

4. Payment and Settlement Systems

The CBC Interbank Funds-Transfer System (CIFS) is the backbone of Taiwan's payment and settlement system, linking payment and remittance systems operated by the Financial Information Service Co., Ltd. (FISC), the Taiwan Clearing House (TCH), the National Credit Card Center of R.O.C. (NCCC), the Taiwan Depository and Clearing Corporation (TDCC), the Taipei Exchange (TPEX), and the Taiwan Stock Exchange Corporation (TWSE), as well as the Central Government Securities Settlement System (CGSS), together to construct a comprehensive system.

In addition, the CBC monitors major payment systems based on the *Principles for Financial Market Infrastructures* released by the Bank for International Settlements (BIS) to ensure sound operation of these systems and to promote stability of the financial system.

Operation of Payment and Settlement Systems

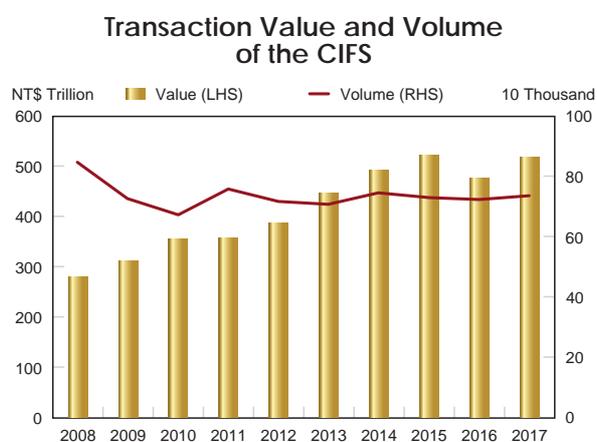
(1) Funds Transfers via the CIFS

The CIFS is a large-value electronic funds-transfer system. In addition to dealing with funds settlements in financial markets, open market operations, and interbank funding, the CIFS also provides interbank final settlement services to each clearing institution.

At the end of 2017, participants of the CIFS included 67 banks, eight bills finance companies, and seven other institutions including Chunghwa Post, the FISC, the TCH, the TWSE, the TPEX, the TDCC, and the NCCC. In the year 2017, the number of transactions via the CIFS was 734,895, with the total amount of funds transferred reaching NT\$517 trillion. Meanwhile, the daily average number of transactions via the CIFS was 2,963, with a daily average amount of funds transferred standing at NT\$2,086.5 billion, increasing by 7.60% over the previous year.

(2) Transactions via the CGSS

The CGSS was established in September 1997. It is a system for issuance, transfer, redemption, and interest payment of book-entry central government securities. Since its inception, central government bonds have been issued in book-entry form. In October 2001, treasury bills were included in this system and have been issued in book-entry form ever since.

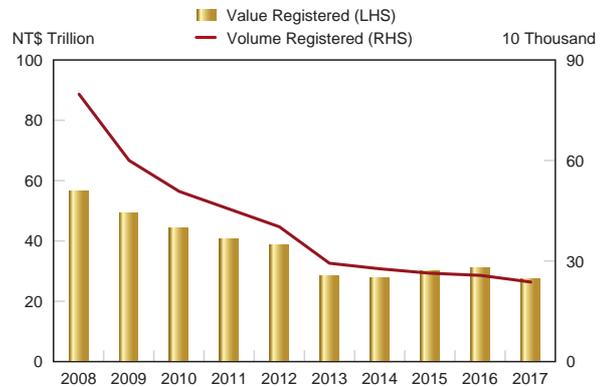


Source: Department of Banking, CBC.

The CGSS linked up with the CIFS in April 2008. Since then, fund settlements, principal redemptions, and interest payments have been handled through the CIFS using a delivery-versus-payment (DVP) mode. The DVP mode, promoted by the BIS, is an arrangement in a securities settlement system to ensure that securities delivery occurs almost at the same time as the funds transfer, effectively mitigating potential risks during the transaction process.

As of the end of 2017, there were 17 clearing banks with 1,687 branches that handled the registration of central government securities transfers. During 2017, 238,000 transfers with a total amount of NT\$27.4 trillion were processed by this system.

Transaction Value and Volume of the CGSS



Source: Department of Treasury, CBC.

Monitoring Payment and Settlement Systems

The CBC monitors the payment and settlement systems on a periodic basis to maintain their safety and efficiency. In 2017, the CBC's monitoring activities in this regard included the following:

- (1) Continuing to monitor the operation of the payment and settlement systems. In 2017, 15 applications for the CIFS operation time extensions were filed by participating institutions because of their own system malfunctions or other contingencies. The CBC required these institutions to submit improvement plans.
- (2) Requiring payment system operators and payment instrument issuers to provide detailed information on their operations and activities on a regular basis.
- (3) Supervising clearing institutions to perform regular drills on operating backup systems and implementing contingency plans in case of emergency to ensure business continuity. The FISC conducted its drill in July 2017, while the TDCC held its drills in May and November.
- (4) Inviting the Financial Supervisory Commission (FSC), the FISC, the TDCC, and the TCH to jointly hold conferences on "Promoting Sound Operation of the Payment Systems" with themes of "Payment System Operation Review and Major Improvements" in May and "Building Information Security Awareness and Maintaining System Security" in December, in order to urge clearing institutions to keep strengthening the governance of payment systems and information security.

Keeping Watch on Financial Technology Trends and Assisting Financial Institutions to Develop Innovative Services

In response to rapid advancement in financial technology (fintech) in recent years, the CBC continued to keep close watch on the development of financial technology and undertook the following actions:

- (1) Forming a digital finance research group within the CBC and holding meetings to discuss fintech-related issues on blockchain technology, regulatory technology, big data, and artificial intelligence.
- (2) Assisting in boosting the adoption of electronic payments domestically and supporting the FISC in its collaboration with financial institutions to promote electronic payment services, such as introducing Taiwan Pay.
- (3) Instructing the TCH to carry out outsourced research programs with a focus on the applications of blockchain technology in financial services.
- (4) Urging the FISC to cooperate with financial institutions in establishing an interconnected financial blockchain platform and conducting trial cases based on the plan formulated by the "Financial Blockchain Research and Application Development Committee."
- (5) Closely watching the development of virtual currencies like Bitcoin and related global regulatory actions.

Box

The Development of Electronic Payments in Taiwan

In order to construct a comprehensive framework of the payment and settlement systems in Taiwan, the CBC has carried out numerous reforms since 1995. In recent years, the CBC has also promoted the development of electronic payment services. Currently, large-value payments are all made electronically. With regard to retail payments, through joint efforts by the government and the private sector, a variety of electronic payment instruments have been brought into use to meet consumers' payment needs.

1. Assisting in Building a Sound Electronic Payment System

1.1 Establishing the CBC Interbank Funds-Transfer System (CIFS)

The CIFS is a large-value electronic funds-transfer system, commencing service in 1995. Since 2002, the CIFS has been comprehensively transformed into a Real-Time Gross Settlement (RTGS)¹ system in order to improve the efficiency of interbank funding and reduce settlement risk of large-value transactions.

¹ RTGS is a mechanism in which all payments are processed and settled continuously in real time (without deferral) and on a gross basis (transaction by transaction) when the banks involved hold sufficient account balances.

1.2 Making the CIFS the Hub of Taiwan's Payment and Settlement Systems

The CIFS, as the backbone of domestic payment systems, has gradually connected to clearing systems of bills, government bonds, and securities with the adoption of a delivery-versus-payment (DVP)² mechanism since 2003. It also deals with interbank settlements of credit card transactions. From February 2014, the CIFS linked with the foreign currency clearing platform to provide payment-versus-payment (PVP)³ settlements for foreign exchange swap transactions between the NT dollar and other foreign currencies. This helped ensure the security and efficiency of the overall financial payment system.

2. Promoting the Use of Electronic Payment Instruments

There are three types of payment instruments under Taiwan's electronic payment system, including (1) electronic funds transfers through bank accounts, (2) credit cards and cash cards for retail payments, and (3) electronic money for storing value and making payments. In 2017, the amount of electronic payment transactions totaled NT\$664.5 trillion, 38 times as large as nominal GDP of the same period.

Electronic Payment Transactions

Unit: NT\$100 Million; %

	2017		2016	
	Amount	Share	Amount	Share
Electronic Funds Transfers (via bank accounts)	6,610,554	99.48	6,150,218	99.48
CIFS	5,174,477	77.87	4,770,355	77.16
FISC	1,408,519	21.20	1,353,090	21.89
TCH	27,558	0.41	26,773	0.43
Credit Cards and Cash Cards	33,807	0.51	31,221	0.51
Credit Cards	26,232	0.39	24,222	0.39
Cash Cards	7,575	0.11	6,999	0.11
Electronic Money	820	0.01	745	0.01
Banks	0.2	0.00	0.2	0.00
Non-banks	820	0.01	745	0.01
Total	6,645,181	100.00	6,182,184	100.00

Sources: CBC, FSC, and FISC.

² DVP is a settlement mechanism aiming to ensure that the delivery of securities occurs only if the corresponding transfer of funds occurs in order to prevent settlement risk.

³ PVP refers to a mechanism for synchronous payments between two different currencies and is used worldwide to control foreign currency settlement risk. To take NTD/USD swaps as an example, PVP ensures that a final transfer of USD (or NTD) occurs only if a final transfer of NTD (or USD) takes place.

2.1 Electronic Funds Transfers through Bank Accounts

Large amounts of electronic funds were transferred via bank accounts, mainly processed through the CIFS, the Interbank Remittance System (IRS) operated by the FISC, and the Automated Clearing House (ACH) system run by the TCH. In 2017, the total amounts transferred through the three systems above were NT\$517.4 trillion, NT\$140.9 trillion, and NT\$2.8 trillion, respectively.

2.2 Credit Cards and Cash Cards

Card-based payment has been a common non-cash payment method in Taiwan. Among electronic payment instruments, credit cards and cash cards are widely used by domestic consumers. In 2017, the total amount of transactions was NT\$3.4 trillion, of which transactions made via credit cards accounted for 77.6%.

2.3 Electronic Money

Electronic money includes electronic stored value cards provided by electronic stored value card issuers and electronic payment accounts (e-payment accounts) managed by electronic payment institutions. As the e-payment account business which allows the public to deposit their stored value funds has only been introduced for a short period of time, the transaction amount remained low, and electronic stored value cards still made up the majority of electronic money transactions.

Electronic stored value cards were primarily issued by non-bank institutions. At the end of 2017, the number of effective electronic stored value cards issued by non-banks reached 93.42 million with stored value amounting to NT\$8.02 billion, far higher than the 20 thousand effective cards issued by banks with stored value of NT\$40 million.

Electronic Stored Value Cards Issued

Unit: 10 thousand; NT\$100 Million

Year	By Banks		By Non-banks	
	Effective Cards	Balance of Stored Value	Effective Cards	Balance of Stored Value
2014	46	0.5	5,753	51.9
2015	122	0.6	6,854	60.7
2016	8	0.5	8,101	69.4
2017	2	0.4	9,342	80.2

Source: FSC.

Electronic stored value cards issued by non-banks mainly include EasyCard, icash card, iPASS card, and HappyCash card. The amount of annual retail sales paid with these cards totaled NT\$82 billion in 2017, with EasyCard contributing the largest share of 75.4%.

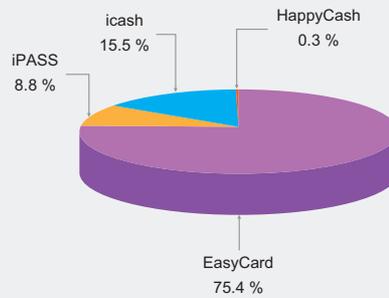
3. Supporting the Development of Electronic Payments

In recent years, currency issuance to GDP ratios have exhibited uptrends in most countries, except for Sweden and China. Meanwhile, cash is still frequently used even in countries with well-developed electronic payment systems, such as the US, South Korea, the euro area, and Japan, indicating that cash remains an important payment instrument for consumers.

Despite diversified electronic payment instruments offered in Taiwan, most people still use cash as a major payment method.

To increase the adoption of electronic payments, the CBC has urged the FISC to assist in the development of payment instruments such as cash card payments and mobile payments. For mobile payments, the Executive Yuan has set a policy target of reaching a 90% penetration rate by 2025. In order to help achieve that goal, the FISC introduced Taiwan Pay, a QR code-based mobile payment service, in September 2017 and will continue to develop a more secure and convenient identity authentication mechanism.

Shares of Electronic Stored Value Cards Issued by Non-banks in 2017



Source: FSC.