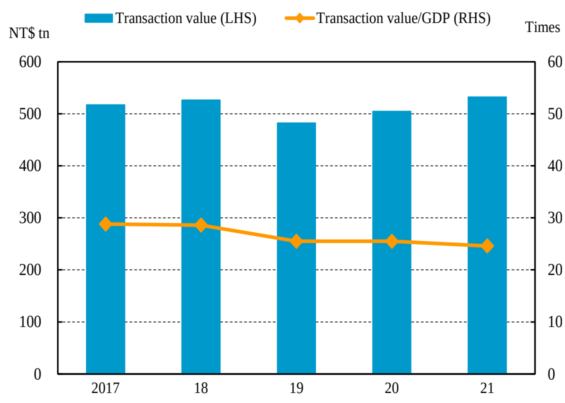
3.3 Financial infrastructure

3.3.1 Payment and settlement systems

Overview of the CIFS's operation

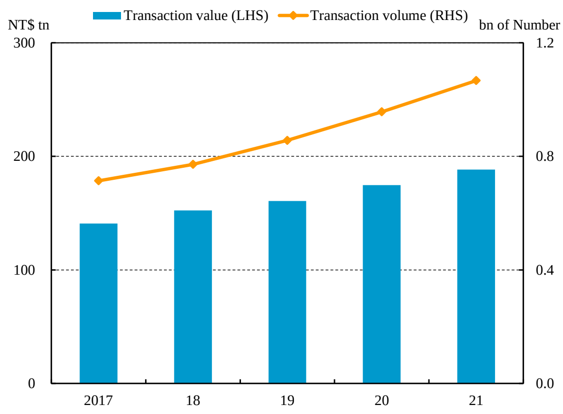
The CBC Interbank Funds Transfer System (CIFS), a large-value electronic payment (e-payment) network system operated by the Bank, is responsible for interbank funds transfers (including interbank lending and the Bank's open market operations) and the final settlement for financial market transactions (e.g., securities and bonds) and retail payment transactions (e.g., remittances, credit cards and check clearing). In 2021, funds transferred via the CIFS amounted to about NT$533 trillion, an increase of 5.5% year on year, equivalent to 24.6 times the GDP for the year (Chart 3.49).

Chart 3.49 Funds transferred via the CIFS



Sources: CBC and DGBAS.

Chart 3.50 Transaction value and volume processed by the FIS



Source: CBC.

In addition, retail payments are mainly processed by the FISC's Inter-bank Financial Information System (hereinafter abbreviated as FIS), which uses the funds deposited by financial institutions in the Interbank Funds Transfer Guarantee Special Account (hereinafter the "Guarantee Account") under the CIFS to clear and settle interbank payment transactions one by one.[49] In 2021, about 1.07 billion transactions were processed by the FIS with the value totaling NT$188 trillion (Chart 3.50), representing year-on-year increases of 11.46% by volume and 7.43% by value.

In view of the increasing demand for interbank transactions via e-payment system, the Bank raised the ceiling ratio for financial institutions' daily balance in the Guarantee Account to be counted as part of their actual reserves in 2019 and later again in 2021 (Chart 3.51). Financial

[49] Interbank payment transactions include remittances, automated teller machines (ATM) withdrawals, transfers (including online and mobile transfers), tax payments and corporate fund transfers.

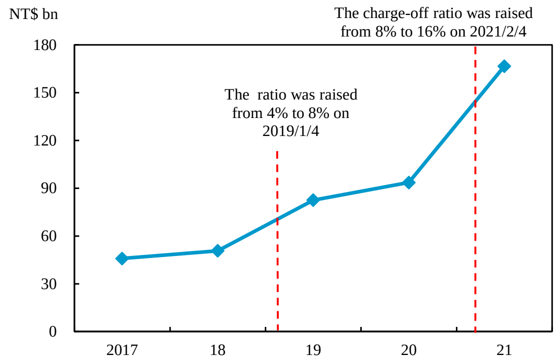
institutions are encouraged to maintain sufficient funds so as to ensure the smooth functioning of the interbank retail payment system on a 24/7 basis.

Development of shared infrastructure for retail payments

The Bank has urged the FISC to establish a common QR Code payment standard and has been promoting it jointly with banks so as to improve the convenience of mobile payment for the public. Since its launch in September 2017, the accumulated volume of transactions processed through this common standard has exceeded 89 million with a total value of approximately NT$334.4 billion at the end of 2021. The volume and value of transactions in 2021 increased respectively by 94.07% and 108.18% year on year.

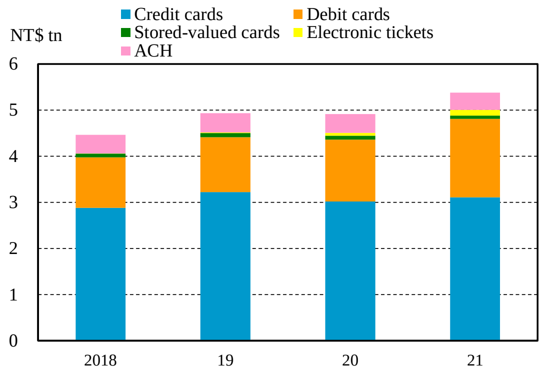
Furthermore, in order to facilitate the interconnection between banks and e-payment institutions' information and cash flows, the Bank urged the FISC to set up a shared platform for cross-institution e-payment, which started to provide intra-institution transfer services from October 2021 onwards. Currently, all domestic e-payment institutions have participated in the platform, which would begin to cover e-payments for taxes and utility bills later in 2022.

Chart 3.51 Average daily balance of the Guarantee Account



Source: CBC.

Chart 3.52 Consumption via non-cash payment tools



Notes: 1. The consumption statistics of debit cards include consumer purchases with domestic chip bank cards, VISA and other international debit cards, UnionPay cards, and ATM transfers for shopping payments.
2. ACH inter-bank collection means that the payment institutions handle deduction and account entry through the ACH system of the TCH after obtaining the entrustment of the public.

Sources: CBC, FSC and FISC.

Domestic consumption via non-cash payment instruments

In 2021, the overall consumption expenditure via non-cash payment tools was NT$5.38 trillion (Chart 3.52), an increase of 9.57% year on year. Among a variety of these payment instruments, the consumption amount via credit cards, debit cards and electronic ticketing increased by approximately NT$88.1 billion, NT$361.9 billion, and NT$59.4 billion, respectively. The growth was mainly due to continuous expansion of mobile payment coverage and mounting demand for contactless payment amid the pandemic.

CBDC development around the world and its policy implications

At present, 86% of central banks worldwide have engaged in CBDC research, and Taiwan, as well as many other economies, has carried out CBDC experiments in stages. However, CBDCs are not always the optimal choice for every country. Each economy should hence adopt the most adequate digital payment strategy in line with its policy objectives and needs of their jurisdictions. Policy implications for the economies that currently develop or conduct CBDC research can roughly fall into three broad categories: (1) exploring the potential of digital technologies in response to the emerging trends of digital payment; (2) safeguarding the role of the state in the payment market to promote sound operation of the financial system; (3) providing a public payment instrument to promote financial inclusion (Box 3).

Box 3
International developments and policy implications of CBDCs

Currently the development of central bank digital currencies (CBDCs) is moving from theoretical research to technical experimentation. However, a CBDC is not always the best option for each economy, and preemptive issuance of a CBDC would not necessarily bring about positive and immediate benefits. Central banks should hence adopt the most suited strategies based on the policy objectives and needs of their jurisdictions.

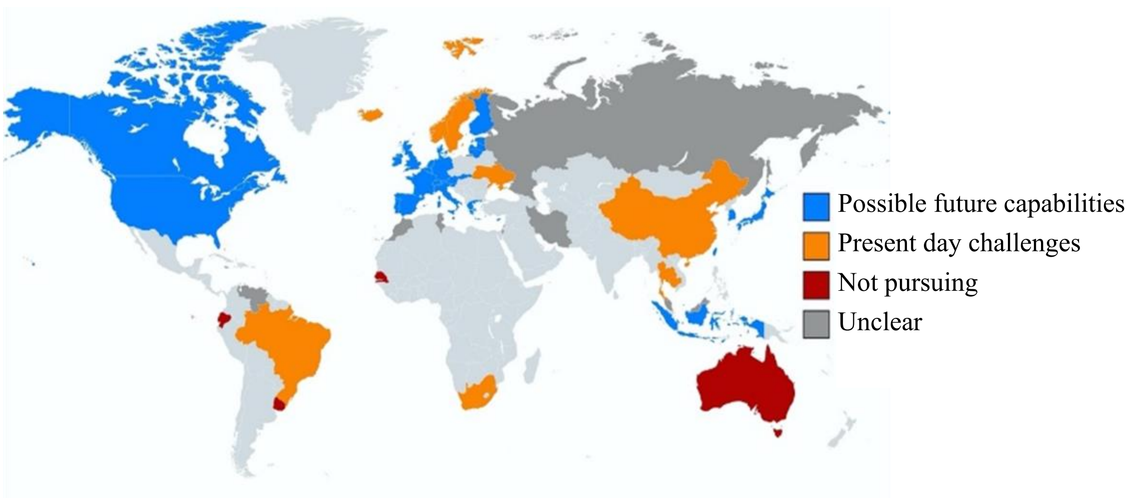
1. International developments of CBDCs

According to a BIS survey,[1] 86% of central banks worldwide have been actively exploring CBDC arrangements. Most of them gradually moved from purely theoretical research to technical experimentation or proofs-of-concept (POC), while only a small number of central banks have advanced to pilot testing or launched CBDCs officially.

1.1 Taiwan and many economies in Europe and North America, with diversified and convenient electronic payment systems in place, have carried out CBDC research and experiments with a gradual approach

In response to the emerging trends of digital payment, major economies in Europe and North America, as well as Japan, South Korea, and Taiwan, have planned for or rolled out CBDC research projects (Chart B3.1).[2] However, none of them has officially issued a CBDC or announced a timetable to launch.

Chart B3.1 Primary motivations for CBDC research and experimentation

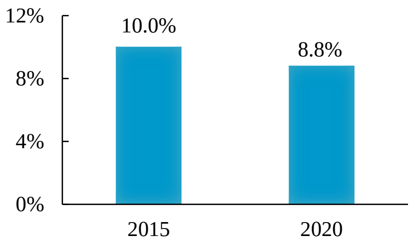
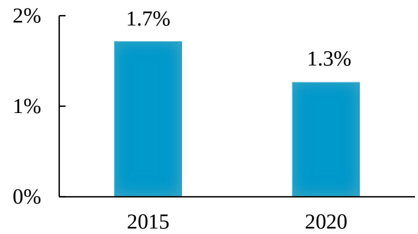
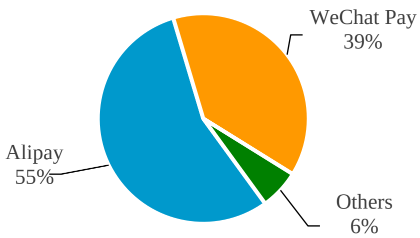
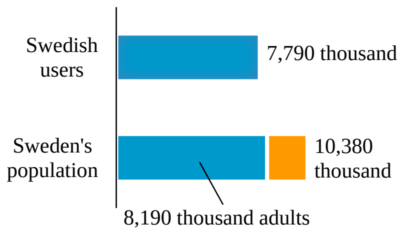


Source: Cheng et al. (2021).

1.2 China and Sweden intend to address special problems in local payment markets with CBDCs

China and Sweden face common problems of the marginalization of the use of cash as a means of payment and payment markets being monopolized by private payment companies (Chart B3.2). Launching a CBDC not only can fill the gap arising from diminishing cash usage but also avoid private monopoly, so as to safeguard the state's role in the payment market. Therefore, China is aggressively conducting e-CNY trials,[3] and the Riksbank continues its experiments on e-krona.[4]

Chart B3.2 Chinese and Swedish payment markets face common problems

<table>
<tr><th></th><th>China</th><th>Sweden</th></tr>
<tr><td>Demand for cash weakens</td><td>The ratio of currency in circulation to nominal GDP continues to decline

</td><td>Same as China

</td></tr>
<tr><td>Private payment companies monopolize payment markets</td><td>Alipay and WeChat Pay together account for 94% of the mobile payment market transaction volume
2020 Q3

</td><td>The private mobile payment system is used by 95% of Swedish adults
2020

</td></tr>
</table>

Sources: BIS, Enfodesk, Swish, and SCB.

1.3 Some emerging economies, including the Bahamas, expect to use CBDCs as a complement to their weak payment infrastructure

In some emerging economies, payment infrastructure is extremely insufficient, and the locals rely on cash transactions. Since a CBDC is expected to supplement weak payment infrastructure, act as the most basic electronic payment tool for the public, reduce the reliance on cash, and help the government to promote financial inclusion, there has been an upsurge of interest in CBDC issuance in emerging economies recently. For example, the Central Bank of the Bahamas' "Sand Dollar",[5] the Eastern Caribbean Central Bank's "DCash" trials,[6] and the Central Bank of Nigeria's "eNaira".[7]

2. Policy implications of CBDCs

The policy implications for the economies that are developing or conducting research on CBDCs can roughly fall into three broad categories:

2.1 Exploring the potential of digital technologies in response to the emerging trends of digital payment

For economies that have efficient payment systems in place, such as Taiwan and those in Europe and North America, a CBDC merely serves as an additional alternative to various existing payment instruments. The primary motivations for those economies to conduct research on CBDCs are expectations that new digital payment instruments can meet the needs of future digital environments and for innovation of business models.

2.2 Safeguarding the role of the state in payment markets so as to promote sound operation of the financial system

Sweden and China are facing challenges such as the private mobile payment companies monopolizing payment markets and continuing to crowd out the use of cash. It is expected that CBDCs can fill the gap with cash losing ground and safeguard the role of the state in payment markets. In addition, a good design can help ensure the sound operation of the financial system by emphasizing consumer privacy protection and complying with regulations such as those for anti-money laundering (AML) and prevention of illegal activities.

2.3 Providing a public payment instrument to facilitate financial inclusion

The Bahamas and other emerging economies lack sufficient financial infrastructure, along with high costs of cash issuance and poor outcomes of private promotion of electronic payments. A feasible alternative is for the government to facilitate financial inclusion by providing the public with a CBDC as a basic electronic payment instrument. Different from commercial interest-oriented private payment instruments, CBDCs are public interest-oriented and can be used by the public in a more inclusive manner.

3. *Policy considerations and research progress of the Bank on CBDC*

3.1 Policy considerations of the Bank's research on CBDC

Similar to major economies in Europe and North America, Taiwan has diversified and convenient electronic payment instruments and adequate cash usage, and shares similar policy considerations for CBDC work (Table B3.1), which mainly focus on how to keep up with the evolving trend of digital payment and to proactively understand the technological challenges and cost-effectiveness of a CBDC, while continuing to explore possible technical solutions and best operating models. Therefore, if a CBDC is indeed launched in the future, it can create value and function differently from other payment instruments.

Table B3.1 International development of payment markets and focus of CBDC policy considerations

	Electronic payment	Cash usage	Focus of CBDC policy considerations
Taiwan and major countries in Europe and North America	Diversified and convenient	Adequate	Exploring the potential of digital technology and responding to the emerging trends of digital payment
China and Sweden	Monopolized by the private sector	Declining	Safeguarding the role of the state in the payment market and promoting sound operation of the financial system
Emerging countries such as the Bahamas	Inefficient	Strongly reliant	Providing a public payment instrument to facilitate financial inclusion

Source: CBC.

3.2 The Bank is conducting CBDC research and testing projects

For these economies, developing CBDCs is an earnest endeavor. They should at a minimum make sure that CBDC issuance meets the needs of businesses, consumers, and governments and is developed according to local circumstances. While a few economies have become the front-runners in CBDC issuance and performed pilot testing of CBDC technologies, they also have to confront the potential risks of those technologies. Most of the other economies could learn from their experience and strive to build a more comprehensive CBDC ecosystem.

In Taiwan, the Bank already completed the first phase program on the feasibility of a wholesale CBDC in June 2020. The results showed that the application of distributed ledger technology (DLT) had its own limits. In particular, it could not achieve efficacy in dealing with real-time, high-frequency, and large-volume payment transactions. Currently the Bank has proceeded to the second phase program on a general-purpose CBDC and is carrying out technical experimentation. By building a prototype CBDC platform, the program will simulate the application of a CBDC in retail payment scenarios and is expected to be finalized in September 2022. The Bank will consider the simulation results in the second phase as the basis for public discussion and extensively consult external opinions, thereby garnering more diverse perspectives to help evaluate the possibility of future CBDC issuance.

Notes: 1. Boar, Codruta and Andreas Wehrli (2021), "Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency," *BIS Papers*, No. 114, January.
2. Cheng, Jess, Angela Lawson and Paul Wong (2021), "Preconditions for a General-purpose Central Bank Digital Currency," *FEDS Notes*, February.
3. PBoC (2021), "Progress of Research & Development of E-CNY in China," July 16.
4. Sveriges Riksbank (2021), "E-krona Pilot Phase 1," April.
5. Central Bank of the Bahamas (2020), "The Sand Dollar is on Schedule for Gradual National Release to The Bahamas in mid-October 2020," September.
6. ECCB (2021), "Bitt Partners with ECCB to Develop World's First Central Bank Digital Currency in a Currency Union," March.
7. Central Bank of Nigeria (2021), "President Buhari to Unveil eNaira on Monday, 25 October 2021," October.

3.3.2 Measures for enhancing risk management of real estate credit of financial institutions

To urge financial institutions to prudently control the credit risk of real estate lending, the Bank has adjusted targeted macroprudential measures regarding real estate loans four times since December 2020. Besides this, the FSC also successively adopted measures to strengthen risk management of real estate credit of financial institutions as follows:

Adopting enhanced supervisory measures for the real estate credit or guarantee of financial institutions

(1) In December 2021, the FSC required banks to abide by the Bank's targeted macroprudential measures when conducting guarantee business of commercial paper or corporate bonds. In addition, the FSC required those banks whose portfolio concentration ratios rose more significantly after adding real estate guarantees – in addition to construction loans – into the calculation to propose improvement plans and formulate management measures.

(2) In December 2021, the FSC revised the regulations to require that the ratio of the guarantee balance of bills finance companies for commercial paper issued by real estate firms to the total guarantee balance shall not exceed 30%. In addition, the FSC asked bills finance companies to incorporate the Bank's targeted macroprudential measures into their internal rules for commercial paper guarantees business.

(3) Towards the end of 2021, the FSC implemented a new series of targeted examinations toward real estate loans at the end of 2021. In addition, compliance with the relevant regulations and requirements issued by the Bank and the FSC was listed as one of the primary focuses of financial examinations in 2022.

Raising risk weights for real estate mortgage loans of banks

With the implementation of the Bank's targeted macroprudential measures, several types of real estate mortgage loans would then be assigned lower risk weights as per current capital requirements. Therefore, the FSC raised the risk weights of the newly extended mortgage loans under the Bank's targeted macroprudential measures in February 2022 (Table 3.3).

Table 3.3 Risk weights of real estate mortgage loans

Loan type	Before amendment in February 2022		After amendment
Housing loans for corporate entities	Residential real estate - general	20%	50%
	Residential real estate - income producing	30%	100%
The third (or more) housing loans for natural persons	Residential real estate - income producing	30%	100%
Land loans	ADC exposures - residential districts	100%	150%
	ADC exposures - commercial districts	150%	200%
Unsold housing unit loans	Residential real estate- income producing	30%	100%
	ADC exposures - residential districts	100%	150%
Mortgage loans for idle land in industrial districts	Non-qualifying commercial real estate exposures - general	75%, 85%, 100%	200%
	Non-qualifying commercial real estate exposures - income producing	150%	
	ADC exposures - non-residential districts	150%	

Notes: 1. The applicable scope includes the regulated types of real estate mortgage loans newly granted by domestic banks.
2. ADC refers to land acquisition, development and construction.
3. Real estate mortgage loan cases undertaken in support of relevant government policies shall not apply.

Source: FSC.

3.3.3 Strengthening financial institutions' climate risk management and financial disclosure

To achieve the objectives for the development of sustainable finance in the Green Finance Action Plan 2.0 and strengthen financial institutions' climate risk management and financial disclosure, the FSC proposed the following measures recently.

Establishing the guidelines on climate-related financial disclosures for domestic banks and insurance companies

The FSC issued the guidelines on climate risk financial disclosures for domestic banks and insurance companies in November 2021. Accordingly, they are required to establish appropriate evaluation and disclosure mechanisms for climate risks and opportunities (given company size and type of business) and disclose information on climate risk management in terms of governance, strategies, risk management, and metrics and targets. Additionally, starting from 2023, they should reveal climate-related financial information for the previous year before the end of June each year.

Enhancing financial institutions' climate risk management

In order to strengthen insurance companies' ability to respond to climate risks, the FSC adopted the following measures: (1) urging insurance companies to enhance identification of sources and types of climate risks; (2) incorporating major catastrophes caused by climate change into non-life insurance companies' stress test scenarios;[50] (3) requiring non-life insurance companies and reinsurance companies to integrate natural disaster risks into their risk-based capital (RBC); and (4) requiring insurance companies to identify and evaluate climate change risks and formulate an appropriate risk management mechanism.

In addition, the FSC proposed to apply a method for calculating a catastrophe risk charge, built by the Insurance Capital Standard (ICS), to the current RBC system, and required domestic banks to conduct scenario analyses and stress tests for climate change. In the future, the FSC will seek to integrate climate risk into the existing regime for financial institutions' stress tests and capital requirements.

3.3.4 The FSC takes a gradual approach to implement the New Generation Insurance Solvency Regime

In the ICS issued by the International Association of Insurance Supervisors (IAIS), assets and liabilities are both measured at fair value. Moreover, the insurers in Taiwan are expected to adopt "IFRS 17: Insurance Contracts", which will require evaluation of insurance liabilities at fair value. Accordingly, the FSC is developing the New Generation Insurance Solvency Regime, which would take reference from the ICS and is scheduled to be officially launched in 2026 in step with the domestic adoption of IFRS 17.

The calculation of the ICS capital requirement for assets and liabilities is based on a market value approach, which is quite different from the existing RBC system adopted by the insurers in Taiwan. Therefore, the FSC is planning to adopt the above-mentioned new solvency regime in three phases from 2020 to 2026 with a gradual approach, including an on-site field-testing phase (phase I), a parallel run phase (phase II) and a preparatory phase (phase III), so that

[50] According to the stress test results released by the FSC in June 2021, the non-life insurance industry under an extremely adverse scenario would have an average capital adequacy ratio of 422.3% and an average net worth ratio of 30.06%, both of which were higher than the statutory minimums. This showed that the non-life insurance industry has sufficient solvency.

Taiwan's insurers can smoothly adopt the approach in compliance with international standards, which would help more reasonably reflect their business risks.

3.3.5 FX regulation amendments

To keep up with rapid changes in economic and financial conditions, fulfill good FX management, streamline relevant administrative processes, and help banks develop digital service channels and provide more flexible access to diversified financial services, the Bank amended FX regulations in the recent year, as follows:

- The Bank revised the *Regulations Governing the Declaration of Foreign Exchange Receipts and Disbursements or Transactions* and related directions in June 2021. The main amendments included: (1) broadening the regulated scope to include FX business conducted by electronic payment institutions; (2) taking a flexible approach, where the Bank may adjust the ceiling of the annual aggregate settlement amount of FX purchased or sold by declarants and of a specific nature; and (3) deleting the provision that the amount of FX purchased as per the guidelines of "direct declaration" and sold later would not be counted toward the declarant's aggregate settlement amount of the same year.

- The Bank revised the *Directions Governing Authorized Banks for Operating Foreign Exchange Businesses through Electronic or Communications Equipment* in December 2021. The amendments included: (1) relaxing the restrictions on authorized banks' counterparties when conducting business not involving FX settlement against the NT dollar and (2) stipulating that authorized banks shall immediately request and verify the relevant supporting documents when the accumulated settlement amount of transactions involving FX settlement against the NT dollar reaches a specific amount.[51]

- The Bank revised the *Directions Governing Banking Enterprises for Operating Foreign Exchange Business* in January 2022. The major amendments included: (1) deleting the procedures and required documents for confirming customer identity when authorized banks engage in remittance business and enabling banks to act in accordance with relevant regulations and their internal operating procedures; and (2) relaxing the restrictions on authorized banks' counterparties when conducting digital foreign currency deposit business and expanding the scope of the required documents for foreign currency loan business.

[51] The threshold is an amount equal to or greater than an equivalent of USD 1 million for the accumulated settlement amount of FX purchased or sold by a company or a firm, and that of USD 500,000 for an association or an individual.