III. Financial system assessment

3.1 Financial markets

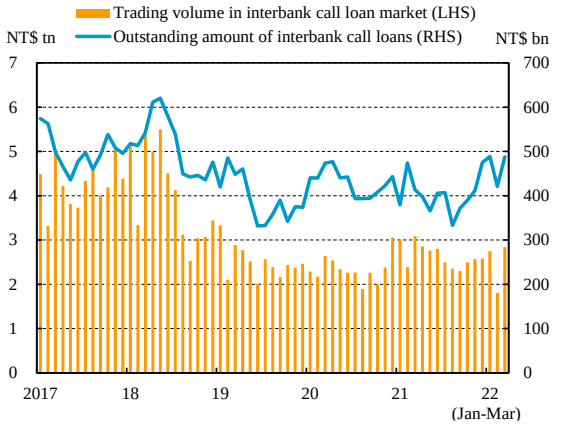
In 2021, the outstanding amount of interbank call loans declined, while their trading volume expanded. On the other hand, the outstanding amount of bill issuance reached another historical high mainly because of a greater increase in CP, and the trading volume amplified. Meanwhile, the outstanding amount of bond issuance continued to expand, with the greatest increase in international bonds, but the trading volume in the secondary market decreased substantially and the turnover rate of outright bond transactions declined. Short-term market rates stabilized at a low level, while long-term interest rates fluctuated upwards after the Bank raised the policy rates in March 2022, resulting in higher interest rate risks in bond investments. As for stock markets, in 2021, stock indices hit historical highs and then fell back with increasing volatility. Meanwhile, the NT dollar oscillated and appreciated against the US dollar. Nevertheless, in the beginning of 2022, propelled by a stronger US dollar, the NT dollar depreciated, while the volatility remained relatively stable.

3.1.1 Money and bond markets

Outstanding amount of interbank call loans declined, while their trading volume expanded

In 2021, owing to the resurgence of domestic pandemic cases, financial institutions became more conservative in extending interbank lending. As a result, the average daily outstanding amount of interbank call loans decreased by 6.68% and registered NT$402.1 billion. However, the trading volume of

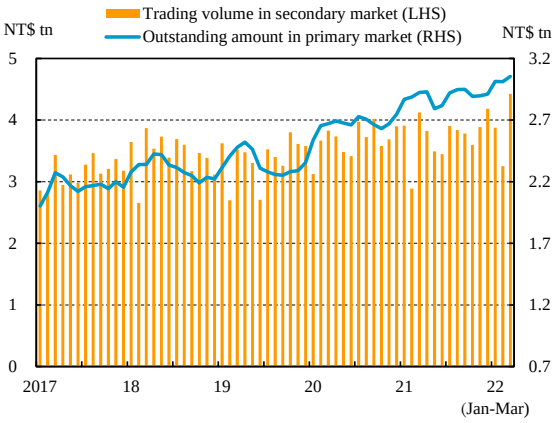
Chart 3.1 Interbank call loan market



Note: Outstanding amount is the monthly average of daily data.
Source: CBC.

interbank call loans increased by 12.78% year on year in 2021, given that the proportion of interbank overnight call loans in the market expanded and financial institutions increased the frequency with which they rolled over their interbank borrowing. In 2022 Q1, the average daily outstanding amount of interbank call loans expanded year on year, but their trading volume decreased over the same period (Chart 3.1).

Chart 3.2 Primary and secondary bill markets



Source: CBC.

Outstanding amount of bill issuance hit a new high, propelling the bill trading volume in the secondary market to increase accordingly

The outstanding amount of bill issuance in the primary market reached a record high of NT$2.91 trillion at the end of 2021, increasing by 5.97% year on year. The main reason was that interest rates in the primary market stayed at low levels and attracted corporates to increase CP issuance for fund raising. In 2022 Q1, the outstanding amount of bill issuance continued to grow because of the increase in the issuance of treasury bills and CP (Chart 3.2).

Impelled by the expansion in the primary market, the bill trading volume in the secondary market also increased in 2021. The trading volume increased by 1.66% year on year and amounted to NT$44.87 trillion with CP constituting the largest share of 95.81%. In 2022 Q1, the bill trading volume continued its upward trend over the same period of the previous year (Chart 3.2).

Bond issuance continued to expand, while the trading volume decreased substantially, and the turnover rate of outright bond transactions dropped to a record low

The outstanding amount of bond issuance increased by 7.58% and reached a new high of NT$15.45 trillion at the end of 2021 because interest rates stayed at low levels and attracted corporates and financial institutions to increase bond issuance so as to lock in long term funding costs. Major bonds all saw increasing issuance. Among them, the outstanding amount of international bond issuance increased the most by value and registered an annual growth rate of 9.26%, followed by corporate bonds and government bonds, which increased by 15.35%

and 3.82%, respectively, year on year (Chart 3.3).

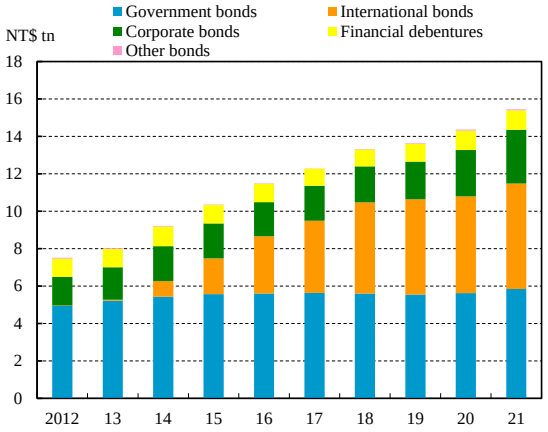
However, the trading volume in the secondary bond market dropped to NT$36.14 trillion in 2021, substantially decreasing by 31.17% year on year (Chart 3.4). This was mainly owing to the fact that major bond market traders such as bills finance companies and securities firms reduced their bond holdings considering that bond yields might rise. Analyzed by trading types, repo transaction volume shrank by 30.01% year on year, and outright transaction volume decreased by 35.52%. As a result, the average monthly outright turnover rate of major bonds decreased continually in 2021 and dropped to a recent low of 2.45%. In 2022 Q1, it declined further to a record low of 2.43%.

Long-term market rates rose markedly, leading to higher interest rate risks on bond investments

In terms of short-term market rates, the interbank overnight call loan rate stabilized at a low level in 2021 and ascended gradually after the Bank raised the policy interest rates and the interest rate on the Bank's certificates of deposit (CDs) in March 2022 (Chart 3.5). However, liquidity in financial markets remained ample.

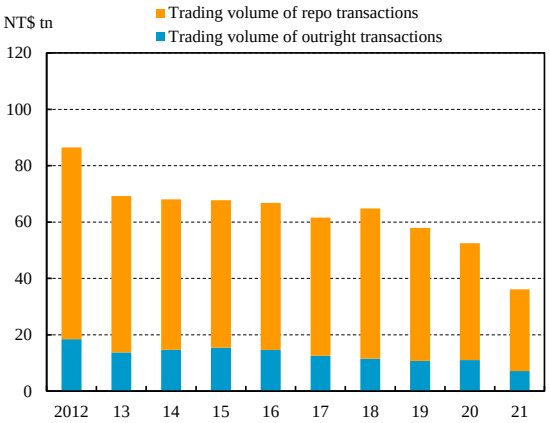
As for long-term market rates, 10-year government bond yields trended upwards in 2021 alongside the movement of US government bond yields. In 2022, the yields rose further and reached a 4-year high of 1.07% on March 28 (Chart 3.5) given that the

Chart 3.3 Total amount of bonds outstanding in the primary market



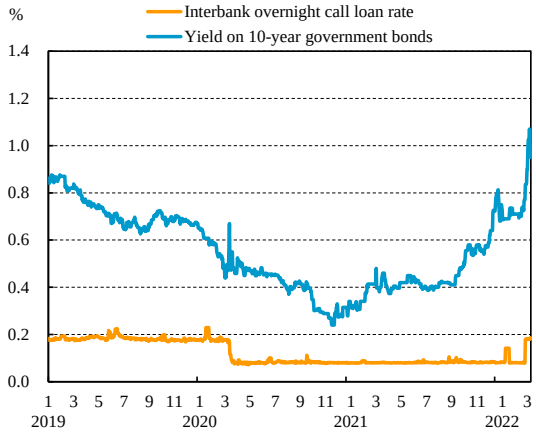
Note: Other bonds include beneficiary securities and foreign bonds.
Source: FSC.

Chart 3.4 Outright and repo transactions in the bond market



Source: CBC.

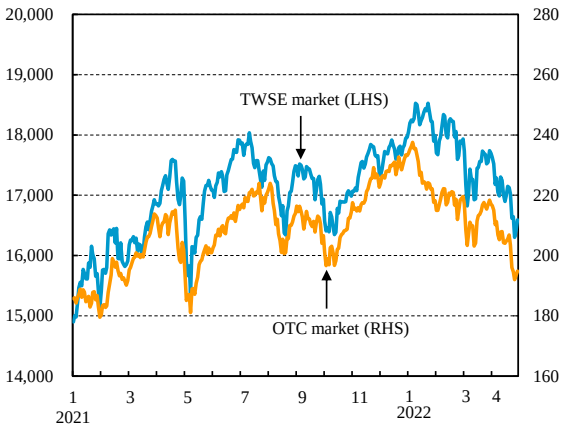
Chart 3.5 10-year government bond yield and interbank overnight rate



Source: Bloomberg.

Bank raised policy interest rates in mid-March and US government bond yields saw a sharp rise. Considering that recent tightening of monetary policies in major economies to curb inflation might put upward pressure on bond yields globally and, in turn, propel 10-year government bond yields to increase further, interest rate risks related to bond investments might elevate and warrant close attention.

Chart 3.6 Taiwan's stock market indices



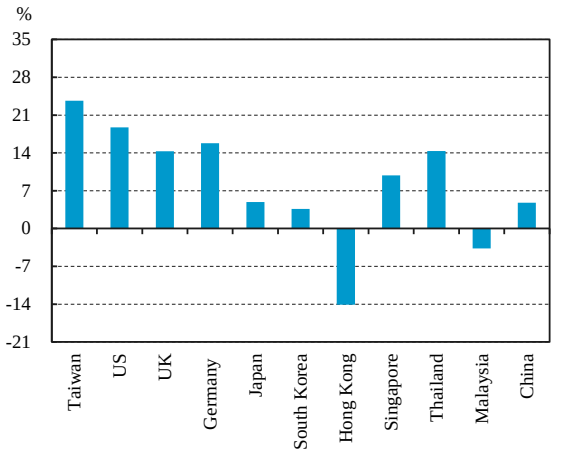
Sources: TWSE and TPEx.

3.1.2 Equity markets

Stock indices reached historical highs before slumping

In the beginning of 2021, benefiting from strong exports and better-than-expected economic performance in Taiwan, as well as US stock indices repeatedly reaching new highs, the TAIEX of the TWSE market went up steadily. Owing to recurring outbreaks of the pandemic, the TAIEX saw a sudden drop in May. However, affected by sequences of positive/negative messages, the TAIEX fluctuated with an upward trend (Chart 3.6), posting an increase of 23.66% year on year and surging higher than the major indices in international stock markets (Chart 3.7). The Taipei Exchange Capitalization Weighted Stock Index (TPEX) of the OTC market closely tracked the movements of the TAIEX, posting an increase of 29.03% year on year in 2021. In 2022 Q1, affected by US policy interest rate hikes, the Russia-Ukraine war, and the resurgence of the pandemic in China, the volatility in international stock markets increased dramatically. Therefore, the TAIEX dropped from its high level, and the TPEX also followed the same trend (Chart 3.6).

Chart 3.7 Major stock market performance



Notes: 1. Changes are figures at the end of 2021 compared to those at the end of 2020.
2. Market performance is based on TWSE Weighted Index for Taiwan, DJIA Index for the US, FTSE-100 Index for the UK, DAX Index for Germany, NK-225 Index for Japan, KOSPI Index for South Korea, Hang Seng Index for Hong Kong, Straits Times Index for Singapore, SET Index for Thailand, Kuala Lumpur Composite Index for Malaysia, and SSE Composite Index for China.

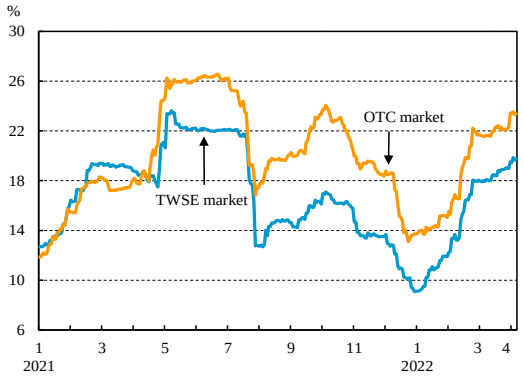
Source: TWSE.

Volatility in the stock markets increased sharply and annual turnover rates rose dramatically

Since May 2021, the spread of intensified panic sentiment in financial markets caused by the domestic COVID-19 resurgence drove the volatility of Taiwan's stock prices to surge sharply. However, the volatility of the TWSE and the OTC markets dropped and stabilized in the second half of the year, registering 10.27% and 13.81%, respectively, at the end of the year. From the beginning of 2022, affected by the intensifying fluctuations in global stock markets, the volatility of Taiwan's stock prices expanded again (Chart 3.8).

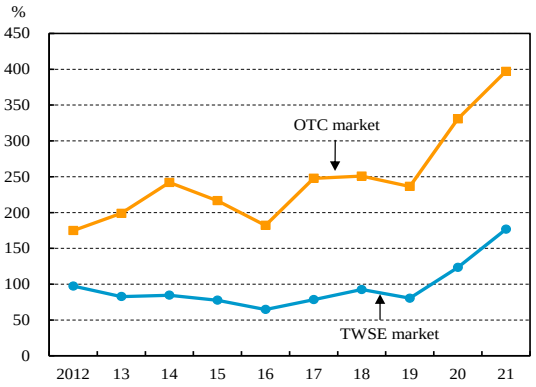
Owing to the booming trading volume of Taiwan's stock markets, the monthly average trading value in both the TWSE and the OTC markets increased to NT$7.69 trillion and NT$1.69 trillion in 2021, respectively, posting increases of 102.15% and 67.75% year on year. Among them, the monthly average trading value of domestic individuals accounted for 69.77% of the total and showed an increase for two consecutive years. Affected by the above factors, the annual turnover rates in terms of trading value also rose to 176.60% and 397.00% in the TWSE and the OTC markets (Chart 3.9), respectively, higher than those in most major international stock markets (Chart 3.10), indicating that Taiwan's stock markets were prosperous and liquidity remained sufficient.

Chart 3.8 Stock price volatility in Taiwan's markets



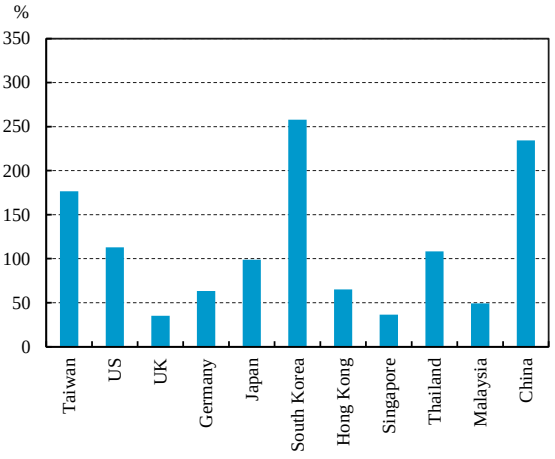
Note: Volatility refers to the annualized standard deviation of 60-day daily index returns.
Sources: TWSE, TPEx, and CBC.

Chart 3.9 Annual turnover rates in Taiwan's stock markets



Sources: TWSE and TPEx.

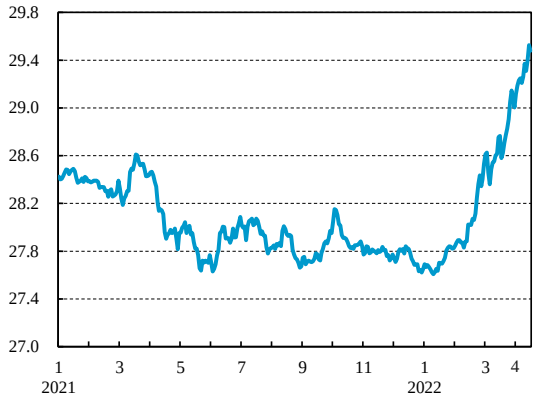
Chart 3.10 Turnover rates in major stock markets



Note: Figures refer to accumulated turnover rates in 2021.
Source: TWSE.

Domestic stock markets were supported by sound economic fundamentals. However, an escalation of the COVID-19 pandemic, along with global geopolitical risks and uncertainties surrounding monetary policies in major economies, may affect the global economy and international stock markets, which could in turn impact domestic stock markets. The developments of the above issues warrant close attention.

Chart 3.11 NTD/USD exchange rate

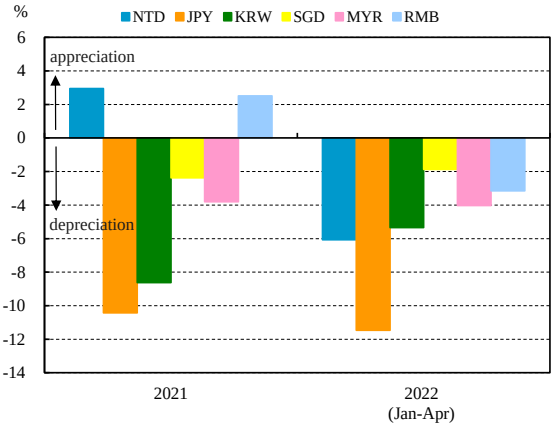


Source: CBC.

3.1.3 FX market

The NT dollar turned to depreciate after appreciating against the US dollar, while the trading volume of the FX market decreased moderately

Chart 3.12 Exchange rate changes of major Asian currencies against the US dollar



Source: CBC.

In 2021, Taiwan's economy performed remarkably well and its exports repeatedly hit new highs. Strong demand for US dollars by exporters, coupled with inflows of foreign capital to invest in domestic stock markets, led the NT dollar to appreciate against the US dollar. Following this upward trend, the NT dollar stood at 27.690 at the end of 2021, rising by 2.95% over the end of the previous year. Nevertheless, in the beginning of 2022, the US dollar began an uptrend caused by US policy interest rate hikes and uncertainties stemming from rising geopolitical tensions. As a consequence, the NT dollar turned to depreciate against the US dollar (Chart 3.11), depreciating by 6.07% at the end of April compared to the end of 2021.

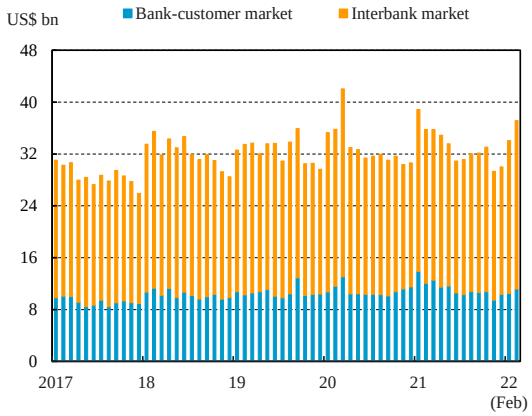
In 2021, owing to appropriate domestic pandemic control and sound economic fundamentals, the extent of NT dollar appreciation against the US dollar was slightly more than the RMB; meanwhile, most other major Asian currencies depreciated against the US dollar. However, from January to April 2022, the rising trend of the US dollar caused the depreciation of most major Asian currencies including the NT dollar (Chart 3.12).

The scale of trading in Taiwan's FX market slightly decreased in 2021, with average daily trading volume amounting to US$33 billion from US$33.1 billion a year earlier, or declining by 0.30%, primarily because of a decrease in interbank transactions (Chart 3.13).

NT dollar exchange rate volatility remained relatively stable

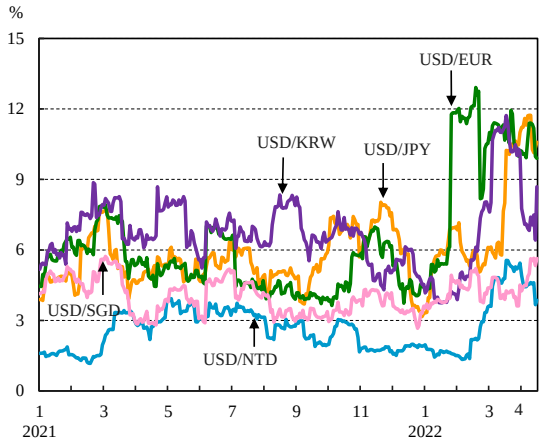
The volatility of the NT dollar exchange rate against the US dollar fluctuated between 1.17% and 3.93% in 2021 and registered an annual average of 2.55%, which was relatively lower than those in other major currencies. From January to April 2022, the volatility of the NT dollar exchange rate rose and registered between 1.34% and 5.56%. Compared to major currencies such as the Japanese yen, the euro, the Singapore dollar, and the Korean won, the NT dollar exchange rate remained relatively steady against the US dollar (Chart 3.14).

Chart 3.13 FX market trading volume



Notes: 1. Trading volume is the monthly average of daily data.
2. The latest data for trading volume are as of February 2022.
Source: CBC.

Chart 3.14 Exchange rate volatility of various currencies versus the US dollar



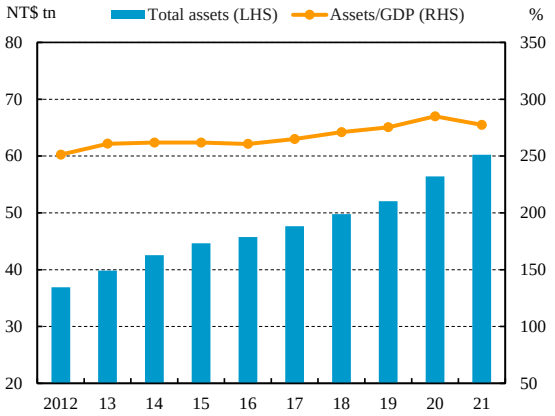
Note: Volatility refers to the annualized standard deviation of 20-day daily returns.
Source: CBC.

3.2 Financial institutions

3.2.1 Domestic banks

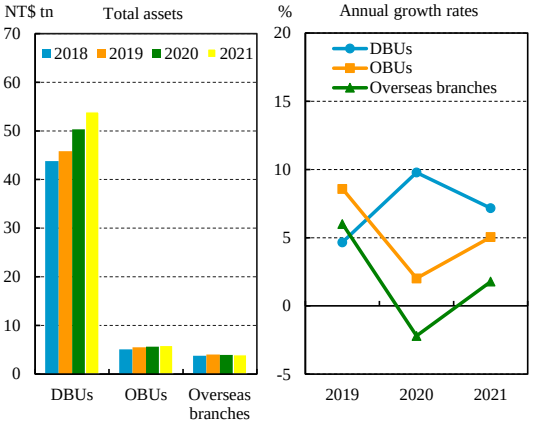
The total assets of domestic banks [31] continually expanded in 2021 but at a slower pace. Asset quality improved and exposures to China continuously decreased. The sectoral concentration in corporate loans declined moderately, while loans related to real estate increased slightly. The estimated value at risk (VaR) of market risk exposures decreased and the impacts on capital adequacy ratios were limited. Liquidity in the banking system was ample, and overall liquidity risk remained relatively low. The profitability of domestic banks turned to increase in 2021, and the average capital adequacy ratio rose, indicating satisfactory capacity to bear losses.

Chart 3.15 Total assets of domestic banks



Note: Figures from 2012 forward are on the TIFRSs basis.
Sources: CBC and DGBAS.

Chart 3.16 Total assets of domestic banks by sector



Note: Figures for total assets include interbranch transactions.
Source: CBC.

Total assets kept growing, but at a slower pace

The total assets of domestic banks kept growing and reached NT$60.23 trillion at the end of 2021, equivalent to 277.41% of annual GDP (Chart 3.15). Nevertheless, the annual growth rate of the total assets rose at a slower pace of 6.78%. Broken down by sector, the annual asset growth rates of offshore banking units (OBUs) and overseas branches trended upwards, whereas those of domestic banking units (DBUs) trended down (Chart 3.16).

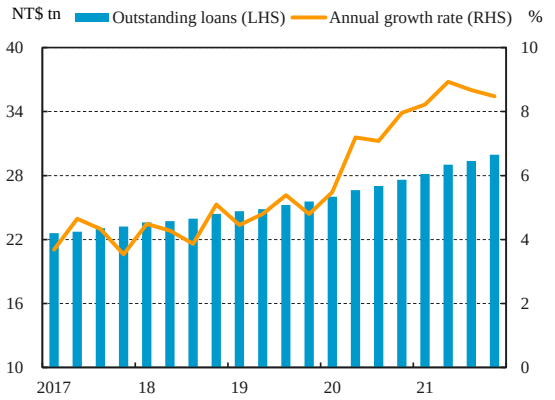
[31] Includes Agricultural Bank of Taiwan.

Credit risk

Customer loans growth accelerated

Customer loans granted by the DBUs of domestic banks stood at NT$29.95 trillion at the end of 2021, accounting for 49.73% of total assets with an annual growth rate of 8.48% (Chart 3.17). Among them, the annual growth rate of household borrowing slightly declined to 8.68%, while the annual growth rate of corporate loans rose to 8.92% owing to the undertaking of relief loans and rising funding demand after the pandemic eased.

Chart 3.17 Outstanding loans in domestic banks



Note: Loans of OBUs and overseas branches are excluded.
Source: CBC.

The share of real estate-secured credit continuously increased

At the end of 2021, real estate-secured credit granted by domestic banks reached NT$20.85 trillion, accounting for 58.49% of total credit [32] (Chart 3.18). Transactions in the housing market thrived and house prices trended upwards in 2021. However, considering that the pressure from the increased stock of unsold new housing units remained and the government had actively introduced relevant measures to curb market speculation, the credit risk related to the real estate sector is still high, warranting continuous monitoring.

Chart 3.18 Credit by type of collateral in domestic banks

Source: CBC.

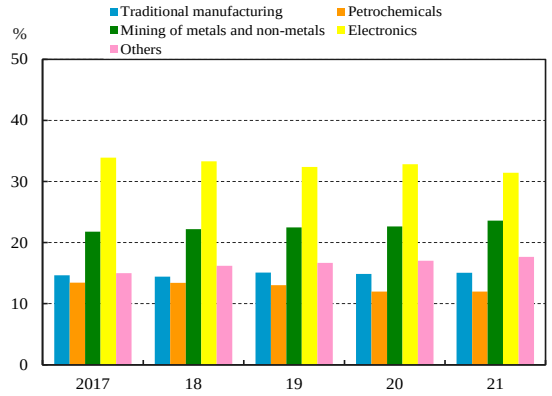
Credit concentration in corporate loans slightly decreased

For the DBUs of domestic banks, corporate loans stood at NT$12.85 trillion at the end of 2021, of which loans to the manufacturing sector accounted for the largest share at 36.63%. Among the manufacturing sector,[33] the largest proportion of loans was in the electronics industry with

[32] The term "credit" herein includes loans, guarantee payments receivable, and acceptances receivable.
[33] Loans to the manufacturing sector are divided into five categories by industry, including: (1) electronics, (2) mining of metals and non-metals, (3) petrochemicals, (4) traditional manufacturing, and (5) others.

a share of 31.42%, showing a slight decrease over the previous year. This reflected the fact that credit concentration in corporate loans reduced mildly (Chart 3.19).

Chart 3.19 Exposure to the manufacturing sector by domestic banks



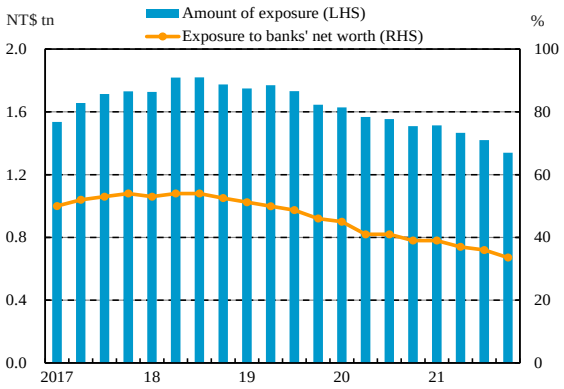
Notes: 1. Exposure to each sector = loans to each sector/loans to the whole manufacturing sector.
2. Exposures of OBUs and overseas branches were excluded.

Source: CBC.

Exposures to China continued to decrease, but potential risks remained high

At the end of 2021, the statutory exposures of domestic banks to China stood at NT$1.34 trillion, decreasing by 11.22% from a year earlier mainly owing to a decline in credit granted. The above exposures as a percentage of their previous year-end final net worth also fell to a new low of 34% (Chart 3.20).

Chart 3.20 Exposures of domestic banks to China



Source: FSC.

Although domestic banks' exposure to China remained at a low level, considering the slowdown in China's short-term economic growth, coupled with the impact of the Russia-Ukraine war disrupting the global supply chain on which it depends, the potential economic and financial risks in China are still high; therefore, they warrant continual close attention.

Asset quality improved

The outstanding classified assets[34] of domestic banks decreased by 6.37% from a year earlier and stood at NT$449.2 billion at the end of 2021. Therefore, the average classified asset ratio stood at 0.75%, slightly decreasing by 0.01 pps from the end of the previous year (Chart 3.21), showing that the asset quality of domestic banks improved. Meanwhile, the expected losses of classified assets[35] decreased by NT$6.7 billion from a year earlier to NT$45.2 billion, accounting for 8.91% of allowances for doubtful accounts and loss provisions, indicating that

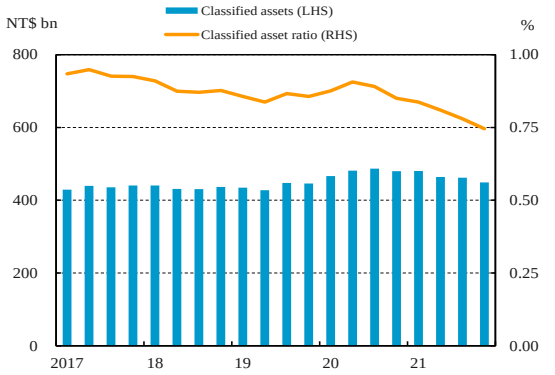
[34] Assets of domestic banks are broken down into five categories: normal, special mention, substandard, doubtful, and loss. The term "classified assets" herein includes all assets classified as the latter four categories.
[35] Loss herein refers to the losses from loans, acceptances, guarantees, credit cards, and factoring without recourse.

domestic banks had sufficient provisions to cover expected losses without eroding equity.

The outstanding NPLs of domestic banks registered NT$59.4 billion at the end of 2021, decreasing by 15.09% from the end of the previous year. The average NPL ratio saw a decline to 0.17% (Chart 3.22), continuing to hit a record low. In addition, at the end of 2021, because of a greater increase in loans than in the allowance for doubtful accounts, the loan coverage ratio declined slightly to 1.36%. However, the NPL coverage ratio rose sharply to 781.47% (Chart 3.23) on account of a greater decrease in NPLs. The overall capability of domestic banks to cope with potential loan losses remained satisfactory.

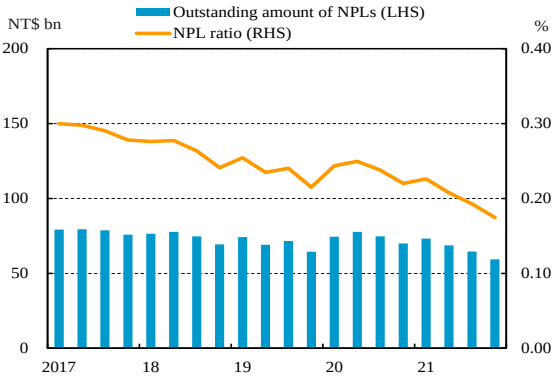
Since the outbreak of the pandemic in early 2020, in order to assist the harder-hit enterprises and individuals and to tide them over, domestic banks have successively provided various relief loans, with a scale of more than 570,000 applicants and the amount exceeding NT$4.88 trillion by late December 2021. Considering that uncertainties surrounding the global and domestic pandemic outlooks remain high and that the relief loans extended by domestic banks in line with government policies will be withdrawn eventually, it is important to closely monitor banks' credit risk management of relief loans and the related impacts on credit quality (Box 2).

Chart 3.21 Classified assets of domestic banks



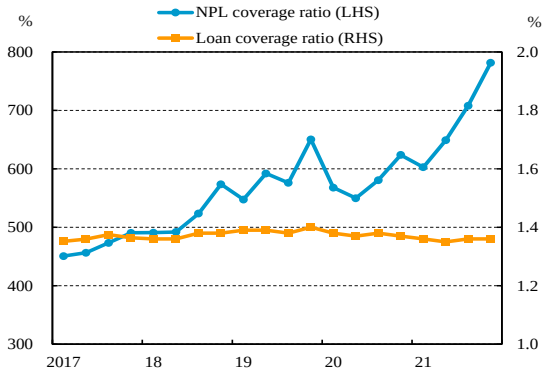
Note: Classified asset ratio = classified assets/total assets.
Source: CBC.

Chart 3.22 NPLs of domestic banks



Note: Excludes interbank loans.
Source: CBC.

Chart 3.23 NPL coverage ratio and loan coverage ratio of domestic banks



Notes: 1. NPL coverage ratio = total provisions/non-performing loans.
2. Loan coverage ratio = total provisions/total loans.
3. Excludes interbank loans.
Source: CBC.

Market risk

Estimated value-at-risk for market risk exposures decreased

Based on the Bank's VaR model,[36] the estimated total VaR for market risk exposures of domestic banks stood at NT$153.1 billion at the end of 2021, decreasing by NT$6.7 billion or 4.19% compared to a year earlier (Table 3.1). Among the market risk exposures, the interest rate VaR declined by 8.17% year on year in 2021. This mainly resulted from a shrinkage in short-term bond yield volatility because of a relative easing of pandemic-induced fear in financial markets. Meanwhile, the equities VaR rose by 49.53%, reflecting a substantial increase of 43.97% in the net position of equity securities. The FX VaR diminished by 2.94%, owing to reductions in the net position of FX and decreasing volatility in the NT dollar exchange rate against the US dollar (Table 3.1).

Since February 2022, the deterioration in the conflict between Russia and Ukraine and monetary policy tightening adopted by central banks in major economies owing to rising inflationary pressures have exacerbated volatilities in both US bond yields and international stock markets. These factors could in turn increase the VaR for relevant exposures of domestic banks and therefore warrant close attention.

Table 3.1 Market risks in domestic banks

Unit: NT$ bn

Type of risk	Item	End-Dec. 2020	End-Dec. 2021	Changes	
				Amount	pps
Foreign exchange	Net position	201.8	200.2	-1.6	-0.79
	VaR	3.4	3.3	-0.1	-2.94
	VaR/net position (%)	1.68	1.65		-0.03
Interest rate	Net position	1,986.5	2,001.3	14.8	0.74
	VaR	145.7	133.8	-11.9	-8.17
	VaR/net position (%)	7.33	6.69		-0.64
Equities	Net position	78.0	112.3	34.3	43.97
	VaR	10.7	16.0	5.3	49.53
	VaR/net position (%)	13.72	14.25		0.53
Total VaR		159.8	153.1	-6.7	-4.19

Source: CBC.

[36] For more details about the Bank's VaR model, please see CBC (2016), Box 2, *Financial Stability Report*.

The impacts of market risk on capital adequacy ratios were limited

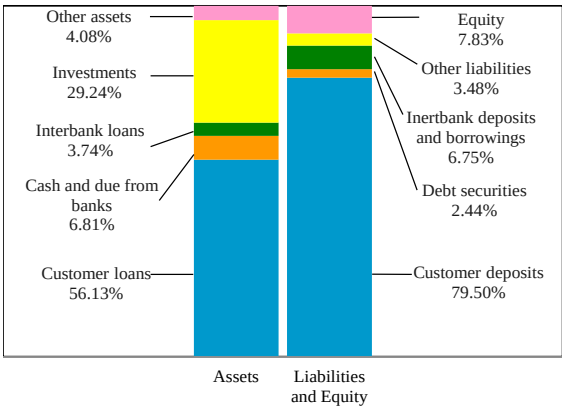
According to the estimation mentioned above, the total VaR would lead to a decrease of 0.33 pps[37] in the average capital adequacy ratio of domestic banks, causing the ratio to drop from the current 14.80% to 14.47%. Nevertheless, it would still be higher than the statutory minimum of 10.5%.

Liquidity risk

Liquidity in the banking system remained ample

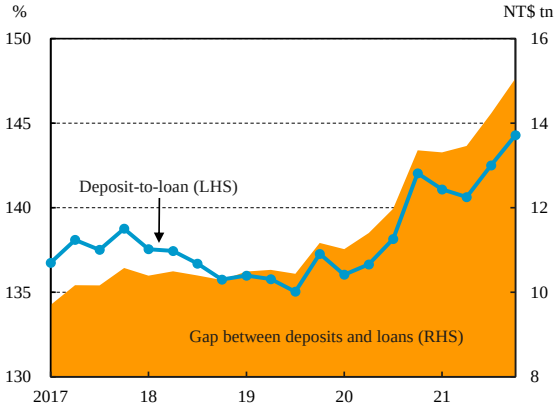
The asset and liability structure of domestic banks remained roughly unchanged in 2021. For the sources of funds, customer deposits, which tend to be relatively stable, still made up the largest share with 79.50% of the total. As for the uses of funds, customer loans accounted for the biggest share with 56.13% (Chart 3.24). At the end of 2021, the average deposit-to-loan ratio of domestic banks rose to 144.30%, and the funding surplus (i.e., deposits exceeding loans) increased to NT$15.06 trillion. The overall liquidity of domestic banks remained abundant (Chart 3.25).

Chart 3.24 Asset/liability structure of domestic banks



Notes: 1. Figures are as of end-December 2021.
2. Equity includes loss provisions. Interbank deposits include deposits with the CBC.
Source: CBC.

Chart 3.25 Deposit-to-loan ratio of domestic banks



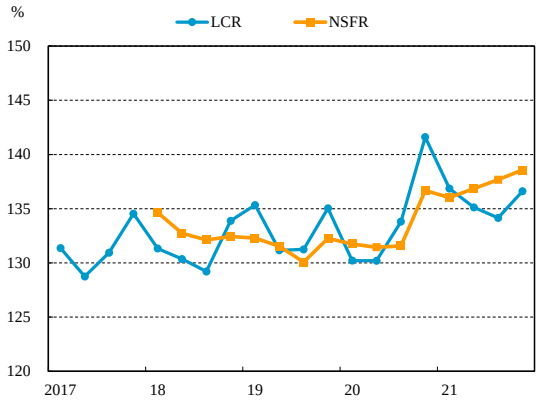
Note: Deposit-to-loan ratio = total deposits/total loans.
Source: CBC.

[37] Domestic banks had already set aside capital for market risk in accordance with relevant regulations. To avoid double counting, the impacts of market risk on the capital adequacy ratio herein were estimated using capital shortfalls after considering the aforementioned market risk capital.

Overall liquidity risk remained relatively low

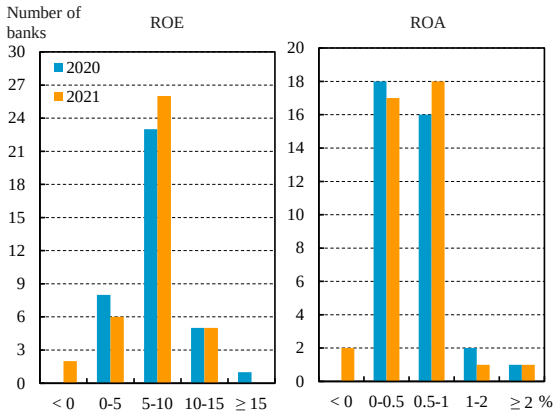
The average NT dollar liquid reserve ratio of domestic banks was well above the statutory minimum of 10% in every month of 2021 and stood at 31.52% in December. At the end of 2021, the average liquidity coverage ratio (LCR) of domestic banks decreased to 137% (Chart 3.26), while the net stable funding ratio (NSFR) of domestic banks rose to 139% (Chart 3.26). Meanhwhile, all banks met the minimum LCR and NSFR requirements in 2021, indicating that the overall liquidity risk of domestic banks was relatively low.

Chart 3.26 LCR and NSFR of domestic banks



Note: LCR and NSFR were implemented from 2015 and 2018 onwards, respectively.
Source: CBC.

Chart 3.27 Domestic banks classified by ROE and ROA



Source: CBC.

Profitability

Profit of domestic banks rebounded in 2021

The net income before tax of domestic banks in 2021 recorded NT$338.7 billion, increasing by NT$24.4 billion or 7.76% over the previous year. This mainly resulted from a pickup in net interest income owing to a greater decrease in interest expenses. The average ROE of domestic banks rose to 8.14%, while the average ROA remained at 0.58%, indicating ascending profitability.

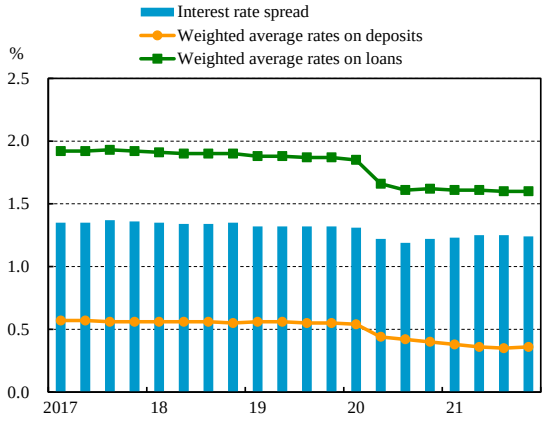
In 2021, except for the operating losses of LINE Bank and Rakuten Bank, which officially began operations at the beginning of the year, all the other banks made profits. Among them, the numbers of banks with higher ROEs and ROAs than the previous year were 27 and 23, respectively. Five banks achieved a profitable ROE of 10% or more, decreasing from six banks in 2020. Meanwhile, the number of banks with ROAs above the international standard of 1% also saw a decrease from three to two (Chart 3.27).

Factors that might affect future profitability

Owing to an increase in the proportion of demand deposits, which pay lower interest, the average interest rate spread between deposits and loans of domestic banks at the end of 2021 slightly elevated to 1.24% from 1.22% at the end of the previous year (Chart 3.28), which is beneficial to domestic banks for expanding net interest income.

Although profits of domestic banks recovered in 2021, there are still uncertainties regarding future profitability which warrant close attention, including: (1) banks with greater exposure to Russia may need to increase provisions for impaired assets, which could affect their profitability, as Russia's sovereign credit rating has been downgraded to junk level recently; (2) issues such as a surge in international commodity prices and supply chain disruptions may affect the operation and debt-servicing capacity of specific industries, thus escalating credit losses; (3) intensified fluctuations in international financial markets may affect future investment returns.

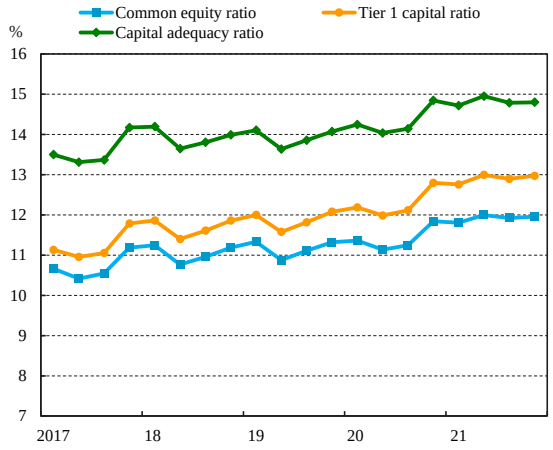
Chart 3.28 Interest rate spread of domestic banks



Notes: 1. Interest rate spread = weighted average interest rates on loans - weighted average interest rates on deposits.
2. The weighted average interest rates on deposits and loans exclude preferential deposits of retired government employees and central government loans.

Source: CBC.

Chart 3.29 Capital ratios of domestic banks



Notes: 1. Common equity ratio = common equity Tier 1 capital/risk-weighted assets.
2. Tier 1 capital ratio = Tier 1 capital/risk-weighted assets.
3. Capital adequacy ratio = eligible capital/risk-weighted assets.

Source: CBC.

Capital adequacy

Capital ratios trended upward

Benefiting from the lower risk weights to domestic banks' real-estate exposures by adopting the LTV approach, which led to a substantial reduction in their risk-weighted assets, and the capital injection from accumulated earnings, the average common equity ratio and Tier 1 capital ratio reached 11.96% and 12.97%, respectively, at the end of 2021. As for the capital adequacy ratio, it stood at 14.80%, almost the same as the ratio a year before (Chart 3.29). Among the components of regulatory capital, common equity Tier 1 (CET 1) capital, featuring

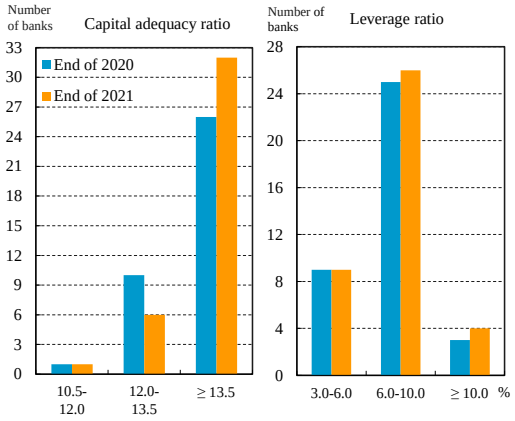
the best loss-bearing capacity, accounted for 80.80% of eligible capital. This showed that the capital quality of domestic banks was satisfactory.

Moreover, the average leverage ratio of domestic banks stood at 6.46% at the end of 2021, lower than 6.64% a year earlier but still above the 3% statutory standard, indicating that financial leverage remained sound.

All domestic banks had capital ratios and leverage ratios higher than the statutory minimum

At the end of 2021, the capital ratios of six domestic systemically important banks (D-SIBs) as well as non-D-SIBs were all above the relevant FSC statutory minimum standards or additional capital buffer requirements. [38] Leverage ratios of all domestic banks also exceeded the statutory minimum of 3% (Chart 3.30).

Chart 3.30 Distribution of domestic banks' capital adequacy ratios and leverage ratios



Note: Leverage ratio = Tier 1 capital/total exposures.
Source: CBC.

Table 3.2 Systemic risk indicators for the banking system

Banking System	Standard & Poor's		Fitch	
	BICRA		BSI/MPI	
	2021/2	2022/2	2020/8	2021/8
Singapore	2	2	aa/1	aa/2
Hong Kong	2	2	a/2	a/2
Japan	3	3	a/2	a/2
South Korea	3	3	a/1	a/2
Taiwan	**4**	**4**	**bbb/2**	**bbb/2**
Malaysia	4	4	bbb/1	bbb/1
Philippines	5	5	bb/1	bb/1
China	6	6	bb/1	bb/1
Thailand	6	6	bbb/1	bbb/1
Indonesia	6	6	bb/1	bb/1

Sources: Standard & Poor's and Fitch Ratings.

Credit ratings

Average credit rating level remained steady

Of the overall risk assessments of Taiwan's banking system made by credit rating agencies, Standard & Poor's kept Taiwan's Banking Industry Country Risk Assessment (BICRA)[39] unchanged at Group 4 with moderate risk. Compared to other Asian economies, the risk level of Taiwan's banking system was the same as that of Malaysia, but much lower than those of the Philippines, China, Thailand and Indonesia. Moreover, the assessment of Taiwan's banking system by Fitch Ratings in its Banking System Indicator/Macro-Prudential Risk Indicator

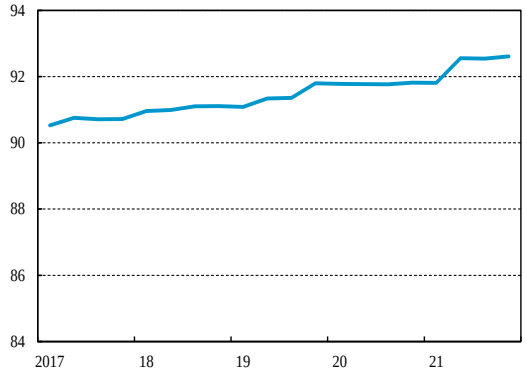
[38] The statutory standards for the common equity ratio, Tier 1 capital ratio and capital adequacy ratio of non-D-SIBs are 7%, 8.5% and 10.5%, respectively. D-SIBs are required to set aside an additional 2% of buffer capital and 2% of internal management capital according to the requirement of the FSC. The additional capital must be achieved before the end of each of the four years equally starting from the next year after the designated date.

[39] BICRA is scored on a scale from 1 to 10, ranging from the lowest-risk (group 1) to the highest-risk (group 10), which indicates the assessment results by Standard & Poor's of economic and industry risks of a country's banking system.

(BSI/MPI)[40] also remained unchanged at level bbb/2 (Table 3.2).

The weighted average credit rating index[41] went up slightly compared to the previous year owing to the upgrading of five banks, indicating that domestic banks generally had the capability to deal with the impact of the pandemic (Chart 3.31).

Chart 3.31 Credit rating index of domestic banks

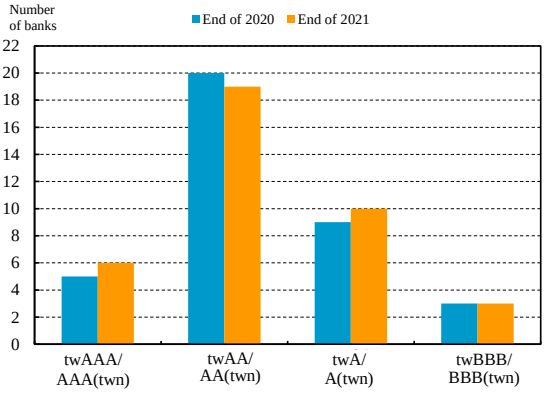


Sources: Taiwan Ratings, Fitch Ratings and CBC.

Rating outlooks for most domestic banks remained stable

Most domestic banks maintained credit ratings of twAA/twA (Taiwan Ratings) or AA(twn)/A(twn) (Fitch Ratings) and none had credit ratings lower than twBB/BB(twn) at the end of 2021 (Chart 3.32). Only four banks received Negative or Evolving Rating Outlooks,[42] while rating outlooks for the other banks remained Stable or Positive.

Chart 3.32 Number of domestic banks classified by credit ratings



Sources: Taiwan Ratings and Fitch Ratings.

Taiwan Ratings announced that Taiwan's banking industry outlook remained stable in 2022, and indicated that domestic banks' adequate capital levels could absorb credit costs which may arise from the phasing out of government relief loan schemes.[43]

[40] Fitch Ratings assesses banking system vulnerability with two complementary measures, the BSI and the MPI. These two indicators are brought together in a Systemic Risk Matrix. The BSI represents banking system strength on a scale from aaa, aa, a, bbb, bb, b, ccc, cc, c and f. The MPI indicates the vulnerability of the macro environment on a scale from 1, 2, 2* and 3.

[41] The credit rating index is an asset-weighted average rating score of rated domestic banks, measuring the overall creditworthiness of those banks on a scale from 1 (weakest) to 100 (strongest). The rating score for banks is determined according to their long-term issuer ratings from Taiwan Ratings or national long-term ratings from Fitch Ratings. The higher the index is, the better the bank's overall solvency.

[42] Standard Chartered Bank (Taiwan) and Shin Kong Commercial Bank received Negative Rating Outlooks at the end of 2021. Citibank Taiwan Ltd. and EnTie Commercial Bank received Evolving Rating Outlooks, while Fitch Ratings revised Citibank's outlook to Stable in February 2022.

[43] Press releases by Taiwan Ratings on January 6 and April 20, 2022.

Box 2
Credit risk management of domestic banks in undertaking pandemic relief loans

When the COVID-19 pandemic broke out in early 2020, governments around the world successively launched large-scale relief measures to help corporations and individuals out of their financial predicaments. As the global economy gradually recovered, international organizations, such as the Bank for International Settlements (BIS), the Financial Stability Board (FSB) and the International Monetary Fund (IMF),* have sequentially issued press releases or research reports on the possibility that prolonged relief measures could increase the risk of financial instability and on the impact arising from the withdrawal of relief measures on banks' credit risk. Meanwhile, domestic banks in Taiwan have provided various types of relief loans for corporations and individuals affected by the COVID-19 pandemic since 2020. The Bank visited some of those domestic banks with larger scales of self-run relief loan schemes to have a good grasp of their credit risk management in extending such loans.

1. Relief loans extended by domestic banks

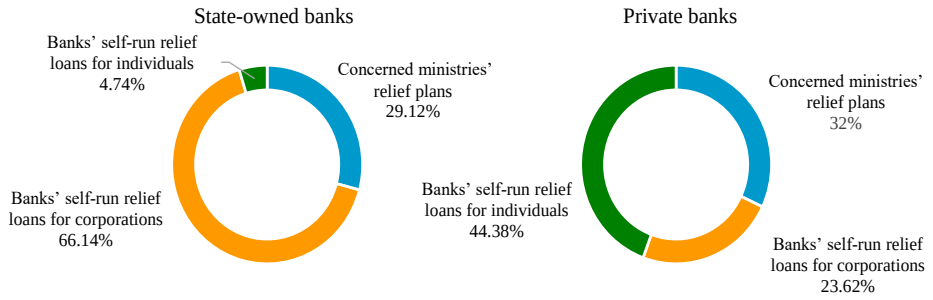
1.1 State-owned banks had played a more active role in relief loan programs

Since relief loan programs were introduced in 2020, domestic banks had approved 572,700 applications with the amount totaling NT$4,884.5 billion as of December 27, 2021. Among them, state-owned banks had approved 388,100 applications totaling NT$4,126 billion, indicating that they had been more active in extending relief loans in coordination with government policies.

1.2 Corporations were the major borrowers of relief loans; lending exposure differed between state-owned and private banks

Corporate loans accounted for the primary shares of the relief loans. The proportions of corporate loans (including those provided under concerned ministries' relief plans and banks' self-run relief loans for corporations) extended by state-owned and private banks were 95.26% and 55.62%, respectively. As for self-run relief loans for individuals, 44.38% of them were extended by private banks, a much larger share than the 4.74% extended by state-owned banks (Chart B2.1).

Chart B2.1 Relief loans by counterparty

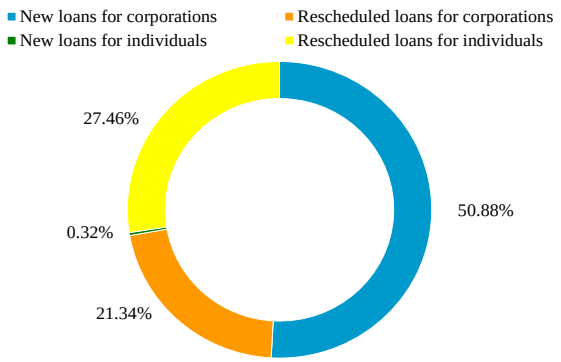


Note: Figures are as of December 27, 2021.
Source: FSC.

1.3 Banks' self-run relief loans were held in almost equal proportion between rescheduled loans and new loans

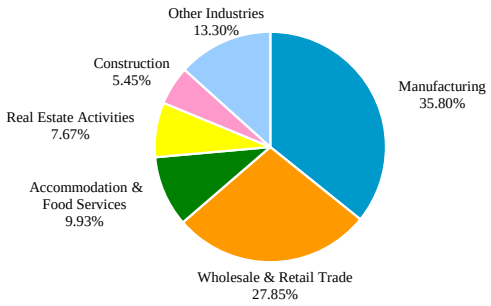
Among visited banks' self-run relief loans, the proportion of rescheduled loans granted with a grace period (both those for corporations and individuals) was 48.8% (Chart B2.2), mainly because these banks, with the aim of customer retention, offered loan forbearance solutions to help viable customers get through pandemic hardship. In addition, most of these new loans were provided for corporations, which accounted for 50.88% of visited banks' self-run relief loans.

Chart B2.2 Banks' self-run relief loans by type



Note: Figures are as of the end of 2021.
Source: Visited banks.

Chart B2.3 Banks' self-run relief loans for corporations by industry



Note: Figures are as of the end of 2021.
Source: Visited banks.

1.4 Relief loans for corporations were chiefly for those in manufacturing and wholesale & retail trade

The top three industry borrowers in terms of relief loans for corporations were manufacturing (35.80%), wholesale & retail trade (27.85%) and accommodation & food services (9.93%). These three industries combined to account for more than 70% of visited banks' self-run relief loans for corporations (Chart B2.3), reflecting the fact that these industries were more significantly impaired by the pandemic.

1.5 More than 80% of the relief loans were guaranteed by Taiwan SMEG or secured by real estate

More than 80% of visited banks' relief loans for corporations were guaranteed by the Small and Medium Enterprise Credit Guarantee Fund of Taiwan (Taiwan SMEG) or secured by real estate, while more than 90% of their relief loans for individuals were secured by real estate.

2. Credit approval and loan review of the relief loans

2.1 Loan forbearance was applicable to borrowers who had paid interest regularly; several banks had temporary measures for credit review

To accelerate the review process and improve operational efficiency in extending the relief loans, several of the visited banks laid down loan forbearance measures including payment moratorium, applicable to individuals paying interest regularly or corporations that were willing to continue operations and paid interest normally. They would agree to defer repayment of principal or lower the interest rates depending on borrowers' situations. New loans or incremental loans, except for the loans applicable for small-scale business entities under Program C of the Bank's Special Accommodation Facility that would be undertaken using a simplified credit score sheet, were handled according to the banks' existing internal credit score mechanisms. In addition, some of the visited banks formulated temporary measures for credit review, lowering credit authorization levels depending on the loan amount and collateral quality.

2.2 Most banks conducted post-lending reviews of the relief loans in accordance with existing internal rules while several banks also performed stress testing

Visited banks conducted post-lending reviews of the relief loans in accordance with their existing internal rules and early warning reporting procedures, while paying special attention to the impact of the pandemic on borrowers' revenues. Moreover, they regularly monitored the lending condition of the relief loans, status of non-performing loans and non-accrual loans, and their exposures to borrowers affected by the pandemic. Several banks also voluntarily conducted stress testing for the relief loans, and the results showed that they maintained sound risk bearing capacities.

3. Credit quality of the relief loans

To ensure that banks prudently evaluate credit risk of the relief loans, the FSC required banks to earnestly classify credit assets and assess expected credit losses in accordance with the IFRS 9 and the five-category classification method stipulated in the relevant

regulations. Among visited banks' relief loans, the NPL ratios of rescheduled loans ranged between 0.13% and 0.81%, while the NPL ratios of new loans were below 0.5% as of the end of 2021. These two NPL ratios were below 1%, indicating that the credit quality of the relief loans remained sound.

4. While credit risk remained under control, the impact of the exit of relief measures on banks' asset quality warrants close attention

Given that over 80% of domestic banks' relief loans were guaranteed by Taiwan SMEG or secured by real estate, coupled with ample liquidity in the banking system and the recent housing market boom, the overall credit risk in the banking system remained controllable. In addition, most of the visited banks had planned relevant response measures in advance, tracked changes in the exposures to the relief loans continuously, adjusted credit policies as needed, and reverted to the regular debt collection or negotiation mechanisms, so as to protect their debt claims. As many of the relief loans are still in the principal moratorium period, any overdue cases could show at a later time. Therefore, domestic banks should strengthen post-lending tracking, conduct risk assessments or stress testing of their relief loan exposures, and develop response measures where necessary. The Bank will also pay close attention to the impact of the withdrawal of COVID-19 relief measures on domestic banks' asset quality in the future.

Note: *BIS (2022), "Newsletter on Covid-19 related credit risk issues," March; FSB (2021), "COVID-19 support measures: Extending, amending and ending"; IMF (2021), "Unwinding COVID-19 Policy Interventions for Banking Systems," *Special Series on COVID-19*, March.

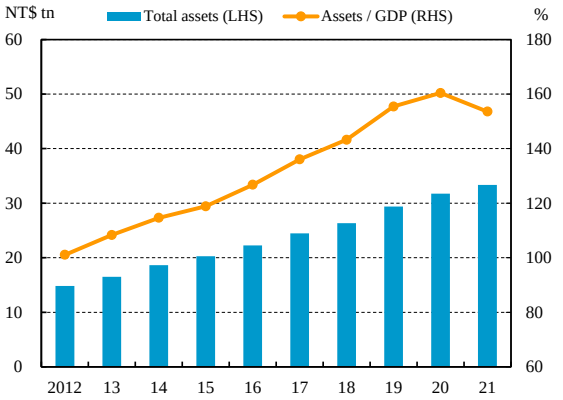
3.2.2 Life insurance companies

In 2021, the total assets of life insurance companies continued to increase but at a slower pace. Their pretax income reached a record high, while the average RBC ratio further improved and overall credit ratings remained stable. However, owing to the expansion of foreign investment positions, life insurance companies still faced higher FX risk, interest rate risk and equity risk.

Assets grew at a slower pace

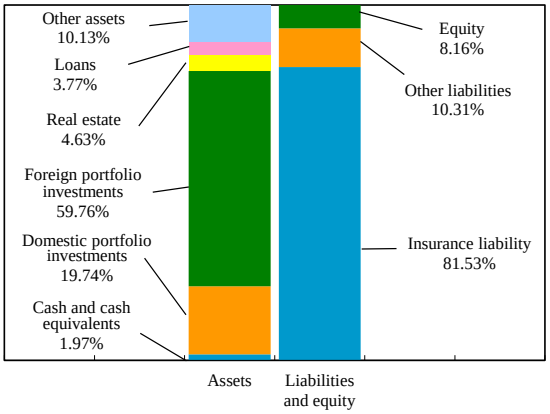
The total assets of life insurance companies reached NT$33.34 trillion at the end of 2021, equivalent to 153.58% of annual GDP (Chart 3.33). The annual growth rate of total assets slowed to 5.00% from 8.03% a year earlier. The top three companies in terms of assets made up a combined market share of 55.25%. The market structure of the life insurance industry remained roughly unchanged in 2021.

Chart 3.33 Total assets of life insurance companies



Sources: FSC and DGBAS.

Chart 3.34 Asset/liability structure of life insurance companies



Note: Figures are as of the end of 2021.
Source: FSC.

Foreign investments remained the primary usage of funds

In terms of the usage of funds of life insurance companies as of the end of 2021, foreign investments and domestic portfolio investments continued to take up the primary shares of total assets. Among them, the share of foreign investments rose to 59.76%, whereas that of domestic portfolio investments decreased to 19.74%. As for the sources of funds, insurance liabilities accounted for 81.53%, ranking the largest share, while the share of equity increased to 8.16%, mainly supported by a substantial expansion of profit (Chart 3.34).

Pretax income continued to reach a record high

Life insurance companies reported a record-high net income before tax of NT$388.5 billion in 2021 from NT$206.1 billion a year earlier, a substantial year-on-year increase of 88.50% (Chart 3.35). This mainly resulted from an increase in investment revenue as life insurance companies actively realized their capital gains of stock and bond investments. Accordingly, their average ROE and ROA increased markedly to 14.83% and 1.19% from 9.27% and 0.67% a year earlier (Chart 3.36).

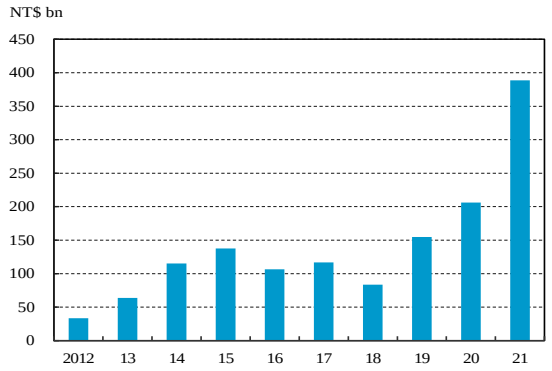
Average RBC ratio and equity to asset ratio continued to rise

In 2021, total capital in life insurance companies rose because of increases in profits and higher valuations of their stock holdings. As a result, the average RBC ratio increased to 335.17% [44] at the end of the year from 299.13% a year earlier (Chart 3.37). Furthermore, the average equity to asset ratio continued to rise to 8.87% from 8.57% at the end of the previous year (Chart 3.38).

Overall credit ratings remained stable

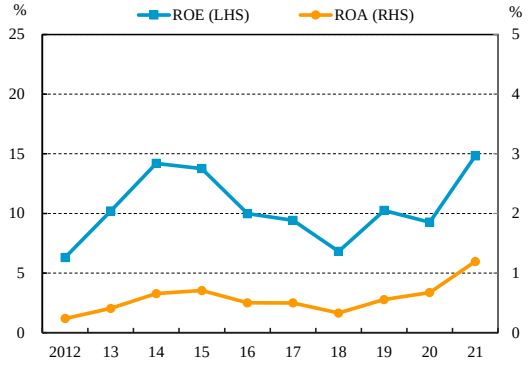
Among the 12 life insurance companies rated by credit rating agencies, none received rating adjustments in 2021. As of the end of the year, all rated life insurance companies

Chart 3.35 Net income before tax of life insurance companies



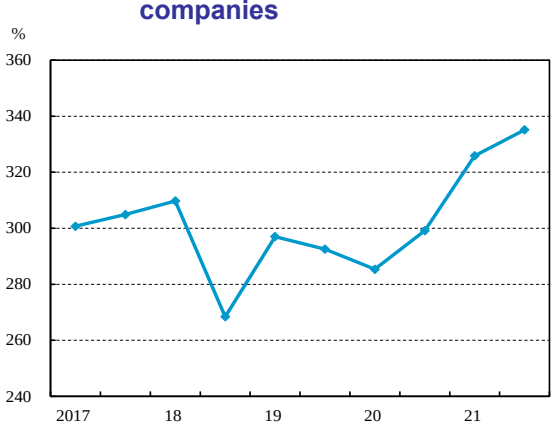
Source: FSC.

Chart 3.36 ROE & ROA of life insurance companies



Notes: 1. ROE = net income before tax/average equity.
2. ROA = net income before tax/average assets.
Source: FSC.

Chart 3.37 RBC ratio of life insurance companies



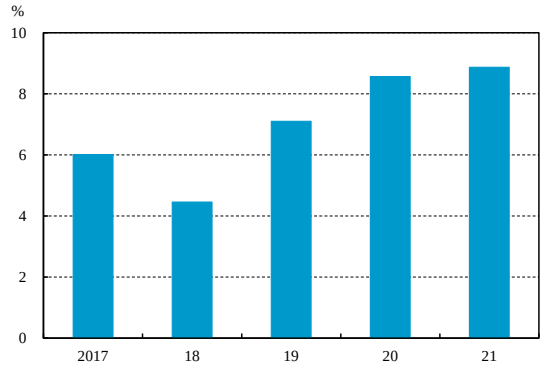
Notes: 1. RBC ratio = regulatory capital/risk-based capital.
2. Figures are exclusive of life insurance companies in receivership.
Source: FSC.

[44] RBC data is reported on a semiannual basis.

maintained credit ratings above twA or its equivalent, with the ratings of the top three companies in terms of assets holding at twAA. Moreover, the prospects of most companies were rated with a positive or stable outlook, except for three companies being rated with a negative outlook.

Taiwan Ratings indicated[45] that Taiwan's life insurers improved capitalization, driven by satisfactory profitability and adequate risk control and monitoring, which could help to support the ratings outlook to remain stable in 2022.

Chart 3.38 Equity to asset ratios of life insurance companies



Notes: 1. Equity is unaudited figures.
2. Assets are exclusive of the assets of investment-linked insurance products in separate accounts.
Source: FSC.

Foreign investment positions faced higher interest rate risk and equity risk

Foreign investment positions of life insurance companies grew continually and reached NT$19.92 trillion at the end of 2021. Securities investments constituted the largest share, of which about 90% were invested in bills and bonds and 10% in equities. With respect to bond investments, since the beginning of 2022, US government bond yields had trended upwards significantly amid the Fed's interest rate hike cycle that potentially could exert an impact on the revaluation of bond investments. Furthermore, the Russia-Ukraine conflict resulted in a sharp rise in volatility in global financial markets. As a result, life insurance companies will likely face higher interest rate risk and equity risk.

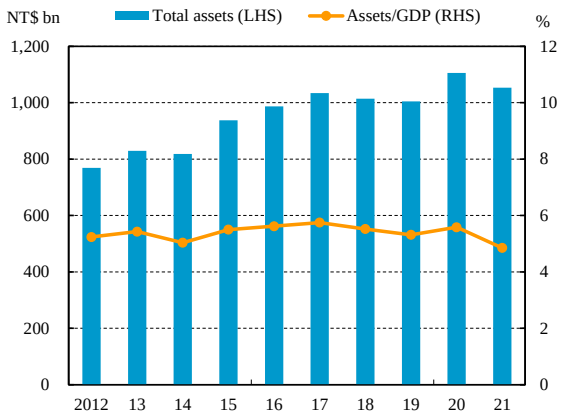
In addition, more than 90% of foreign investment positions of life insurance companies were denominated in US dollars. In order to alleviate the impacts of exchange rate fluctuations, life insurance companies actively used derivative financial instruments for FX hedging while they also built up FX valuation reserves in compliance with the relevant regulations. However, the FX risk inherent in large-value open FX positions of life insurance companies still warrants close attention.

According to the statistics of the FSC, eight life insurance companies held a combined Russian exposure of NT$104.6 billion as of the end of March 2022, most of which was Russian government bonds denominated in US dollars. As the three major international credit

[45] Taiwan Ratings (2022), "Robust Economy Underpins Stable Credit Outlook for Taiwan in 2022," *Media Release*, January.

rating agencies successively downgraded Russia's sovereign credit rating to non-investment grades, these eight life insurance companies recognized provisions of about NT$14.2 billion for their Russian exposures. Furthermore, the FSC required these life insurance companies to report the risk management enhancement measures to their board of directors and to adjust their investment positions within six months. Taiwan Ratings also pointed out [46] that Taiwan's life insurance companies have sufficient buffers to absorb the adverse impacts from price fluctuations of the above investment exposures even in the least-favorable scenario; therefore, the risk from their Russian exposures is still manageable.

Chart 3.39 Total assets of bills finance companies



Sources: CBC and DGBAS.

3.2.3 Bills finance companies

In 2021, the total assets of bills finance companies decreased, but their guarantee business expanded and credit asset quality remained sound. Moreover, their pretax income reached the highest recorded in recent years, with rising profitability. However, the average capital adequacy ratio edged down, while liquidity risk and interest rate risk remained high.

Total assets decreased

The total assets of bills finance companies decreased by NT$52.2 billion or 4.72% in 2021 and stood at NT$1,053.2 billion at the end of the year, mainly owing to reductions in positions of bond investments and negotiable certificates of deposit. The ratio of their total assets to annual GDP also dropped to 4.85% over the same period (Chart 3.39).

With respect to the asset and liability structure of bills finance companies, bill and bond investments constituted the largest share of 96.39% of total assets as of the end of 2021. On the liability side, bills and bonds sold under repo transactions as well as borrowings accounted for 84.75% of total assets, while the proportion of equity accounted for 13.08% (Chart 3.40). The

[46] Taiwan Ratings (2022), *Taiwan Life Insurers' Russia Exposures Look Manageable*, February.

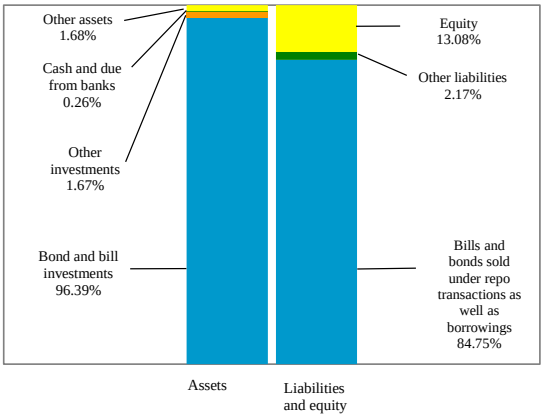
asset and liability structure remained roughly unchanged compared to the previous year.

Credit risk

Guarantee liabilities expanded and the share of credit secured by real estate remained high

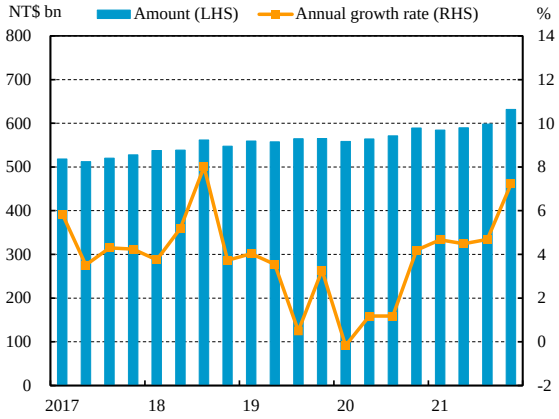
CP guaranteed by bills finance companies registered NT$631.6 billion at the end of 2021, increasing by 7.22% year on year (Chart 3.41) to a new record high. The increase was mainly because corporates increased CP issuance to raise funds on the back of a low level of interest rates in the bill market. Although the amount of CP guaranteed rose, the average ratio of guarantee liabilities to equity decreased slightly to 4.88 times owing to a greater increase in equity, and the ratio for each company remained below the regulatory ceiling of 5 or 5.5 times.

Chart 3.40 Asset/liability structure of bills finance companies



Note: Figures are as of the end of 2021.
Sources: CBC and FSC.

Chart 3.41 Outstanding CP guaranteed by bills finance companies



Source: CBC.

At the end of 2021, guarantees granted to the real estate and construction industries and credit secured by real estate stood at 31.42% and 40.61%, respectively, of the total credit of bills finance companies. Both ratios remained at recent high levels. Moreover, as a large overhang of unsold new residential housing units could restrain prices and the government continued with rigorous policy efforts to curb housing speculation, the prospects of the domestic real estate market may be affected. Bills finance companies should closely monitor those impacts on the asset quality of mortgage-related credit.

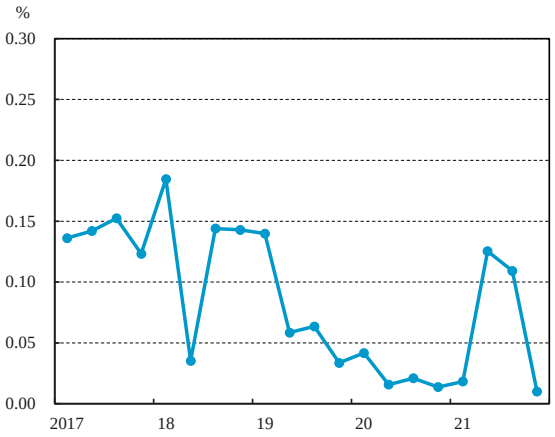
To prevent excessive credit resource allocation to the real estate market, in December 2021, the FSC announced the implementation of enhanced supervision measures governing bills finance companies' guarantee business for the real estate industry, including a ceiling of 30% for the share of guarantees granted to the real estate industry. As of the end of 2021, the average

share of guarantees granted by bills finance companies to the real estate industry was 28.18%, staying below the aforementioned regulatory ceiling.

Guaranteed advances ratio remained relatively low, showing sound credit quality

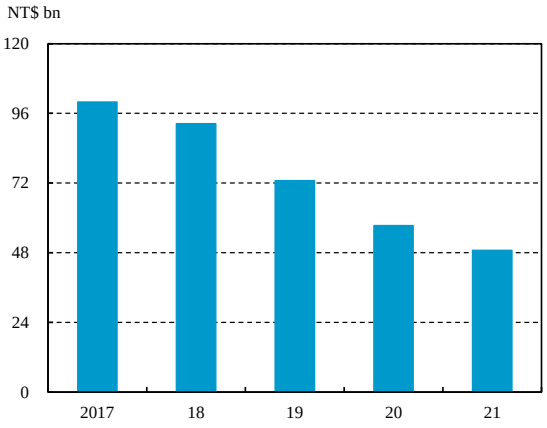
At the end of 2021, the guaranteed advances ratio of bills finance companies stayed at 0.01%, the same as a year before (Chart 3.42), reflecting satisfactory credit quality. Moreover, the credit loss reserves to guaranteed advances ratio [47] expanded to 219.95 times, indicating sufficient reserves to cover potential credit losses. However, the recent resurgence of domestic COVID-19 pandemic cases might impact the credit quality of bills finance companies going forward, and thus warrants close attention.

Chart 3.42 Guaranteed advances ratio of bills finance companies



Note: Guaranteed advances ratio = overdue guarantee advances/(overdue guarantee advances + guarantees)
Source: CBC.

Chart 3.43 Outstanding amount of non-guaranteed CP investments of bills finance companies



Source: CBC.

Investment in non-guaranteed CP issued by the leasing industry expanded substantially and its potential credit risk warrants attention

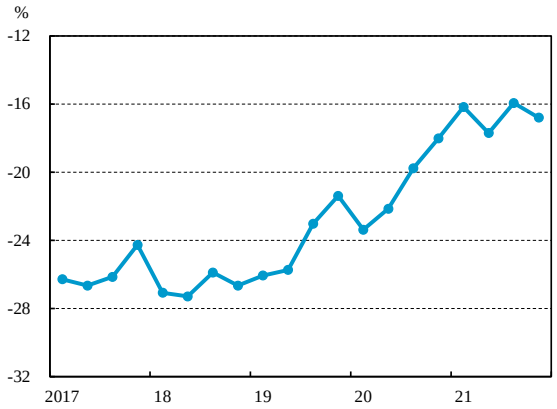
The outstanding amount of non-guaranteed CP investment held by bills finance companies stood at NT$48.8 billion at the end of 2021, decreasing by 14.92% year on year (Chart 3.43). Each company's ratio of non-guaranteed CP investment to equity remained below the self-disciplinary ceiling of 2 times. However, the outstanding amount of non-guaranteed CP investment issued by the leasing industry expanded substantially by 91.32% to NT$17 billion over the same period. The leasing industry has higher potential credit risk owing to the fact that it tends to rely on short-term sources for funding long-term investments, hence warranting continuous attention.

In April 2022, the Bills Finance Association amended the *Self-disciplinary Rules Governing*

[47] Credit loss reserves to guaranteed advances ratio = (provisions + loss reserves to guarantees)/guaranteed advances

Non-guaranteed Commercial Paper Business Conducted by the Members of Bills Finance Association. It stipulated that when underwriting non-guaranteed CP, bills finance companies should observe industry caps and ensure the outstanding amount of non-guaranteed CP issuance of each issuer stay within 3 times of its net worth, so as to promote the sound development of the bill market.

Chart 3.44 0-30 day maturity gap ratio of bills finance companies

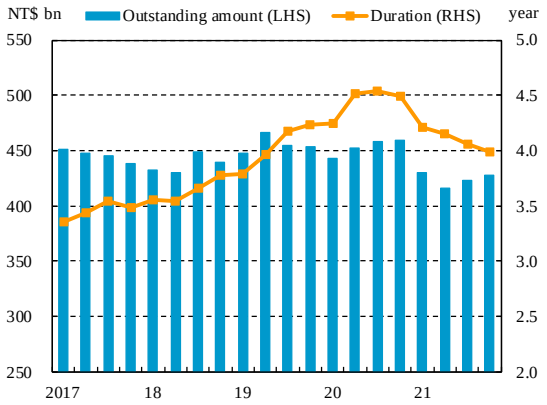


Note: 0-30 day maturity gap ratio = net NTD cash flow within 0-30 days/total assets denominated in NTD.
Source: CBC.

Liquidity risk remained high

In 2021, bills finance companies still faced a significant maturity mismatch between assets and liabilities. More than 90% of their assets were invested in bills and bonds as of the end of the year, 43.65% of which were long-term bonds. Meanwhile, more than 80% of their liabilities were from short-term interbank call loans and repo transactions. Nevertheless, bills finance companies' 0-30 day maturity gap to total assets denominated in NTD shrank further and registered -16.80% at the end of the year (Chart 3.44), reflecting a declining but still high liquidity risk.

Chart 3.45 Outstanding amount of fixed-rate bond investments and bond duration of bills finance companies



Source: CBC.

The outstanding amount of major liabilities[48] decreased by 5.41% to NT$897.3 billion at the end of 2021, owing to the fact that bills finance companies reduced bill and bond investments and, in turn, required less interbank borrowing or bill and bond repo transactions to meet funding needs. The average ratio of major liabilities to equity also decreased to 6.93 times from 7.88 times registered at the end of the previous year, reflecting a lower degree of financial leverage. Moreover, the leverage ratios of all bills finance companies stayed below the regulatory ceilings of 10 or 12 times.

[48] Major liabilities include call loans, repo transactions, as well as issuance of corporate bonds and CP.

Interest rate risk of bond investments remained high

In 2021, the outstanding amount of fixed-rate bond investments of bills finance companies decreased by 6.91% to NT$428.2 billion with average duration shortening to 3.99 years (Chart 3.45). Considering that 10-year Taiwan government bond yields continued rising recently and global bond yields might face upward pressure because of the tightening of monetary policies in major countries, domestic government bond yields could rise further. The interest rate risk of bills finance companies' bond investments remains high, which warrants close attention.

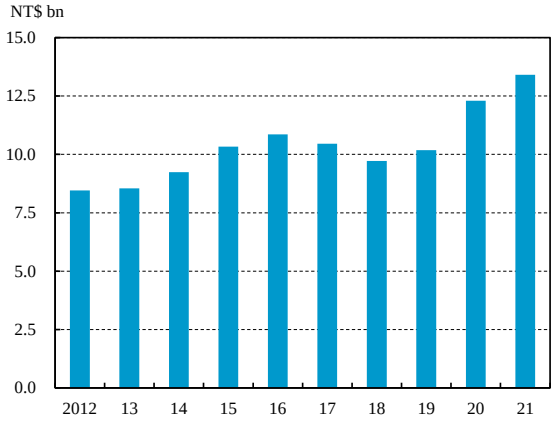
Pretax income hit a recent high and profitability improved further

In 2021, the net income before tax of bills finance companies increased by 9.01% year on year to NT$13.4 billion (Chart 3.46), a new high since 2006, mainly owing to a substantial decrease in interest expenses of bill and bond repo transactions and an expansion in underwriting fee income. The average ROE and ROA thus rose to 9.78% and 1.27% (Chart 3.47), respectively, reflecting improving profitability.

Average capital adequacy ratio declined marginally

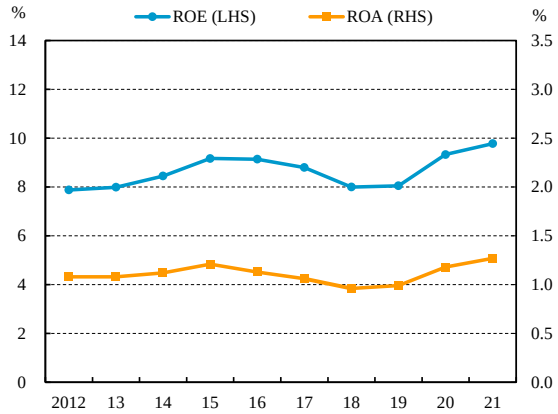
At the end of 2021, the average Tier 1 capital ratio of bills finance companies rose marginally to 12.88%, while their average

Chart 3.46 Net income before tax of bills finance companies



Source: CBC.

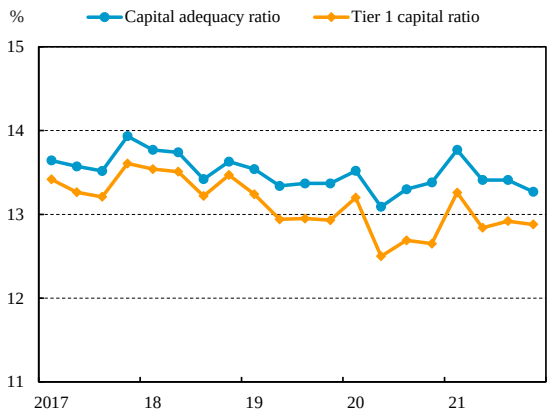
Chart 3.47 ROE & ROA of bills finance companies



Notes: 1. ROE = net income before tax/average equity.
2. ROA = net income before tax/average assets.

Source: CBC.

Chart 3.48 Average capital adequacy ratios of bills finance companies



Source: CBC.

capital adequacy ratio declined slightly to 13.27% (Chart 3.48). Moreover, the capital adequacy ratio for each company remained well above the statutory minimum of 8%.

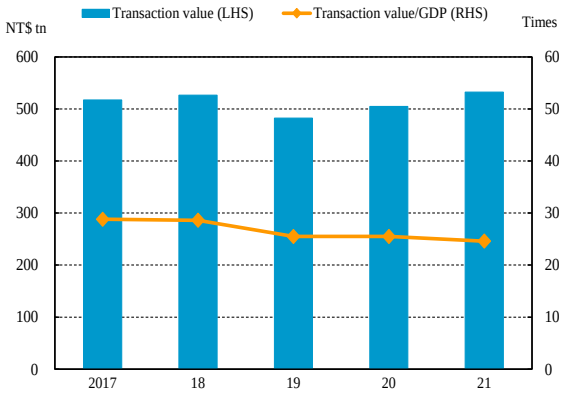
3.3 Financial infrastructure

3.3.1 Payment and settlement systems

Overview of the CIFS's operation

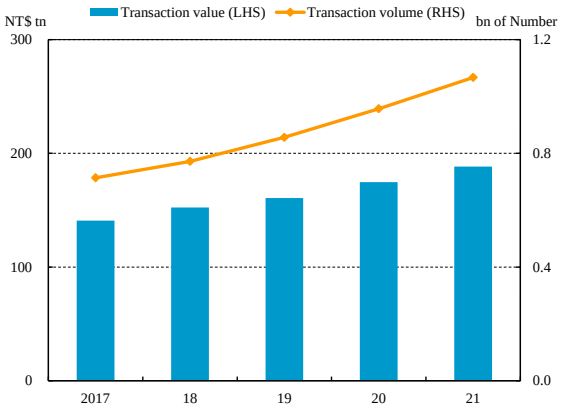
The CBC Interbank Funds Transfer System (CIFS), a large-value electronic payment (e-payment) network system operated by the Bank, is responsible for interbank funds transfers (including interbank lending and the Bank's open market operations) and the final settlement for financial market transactions (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.

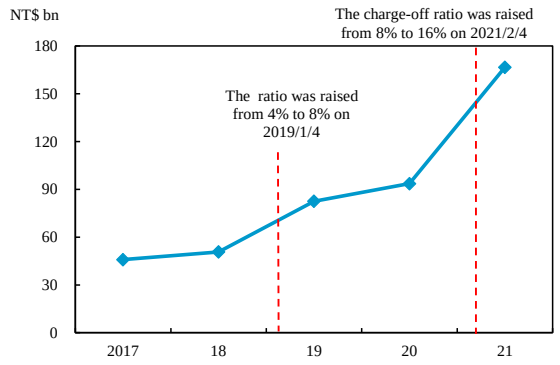
In addition, retail payments are mainly processed by the FISC's Inter-bank Financial Information System (hereinafter abbreviated as FIS), which uses the funds deposited by financial institutions in the Interbank Funds Transfer Guarantee Special Account (hereinafter the "Guarantee Account") under the 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.

Chart 3.51 Average daily balance of the Guarantee Account

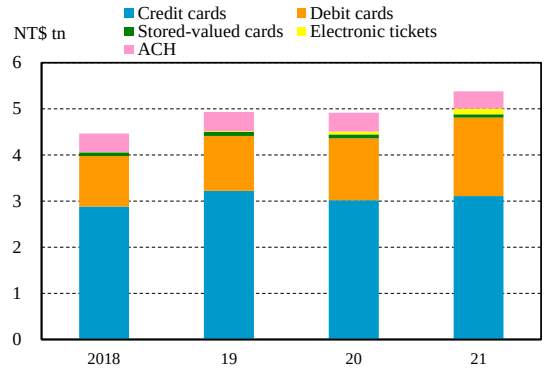


Source: CBC.

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.

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.

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.

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.

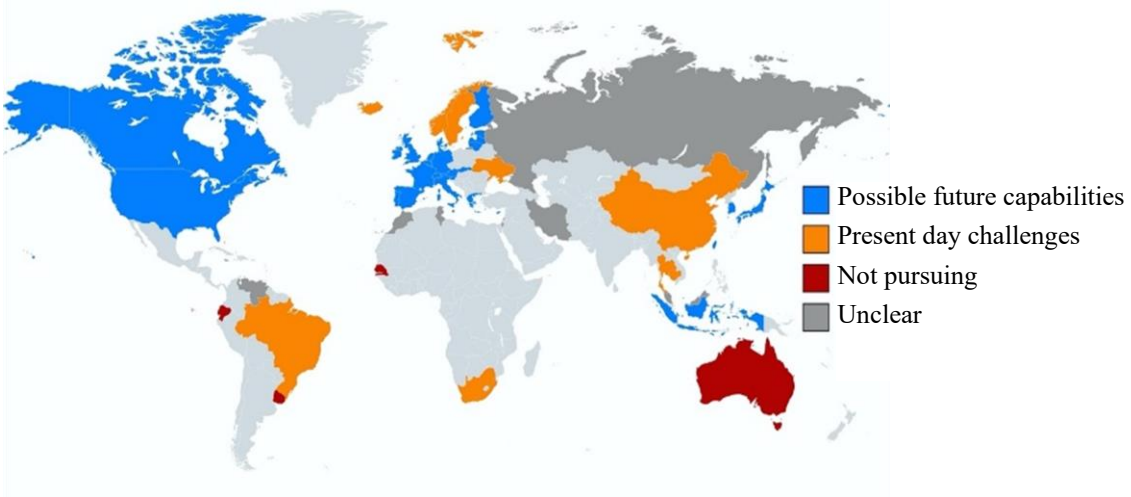
1. International developments of CBDCs

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

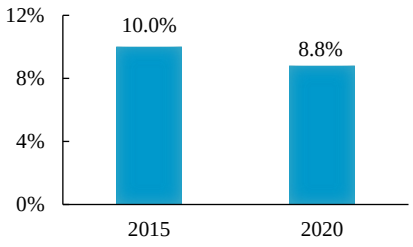
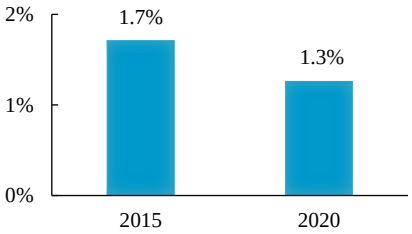
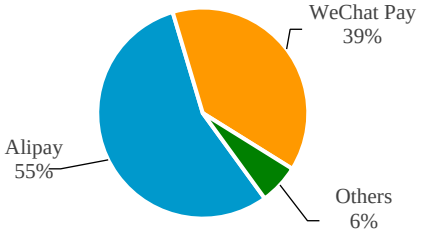
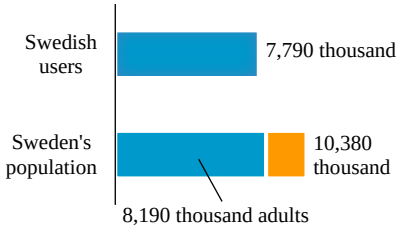


Source: Cheng et al. (2021).

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

	China	Sweden
Demand for cash weakens	The ratio of currency in circulation to nominal GDP continues to decline 	Same as China 
Private payment companies monopolize payment markets	Alipay and WeChat Pay together account for 94% of the mobile payment market transaction volume **2020 Q3** 	The private mobile payment system is used by 95% of Swedish adults **2020** 

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.