I. Environment Surrounding Payment and Settlement Systems

Since the release of the previous issue of the Payment and Settlement Systems Report (PSSR) in March 2019, the global environment surrounding payment and settlement systems has undergone some significant changes. This chapter will first shed light on the relatively long-term trends in economic and social developments, then describe major environmental changes surrounding payment and settlement systems in recent years.

A. Globalization of Economic Activity and Digitalization of Consumer Behavior

Increased Global Economic Activity

Against the background of increased global economic activity, trade and capital transactions have shown an increasing trend, reflecting overseas expansion of businesses. Over the past few years, e-commerce across borders has expanded partly due to the effects of the novel coronavirus (COVID-19). Furthermore, with the effects of COVID-19 waning, the coming and going of people for wide-ranging purposes -- business, travel, overseas study, and labor -- has seen a steady recovery across the globe. As a payment and settlement arrangement for supporting such cross-border economic and social activities, an international payment network known as a correspondent banking network, involving multiple banks, has developed over the course of history. Payment services provided by these banks continue to fulfill crucial roles today. Meanwhile, in recent years, payment services provided by non-bank payment service providers have also been expanding, with cross-border retail payments and small-value payments increasing.

Digitalization of Consumer Behavior

In the past ten plus years, the remarkable proliferation of smartphones has enabled consumers to engage in various economic transactions, such as online booking and shopping as well as online trade via their smartphone apps, wherever and whenever they wish to. It has also become easier to make domestic and international payments and settlements associated with these transactions. Such digitalization of consumer behavior has brought to attention the importance of taking into account user

interfaces (UIs), and user experience (UX) such as extension of operating hours, partly with a view to achieving financial inclusion and, as a nationwide effort, building convenient payment infrastructures.

B. Emergence of New Payment and Settlement Instruments

Expectations for DLT and Blockchains

In recent years, with crypto assets drawing attention, fundamental technologies such as distributed ledger technology (DLT) and blockchains have gained recognition. Initially, the benefits of these technologies attracted attention due to the fact that their mechanisms allow the legitimacy of transactions to be verified by a wide range of participants through a consensus algorithm, without relying on a central administrator, and enable the ledger information to be updated and shared among the participants. Subsequently, the possibility of being able to quickly and inexpensively build a system that allows the sharing of ledgers among multiple parties and to provide opportunities to use smart contracts also came to be recognized as attractive.

A practical example of such technologies is decentralized finance (DeFi). This refers to financial services involving crypto assets, built and operated by utilizing smart contracts on public blockchains, which do not require a specific administrator. By using smart contracts, financial services are provided autonomously without being reliant on specific intermediary or administrative entities. Not only are these services made widely available for users and developers, but the transaction results are disclosed publicly.

Expectations for Fintech

Meanwhile, an increasing number of fintech firms have entered the payments market with continued advancements in new technologies. Wide-ranging services have been developed while factoring in users' needs, leading to enhanced user convenience. In addition, continued efforts have been made in developing open application programming interfaces (APIs) -- technology that allows for secure data exchange between banks and external service providers via APIs. With financial institutions

disclosing the connection specifications of their systems to external providers and allowing access by those having signed a contract in advance, it has become easier for service providers other than financial institutions to develop enhanced, highly convenient financial services in joint efforts with financial institutions.

Emergence of Global Stablecoin Initiatives

In 2019, Meta (then Facebook) announced its initiative to launch Libra, a global stablecoin. The idea was for the firm, which had over 2 billion users at the time, to issue stablecoins based on its unique unit of currency and provide payment and settlement services on a global scale. If this materialized, the stablecoins would be circulated globally reflecting the vast number of users. This gave rise to concerns, specifically, that issues related to anti-money laundering/combating the financing of terrorism (AML/CFT) may arise, the financial and monetary policy of each country may be faced with uncertainty, and emerging countries may be exposed to the risk of currency substitution.

As international response measures to these concerns, effective regulation of stablecoins was taken up for discussion, and issues regarding existing payment systems, in particular improving the inefficiencies of cross-border payments, was raised as a topic for future consideration. At the G20 Leaders' Summit held in February 2020, it was decided that efforts to improve cross-border payments would be strengthened by making these a priority. The G20 appointed the Financial Stability Board (FSB) and the Committee on Payments and Market Infrastructures (CPMI) to move forward on related discussions, and deliberations have since been made on resolute measures that would facilitate improvements in the efficiency of cross-border payments and enhance financial inclusion while also bearing in mind the risks involved.

This also spurred discussions in different countries and jurisdictions on central bank digital currency (CBDC), with a view to providing secure and convenient payment instruments across their own country/jurisdiction tailored to their unique needs.

Proliferation of Cashless Payments and Expansion of Non-Bank Payment Services

In addition to development trends such as progress in e-commerce owing to advances in economic and financial digitalization, more abrupt changes were also observed. An example of this was the heightened consumer preference for payment instruments that required less physical contact in a world where COVID-19 was raging. Under these circumstances, an increase was observed in payments using cashless payment instruments including private e-money and credit cards.

There is a wide array of cashless payments available worldwide. While card payments are the primary choice in Europe and the United States, Asia has seen an expansion in mobile payments using QR codes in addition to card payments.

Similarly, in Japan, there has been an expansion of payment services provided by non-bank payment service providers. As a result, various cashless payment instruments have been introduced, crowding the market. While the widening of options has increased user convenience, it has also been pointed out that the fact that the payment instruments of individual service providers are not interoperable is reducing convenience for both merchants and users.

Meanwhile, with growing demand for enhanced user convenience in bank transfers, an increasing number of fast payment systems (FPSs) -- which allow for 24/7 instant payments -- came to be built in many countries, particularly advanced countries, with a view to improving the convenience of small-value interbank payments. For many FPSs, user convenience increased further, owing to the provision of new services where users could make payments by specifying payee information such as mobile phone numbers or e-mail addresses, instead of the former system, which required bank account numbers.

International Efforts toward Enhancing Payment Systems

In the past few years, international efforts have been increasing to utilize new technologies, such as DLT and blockchains, as a means to improve payment systems. As part of these efforts, the Bank for International Settlements (BIS) established the

BIS Innovation Hub in 2019. In the years that followed, the Innovation Hub has organized and led various experiments in which central banks have participated. The majority of these experiments concern either retail payments, with a focus on domestic use, or wholesale payments, with a focus on cross-border payments.

In the private sector, various experiments are being conducted with the utilization of DLT and blockchains, while in some cases new payment services using these technologies have actually begun to be provided. In many of these cases, such efforts are made with a view to utilizing the technologies for cross-border payments and digital assets.

Attention is being increasingly paid to how these various efforts will bring improvements in payment systems to fruition.

C. The Need to Strengthen the Resilience of CCPs and Payment Systems

Expansion of Roles for CCPs

Since the emergence of the global financial crisis (GFC) in the latter half of the 2000s, central counterparties (CCPs) have been expanding their roles in terms of both quantity and quality. Taking into account, for example, that market infrastructures related to over-the-counter (OTC) derivatives and other instruments had not been developed sufficiently at the time of the GFC, it was decided globally that central clearing of OTC derivatives transactions would be conducted as a policy initiative. Consequently, while this contributed to enhancing financial system stability, many jurisdictions saw an expansion in the size of CCPs and a concentration of risks against CCPs, raising awareness of the possibility that CCPs themselves had become "too big to fail." Under these circumstances, issues such as effective CCP resolution processes were taken up for discussion.

Furthermore, when financial conditions and commodity market conditions experienced high volatility in spring 2020, following the outbreak of COVID-19, and in spring 2022, due to Russia's invasion of Ukraine, significant rises were observed in cases of increases in margins and triggered margin calls by CCPs. This served as a

reminder of the importance of strengthening the resilience of CCPs, including the appropriate handling of margins.

Heightened Cyber Risks and Third-Party Risks

In recent years, not only is there a growing trend in the number of cyberattacks but their methods are becoming increasingly sophisticated. For example, ransomware attacks as well as other attacks that target insufficiencies in and vulnerabilities of security measures have been increasing. Under these circumstances, heightened cyber security risks on financial market infrastructures (FMIs) have also been noted. The risk of being adversely affected by cyberattacks not only involves the theft of an FMI's assets and client information. In fact, if an FMI were to cease functioning, this would bring about widespread effects on financial and payment systems.

Moreover, with regard to FMIs overseas, new forms of third-party outsourcing have emerged in response to the shift of core systems to a cloud environment. Proper management of third-party risk is therefore an urgent task in order to ensure the operational resilience of FMIs. In addition to security measures that have already been put in place, FMIs are now being tasked with strengthening the risk management of third-party outsourcing.

Growing Awareness of Climate-Related Financial Risks

Amid growing awareness of climate-related financial risks,[1] FMI operating entities as well as regulatory, supervisory, and oversight authorities have been examining the effects that these risks may have on FMIs and the management of such risks.

Climate-related financial risks, which are broadly divided into physical risks and transition risks, could affect FMIs via various transmission channels. In other words, it is possible that physical phenomena such as natural disasters would not only directly affect the operation of FMIs but also indirectly affect members of the wider

[1] With a view to achieving carbon neutrality by 2050, a Cabinet decision was made in February 2023 on "The Basic Policy for the Realization of GX," under which the emissions trading system was introduced as part of carbon pricing arrangements. Subsequently, the Tokyo Stock Exchange (TSE) opened its Carbon Credit Market in October 2023.

ecosystem including FMI participants, customers, and critical service providers. Furthermore, climate-related financial risks are multifaceted; they may materialize abruptly as extreme, rapid phenomena, or amplify general financial stress and risks. There is a growing need for FMIs to monitor and manage these risks.