✓	✓	✓	✓	
Saudi Arabia	✓	✓	✓	✓	✓	
Singapore	✓	✓		✓	✓	
South Africa	✓	✓		✓	✓	
Sweden		✓		✓	✓	
Switzerland ¹	✓	✓		✓	✓	
Turkey	✓	✓	✓	✓		
United Kingdom	✓	✓	✓	✓		
United States	✓	✓	✓	✓	✓	

¹ The RTGS system, SIC, is operated on behalf of the Swiss National Bank by SIX Interbank Clearing Ltd (SIC).

Catalyst role

As catalysts for change, central banks use their influence, knowledge and analytical capabilities, normally in cooperation with other authorities and industry stakeholders, to facilitate the achievement of desired public policy outcomes. This role is less formalised than other functions, such as oversight, but can effectively complement a central bank's oversight function. In many jurisdictions, the catalyst role may be influenced by concerns that safe, efficient and accessible retail payment services should be available across a jurisdiction, as well as concerns for the smooth operation of the monetary and payment system. Such a role may include the pursuit of specific policy objectives, such as the further integration of the payments market by ensuring common and interoperable standards or the advancement of financial inclusion through the provision of fast and affordable cashless solutions. In other jurisdictions, the development of retail payment services and infrastructure is left largely to the private sector, reflecting differences in central bank mandates and related policy objectives. In such jurisdictions, a catalyst role may be the primary route for central bank involvement in initiatives such as the implementation of fast payments.

Oversight role

As defined in the CPMI publication *A glossary of terms used in payments and settlement systems*, payment system oversight is "a central bank function whereby the objectives of safety and efficiency are promoted by monitoring existing and planned systems, assessing them against these objectives and, where necessary, inducing change".

Operational role

As discussed in Chapter 6.2, central banks are usually the operators of the core large-value payment infrastructure in each jurisdiction: the real-time gross settlement (RTGS) payment system. Additionally, central banks may provide other types of specialised settlement service (beyond the scope of the RTGS system). They also provide the only risk-free settlement asset (central bank money) and normally establish and operate mechanisms to provide intraday liquidity (usually against collateral or at a certain cost) in order to ensure the smooth processing of payments, particularly in the RTGS and related systems (see Table B). Central banks can also provide emergency liquidity by acting as lenders of last resort (LLR) if additional liquidity is needed to complete settlement. These services may be closely integrated, as central bank money is used as the settlement asset in the RTGS system (or other systems), and the provision of additional liquidity such as intraday credit may be channelled through this type of system.

 Provision of intraday liquidity (in normal circumstances)

Table B

	Repo	Collateralised provision	Uncollateralised provision
Australia	✓		
Belgium		✓	
Brazil	✓		
Canada	✓	✓	
China ¹	✓	✓	
Eurosystem central banks		✓	
France		✓	
Germany		✓	
Hong Kong SAR	✓		
India	✓		
Italy		✓	
Japan		✓	
Korea	✓	✓	
Mexico	✓	✓	
Netherlands		✓	
Russia		✓	
Saudi Arabia	✓	✓	
Singapore	✓		
South Africa		✓	
Sweden		✓	
Switzerland	✓		
Turkey		✓	
United Kingdom	✓	✓	
United States ²		✓	✓

¹ Repos are allowed not in the fast payment system but in the RTGS system. ² Intraday credit provided to a qualifying depository institution is subject to a cap, and any uncollateralised intraday credit is also subject to an explicit fee.

Annex 2: Summary of the stocktaking

General information on existing fast payment implementations in CPMI countries¹

Table A

Country	Implementation	Adapted/ built ²	Year ³	Payee speed ⁴	Service operator	Regulator
Korea	Electronic Banking System (EBS)	A	2001	1–2 seconds	Korea Financial Telecommunications & Clearings Institute (KFTC)	Bank of Korea
South Africa	Real-Time Clearing (RTC)	A	2006	0–60 seconds	BankservAfrica	South African Reserve Bank
Korea	CD/ATM System	A	2007 ⁵	1–2 seconds	KFTC	Bank of Korea
United Kingdom	Faster Payments Service (FPS)	B	2008	0–120 seconds	Faster Payments Scheme Ltd (FPSL)	Bank of England and Payment Systems Regulator
China	Internet Banking Payment System (IBPS)	B	2010	0–20 seconds	People's Bank of China	People's Bank of China
India	Immediate Payment Service (IMPS)	B	2010	0–30 seconds	National Payments Corporation of India (NPCI)	Reserve Bank of India
Sweden	BiR/Swish	B	2012	1–2 seconds	Bankgirot	Finansinspektionen
Turkey	BKM Express	B	2013	0–30 seconds	BKM	Central Bank of the Republic of Turkey and Banking Regulation and Supervision Agency
Italy	Jiffy – Cash in a flash (Jiffy)	B	2014	2–3 seconds	SIA	Bank of Italy
Singapore	Fast And Secure Transfers (FAST)	B	2014	Approximately 15 seconds ⁶	Banking Computer Services Pte Ltd	Monetary Authority of Singapore
Switzerland	Twint ⁷	B	2015	2–3 seconds	Twint	FINMA
Mexico	SPEI	A	2015 ⁸	0–60 seconds ⁹	Bank of Mexico	Bank of Mexico

¹ Tables in this annex include initiatives that meet the definition of fast payment implementation in this report (see Section 2.1 for the definition). ² A: existing system adapted or upgraded for fast payments; B: newly built system for fast payments. ³ This year refers to the year at which an implementation provided full fast payment functionality, including near-24/7 service availability. ⁴ Typical time between payment initiation and availability of funds to the payee for a successful transaction. ⁵ The CD/ATM System has provided near-real-time payments since 1988 with operations on a near-24/7 basis (00:05–23:55) since 2007. ⁶ This is the estimated timing between initiating and receiving banks for a successful FAST transaction, and not an end-to-end timing from the payee's perspective. ⁷ At the time of publication, the two providers offering fast payment services in Switzerland – Twint and Paymit – were in a merging process. Post-merger specifications of the new service (expected to be called Twint) had not been published. All references to Twint, thus, reflect the state of the Twint and/or Paymit service as of end-September 2016. ⁸ The SPEI began conducting near-real-time payments in 2004 with operations on a 21/7 basis for mobile payments since March 2015 and on a 24/7 basis since November 2015. ⁹ 0–15 seconds for mobile payments; 0–60 seconds for other online payments.

Current access channels and addressing functionality

Table B

Country	Implementation	Current access channels				Current addressing functionality (eg information to identify payee)		
		Online ¹	Mobile ²	Physical channels ³	Other	Bank account number	Mobile phone number	Other
Korea	EBS	✓	✓		IVR ⁴	✓		
South Africa	RTC	✓	✓	✓		✓	✓	Bank branch clearing code and payment reference
Korea	CD/ATM System			✓		✓		
United Kingdom	FPS	✓	✓	✓	Phone	✓	✓	
China	IBPS	✓	✓	✓		✓		
India	IMPS	✓	✓	✓	IVR ⁴	✓	✓ ⁵	Aadhaar (biometric identification number)
Sweden	BiR/Swish		✓			✓	✓	Proxy number for businesses and charities to substitute for mobile number
Turkey	BKM Express		✓				✓	
Italy	Jiffy	✓	✓				✓	
Singapore	FAST	✓	✓	✓		✓	✓ ⁶	National registration identification number and unique entity number ⁶
Switzerland	Twint		✓				✓	
Mexico	SPEI	✓	✓ ⁷	✓ ⁸		✓	✓	Debit card number

¹ Online includes traditional, often static home or office computer devices that access online banking services via the internet. ² Mobile includes mobile banking, mobile wallets and mobile payments, which can be made using SMS, USSDs or apps. ³ Physical channels include, for instance, bank branches, ATMs and banking agents. ⁴ Interactive Voice Response via a mobile and/or telephone. ⁵ Mobile phone number is not used alone but is used in combination with a separate identifier called MMID, which is obtained by customers or by registering with banks for mobile banking. ⁶ Mobile number, national registration identity number and unique entity number will be introduced as addressing proxies for FAST transactions in mid-2017. ⁷ Not applicable to mobile wallets. ⁸ Bank branches, and one bank ATM operator allows its own customers to initiate SPEI transactions.

Participation arrangements for clearing and settlement¹

Table C

Country	Implementation	Banks				Non-banks ²	
		Participation in clearing Participation in settlement	Direct Direct	Direct Indirect	Indirect Direct	Indirect Indirect	Direct Indirect
Korea	EBS	✓	✓	✓	✓	✓	✓
South Africa	RTC	✓					
Korea	CD/ATM System	✓	✓	✓	✓	✓	✓
United Kingdom	FPS	✓			✓	✓	✓
China	IBPS	✓			✓		
India	IMPS	✓			✓	✓	✓
Sweden	BiR/Swish	✓	✓			✓	
Turkey	BKM Express	✓					
Italy	Jiffy	✓	✓	✓	✓		✓
Singapore	FAST	✓					
Switzerland	Twint	✓					
Mexico	SPEI	✓					

¹ For purposes of this table, the term “banks” is used to refer to banks and other financial institutions that accept deposits. The term “non-banks” is used to refer to any entity involved in the provision of retail payment services whose main business is not related to taking deposits from the public and using these deposits to make loans. ² SPEI in Mexico is an exception that allows direct participation in both clearing and settlement arrangements for non-bank participants.

Inter-PSP settlement model and risk mitigation measures

Table D

Country	Implementation	Inter-PSP settlement model	Number of settlement batches per day ¹	
			Normal business hours	Outside business hours
Korea	EBS	Deferred net	1	0
South Africa	RTC	Deferred gross	3	4, 2 or 1 ²
Korea	CD/ATM System	Deferred net	1	0
United Kingdom	FPS	Deferred net	3	0
China	IBPS	Deferred net	6	0
India	IMPS	Deferred net	4	0
Sweden	BiR/Swish	Real-time	N/A	N/A
Turkey	BKM Express	Deferred net	1	0
Italy	Jiffy	Deferred net	5 ³	1/2 ³
Singapore	FAST	Deferred net	2	0
Switzerland	Twint	Deferred net	1	0
Mexico	SPEI	Real-time	Several batches (every three seconds or whenever more than 300 payments are queued, whichever occurs first)	Several batches (every three seconds or whenever more than 300 payments are queued, whichever occurs first)

¹ N/A refers to “not applicable”. ² Four times on weekdays, twice on Saturdays and once on Sundays and public holidays. ³ Jiffy is based on SCT and thus payments can be cleared and settled in any SEPA complaint clearing and settlement mechanism (CSM). The actual number of settlement batches depends on the design of each CSM. The answer refers to the Italian CSMs and the European CSM STEP2.

Inter-PSP settlement model and risk mitigation measures

Table E

Country	Implementation	Risk mitigation measures ¹		
		Customer transaction limits ²	Net debit caps on participants	Liquidity/collateral ³
Korea	EBS	KRW 1 billion per transaction	At participants' discretion	B, C
South Africa	RTC	ZAR 5 million during normal business hours; ZAR 250,000 from 16:00 to 00:00.	N/A	A, C
Korea	CD/ATM System	KRW 6 million per transaction; KRW 30 million per day	At participants' discretion	B, C
United Kingdom	FPS	GBP 250,000	Yes, required by the scheme to have a net debit cap	A
China	IBPS	CNY 50,000	At participants' discretion	A
India	IMPS	INR 200,000; INR 5,000 for transactions originating from SMS or USSD	Yes, determined by the National Payments Corporation of India	B, C
Sweden	BiR/Swish	BiR: no, Swish: SEK 150,000	N/A	N/A
Turkey	BKM Express	TRY 250 per transaction, TRY 2,000 per day	N/A	N/A
Italy	Jiffy	At participants' discretion	At participants' discretion	N/A ⁴
Singapore	FAST	SGD 50,000	At participants' discretion	A
Switzerland	Twint	CHF 1,000 per month and 5,000 per year for P2P payments ⁵	At participants' discretion	N/A
Mexico	SPEI	At participants' discretion	N/A	N/A

¹ N/A refers to "not applicable". ² As set by the rule provider; in most systems, participants may determine their own customer transaction limits. ³ A: full prefunding by cash; B: partial coverage with funds or securities; C: loss-sharing arrangements. ⁴ Jiffy does not provide for additional risk management measures (a part from customer transactions limits and net debit caps on participants) other than those already offered for SCT by the SEPA compliant CSM chosen by PSPs. ⁵ For non-Swiss residents, transaction limits are CHF 500 per month and CHF 3,000 per year. Different limits can apply for person to business payments.

Summary information on proposed fast payment implementations in CPMI countries¹

Table F

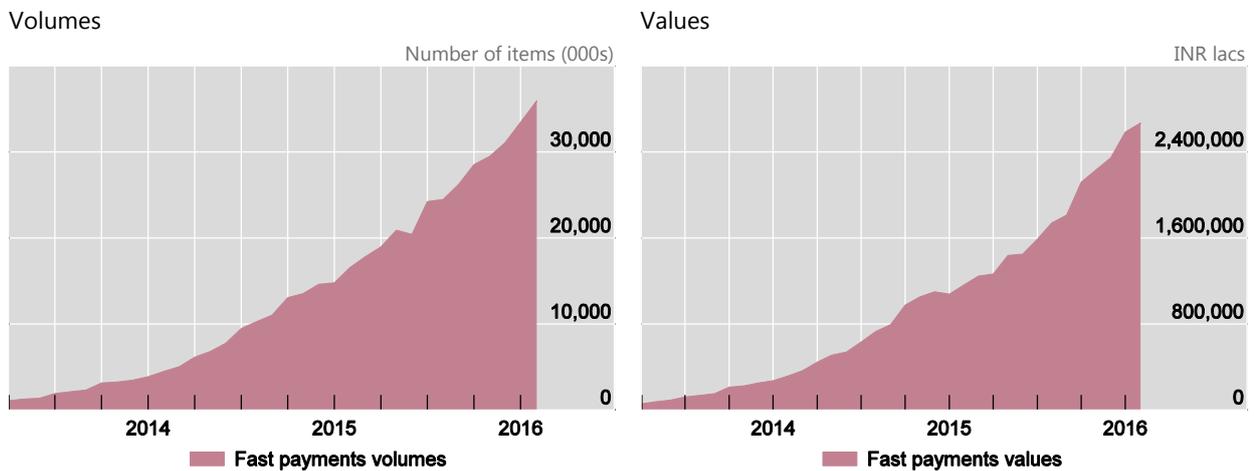
Country/region	Implementation	Adapted or built ²	Year ³	Proposed access channels				Proposed addressing functionality			Proposed inter-PSP settlement model
				Online ⁴	Mobile ⁵	Physical channels ⁶	Other	Bank account number	Mobile phone number	Other	
Australia	New Payments Platform (NPP)	B	2017	✓	✓			✓	✓		Real-time
SEPA	Various implementations based on SEPA Credit Transfer instant (SCTinst) scheme including		2017	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Netherlands	Instant Payments	B	2019	✓	✓			TBD	TBD	TBD	Deferred net
Belgium	Instant Payments	B	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Deferred net
Saudi Arabia	Future Ready ACH (FR-ACH)	B	2017/18	✓	✓	✓		✓	✓	✓	Deferred net
Hong Kong SAR	TBD (name to be determined later)	B	2018	✓	✓	✓		✓	✓	✓	Real-time
Japan	Zengin Data Telecommunication System	A	2018	✓	✓	✓		✓	TBD		Deferred net
United States	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

¹ Throughout this table, TBD refers to details of a fast payment implementation that have not been finalised by stakeholders and authorities. ² A: existing system adapted or upgraded for fast payments; B: newly built system for fast payments. ³ This year refers to the proposed year of implementation. ⁴ Online includes traditional, often static home or office computer devices that access online banking services via the internet. ⁵ Mobile includes mobile banking, mobile wallets and mobile payments, which can be made using SMSs, USSDs or apps. ⁶ Physical channels include, for instance, bank branches, ATMs and banking agents.

Annex 3: Fast payment volumes and values per month in India, Mexico, Sweden and the United Kingdom

India¹

Graph 1

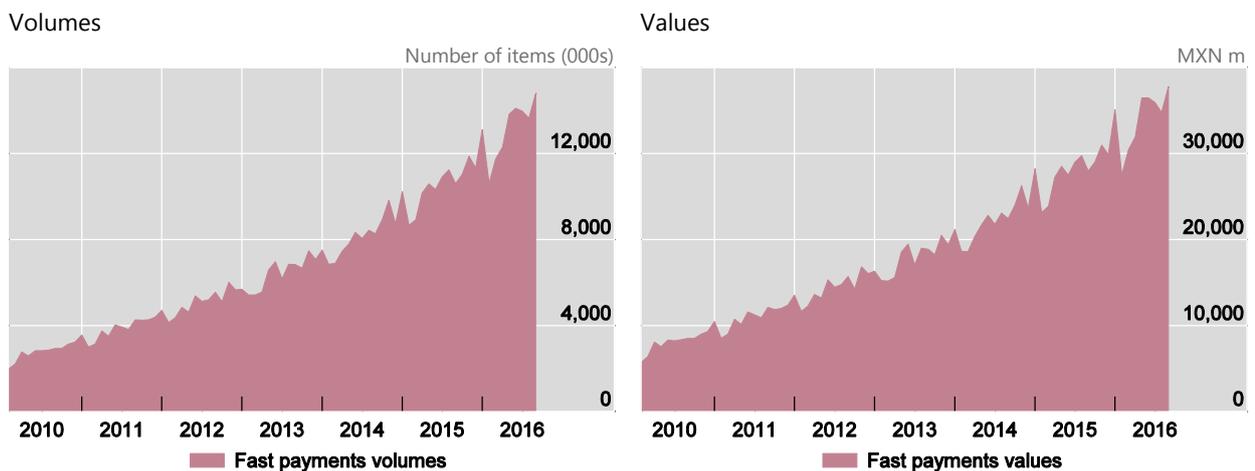


¹ Figures show fast payments conducted through IMPS in India.

Source: National Payments Corporation of India.

Mexico¹

Graph 2



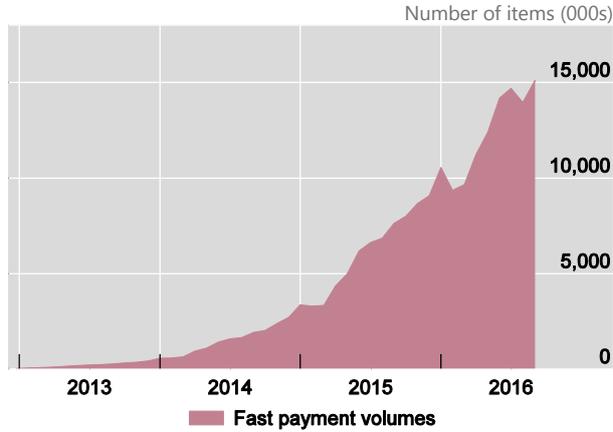
¹ Figures only include low value payments (payments less than MXP 8,000 per transaction).

Source: Bank of Mexico.

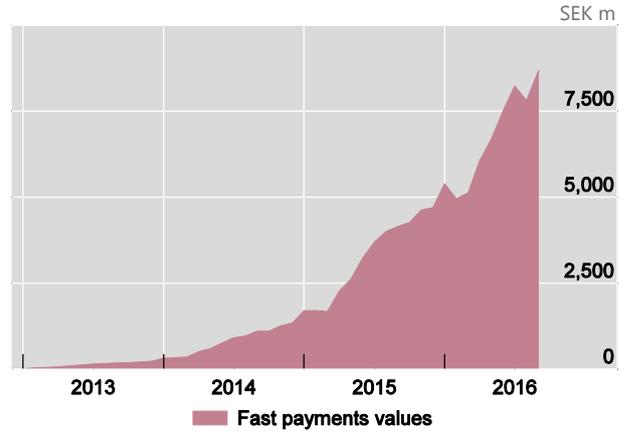
Sweden¹

Graph 3

Volumes



Values



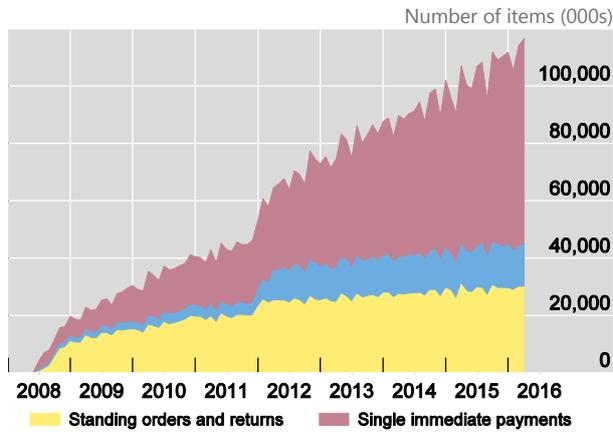
¹ Figures show fast payments conducted through the Bankgirot Real Time payment system.

Source: Bankgirot.

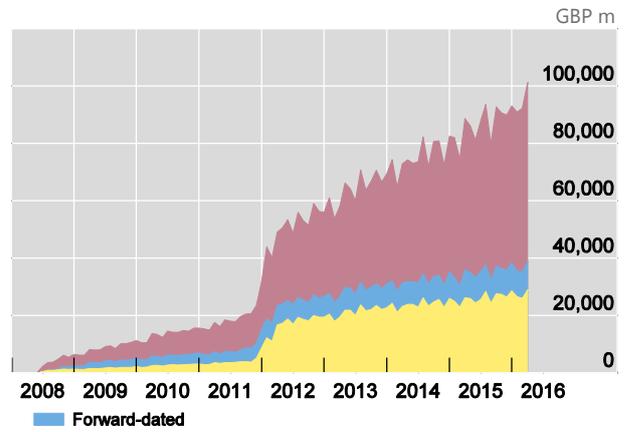
United Kingdom^{1, 2}

Graph 4

Volumes



Values



¹ "Single immediate payments" are fast payments conducted through the UK Faster Payments Service. ² In 2012, a new regulation was introduced in the UK for payments to reach the payee's account no later than the day after the payer's account is debited. This resulted in the migration of remaining bill payments and standing orders to payments processed by Faster Payments Service.

Source: The UK Faster Payments Service Statistics.

Annex 4: Glossary

Below is a short glossary of some key terms relating to fast payments as they are used in this report. For more general terms relating to retail payments and payment systems, see CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

Glossary

Terms	Definition
Fast payment	A payment ⁵⁵ in which the transmission of the payment message and the availability of “final” funds to the payee occur in real time or near-real time on as near to a 24-hour and seven-day basis as possible.
Fast payment implementation (or fast payment deployment)	A fast payment implementation or deployment in a jurisdiction involves a fast payment scheme (or schemes) and an associated fast payment system (or systems) such that payment service providers are able to provide fast payment services to end users.
Fast payment scheme	A set of procedures, rules and technical standards governing the execution of fast payment orders.
Fast payment service	An actual offering or product that allows end users to conduct fast payments.
Fast payment system	An infrastructure focused on clearing and/or settlement of fast payments for its participants.

⁵⁵ “Payment” is defined as the payer’s transfer of a monetary claim on a party acceptable to the payee. See CPSS, *A glossary of terms used in payments and settlement systems*, 2003.

Annex 5: References

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Annex 6: Members of the CPMI Working Group on Retail Payments

Chair

Bank of Mexico Lorenza Martínez Trigueros

Members

Reserve Bank of Australia	David Emery
National Bank of Belgium	Jan Vermeulen
Central Bank of Brazil	Rogerio Antonio Lucca
Bank of Canada	Paul Miller
People's Bank of China	Chen Xue
European Central Bank	Francisco Tur Hartmann
	Emanuela Cerrato
Bank of France	Alexandre Stervinou
	Julien Lasalle
Deutsche Bundesbank	Heike Winter
	Johannes Klocke
Hong Kong Monetary Authority	Clarence Hui
	Helen Leung
Reserve Bank of India	Charulatha Kar
Bank of Italy	Maria Iride Vangelisti
	Michela Tocci
Bank of Japan	Shuji Kobayakawa
Bank of Korea	Eun Yeong Song
Bank of Mexico	Alberto Mendoza Hernández
Netherlands Bank	Jakob Rotte
Central Bank of the Russian Federation	Tatiana Mazgushina
Saudi Arabian Monetary Agency	Ali Al Homidan
Monetary Authority of Singapore	Chek Tchung Foo
South African Reserve Bank	Annah Manganyi
Bank of Spain	Carlos Conesa (since August 2015)
Sveriges Riksbank	Björn Segendorf
Swiss National Bank	David Maurer
	Nino Landerer
Central Bank of the Republic of Turkey	Ismail Behlul Kaya
Bank of England	Joanna Bibby-Scullion

Board of Governors of the Federal Reserve System

Mark D. Manuszak

Jeffrey Marquardt

Anjana Ravi

Federal Reserve Bank of New York

Antoine Martin

World Bank

Harish Natarajan

Massimo Cirasino

Secretariat

Bank for International Settlements

Yuuki Shimizu

Carlos Conesa (until July 2015)

Tze Hon Lau (from July 2015 until January 2016)

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