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Recent Developments in Central Bank Digital Currency (CBDC) - Strategies and Challenges in China, Cambodia, and Sweden –¹

Review of the webinar held on March 22, 2021

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1. Overview

The widespread use of mobile devices and the Internet has strengthened financial inclusion in many countries, and the novel coronavirus pandemic has expanded the use of contactless payment methods. In addition to such private-sector-led digitalization and cashless transactions, "central bank digital currency (CBDC)," a digital currency issued by a central bank, has been attracting attention, and some countries have started issuing and operating CBDCs.

In light of this situation, this webinar was held, focusing on three countries of China, Cambodia, and Sweden that are taking the lead in developments and operations of CBDCs, to discuss specific strategies and challenges in these countries. The following is a summary of the presentations and panel discussions made by the panelists. The main points of the discussions are summarized below.

【Discussion Points】

- (1) In the three countries that are promoting developments and operations of CBDCs, the purpose of issuing CBDCs is clearly recognized. In these countries, CBDCs have been introduced or considered as a means to overcome national challenges, such as for responding to a rapidly advancing cashless society (Sweden), promoting financial inclusion (Cambodia),

¹ For details of panelists, moderator and presentation documents, refer to the IIMA homepage at https://www.iima.or.jp/info_active/workshop/20210322.html.

or addressing oligopoly in the payment services market and promoting the digital state initiative (China).

- (2) It was also understood that these countries are taking into account the impact of CBDCs on the financial system structure in their specific design. In China and Cambodia, frameworks are being developed to issue CBDCs indirectly through banks, while placing a ceiling on the amount of CBDCs that can be held. This may suggest that they intend to limit the impact of CBDCs on deposits, which are an important source of funding for private banks.
- (3) With regard to distributed ledger technology (DLT) as a technology platform to support CBDCs, while a case in Cambodia was reported where the technology has been fully adopted because of its many advantages compared to existing technologies, there was also a cautious view presented that there is a possibility that the technology has not been adopted for China's digital RMB (e-CNY) at this time due to limitations in the processing capacity of the technology.
- (4) In the panel discussion, the panelists discussed the relationship between CBDCs and private settlement services. It was a general view that the future vision of CBDCs is to coexist with private settlement services while each taking advantage of the strength of its own settlement instrument. Regarding the use of CBDCs for cross-border payments, it was viewed that it would be too early for China to start it since restrictions on capital movements still remain, but in Cambodia and Sweden, it was reported that a view that CBDCs could be a means to increase the competitiveness of the home currency was gaining support. In the meantime, in light of President Xi Jinping's statement that China should be actively involved in the development of an international standard for digital currencies, the panelists had a common understanding that future trends in China need to be carefully monitored.

2. Outline of the presentations

- (1) Prof. Kobayakawa, School of Political Science and Economics, Meiji University, kicked off the discussion by briefly summarizing the characteristics of CBDCs and recent efforts to develop them from a global perspective. Main findings are:
 - CBDC is a new currency to be issued by a central bank as a debt, which is expected to provide functions of a measure of value as a legal tender as well as a means of exchange and storing value, and will be provided through digital media. For this reason, it fundamentally differs from crypto-assets such as Bitcoin and stablecoins such as Libra (later renamed as Diem) that has been under consideration since last year. Based on this understanding, there are two types of CBDCs; retail (or general use) CBDCs, where a central bank will digitize banknotes and coins, and wholesale CBDCs, where a new

technology will be used for interbank settlements when managing and operating the already digitized central bank current accounts.

- According to a recent survey conducted by the Bank for International Settlements (BIS), of the 65 central banks that participated in the survey:
 - 1) More than 80% of the respondents are engaged in CBDC-related activities, including surveys and research.
 - 2) Although many central banks remain cautious about issuing CBDCs, the overall trend is for a gradual increase in the number of central banks that are looking to issue CBDCs in the future, particularly centering on retail CBDCs.
 - 3) The purpose of issuing such CBDCs varies mainly between emerging countries (primarily to promote financial inclusion) and developed countries (to improve the efficiency of payment systems).

Looking at the status of CBDCs in Japan, the U.S., and Europe, we can see that the Federal Reserve Banks in the U.S. and the central banks in the European region have made various efforts to verify the technical aspects that support CBDC and to collaborate with private companies and academic organizations. Under such circumstances, the U.S. Federal Reserve is promoting its research and experiments in a close collaboration with the Federal Reserve Banks, while the ECB is planning to make a formal decision on whether to formally launch a project on the digital euro in the middle of this year while sorting out various issues related to CBDC. The Bank of Japan has also announced that it will launch a Proof of Concept (PoC) for CBDC early in fiscal year 2021, in line with "The Bank of Japan's Approach to Central Bank Digital Currency" released in October 2020.

- In addition, it is a recent feature of CBDCs that the BIS and other central banks and financial infrastructure providers are collaborating on CBDC projects. The BIS has started works to explore the added values to CBDCs, while expanding globally its Innovation Hub that aims to promote cooperation among central banks, on such projects related to CBDCs. Specifically, they include Project Helvetia, which aims to realize DvP settlement between CBDCs and securities/securitized tokens, and the m-CBDC Bridge initiative, which aims to realize cross-border settlements in cooperation with central banks in Hong Kong, Thailand, China, and the United Arab Emirates (UAE). Looking ahead, it will be necessary to keep a close eye on the cooperation among central banks, especially centered on the BIS.

(2) Next, Mr. Miyazawa, CEO of SORAMITSU, gave a presentation on the potential and future of the Cambodia's CBDC Bakong.

- As a result of deregulation on foreign investment, Cambodia has achieved a steady

economic development through increased foreign direct investment and development assistance. On the other hand, the government and the Central Bank have been faced with a difficulty in that their macroeconomic policies have failed to fully control financial and economic activities due to the excessive dollarization of the economy where the share of the dollar exceeds 90% of bank deposits and loans. Cambodia's payment services also face a number of problems, including: (i) lack of interoperability of services due to the proliferation of payment service providers, (ii) high settlement cost and merchant fees, (iii) worsening cash-flows due to time consuming payment process for merchants, and (iv) high risk of fraud and default by payment service providers.

- In this context, the National Bank of Cambodia (NBC) began around 2016 to consider mainly two options for the establishment of a new payment system. The first option was to connect payment service providers to the existing banking network and establish a framework where they were subject to the same regulations and supervision as banks. The advantage of this option was that it allowed the payment service providers to use existing payment infrastructures, but in the meantime put them at a disadvantage of high costs associated with system support and compliance to regulations and supervisions. The second option was to issue a new central bank digital currency whereby to ensure interoperability among a wide range of financial institutions including payment service providers, and to provide a uniform wallet (digital wallet) nationwide. This second option was eventually adopted because, in addition to the advantage of not being bound by existing infrastructures, it would reduce the cost of system support and compliance for payment service providers, and it was concluded that blockchain technology was essential for building CBDC. In the background of this decision, it seems that Cambodia's unique circumstances were also taken into consideration, namely, the bank account opening rate is low at 22%, the smartphone penetration rate is extremely high at 150% (approximately two smartphones per adult). It is also believed that it was the government's intention to promote the sophistication of the financial infrastructure while taking full advantage of smartphones widely used by the Cambodian people.
- In summary, the purpose of introducing a central bank digital currency in Cambodia can be pointed out as:
 - To promote financial inclusion, including the spread of banking services, and improve the effectiveness of macroeconomic policies.
 - To improve the convenience of the local currency Riel, and promote e-commerce and use of it for cross-border payments, while keeping an eye on the development of e-CNY in China.
 - To build a state-of-the-art system using blockchain technology to process the entire

national payment architecture, including retail and wholesale payments, on a consistent system.

On the technical side, under the conventional multiple ledger system, each payment and settlement service provider has to manage its own ledger separately, which generates the need of clearing among these ledgers and requires a centralized pyramidal hierarchy among central banks and private payment system operators. In contrast, with blockchain technology, all participants share the same ledger, which eliminates the need for clearing between ledgers and allows for a decentralized, flat structure. Another important benefit of blockchain technology is that it can simplify the nation-wide payment architecture and reduce its cost by integrating retail and wholesale payments.

- As of now, 18 banks have participated in the CBDC project "Bakong" which officially became operational in October 2020, and 24 other banks are preparing for participation. Through these banks, 16 million people, or almost all Cambodian citizens, will be able to send money and make payments using their mobile phone numbers or two-dimensional bar codes (QR codes). Some of the features of Bakong include:
 - It is a token-type or indirectly issued CBDC with the same circulating nature as cash.
 - It has both strong security and sufficient processing capacity.
 - It allows for settlements and remittances in US dollars as well as in Riel.
 - It allows for transactions of up to \$250 per day without identification, and transactions of \$2,500 or more per day if identification is available, in a way to link them to bank accounts.
 - It has realized, if only partially, cross-border remittances and settlements with Thailand and Malaysia.

(3) Mr. Inoue, Chief Researcher, Financial Market and Innovation Research Department, Nomura Research Institute, Ltd. made a presentation on the move toward the development of the Swedish e-Krona and its implications.

- Looking at the background of the debate over the e-krona from a perspective of cash supply, it can be pointed out that the cost of managing banknotes has been increasing for banks because large cities spread across Sweden, and that the incentives for banks to maintain the cash supply system have been gradually weakened due to the deteriorating profitability of banks under the prolonged low interest rate environment. On the demand side of cash, as is apparent with the rapid increase in the use of Swish jointly operated by the private banks in Sweden, the use of cashless instruments for household payments and settlements is steadily increasing in Sweden. As a result, its ratio of cash to nominal GDP is extremely low compared to other major countries in Europe. In addition, it can be seen as another

important factor in promoting cashless society that Swish was successfully introduced as a smartphone application in a form suitable for the mobile environment from the beginning of its service launch, which was helped by the fact that the country has global companies that can manufacture excellent mobile phones.

➤ Against the backdrop of the above supply and demand factors for cash, the Swedish central bank (Riksbank) began a full-scale research study on CBDC from 2016. In a report published in 2017 (Report 1), the Riksbank pointed out that with the declining use of cash, households might lose the opportunity to use a risk-free payment instrument issued by the Central Bank, that there would be certain groups of users who cannot be served by private digital payment services that substitute cash, and that a movement towards oligopoly of private sector services may undermine the grounds for competition. To maintain competitive environment, it was pointed out that the Central Bank was cautious about Sweden's move to a cashless society led by international brand companies. The expected roles of the e-krona in overcoming these problems were securing of households' access to risk-free payment instruments, providing services that can be used by the elderly and other digitally disadvantaged groups, and providing a neutral infrastructure to promote innovation in the private sector. As for the impact on the Central Bank's policy management, the Bank assessed that the introduction of CBDC would not pose a major obstacle to the management of monetary policy, its spillover channels, and the maintenance of financial stability.

➤ Subsequently, a report published by the Riksbank in 2018 (Report 2) defined the following fundamental requirements for e-krona.

- It should provide opportunities for comprehensive services that meet the diverse needs of users.
- It should be simple and easy to use for a wide range of users.
- It should ensure technical resiliency, including the ability and performance to deal with a large number of users/transactions.
- It should ensure a high level of security against cyber attacks, etc.
- It should provide options for maintaining confidentiality on users and transaction details as in the case of banknotes, while ensuring traceability of transactions for the purpose of AML/KYC compliance, etc.

In examining these requirements, it will be important to consider what functions are required for the alternative means of cash.

➤ In addition, the Riksbank's recent papers seem to have a strong focus on ensuring international competitiveness in e-krona payment and settlement services. In other words, they see problems in that the strong network externality in payment and settlement services

can easily lead to oligopoly among service providers, and its high barriers for new entrance may prevent innovation. In addition, there is a risk that the Sweden's payment and settlement services might be dominated by global giant IT companies, mainly headquartered in the U.S. Also, there is a fear on the impact on macroeconomic policies associated with the decline in the use of the home currency, and a threat on the security aspect that data on users and their transactions might be accumulated and abused improperly by foreign companies. These are the factors behind the need to consider e-krona.

In line with the roadmap published in 2018, the Riksbank has been working on a PoC based on the proposed design of the e-krona (experiments with Accenture have been ongoing since February 2020), and is also working on the amendment of the laws necessary to issue e-krona. The Riksbank plans to implement a joint project with private companies in 2021 and after, but at this point the implementation has been lagging behind the schedule by about a year. In the meantime, Sweden, in collaboration with its neighbors Denmark and Norway, has launched the P27 Project, which aims to introduce real-time payment system, and plans to realize domestic and cross-border payments in multiple currencies by 2022.

(4) Finally, Mr. Takeshita, Managing Director, Head of RMB Internationalization Business Promotion Office, MUFG Bank (China), Ltd. gave a presentation on the trend of e-CNY.

- To begin with, an overview of the various tests in major cities that began in October 2020 was presented. In Shenzhen and Suzhou, a demonstration experiment was conducted on a scale of 100,000 people, and various functions associated with e-CNY, such as the use of offline functions, were confirmed. In addition, in February 2021, a demonstration experiment was conducted in Beijing with 50,000 people, in which the utilization of the system was checked in actual shops and e-malls in the city center, and ATMs were used to verify deposits and withdrawals between cash and e-CNY. The infrastructure relating to e-CNY has been steadily developed for its use at the 2022 Winter Olympics.
- E-CNY used in the experiments in major cities has the following features:
 - It has a layered structure in which six largest banks (designated operating banks) directly receive e-CNY issued by the People's Bank of China (PBOC), and other banks and individuals receive it in exchange for reserves or cash.
 - Because it is issued as a substitute for cash, it does not bear interest and is intended for use mainly by individuals in small amounts.
 - A maximum spending limit (up to CNY2,000 per transaction) has been set.
 - A card-type wallet has been developed for users (mobile disadvantaged) who cannot

use smartphones and other devices.

- The first factor in the background of these active efforts of China toward implementing e-CNY is the need to respond to the ongoing oligopoly of private services (specifically, by WeChat Pay and Alipay) in the online and mobile payment market. In January 2021, the PBOC released a draft ordinance on non-bank payment service providers, indicating that it is taking preventive measures against these big providers from gaining a dominant position in the market. Secondly, there is an aim of preventing frauds and misconducts. Specifically, in addition to preventing the fraudulent receipt of pensions and public works related funds, e-CNY is expected to be the major deterrent in preventing fraudulent use of bank accounts. Moreover, the fact that the Chinese people do not have a high level of trust in paper money, as counterfeit bills are widely circulating, has led to a widespread use of mobile and online payments, and seamless payment services integrated with online applications are widely used. Therefore, China has the sufficient social infrastructures for implementing e-CNY. In addition, the well-accepted notion among Chinese people that disclosure of personal information can protect the social safety, i.e., that personal information is to be managed for that purpose, has been another important foundation supporting China's digital society.
- Although cross-border use of e-CNY is not envisioned at present and many issues remain to be resolved, President Xi Jinping has instructed the government to actively participate in the creation of international rules for digital currencies. There is also a move that China has participated in the m-CBDC Bridge initiative, a project that aims at realizing cross-border payments among Hong Kong, Thailand, China, and the UAE. The development of China's international cooperation should be closely monitored.

3. Panel discussion

Following the presentations by the panelists, Mr. Iwaoka, General Manager and Chief Economist of the Economic Research Department of the Institute for International Monetary Affairs (IIMA), moderated the discussion by collecting questions submitted in advance by the webinar participants.

The first question was about the advantages and risks of using DLT used in CBDCs in Cambodia and China. Mr. Miyazawa explained that the DLT used in Bakong has such advantages as securing safety against spoofing, double transactions, and counterfeiting, satisfying technical resilience due to its high availability, as well as ensuring instant payment with finality. In addition, helped by its high processing power and scalability, Bakong gives consideration both to consumer protection with measures against key loss and default, and to privacy aspect by permitting anonymous transactions while taking measures for AML/CFT. On the other hand, Mr. Takeshita

commented that although there is no official announcement by the Chinese government, he assumed that e-CNY does not use DLT, because the processing capacity of this technology may not be able to meet the number of online payments by the non-banking sector, which reached 720 billion cases in 2019. However, it should be noted, he added, that in the future, DLT may be applied in China along with the improved level of technology in association with its aggressive effort to build digitalized China.

To the query of whether, from the perspective of international competition, the government intends to use e-CNY for cross-border settlements in the future, Mr. Takeshita responded that it would be a little premature to assume that China promotes the development of e-CNY with a view to using it for cross-border payments. He pointed out that there still remain technical issues with e-CNY although the internationalization of the RMB takes into account the "three pillars" (1) the utilization of the One Belt, One Road initiative, (2) financial deregulation, and (3) the development of settlement infrastructure (CIPS, the cross-border interbank payment system for the RMB, introduced in 2015). He added, however, that considering the President Xi Jinping's intention in his directive to actively participate in the creation of international rules for digital currencies, it is necessary to carefully monitor future developments on the cross-border use of e-CNY.

There was also a question about the division of roles between private settlement services and CBDC. Mr. Miyazawa raised the issue of whether banks should issue private digital currencies as payment instruments with settlement function and expand their credit creation function, while promoting competition and innovation in the private sector by setting the limits on the use of CBDC. The private digital currency referred to here can be positioned as a "synthetic CBDC" collateralized against the CBDC, with CBDC used for cross-border and interbank payments, and private digital currency used for retail payments. He said that it is possible to envision a future where the two can coexist by using CBDCs for cross-border and interbank settlements and private digital currencies for retail high-frequency, small-lot settlements. Mr. Inoue, pointing out that Sweden's cashless system has been driven by private sector and that innovative services such as Swish and P27 projects have been implemented or under study, expressed his view that it is unlikely that the CBDC payment system will completely replace these private sector services. In addition, Mr. Takeshita also presented a prospect that, considering the fact that mobile payment services (WeChat Pay, Alipay) are already widely used in China and that interest rates on deposits are at an attractive level (2.1%), e-CNY, mobile payment services, and deposit services will coexist while leveraging their own strength. Prof. Kobayakawa concluded the discussion by saying that, taking into account the facts that (i) major countries share the view that CBDCs play a role to support private sector services, and (ii) countries are actively working to upgrade private settlement services, it would be important in the future to continue to upgrade private sector services in a way that makes them interoperable with CBDC while maximizing the key role of

CBDC as a safe payment instrument.

In closing the webinar, Mr. Iwaoka indicated that his Institute would continue to conduct research and studies on CBDCs and actively exchange views with related parties through webinars and other opportunities.

4. Implications for other CBDC initiatives

Based on the discussions in this webinar, the implications for future CBDC initiatives in major countries can be summarized as follows.

Firstly, while the three countries discussed in the webinar have relatively straightforward objectives in issuing CBDCs, the major countries will still need to clarify what they are trying to achieve with CBDCs through discussions with various stakeholders. The aims of promoting financial inclusion (Cambodia), providing central bank money in a cashless society (Sweden), and addressing the oligopoly problem of payment services and preventing fraud and abuse (China) are easy to understand for people in each country. On the other hand, many developed countries have not faced these challenges, and understanding of CBDCs has been hardly fostered among a wide range of stakeholders including the general public. Meanwhile, in Europe, the ECB conducted a questionnaire survey on the digital euro from October last year to January this year, receiving more than 8,000 responses. In the U.S., it is reported that Fed Chairman Jerome Powell said at a congressional hearing held in February 2021 that this would be the year when the Fed would actively engage in dialogue with the public, raising the expectation that discussions on the digital dollar will become more active. In Japan as well, the Bank of Japan has announced that it will actively promote dialogue with various stakeholders, setting up "Liaison and Coordination Committee on Central Bank Digital Currency²" in March to share information with relevant parties on the content and progress of the CBDC demonstration experiment that started in 2020 fiscal year. Through these efforts, it is hoped that interest in CBDCs will increase also in major countries, deepening the understanding of how CBDCs can be used to solve national issues based on the circumstances of each country.

Secondly, in introducing CBDCs, it is important to design the system so that it coexists with the financial services provided by existing financial intermediaries. In China, e-CNY is issued through the designated operating banks (six major banks), and in Cambodia, Bakong is issued through 18 major banks. These methods of issuing CBDCs to individuals and corporations through the intermediary channel of banks are highly compatible with the existing financial system. In the future, it is expected that many countries will use the intermediary channel of banks in issuing CBDCs. On the other hand, it is also a fact that many of these countries have already provided highly convenient services to users through banks, and if CBDCs were to replace a wide

² See the Bank of Japan: https://www.boj.or.jp/announcements/release_2021/rel210326a.pdf

range of private sector services in these areas, it might impair the efforts of banks and nonbanks to create innovation through competition. Therefore, in designing a digital system in the future, it is necessary to keep in mind that the private sector should take the lead in promoting the sophistication of settlement services in order to meet the various transaction needs of users, while making the best use of CBDC as a safe payment instrument with settlement finality. This will mean that CBDC as a central bank money and private moneys should be allowed to coexist.

This webinar has deepened our understanding of countries that are leading CBDC developments. Looking forward, it will be important to stimulate, while closely monitoring the efforts by the Bank of Japan, a national debate on CBDC including what should be the future payment service system appropriate for Japan and how CBDC should be positioned in that vision.

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