III. Financial system assessment

3.1 Financial markets

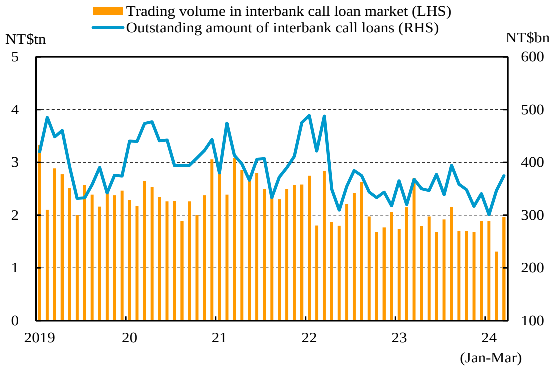
In 2023, the outstanding amount and trading volume of interbank call loans both continued to decline, while the markets remained stable. The outstanding amount of bill issuance increased, driven mainly by a substantial rise in the issuance of CP. However, the bill trading volume in the secondary market kept growing, with CP constituting the largest share, as it played a role of facilitating short-term financing for businesses. Meanwhile, the outstanding amount of bond issuance continued to expand, with corporate bonds increasing the most, though the trading volume in the secondary market remained relatively constant. Moreover, in 2023, bolstered by the global stock market recovery and significant foreign capital inflows, the domestic stock market continued to hit record highs. The NT dollar turned to depreciate after appreciating against the US dollar, while its volatility remained relatively stable. Overall, domestic financial markets have remained stable; however, international circumstances such as the monetary policy directions of major central banks, geopolitical risks, and spillover effects from the economic downturn in Mainland China could impact Taiwan's financial markets and their developments and implications are worthy of close attention.

3.1.1 Money and bond markets

Both the outstanding amount and trading volume of interbank call loans kept declining

In 2023, the average daily outstanding amount of interbank call loans was NT$352.0 billion, and dropped by 6.30% year on year, primarily owing to significant decreases in interbank borrowing and lending.[30] Consequently, the trading volume of interbank call loans

Chart 3.1 Interbank call loan market

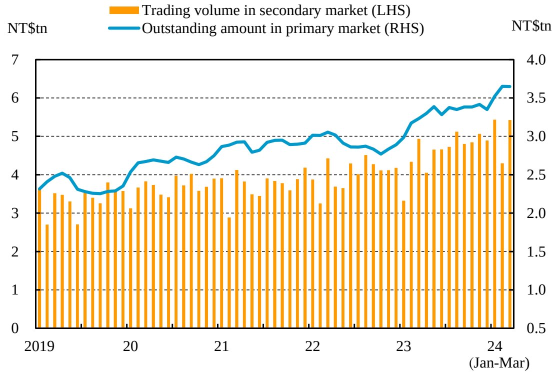


Note: Outstanding amount is the monthly average of daily data.
Source: CBC.

[30] In 2023, the average daily outstanding amount of interbank lending from domestic banks decreased by 10.72% year on year, while the average daily outstanding amount of interbank borrowing decreased by 15.01% year on year.

decreased by 10.52% year on year in 2023, as the proportion of interbank overnight call loans in the market decreased and financial institutions reduced the frequency with which they rolled over their interbank borrowings because of the extended maturity of these interbank call loans.[31] In 2024 Q1, the average daily outstanding amount and trading volume of interbank call loans both decreased year on year (Chart 3.1).

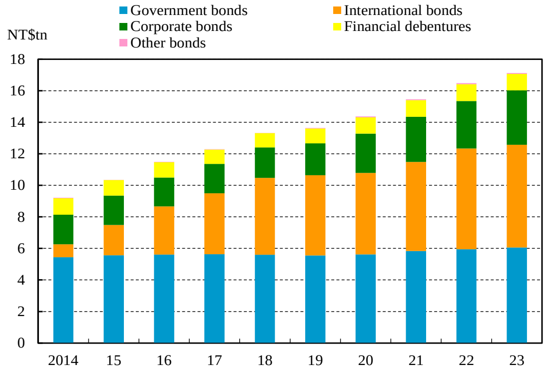
Chart 3.2 Primary and secondary bill markets



Source: CBC.

Both outstanding amount of bill issuance and the bill trading volume in the secondary market expanded year on year

Chart 3.3 Bonds outstanding in the primary market



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

The outstanding amount of bill issuance in the primary market reached NT$3.35 trillion by the end of 2023, marking a rise of NT$456.9 billion or 15.81% year on year. The main reason for this increase was higher corporate funding needs, bringing about a substantial increase of NT$416.1 billion in the outstanding amount of CP issuance. Moreover, NCDs issued by banks rose by NT$41.3 billion, while treasury bills remained flat. In 2024 Q1, the outstanding amount of bill issuance began to climb year on year as the issuance of CP increased (Chart 3.2).

In 2023, as the outstanding amount of bill issuance edged up, the trading volume in the secondary market increased by 14.50% year on year to NT$55.42 trillion. Among them, CP continued to constitute the largest share of 96.73%, slightly decreasing from a year earlier. In 2024 Q1, the bill trading volume continued its upward trend over the same period of the previous year (Chart 3.2).

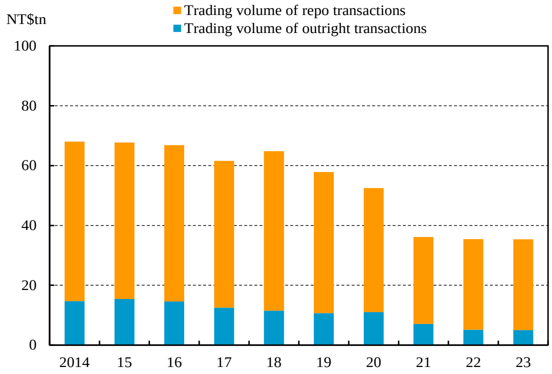
[31] In 2023, the proportion of overnight interbank call loans decreased from 46.21% last year to 45.55%, with these loans' maturities extended.

Outstanding amount of bond issuance continued to expand, while the trading volume remained roughly unchanged; however, the turnover rate of outright bond transactions continued to drop to a record low

The outstanding amount of bond issuance reached a new high of NT$17.11 trillion at the end of 2023 and increased by 3.87% over the end of the previous year. This increase was primarily attributed to a 14.59% rise in corporate bond issuance, as state-owned enterprises such as Taiwan Power Company and Chinese Petroleum Corporation increased bond issuance for the purpose of supplementing operating funds. At the end of 2023, the outstanding amount of international bond and government bond[32] issuance increased by 1.91% and 1.85%, respectively, compared to the end of the previous year (Chart 3.3).

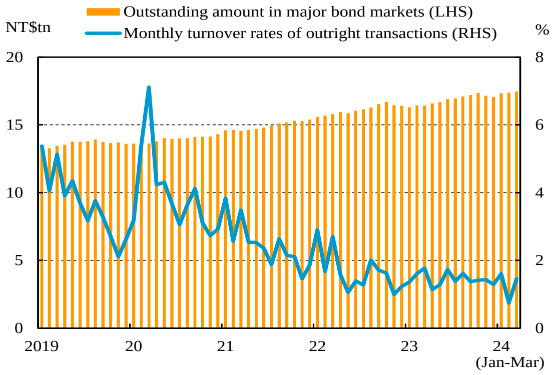
On the other hand, the trading volume in the secondary bond market registered NT$35.41 trillion in 2023, roughly unchanged year on year (Chart 3.4). Analyzed by trading type, outright transaction volume shrunk by 3.26% year on year, while repo transaction volume slightly increased by 0.56% year on year. Nevertheless, the overall trading volume remained at a relatively low level in recent years. As a result, the average monthly outright turnover rate of major bonds decreased continually in December 2023 to 1.45% and declined further to a record low of 1.27% in 2024 Q1 (Chart 3.5).

Chart 3.4 Outright and repo transactions in the bond market



Source: CBC.

Chart 3.5 Outstanding amount in major bond markets and monthly turnover rates of outright transactions



Notes: 1. Major bonds include government bonds, corporate bonds, financial bonds, and international bonds.
2. The monthly turnover rate for outright transactions = total value of outright transactions in the month / average outstanding issuance, where the average outstanding issuance = (the outstanding issuance at the end of the current month + the outstanding issuance at the end of the previous month) / 2 .

Source: FSC.

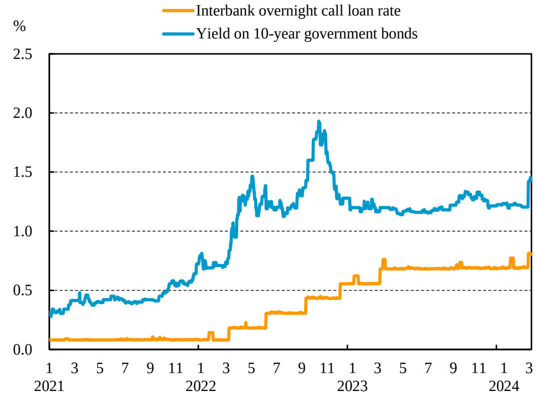
[32] Including central and local government bonds.

Long-term and short-term market rates rose

In terms of short-term market rates, after the Bank raised the policy interest rates and the interest rates on the Bank's CDs in March 2023 and March 2024 to curb domestic inflation expectations, the interbank overnight call loan rate trended upwards, stabilizing at around 0.81% from March 22, 2024 onwards (Chart 3.6). Still, market liquidity remained ample.

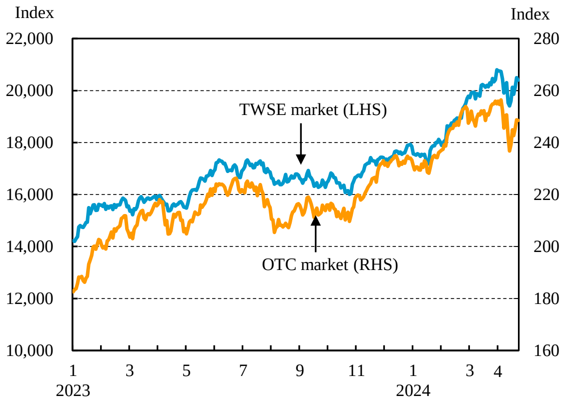
As for long-term market rates, owing to market expectations that the cycle of rate hikes by major central banks was nearing its end, coupled with ample domestic liquidity, domestic 10-year government bond yields gradually trended downwards during the first three quarters of 2023. Afterwards, following the Fed's cautious stance on future rate cuts, the market adjusted its expectations, reducing the anticipated extent of rate cuts and causing US government bond yields to rise. Consequently, domestic 10-year government bond yields gradually increased, reaching 1.34% on October 19 before declining (Chart 3.6). From mid-March 2024 onwards, influenced by the Bank's policy rate hike and the rebound in US government bond yields, domestic 10-year government bond yields rose again, reaching a recent high of 1.71% on April 17. Considering higher inflation driven by both the uncertain future trajectory of monetary policy of major central banks and disruptions in supply chains on account of escalating geopolitical risks, together with the upward pressure on bond yields globally, the domestic 10-year government bond yields are likely to be affected. Therefore, the interest rate risks of bond investments of domestic financial institutions are worthy of close attention.

Chart 3.6 Interbank overnight rate and 10-year government bond yield



Source: Bloomberg.

Chart 3.7 Taiwan's stock market indices



Sources: TWSE and TPEx.

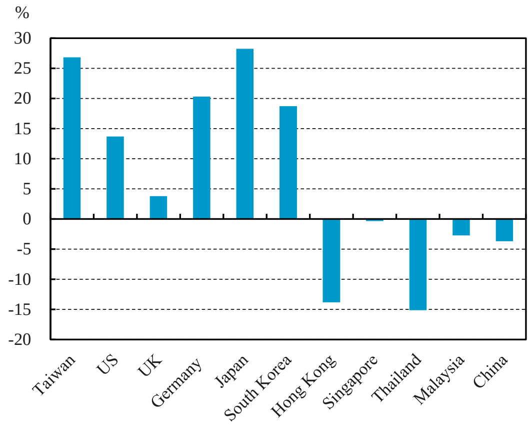
3.1.2 Equity markets

Stock indices fluctuated with an uptrend and reached historical highs

In 2023, benefiting from international stock markets rising and inflows of foreign capital to invest in domestic stock markets, the TAIEX of the TWSE market went up to 17,931 at year end from 14,224 at the beginning of the year (Chart 3.7), posting an increase of 26.83% year on year and surging higher than the major indices in Germany, Korea, the US, and other international stock markets, except for Japan (Chart 3.8). The Taipei Exchange Capitalization Weighted Stock Index (TPEX) of the OTC market closely tracked the movements of the TAIEX, registering 234 at year end and posting an increase of 29.76% year on year.

From January to April 2024, driven by market expectations that the major central banks will ease monetary policy and a rise in technology stocks driven by applications of AI, the TAIEX went up steadily and kept reaching historical highs. The TPEX also followed the same trend (Chart 3.7).

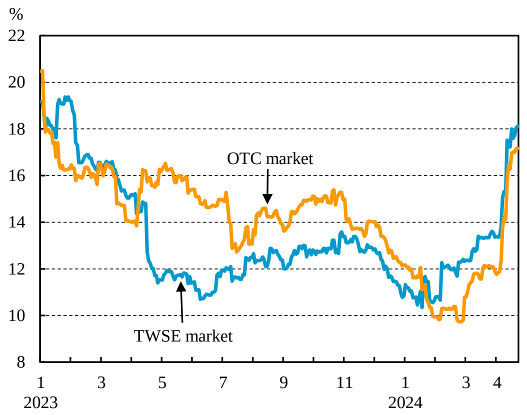
Chart 3.8 Major stock market performance



Notes: 1. Changes are figures at the end of 2023 compared to those at the end of 2022.
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.

Chart 3.9 Stock price volatility in Taiwan's markets



Note: Volatility refers to the annualized standard deviation of 60-day daily index returns.

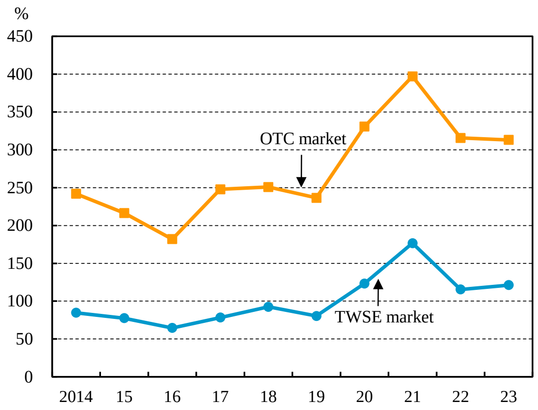
Sources: TWSE, TPEx, and CBC.

Volatility in the stock markets rose after falling, while annual turnover rates remained stable

Affected by the rise of domestic stock prices and investor optimism in 2023, the volatility in the TWSE and the OTC markets dropped to 10.78% and 12.12% at the end of the year from 19.17% and 20.48%, respectively, at the beginning of the year. However, since February 2024, the volatility of the TWSE and the OTC markets have surged again owing to the combined effects of various positive and negative factors emerging in both domestic and international markets (Chart 3.9).

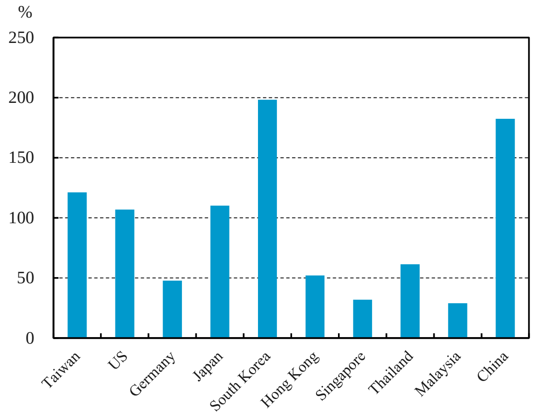
Benefiting from the booming trading volume of Taiwan's stock markets, the monthly average trading value in both the TWSE and the OTC markets increased to NT$5.26 trillion and NT$1.4 trillion in 2023 respectively, posting increases of 12.64% and 13.23% year on year. As a consequence, the annual turnover rate in terms of trading value also elevated to 121.19% in the TWSE market (Chart 3.10), which was higher than those in most major international stock markets (Chart 3.11). The annual turnover rate in terms of trading value in the OTC market slightly declined to 313.08%, but still stayed at a high level, indicating that trading in Taiwan's stock markets was quite active and liquidity remained ample.

Chart 3.10 Annual turnover rates in Taiwan's stock markets



Sources: TWSE and TPEx.

Chart 3.11 Turnover rates in major stock markets



Note: Figures refer to accumulated turnover rates in 2023.
Source: TWSE.

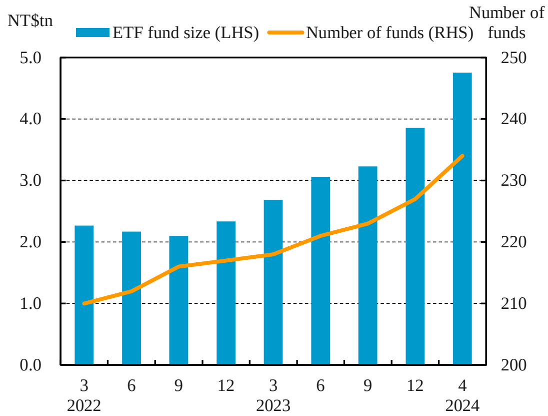
Domestic stock markets are highly correlated with international stock markets. Considering that rising geopolitical risks and uncertain monetary policy stances by major central banks may affect the global economy and international stock markets and, in turn, impact the performance of domestic stock markets, it is necessary to pay close attention to these developments.

Domestic ETF market has grown rapidly

In the past two years, affected by the excellent performance of domestic stock markets, market expectations for the Fed's policy rate cuts, and the incentive of high dividends, the domestic ETF market has grown rapidly. The number of funds and aggregated fund size of ETFs went up to 234 and NT$4.75 trillion, respectively, as of the end of April 2024 (Chart 3.12), accounting for 60.96% of total onshore mutual funds worth NT$7.8 trillion. The aggregated fund size of ETFs increased by NT$2.02 trillion, a rise of 73.65% year on year. In addition, ETF beneficiaries rose to 11.62 million and reached a historical high.

ETF investments have many advantages, but investors also face multiple risks such as price risks, tracking error risks, and liquidation risks. When trading volume of ETFs surges sharply, it may lead to stock price co-movement, which is worth paying more attention to. [33] Furthermore, recently there have been several incidents such as abuse of income equalization, trading frequently for high dividend distribution, and improper marketing by internet celebrities in the domestic equity ETF market. Therefore, the FSC has successively implemented relevant regulatory measures to address these issues.[34]

Chart 3.12 ETF fund size and number of funds in Taiwan

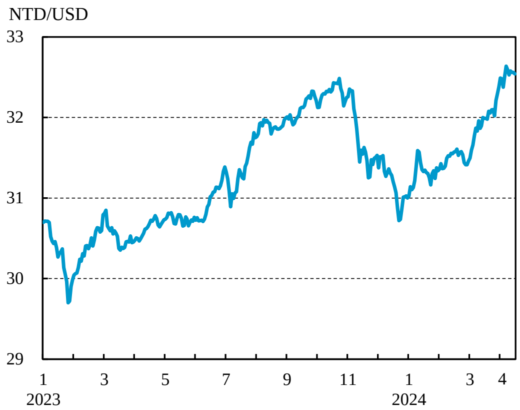


Note: Offshore ETFs, futures ETFs and leveraged/ inverse futures ETFs were not included.
Source: SITCA.

3.1.3 FX market

The NT dollar broadly depreciated against the US dollar, while the trading volume of the FX market increased

Chart 3.13 NTD/USD exchange rate



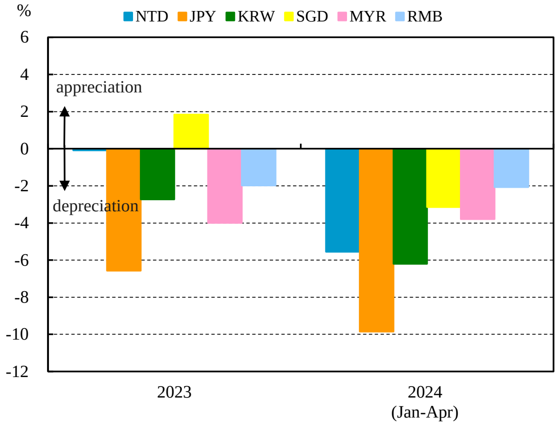
Source: CBC.

At the beginning of 2023, owing to the Fed slowing its pace of interest rate hikes and inflows of foreign capital to invest in domestic stock markets, the NT dollar exchange rate against the US dollar appreciated to below 30 in February. In the second half of 2023, the strong US dollar led to the NT dollar reversing and sharply depreciating against the US dollar. Subsequently, as the US government bond yields and the US dollar declined from November, the NT dollar exchange rate rebounded to 30.735 against the US dollar at the end of 2023 (Chart 3.13), depreciating by 0.09% from the end of the previous year. At the beginning of 2024, considering the decrease in US inflation was slower than expected, the Fed continued its tight monetary policies. This, coupled with escalating geopolitical risks, led to a stronger US dollar. Therefore, the NT dollar turned to depreciate and stood at 32.542 against the US dollar at the end of April 2024 (Chart 3.13), depreciating by 5.55% compared to the end of 2023.

33 For the advantages and risks of ETF investments, please see CBC (2021), Box 2, *Financial Stability Report.*
34 See the "Measures undertaken by the FSC to maintain financial stability" in the *Financial Stability Report*, May 2024.

In 2023, most major Asian currencies depreciated against the strong US dollar except for the SGD. The extent of the NT dollar depreciation against the US dollar was lower than other major Asian currencies. As the US dollar kept strengthening from January to April 2024, most major Asian currencies continued to depreciate against the US dollar (Chart 3.14).

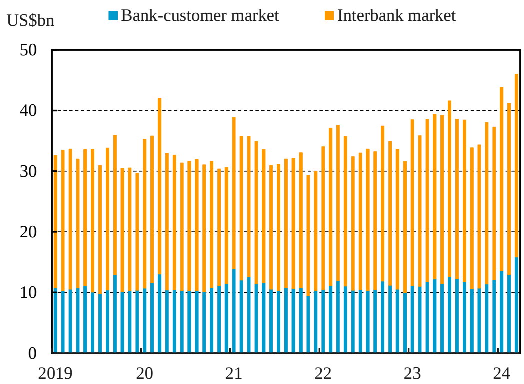
Chart 3.14 Exchange rate changes of major Asian currencies against the US dollar



Note: Changes in 2023 are figures at the end of the year compared to those at the end of 2022; changes in the period of Jan-Apr 2024 are figures at the end of April 2024 compared to those at the end of 2023.
Source: CBC.

The average daily trading volume in Taiwan's FX market amounted to US$37.8 billion in 2023, rising by 9.72% compared to a year earlier primarily because of an increase in interbank transactions (Chart 3.15). The daily trading volume in March 2024 amounted to US$46 billion and increased by 19.48% over the same period of the previous year.

Chart 3.15 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 March 2024.
Source: CBC.

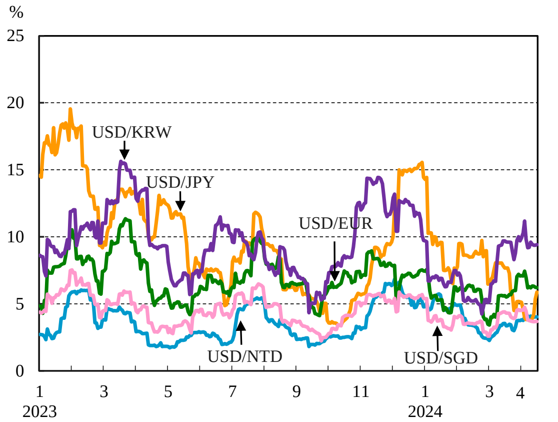
NT dollar exchange rate volatility remained relatively stable

The volatility of the NT dollar exchange rate against the US dollar fluctuated between 1.72% and 6.83% in 2023 and registered an annual average of 3.6%, which was relatively low compared to those of other major currencies. From January to April 2024, the volatility of the NT dollar exchange rate registered between 2.27% and 5.74%, which was lower than those of the Japanese yen, the euro, and the Korean won, but slightly higher than the Singapore dollar (Chart 3.16).

The nominal and real effective exchange rate indices of the NT dollar fluctuated within a narrow range

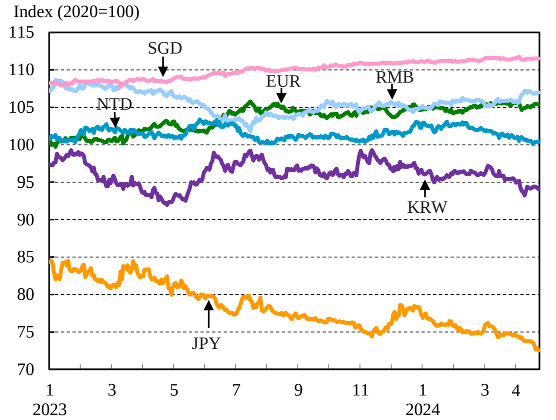
In 2023, as the applications of AI promoted the growth of related supply chain demand and, in turn, made exports rebound, coupled with inflows of foreign capital to invest in domestic stock markets, the NEER index of the NT dollar increased slightly and registered 103.05 at year end, an increase of 2.15% compared to 100.88 registered at the end of 2022. The NEER of the NT dollar fluctuated within a narrow range and remained relatively stable compared to other major Asian currencies. However, because of the strong US dollar, the NEER of the NT dollar dropped to 100.4 at the end of April 2024, a slight decrease of 2.57% compared to the end of 2023 (Chart 3.17). During the same period, the real effective exchange rate (REER) index of the NT dollar also fluctuated within a limited range and stood at 99.42 in December 2023, an increase of 0.24% compared to 99.18 registered in December 2022. The volatility of the NT dollar's REER remained relatively stable compared to other major Asian currencies. In April 2024, the NT dollar's REER declined to 97.95, a decrease of 1.48% compared to December 2023.

Chart 3.16 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.

Chart 3.17 NT dollar nominal effective exchange rate index



Source: BIS.

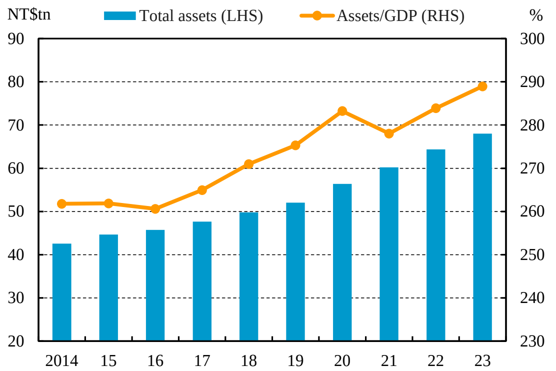
3.2 Financial institutions

In 2023, the performance of domestic financial institutions varied. Domestic banks achieved record-high profits, with improvements in asset quality and capital adequacy ratios. Life insurance companies saw a notable rebound in profits after experiencing a significant decline, and overall capital levels remained adequate, yet they still faced higher market risk. Bills finance companies suffered a drop in profits and continued to face elevated liquidity risk, while their capital adequacy ratios increased. Overall, domestic banks, life insurance companies, and bills finance companies were able to operate stably.

3.2.1 Domestic banks

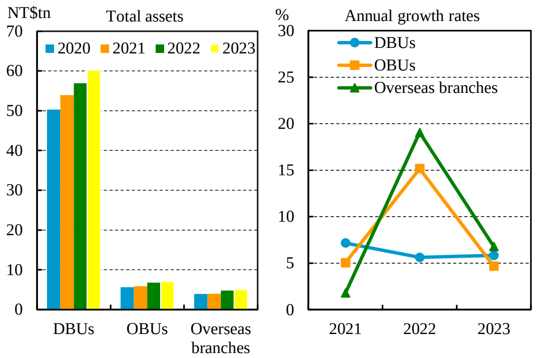
In 2023, the total assets of domestic banks[35] continued to expand, while asset quality improved. The sectoral concentration in corporate loans declined marginally, and exposures to China continued to decline. However, real estate-secured credit remained at a high level, and credit quality of overseas real estate-secured credit deteriorated. The estimated value at risk (VaR) of market risk exposures slightly increased, but its 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 continuously increased in 2023 and reached a historical high. The average capital adequacy ratio rose and maintained an adequate capital level, suggesting satisfactory capacity to bear losses.

Chart 3.18 Total assets of domestic banks



Sources: CBC and DGBAS.

Chart 3.19 Total assets of domestic banks by sector



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

Total assets kept growing

The total assets of domestic banks kept growing, albeit at a slower pace, and reached NT$68.03 trillion at the end of 2023, with an annual growth rate of 5.66% compared to

[35] Includes the Agricultural Bank of Taiwan.

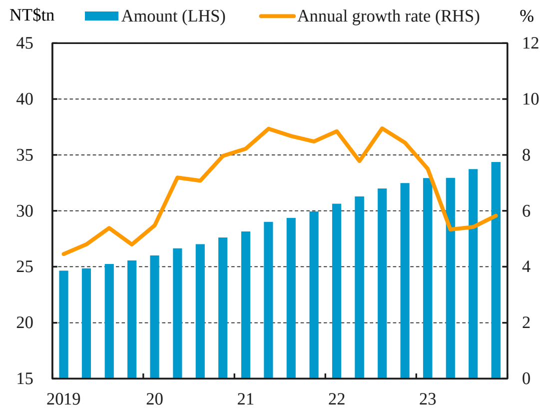
6.91% a year earlier. The ratio of total assets to annual GDP continuously rose to 288.95% (Chart 3.18). Broken down by sector, the annual asset growth rates of domestic banking units (DBUs) rebounded slightly, whereas the rates of offshore banking units (OBUs) and overseas branches experienced sharp drops (Chart 3.19).

Credit risk

Customer loan growth slowed

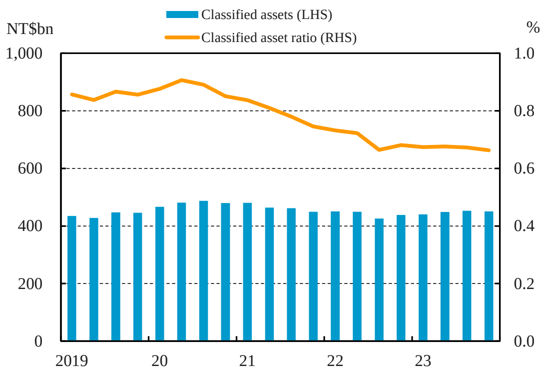
Customer loans were the major source of credit risk for domestic banks. The outstanding customer loans of DBUs stood at NT$34.37 trillion at the end of 2023, accounting for 50.52% of total assets with its annual growth rate decreasing to 5.83% (Chart 3.20). Among them, the annual growth rate of household borrowing rose marginally to 7.03%, while the growth rate of corporate loans declined to 5.61% owing to decreasing corporate funding demand amid international and domestic economic downturns. Moreover, the annual growth rate of government loans continued to drop to -5.91%, mainly because increasing government tax revenues reduced borrowing demand from banks.

Chart 3.20 Outstanding loans in domestic banks



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

Chart 3.21 Classified assets of domestic banks



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

Asset quality improved

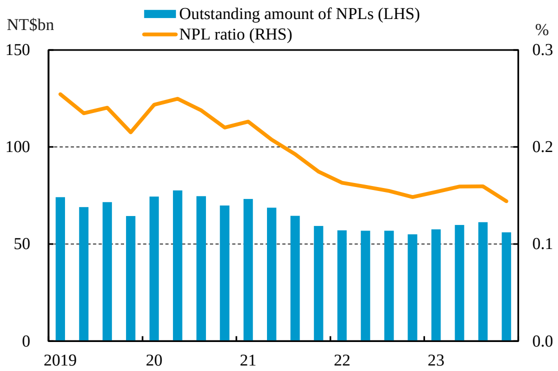
The outstanding classified assets[36] of domestic banks increased by 2.85% from a year earlier to NT$450.9 billion at the end of 2023. However, the average classified asset ratio slightly decreased by 0.02 pps from the end of the previous year and stood at 0.66% (Chart 3.21), showing that the asset quality of domestic banks improved. Although the expected losses of classified assets[37] increased by NT$0.3 billion from a year earlier to NT$50.4 billion, they

[36] 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 under the latter four categories.
[37] Loss herein refers to losses from loans, acceptances, guarantees, credit cards, and factoring without recourse.

only accounted for 8.62% of allowances for doubtful accounts and loss provisions, indicating sufficient provisions to cover expected losses without eroding equity.

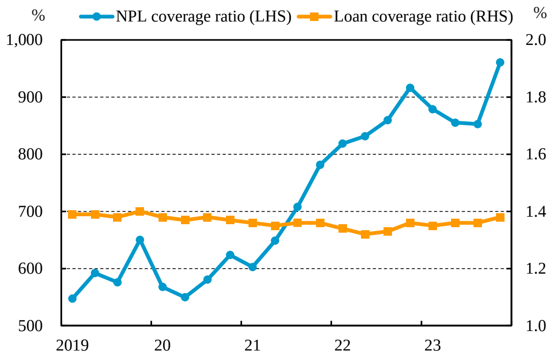
The outstanding NPLs of domestic banks registered NT$56.0 billion at the end of 2023, decreasing by 1.84% from the end of the previous year. The average NPL ratio also declined and reached a record low of 0.14% (Chart 3.22). In addition, at the end of 2023, the loan coverage ratio and the NPL coverage ratio increased to 1.38% and 960.96% (Chart 3.23), respectively, owing to a greater increase in total provisions. The overall ability of domestic banks to cover potential loan losses remained satisfactory.

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

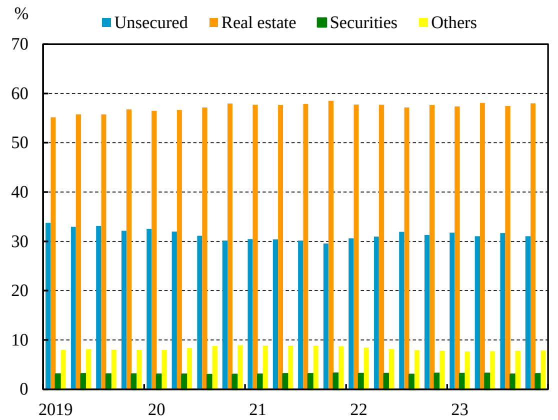


Notes: 1. NPL coverage ratio = total provisions/non-performing loans.
2. Loan coverage ratio = total provisions/total loans.
3. Excludes interbank loans.
Source: CBC.

The share of real estate-secured credit increased

At the end of 2023, real estate-secured credit granted by domestic banks amounted to NT$23.44 trillion, accounting for 57.99% of total credit.[38] The ratio increased over the previous year, indicating a rise in concentration (Chart 3.24). As the government lanched the enhanced program of Preferential Housing Loans for the Youth, transactions in the housing market gradually gained momentum and housing prices remained high. However, owing to owner-occupant homebuyers' limited ability to chase market prices as well as a continual increase in unsold newly built residential housing units from

Chart 3.24 Credit by type of collateral in domestic banks



Source: CBC.

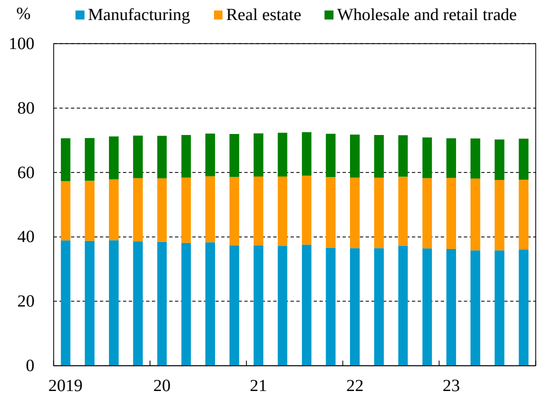
[38] The term "credit" herein includes loans, guarantee payments receivable, and acceptances receivable.

2022 Q1, the impact from changes in housing supply and destocking of unsold residential housing units on banks' credit quality merits close attention.

Credit concentration in corporate loans slightly decreased

Corporate loans granted by the DBUs of domestic banks stood at NT$15.18 trillion at the end of 2023. Among the borrowers, the largest three industries combined accounted for 70.52%, slightly lower than the 70.90% of the previous year (Chart 3.25), indicating that credit concentration in corporate loans decreased modestly. Among loans to the manufacturing sector,[39] which represented the largest segment, loans to the electronics industry constituted the largest share at 32.36%, slightly increasing from 31.88% the previous year.

Chart 3.25 Shares of corporate loans of the three largest industries



Note: Exposures of OBUs and overseas branches were excluded.
Source: CBC.

Credit quality of overseas CRE deteriorated

In 2023, affected by serveral factors such as the rising trend of working from home after the pandemic, the Fed's rapid rate hikes, high inflation, and worsening CRE market conditions, the credit quality of US and Euporean CRE loans granted by domestic banks deteriorated. Nonetheless, the risk was manageable because CRE loans were less than 0.5% of total loans.

Given that the IMF and regulatory authorities such as the US Fed and the Financial Stability Oversight Council recently all regarded the vulnerability related to the CRE industry as one of the main financial stability risks,[40] changes in credit quality of overseas CRE loans still require close attention.

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

At the end of 2023, the exposures of domestic banks to China stood at NT$0.96 trillion, representing a 10.66% decrease from the previous year, mainly attributed to a 14.53% reduction in credit granted. The above exposures as a percentage of net worth also reached

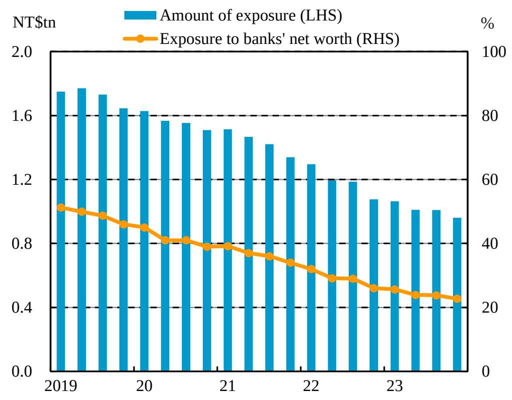
[39] Loans to the manufacturing sector are divided into five categories by industry, including: (1) electronics, (2) mining of metals and non-metals, (3) petrochemicals, (4) traditional manufacturing, and (5) others.

[40] For more details, please refer to Federal Reserve (2023), *Financial Stability Report*, May; IMF (2023), *Global Financial Stability Report*, October; FSOC (2023), *Annual Report*, December.

a new record low of 23% (Chart 3.26).

China's economy is currently experiencing a contraction in the real estate market, subdued domestic demand, and a worsening local government debt crisis, all contributing to a protracted economic deceleration. In addition, with escalating global geopolitical risks, it is essential to closely monitor how these evolving conditions might affect the quality of credit risk exposure.

Chart 3.26 Exposures of domestic banks to China



Source: FSC.

Market risk

Estimated value-at-risk for market risk exposures witnessed a marginal increase

Based on the Bank's VaR model,[41] the estimated total VaR for market risk exposures of domestic banks stood at NT$172.5 billion at the end of 2023, increasing by NT$3.2 billion or 1.89% compared to a year earlier. Among the market risk exposures, the interest rate VaR rose slightly by 1.11% year on year due to higher net positions in debt securities. The equities VaR climbed by 19.66% as banks significantly expanded their net positions in equity securities. The

Table 3.1 Market risks in domestic banks

Unit: NT$bn

Type of risk	Item	End-Dec. 2022	End-Dec. 2023	Changes	
				Amount	pps
Foreign exchange	Net position	200.5	178.5	-22.0	-10.97
	VaR	4.4	3.6	-0.8	-18.18
	VaR/net position (%)	2.19	2.02		-0.17
Interest rate	Net position	1,760.9	2,034.1	273.2	15.51
	VaR	153.2	154.9	1.7	1.11
	VaR/net position (%)	8.70	7.62		-1.08
Equities	Net position	59.2	95.1	35.9	60.64
	VaR	11.7	14.0	2.3	19.66
	VaR/net position (%)	19.76	14.72		-5.04
Total VaR		169.3	172.5	3.2	1.89

Source: CBC.

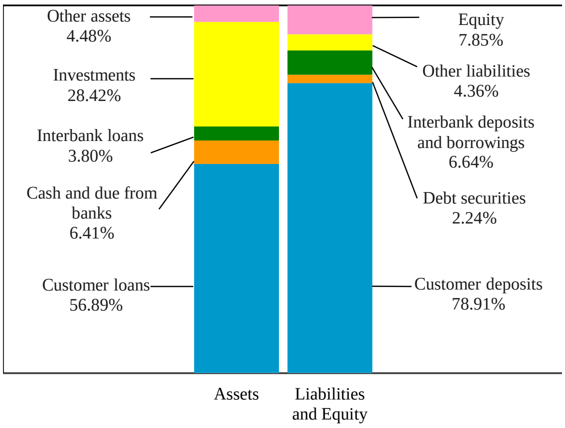
[41] For more details about the Bank's VaR model, please see CBC (2016), Box 2, *Financial Stability Report*.

FX VaR diminished by 18.18% compared to the end of the previous year, owing to a reduction in net positions and a notable decline in the volatility of the NT dollar exchange rate against the US dollar (Table 3.1).

The impact of market risk on capital adequacy ratios was limited

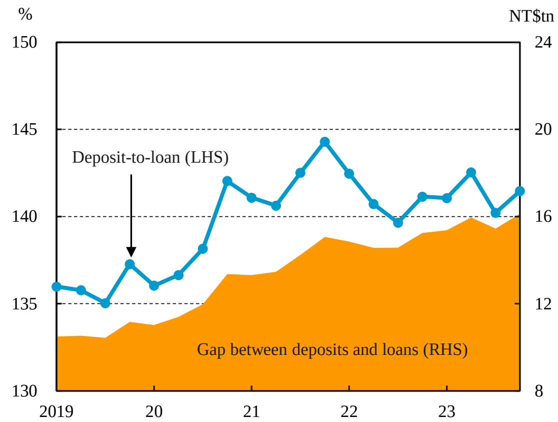
According to the estimation mentioned above, the total VaR would lead to a decrease of 0.42 pps[42] in the average capital adequacy ratio of domestic banks, causing the ratio to drop from the current 15.33% to 14.91%. Nevertheless, it would still be higher than the statutory minimum standard of 10.5%. Considering the uncertainty surrounding the pace of interest rate cuts by the Fed and central banks in other advanced economies, along with potential heightening of financial market volatility resulting from the spillover effects of global geopolitical risks, market risk could further increase, which warrants close attention.

Chart 3.27 Asset/liability structure of domestic banks



Notes: 1. Figures are as of end-December 2023.
2. Equity includes loss provisions. Interbank deposits include deposits with the CBC.
Source: CBC.

Chart 3.28 Deposit-to-loan ratio of domestic banks



Source: CBC.

Liquidity risk

Liquidity in the banking system remained ample

The asset and liability structure of domestic banks remained roughly unchanged in 2023. For the sources of funds, customer deposits, which tend to be relatively stable, still made up the largest share with 78.91% of the total, followed by equity at 7.85%. As for the uses of funds, customer loans accounted for the biggest share with 56.89%, followed by security investment at 28.42% (Chart 3.27).

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[42] 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.

At the end of 2023, the average deposit-to-loan ratio of domestic banks slightly rose to 141.46%, higher than the end of the previous year, and the funding surplus (i.e., deposits exceeding loans) was NT$16.12 trillion (Chart 3.28). The overall liquidity of domestic banks remained abundant.

Overall liquidity risk remained relatively low

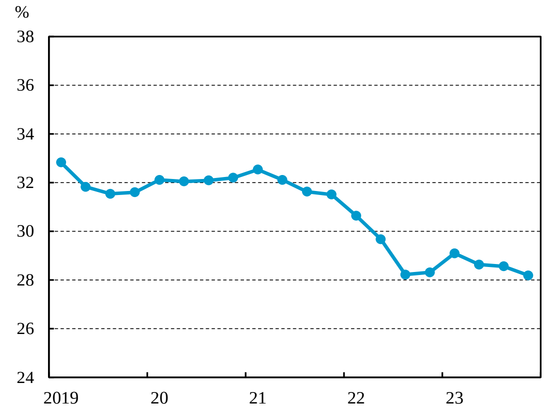
The average NT dollar liquid reserve ratio of domestic banks was much higher than the statutory minimum standard of 10% in every month of 2023 and stood at 28.19% in December (Chart 3.29), a slight decrease compared to the same period of the previous year, while the ratios of individual banks were each higher than 15%. At the end of 2023, the average liquidity coverage ratio (LCR) of domestic banks dropped marginally to 133%; the net stable funding ratio (NSFR) of domestic banks remained at 138% (Chart 3.30). The overall liquidity risk of domestic banks was relatively low.

Profitability

Profits in 2023 hit new historical highs

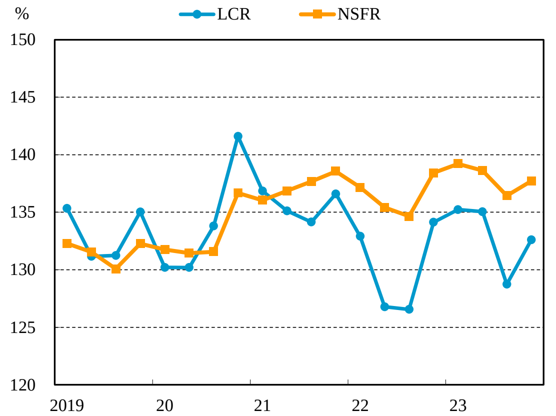
Benefiting from increases in investment profits , gains on disposal, and valuation from FX swap transactions, the net income before tax of domestic banks kept rising to a new historical high of NT$472.6 billion in 2023, increasing by 20.30% over the previous year. The average ROE and ROA also went up to 10.33% and 0.70%, respectively (Chart 3.31).

Chart 3.29 Liquid reserve ratio of domestic banks



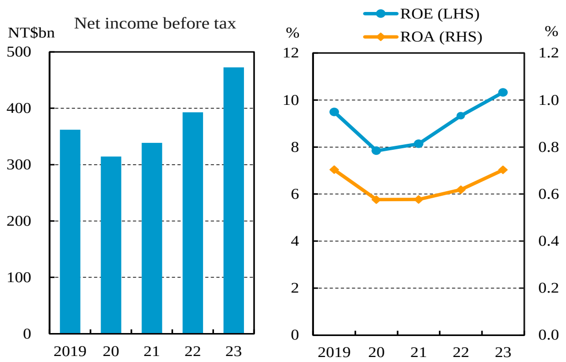
Note: Figures are the average daily data in the last month of each quarter.
Source: CBC.

Chart 3.30 LCR and NSFR of domestic banks



Source: CBC.

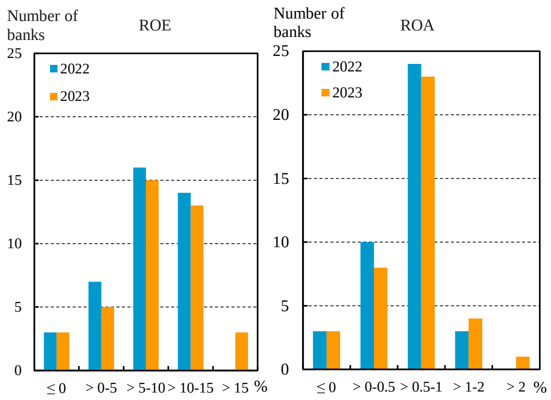
Chart 3.31 Net income before tax of domestic banks



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

In 2023, three internet-only banks, which officially began operations in recent years, posted operating losses, whereas all the other banks made profits. Most banks' ROEs and ROAs were higher than the previous year. Sixteen banks achieved a profitable ROE of 10% or more, compared to fourteen banks in 2022. Meanwhile, five banks recorded ROAs above the international standard of 1%, more than the three banks in 2023 (Chart 3.32).

Chart 3.32 Domestic banks classified by ROE and ROA

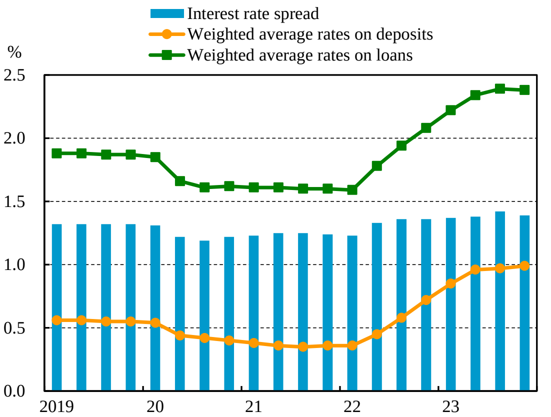


Source: CBC.

Factors that might affect future profitability

Affected by the policy rate hikes, the average interest rate spread between deposits and loans of domestic banks continued to widen to 1.39% at the end of 2023 from 1.36% a year earlier (Chart 3.33), which helped to raise the profitability of domestic banks. However, there are still some uncertainties warranting close attention, including: (A) In 2024, gains from FX swap transactions have gradually decreased owing to subdued market demand. Additionally, relatively high lending interest rates may affect corporate loan demand. Both of the aforementioned could be detrimental to banks' future profit growth. (B) The escalation of geopolitical risks and the resultant global supply chain disruptions and trade fragmentation could drag down global economic growth. This, in turn, may impact corporate profits and real household income, ultimately threatening banks' profitability and loan quality.

Chart 3.33 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.

Capital adequacy

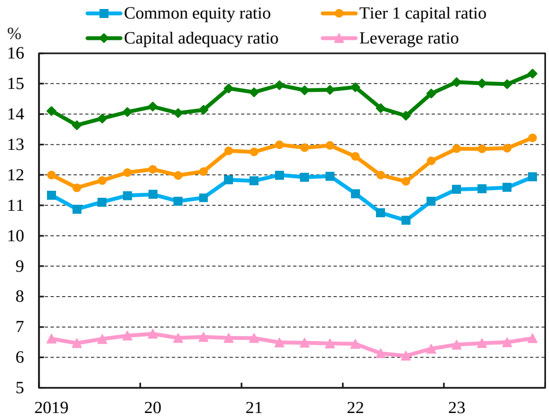
Capital ratios rose

In 2023, benefiting from accumulated earnings, an increase in valuation gains on financial assets and capital injections in cash by several banks, the average common equity ratio, Tier 1 capital ratio, and capital adequacy ratio rose to 11.93%, 13.22%, and 15.33%, respectively, at the end of 2023 (Chart 3.34). Among them, the Tier 1 capital ratio and capital adequacy ratio both reached new record highs in 20 years.

Among the components of regulatory capital, common equity Tier 1 (CET1) capital accounted for 77.83%. The high share of CET1 capital, which features the best loss-bearing capacity, showed that the capital quality of domestic banks was satisfactory. Furthermore, according to the latest regulatory stress tests requested by the FSC,[43] domestic banks maintained sound capital adequacy, reflecting satisfactory risk management capability.

Moreover, the average leverage ratio of domestic banks stood at 6.63% at the end of 2023 (Chart 3.34), higher than 6.28% a year earlier and well above the 3% statutory standard, indicating that financial leverage remained sound.

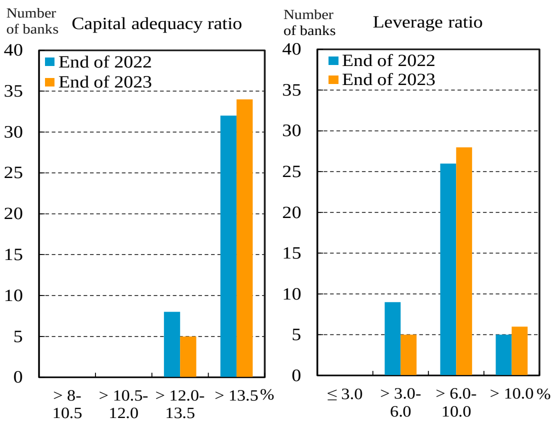
Chart 3.34 Capital ratios and leverage ratios of domestic banks



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 = regulatory capital/risk-weighted assets.
4. Leverage ratio = Tier 1 capital/total exposure.

Source: CBC.

Chart 3.35 Capital ratios and leverage ratios of domestic banks



Source: CBC.

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

At the end of 2023, the capital ratios of six domestic systemically important banks (D-SIBs) and non-D-SIBs were all above statutory minimum standards or the relevant capital buffer requirements set by the FSC in 2023.[44] Leverage ratios of all domestic banks also exceeded the statutory minimum standard of 3% (Chart 3.35).

[43] According to the press release published by the FSC on September 14, 2023, 38 domestic banks carried out regulatory stress tests. The result revealed that in the serious scenario, the average common equity ratio, Tier 1 capital ratio, capital adequacy ratio and leverage ratio of domestic banks were all higher than the statutory minimum standards, reflecting that domestic banks have sound risk management and capital adequacy in the face of changes in the global economy and financial environment.

[44] 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 (the enforcement of the internal management capital requirement was postponed for one year and must be achieved before each year-end of the four years equally from 2022 onwards).

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) [45] unchanged at Group 4 with moderate risk. Compared to other Asian economies, the systemic risk level of Taiwan 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 Indicator (BSI/MPI)[46] also remained unchanged at level bbb/2 (Table 3.2).

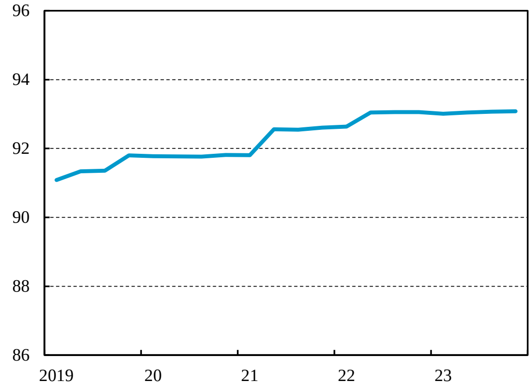
In addition, the weighted average credit rating index[47] was broadly the same as the end of the previous year (Chart 3.36). Overall, the credit rating level remained steady.

Table 3.2 Systemic risk indicators for the banking system

Banking System	Standard & Poor's		Fitch	
	BICRA		BSI/MPI	
	2023/2	2024/2	2022/7	2023/7
Singapore	2	2	aa/2	aa/2
Hong Kong	2	2	a/2	a/2
Japan	3	3	a/3	a/3
South Korea	3	3	a/2	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	bbb/1
Thailand	7	7	bbb/1	bbb/1
Indonesia	6	6	bb/1	bb/1

Sources: Standard & Poor's and Fitch Ratings.

Chart 3.36 Credit rating index of domestic banks



Sources: Taiwan Ratings, Fitch Ratings and CBC.

Rating outlooks for most domestic banks remained stable or positive

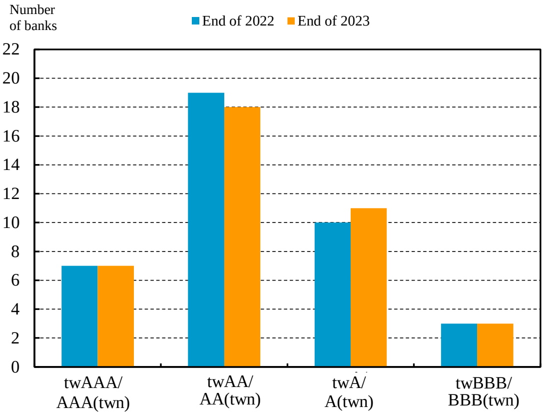
As of the end of 2023, most of the 39 domestic banks[48] maintained credit ratings of twAA/twA (Taiwan Ratings) or AA(twn)/A(twn) (Fitch Ratings) and none had credit ratings lower than

[45] 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.
[46] 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 (strongest), aa, a, bbb, bb, b, ccc, cc, c to f (fail). The MPI indicates the vulnerability of the macro environment on a scale from 1 (lowest vulnerability), 2, 2* to 3 (highest vulnerability).
[47] 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.
[48] With JihSun Bank (AA-(twn)) merged into Taipei Fubon Bank (twAA+) on April 1, 2023, the number of domestic banks dropped to 39, and all of them received credit ratings.

twBB/BB(twn) (Chart 3.37).[49] In terms of rating outlooks, except for one bank whose rating outlook was negative, those of the rest remained stable or positive.

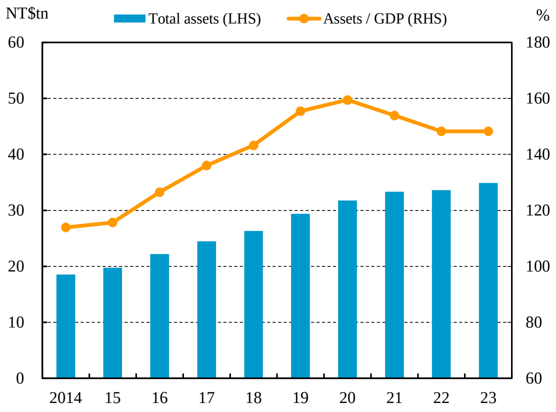
Taiwan Ratings projected that Taiwan's banking industry outlook would remain stable in 2024 and indicated that credit costs would stay at a low level amid the stable domestic economic situation and a cautious overseas growth environment. This, together with banks' adequate capital levels, could support their business growth and ability to withstand unexpected market fluctuations.[50]

Chart 3.37 Number of domestic banks classified by credit ratings



Sources: Taiwan Ratings and Fitch Ratings.

Chart 3.38 Total assets of life insurance companies



Sources: FSC and DGBAS.

3.2.2 Life insurance companies

In 2023, the total assets of life insurance companies continued to increase. The average equity to asset ratio improved, and overall credit ratings remained stable. Although their profits significantly declined, there was a notable rebound in 2024 Q1. With the expansion of foreign investment positions, life insurance companies still faced higher FX risk, interest rate risk and equity risk. In addition, considering their premium income is generally lower than their benefit payment, their future cash flows warrant continuous attention.

Assets kept growing

The total assets of life insurance companies reached NT$34.90 trillion at the end of 2023, equivalent to 148.24% of annual GDP (Chart 3.38). The annual growth rate of total assets increased to 3.81% from 0.84% a year earlier, indicating continuous asset growth. The market

[49] Since Line Bank was rated BBB+(twn) for the first time, Hwatai Bank's credit rating changed from twBBB+ to A-(twn) as of changing the rating agency, and JihSun Bank merged into Taipei Fubon Bank, the number of domestic banks with credit ratings of twAA/AA(twn) decreased by one, twA/A(twn) increased by one, and twBBB/BBB(twn) remained unchanged as of the end of 2023.

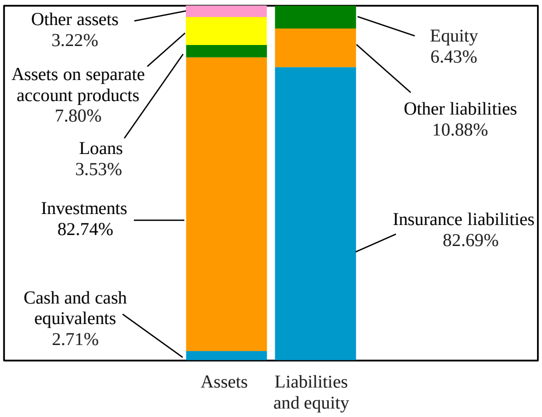
[50] Press release by Taiwan Ratings on December 14, 2023.

structure of the life insurance industry remained roughly unchanged at the end of 2023, as the top three companies in terms of assets held a combined market share of 54.67%.

Investment positions continued to grow

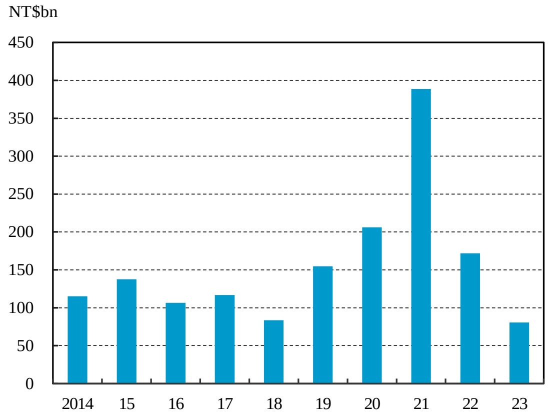
In terms of the usage of funds of life insurance companies as of the end of 2023, investments continued to take up the primary share of total assets, with the share rising to 82.74% owing to an increase in foreign investments.[51] As for the sources of funds, insurance liabilities accounted for the largest share of 82.69%. Meanwhile, the share of equity increased to 6.43% mainly owing to the reclassification of financial assets by some life insurers and a substantial reduction in unrealized valuation losses from financial assets (Chart 3.39).

Chart 3.39 Asset/liability structure of life insurance companies



Note: Figures are as of the end of 2023.
Source: FSC.

Chart 3.40 Net income before tax of life insurance companies



Source: FSC.

Pretax income slumped in 2023 but rebounded substantially in 2024 Q1

Life insurance companies reported a net income before tax of NT$80.6 billion in 2023, a considerable year-on-year decrease of 53.09% from NT$171.9 billion a year earlier (Chart 3.40). This mainly resulted from a huge drop in FX gains and a rise in hedging costs.[52] Their average ROE and ROA reached near 10-year lows after dropping to 4.20% and 0.24%, respectively, from 7.97% and 0.51% a year earlier (Chart 3.41). In 2024 Q1, driven primarily by improvements in FX gains and investment revenue, the net income before tax totaled NT$96.0 billion, indicating a significant increase from the same period of the previous year.

51 Foreign investments and domestic portfolio investments (including investments in insurance-related enterprises) made up 62.62% and 17.14% of total assets, respectively.

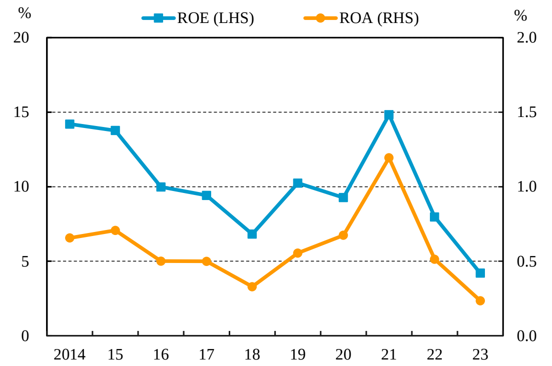
52 In 2023, the NT dollar depreciated by 0.09% against the US dollar compared to a depreciation of 9.83% in 2022, leading to a plunge of NT$1,275.1 billion in FX gains. Hedging costs in 2023 amounted to NT$360.2 billion, a rise of NT$210.6 billion or 140.78% compared to the previous year.

Average RBC ratio and equity to asset ratio both rebounded

At the end of 2023, mainly because of a marginally larger increase in total capital than in risk-based capital, the average RBC ratio slightly rose to 298.09% from 297.82% a year earlier (Chart 3.42).[53] Among life insurers, two life insurance companies were below the minimum statutory ratio of 200% (Chart 3.43).

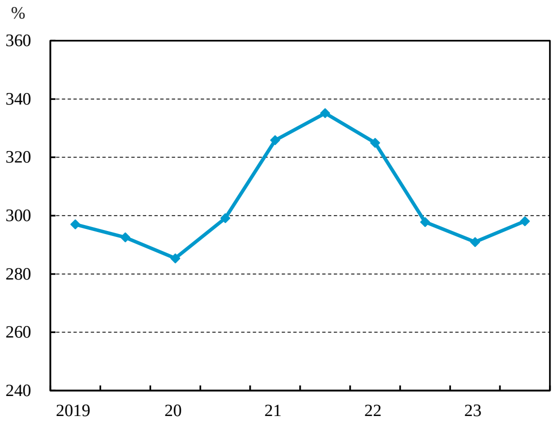
Furthermore, with some life insurance companies conducting financial asset reclassification, as well as a surge in US government bond prices and stock rallies, the average equity to asset ratio climbed to 7.12% at the end of 2023, much higher than the 5.27% registered a year earlier (Chart 3.44). Nonetheless, there was still one life insurance company with the ratio below the statutory minimum of 3%.

Chart 3.41 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 3.42 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.

Overall credit ratings remained stable

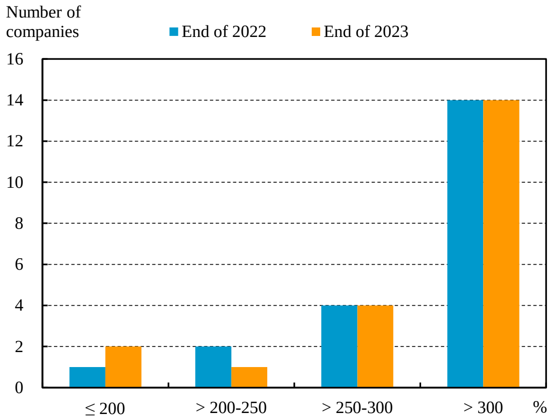
Among the 15 life insurance companies rated by credit rating agencies in 2023, only one was downgraded to twA- by Taiwan Ratings owing to its weakened profitability and a capital level below the industry average, while ratings for other companies remained unchanged. At the year-end, except for one company rated twA-, all the other life insurance companies maintained credit ratings above twA or its equivalent. Among them, the top three companies in terms of assets all retained twAA ratings, representing a strong capacity to meet their financial commitments. As for rating prospects, most of them were rated with a stable outlook, except for two being rated with a negative outlook.

Taiwan Ratings indicated[54] that life insurers' profitability in 2024 would continue to face

[53] Life insurance companies are required to report their capital adequacy ratio data to the regulatory authority every six months.
[54] Taiwan Ratings (2023), "2024 Taiwan Credit Outlook," December.

challenges, such as the elevation of FX hedging costs and the difficulty of timely disposal of investment positions amid drastic volatility in financial markets. As these factors could lead to weakening capital buffers, the rating outlook was maintained as negative.

Chart 3.43 Number of life insurance companies classified by RBC ratios

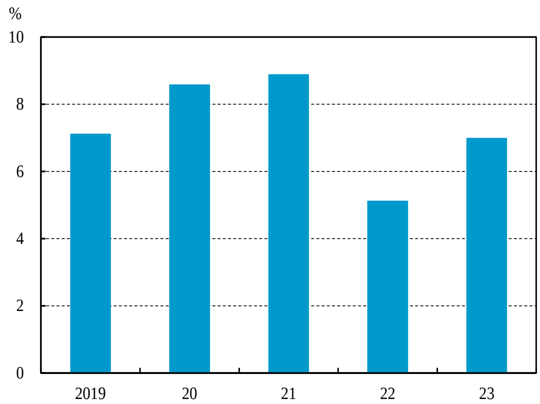


Source: FSC.

Foreign investment positions faced higher market risk

Foreign investment positions of life insurance companies grew continuously and reached NT$21.86 trillion at the end of 2023. Securities investments constituted the largest share, of which about 90% went to bills and bonds and 10% to equities. As the FOMC continued to be cautious about cutting interest rates, the future direction of its monetary policy remained uncertain. Additionally, the Russia-Ukraine war and ongoing tensions in the Middle East could affect the performance of domestic and foreign stock and bond markets. As a result, life insurance companies still faced higher equity risk and interest rate risk.

Chart 3.44 Equity to asset ratios of life insurance companies

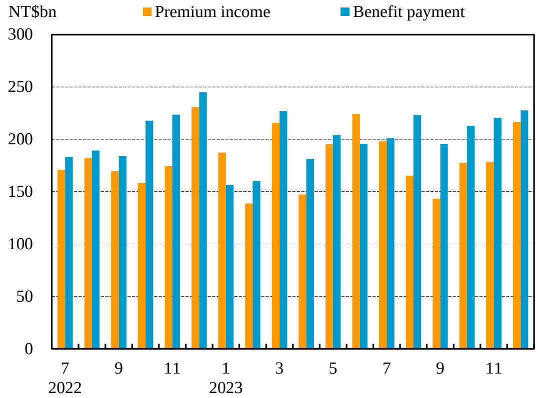


Notes: 1. Equity to asset ratio of 2023 is audited figure.
2. For assets, the assets of investment-linked insurance products in separate accounts are excluded.
Source: FSC.

Furthermore, more than 90% of foreign investment positions of life insurance companies were in US dollars. In order to alleviate the impacts of exchange rate fluctuations, life insurance companies actively used derivative financial instruments for FX hedging, as well as building up FX valuation reserves in compliance with the relevant regulations. However, as the FX risk inherent in large-value open FX positions of life insurance companies remained high, it warrants constant close attention. Given the recent surge in FX hedging costs for life insurance companies, the FSC amended the regulations related to FX valuation reserves in March 2023. These amendments aimed to help life insurers to improve exchange rate risk management in a more flexible manner and stabilize hedging costs, thereby strengthening their solvency and financial soundness.

Decline in premium income narrowed, but future cash flow changes warrant continuous monitoring

Chart 3.45 Premium income and benefit payment of life insurance companies



Note: Benefit payment includes maturity, survival repayment and termination.
Source: Taiwan Insurance Institute.

Affected by a slump in the sales of interest-sensitive policies and continued shrinkage in the sales of investment-linked annuities, the monthly premium income has been mostly lower than benefit payment since July 2022 (Chart 3.45). In 2023, premium income amounted to NT$2.19 trillion with a 6.27% year-on-year decrease, representing a more moderate decline than the 21.43% drop experienced the year before. After deducting benefit payment from premium income, the net cash outflow for the entire year was approximately NT$217.5 billion. Nevertheless, cash and cash equivalents reached NT$944.3 billion at the end of December 2023, which was sufficient to cover the cash outflows. Furthermore, the FSC actively monitored the cash flows of life insurance companies and relaxed the types of bonds and notes with reverse repurchase agreements (reverse repo) or repo agreements that insurance enterprises may engage in, which should help alleviate funding pressure on these companies. However, some life insurance companies have had their financial assets reclassified to be measured at amortized cost, which potentially limited their ability to realize the capital gains from bond investments.[55] Additionally, with benefit payment continuing to increase in 2024 Q1, it remains crucial to monitor the evolving cash flow dynamics of life insurance companies.

To smoothly transition towards the new generation solvency regime, large life insurance companies have been issuing long-term subordinated bonds

To enhance fundraising flexibility, the FSC relaxed the regulations on the issuance of long-term corporate bonds by the insurance industry in April 2023.[56] Large life insurance companies have successively issued long-term subordinated bonds since the second half of 2023, with a total issuance amount surpassing NT$105 billion for the year. This initiative was aimed at a

[55] In accordance with the FSC Insurance Bureau's meeting resolution on July 23, 2020, regarding the "Constant Materiality Standards for Early Sale of 'Financial Assets Measured at Amortized Cost (AC)'," the insurance industry is not allowed to sell AC bonds annually at a ratio exceeding 5% of the bonds initially classified as AC. Should this threshold be surpassed, from the following year until the implementation of IFRS 17 (i.e., before the effective date in 2025), no newly acquired bonds are permitted to be classified as AC assets.

[56] The primary amendment was to lift the restriction to allow insurers to issue long-term corporate bonds with maturities of 10 years or more, and to include these bonds in Tier 2 capital.

smooth transition toward compliance with the Insurance Capital Standard (ICS), as well as strengthening the financial structure, enriching self-owned capital, and improving the capital adequacy ratio of the insurance industry.

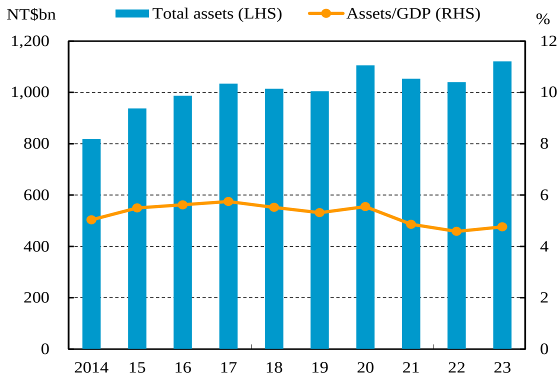
3.2.3 Bills finance companies

In 2023, the total assets of bills finance companies rose, along with an increase in their guarantee business. Meanwhile, the concentration of credit secured by real estate declined, and the quality of credit assets improved. Although profitability continued to subside and liquidity risk and interest rate risk were still high, the capital adequacy ratio went up.

Total assets increased

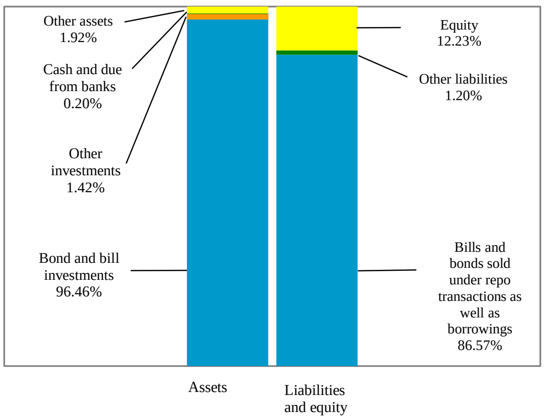
The total assets of bills finance companies stood at NT$1.12 trillion at the end of 2023, an increase of 7.84% compared to a year earlier mainly owing to greater investments in corporate bonds and in negotiable certificates of deposit. The ratio of their total assets to annual GDP rebounded to 4.76% over the same period (Chart 3.46).

Chart 3.46 Total assets of bills finance companies



Sources: CBC and DGBAS.

Chart 3.47 Asset/liability structure of bills finance companies



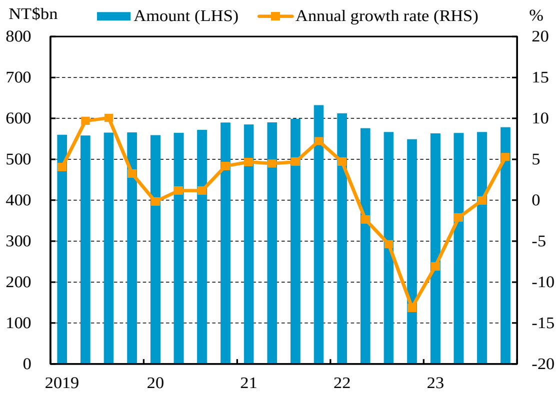
Note: Figures are as of the end of 2023.
Sources: CBC and FSC.

In terms of the asset and liability structure of bills finance companies, bill and bond investments constituted the largest share of 96.46% of total assets as of the end of 2023. On the liability side, bills and bonds sold under short-term repo transactions as well as borrowings accounted for 86.57% of total assets, while the proportion of equity increased to 12.23% (Chart 3.47). The asset and liability structure remained roughly unchanged compared to a year earlier.

Credit risk

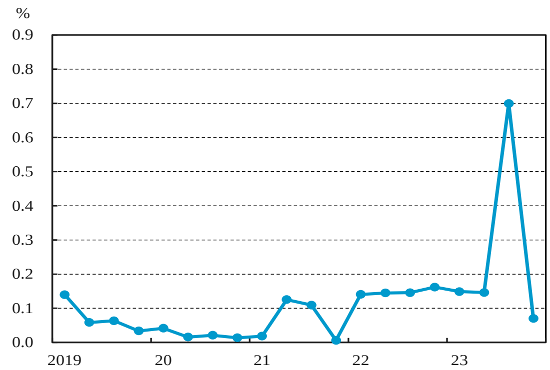
Guarantee liabilities increased, while the concentration of credit secured by real estate declined

Chart 3.48 Outstanding CP guaranteed by bills finance companies



Sources: CBC.

Chart 3.49 Guaranteed advances ratio of bills finance companies



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

The amount of CP guaranteed by bills finance companies registered NT$577.7 billion at the end of 2023 (Chart 3.48), increasing by 5.28% year on year. This was because of a lower base effect as bills finance companies reduced their risky asset positions for CP guarantees in the previous year to maintain an adequate capital ratio. Consequently, the average ratio of guarantee liabilities to equity increased to a multiple of 4.96 times, and the ratio for each company remained below the regulatory ceiling of 5.5 times.

At the end of 2023, guarantees granted to the real estate and construction industries decreased from 31.45% a year earlier to 29.48% of the total credit of bills finance companies. Among these, the proportion of real estate industry guarantees regulated by the FSC shrunk to 25.57%, still below the regulatory ceiling of 30%. In addition, the share of credit secured by real estate also decreased from 42.05% a year earlier to 38.78%. Considering the recent resurgence in domestic real estate market transactions, still-high house prices, and an increase in unsold newly built residential housing units, bills finance companies should monitor closely the above-mentioned impacts on the asset quality of mortgage-related credit.

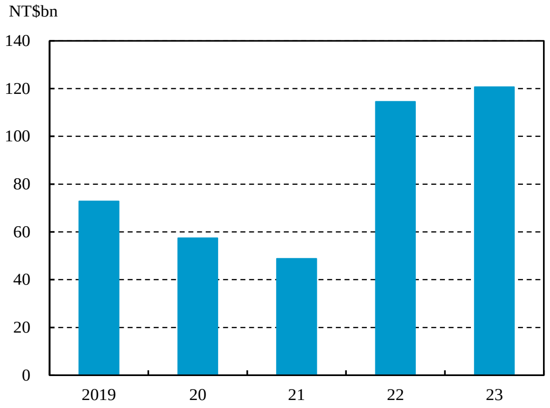
Guaranteed advances ratio declined, while credit quality improved

At the end of 2023, the guaranteed advances ratio of bills finance companies was 0.07% (Chart 3.49), reflecting improved credit quality. Consequently, the credit loss reserves to guaranteed advances ratio[57] increased to 18.68 times, with the provision sufficient to cover potential credit losses.

Investment in non-guaranteed CP issued by the leasing industry shrank, but its potential credit risk warrants attention

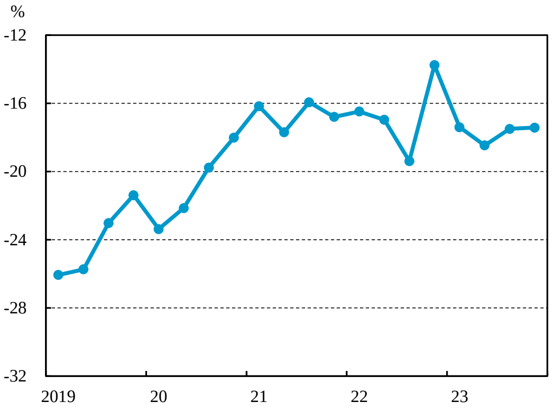
The non-guaranteed CP investment of bills finance companies stood at NT$120.7 billion at the end of 2023, representing an increase of 5.39% year on year (Chart 3.50). This was because the positions of their non-guaranteed CP had been increased to expand yield spreads between their long-term bonds and short-term reverse repos amid ample liquidity in the money market in the fourth quarter. Each company's ratio of non-guaranteed CP investment to equity remained below the self-disciplinary ceiling of 2 times.[58] However, the investment in non-guaranteed CP issued by the leasing industry kept decreasing, reaching NT$30.8 billion at the end of 2023. The leasing industry could pose a higher potential credit risk owing to the fact that it tends to rely on short-term sources for funding long-term investments, hence warranting close attention to such impact on the asset quality of bills finance companies.

Chart 3.50 Outstanding amount of non-guaranteed CP investments of bills finance companies



Source: CBC.

Chart 3.51 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 increased

The business models of bills finance companies are characteristic of deploying short-term funds for long-term objectives. At the end of 2023, more than 80% of their funding sources relied on short-term interbank borrowing and repurchase agreements with financial institutions,

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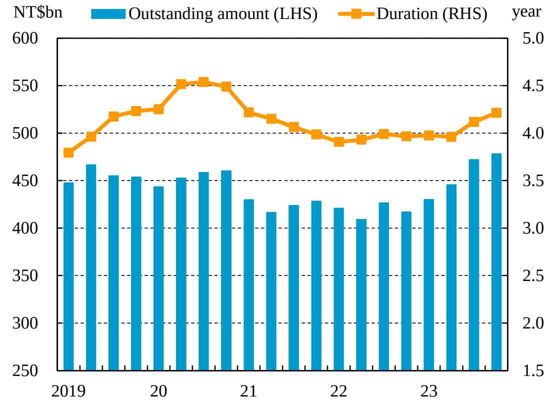
57 Credit loss reserves to guaranteed advances ratio = (provisions + loss reserves to guarantees)/guaranteed advances.
58 According to the *"Self-Disciplinary Rules for Members of the R.O.C. Bills Finance Association on Handling Non-Guaranteed Commercial Paper Transactions,"* a bills finance company shall hold non-guaranteed commercial paper (including those of state-owned enterprises) to no more than twice its net worth.

while more than 90% of their assets were invested in bills and bonds, 44.10% of which were long-term bonds, continually showing maturity mismatch between assets and liabilities. Nevertheless, the average ratio of 0-30 day maturity gap to total NTD-denominated assets increased further and registered -17.43% at the end of the year (Chart 3.51), highlighting an escalating liquidity risk.

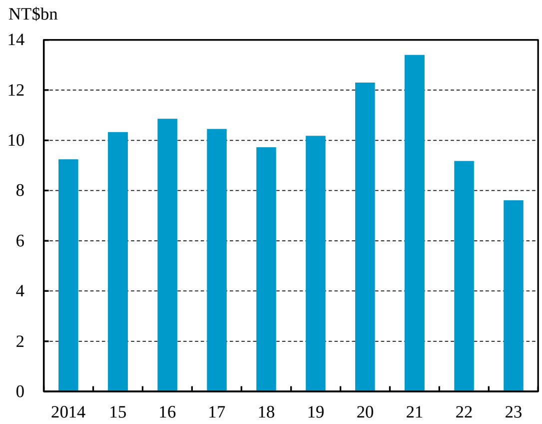
Moreover, the average ratio of major liabilities[59] to equity rose to 8.34 times at the end of 2023 because the expansion in bill and bond repo transactions conducted resulted in an increase in major liabilities and led to a higher degree of overall financial leverage. However, the leverage ratios of all bills finance companies stayed below the regulatory ceilings of 10 or 12 times.

Chart 3.52 Outstanding amount of fixed-rate bond investments and bond duration of bills finance companies



Source: FSC.

Chart 3.53 Net income before tax of bills finance companies



Source: CBC.

Interest rate risk of bond investments rose

In 2023, the outstanding amount of fixed-rate bond investments of bills finance companies increased by 14.65% to NT$478.0 billion with the average duration lengthening to 4.21 years (Chart 3.52). Although the Fed has adopted a more cautious stance towards interest rate cuts recently, if US government bond yields continue to stay at a high level, with the strong correlation of government bond yields between domestic and US markets, the interest rate risk of bond investments would still be high, meriting close attention.

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

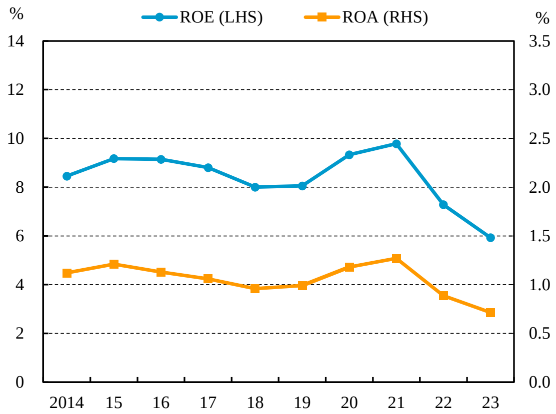
Profitability declined continuously

The net income before tax of bills finance companies decreased by 17.05% year on year to NT$7.6 billion in 2023 (Chart 3.53). This was due to a reduction in net interest income resulting from a narrowing yield spread by way of hoarding bills for arbitrage and an increase in reserves against guarantee liabilities. Thus, the average ROE and ROA decreased to 5.93% and 0.71% (Chart 3.54), respectively, reflecting declining profitability.

Average capital adequacy ratio rose

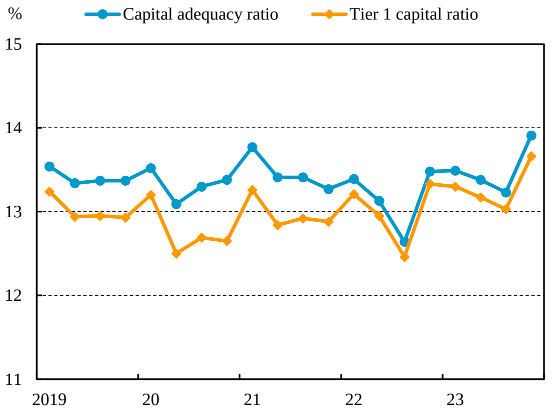
Benefiting from a decrease in unrealized valuation losses on investments in marketable securities and an injection of earnings, the average Tier 1 capital ratio and capital adequacy ratio rose to 13.66% and 13.91%, respectively, at the end of 2023 (Chart 3.55). The capital adequacy ratio stayed well above the statutory minimum of 8% for each company.

Chart 3.54 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.

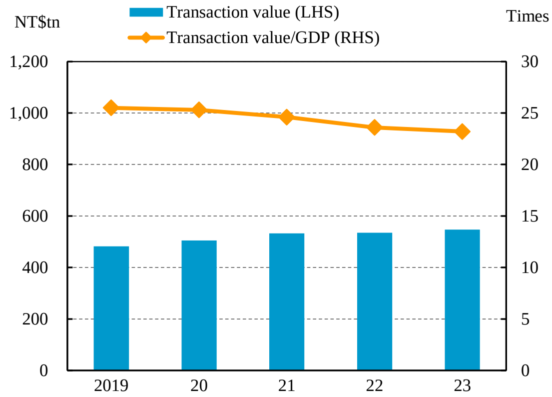
Chart 3.55 Average capital adequacy ratios of bills finance companies



Source: CBC.

3.3 Financial infrastructure

Chart 3.56 Funds transferred via the CIFS



Note: Figure for GDP in 2023 is published by DGBAS on May 30, 2024.
Sources: CBC and DGBAS.

In 2023, Taiwan's payment and settlement systems operated smoothly, and the shared infrastructure for retail payments was further strengthened, thereby promoting the development of electronic payments. Meanwhile, the FSC assisted Taiwan's insurance industry in aligning with international standards, continually promoted the early identification and assessment of climate change-related risks in the financial industry, enhanced the management of crypto asset platforms, and persistently amended regulations to facilitate the stable development of the financial sector.

3.3.1 Payment and settlement systems

In 2023, the operation of the CBC's CIFS and the FISC's IFIS both functioned smoothly, along with steady growth in their transaction values. The FISC continued to strengthen the shared infrastructure for retail payments. With an increase in the public's willingness to use e-payment instruments, consumer spending related to these instruments has also been expanding.

Overview of the CIFS's operation

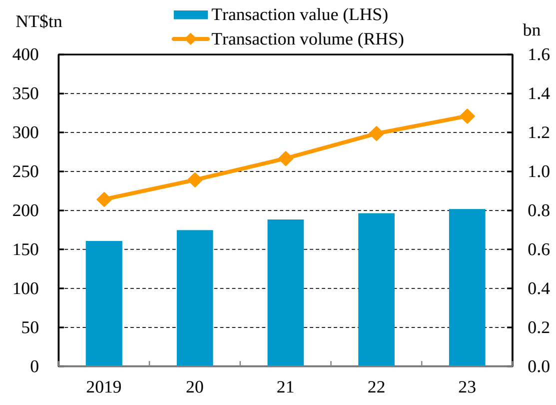
The CIFS deals with large-value fund transfers among financial institutions and the final settlements for domestic securities, bills, bonds, and retail payments. In 2023, the amount of funds transferred via the CIFS was approximately NT$547 trillion, nearly 23.2 times the size of the GDP for the year (Chart 3.56).

In terms of retail payments, they are primarily processed by the IFIS, which utilizes the funds deposited by financial institutions in the Interbank Funds Transfer Guarantee Special Account (hereinafter the Guarantee Account)[60] under the CIFS to clear and settle interbank payment

[60] The Guarantee Account, established jointly by financial institutions with the Central Bank, holds funds for clearing interbank transactions. When the public makes interbank withdrawals or transfers, the FISC system promptly deploys these funds to clear transactions between financial institutions.

transactions on a trade-by-trade basis.[61] In 2023, approximately 1.28 billion transactions were processed by the IFIS, with the value totaling NT$202 trillion (Chart 3.57), representing increases of 7.48% and 2.63%, respectively, compared to 2022.

Chart 3.57 Transaction value and volume processed by the IFIS

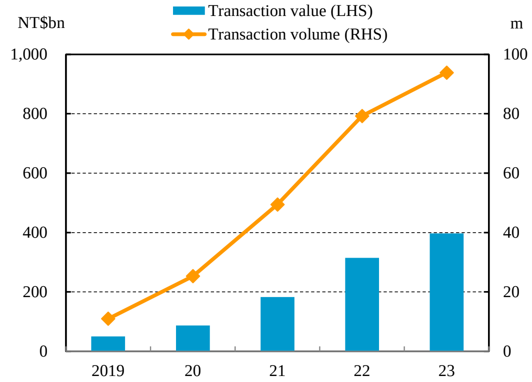


Source: CBC.

Development of shared infrastructure for retail payments

To enhance the convenience of using mobile payments for the public, the Bank had urged the FISC to establish a common QR Code payment standard, which had successively offered various functions such as transfers, bill payments, and shopping payments. From its launch in September 2017 to the end of 2023, 41 banks, nine e-payment institutions, and over 390,000 affiliated merchants had joined this initiative. The accumulated volume of transactions processed through this common standard exceeded 260 million transactions, with a total value of approximately NT$1.05 trillion. The value and volume of transactions in 2023 increased by 26.09% and 18.41%, respectively, compared to the previous year (Chart 3.58).

Chart 3.58 Transaction value and volume via QR Code payment standard



Source: CBC.

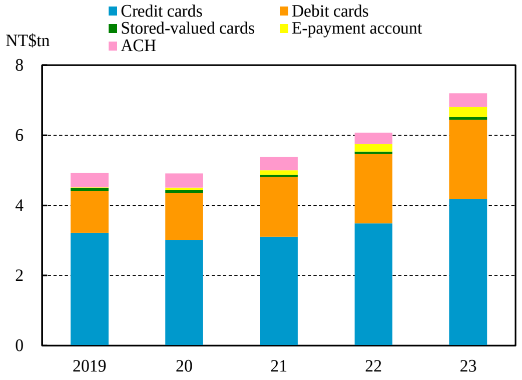
Additionally, to facilitate the interconnection of information flows and cash flows between banks and e-payment institutions, the FISC established a shared platform for cross-institution e-payments in October 2021. This platform subsequently added various functions, such as transfers, utility bill payments, and tax payments. In October 2023, the function of "e-payments for shopping" on the platform went live. Meanwhile, Taiwan's common QR Code payment standard was officially labeled as "TWQR." Through the apps of e-payment institutions, the public can seamlessly conduct transfers, bill payments, tax payments, and shopping transactions across different e-payment and financial institutions (Box 1).

[61] Interbank payment transactions include remittances, automated teller machine (ATM) withdrawals, transfers (including online and mobile transfers), tax payments and corporate funds transfers.

Domestic consumption via e-payment instruments

In 2023, the overall expenditure via e-payment instruments reached NT$7.21 trillion (Chart 3.59), an increase of 18.67% year on year. Among these payment instruments, spending via credit cards, debit cards, and e-payment accounts increased by NT$695.8 billion, NT$281.3 billion, and NT$83.6 billion, respectively. This growth can be mainly attributed to an enhancement in convenience of e-payments, supported by the continuous improvement of the shared infrastructure for retail payments.

Chart 3.59 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 interbank collection refers to the handling by payment institutions of funds deducted from and transferred to the relevant accounts through the ACH system of the TCH on behalf of customers.

Sources: CBC, FSC and FISC.

Box 1
Taiwan's common QR code payment standard

Riding the wave of rapid growth in electronic payments, a large number of payment institutions have entered the market, providing consumers with more diverse payment options. The payment function is an integral part of financial businesses, and promoting security and efficiency of the payment system helps sustain financial stability. Particularly, QR code payment has been increasingly popular in recent years. Many countries have successively launched national common QR code payment standards. Taiwan also established such a standard as early as 2017, allowing customers of different financial institutions to make payments and transfers via QR codes, thereby contributing to a more convenient and secure mobile payment environment.

1. Many countries have launched common QR code payment standards

Payment services exhibit "network effects," where the more people use the services, the higher the value for themselves. Therefore, payment services should be made as accessible as possible to take full advantage of network effects. However, considering operating profits and business competition, payment institutions tend to develop independent, closed and non-interoperable systems individually, which only serve their own customers and provide no cross-institutional services, leading to a phenomenon of "fragmentation" in the payment market. Not only does it cause inconvenience for users but hinders healthy competition in the market. Over time, the market may even be dominated by a small number of payment institutions, thus becoming monopolistic or oligopolistic, which is detrimental to healthy market development. In addition, in a fragmented market structure where payment institutions are allowed to develop their own systems separately without collectively adopting secure and efficient common platforms and standards, once an anomaly or failure occurs in the system of a payment institution, it could disrupt the operation of the payment market as a whole and impact financial stability, and would potentially be more serious if it's one of the few dominant payment institutions.

In order to bring the network effects of payment services into full play, preserve the long-term competitiveness in payment markets, and ensure financial stability, international efforts have been aimed at actively implementing policies to enhance the interoperability of payment systems, mainly by urging payment institutions to adopt secure and efficient common platforms and standards. Therefore, aside from establishing retail "fast payment systems"[1] to provide real-time settlement services year-round by integrating the movement of messages and funds among various payment institutions on the back end, many countries have recently also introduced national standardized QR code payment standards on the front end of payment interfaces (Table B1.1).[2] These initiatives have addressed challenges such as incompatible QR code specifications that hindered interoperability, where merchants had to interface with individual payment institutions, leading to increased operational costs and inconvenience for the public to identify and use.

Table B1.1 Launch of common QR code payment standards in selected countries in recent years

Country/ jurisdiction	QR standard	Time of launch
India	BharatQR	September 2016
Taiwan	TWQR	September 2017
Thailand	Thai QR	October 2017
Singapore	SGQR	September 2018
Hong Kong	HKQR	September 2018
Indonesia	QRIS	August 2019
Australia	NPP QR Code Standard	June 2019
Malaysia	DuitNow QR	July 2019
Japan	JPQR	August 2019
Philippines	QR Ph	November 2019
Vietnam	VietQR	June 2021

Sources: Yulius et al. (2023) and websites of selected countries.

2. Development of Taiwan's common QR code payment standard

While other countries only began to launch fast payment systems in recent years (for example, the FedNow service introduced by the US in 2023), Taiwan established the IFIS, operated by the FISC, as early as in 1987. Later, the IFIS began to offer 24-hour payment services in 1991. Then, coordinated efforts among financial institutions led by the FISC were made to introduce the common QR code payment standard in September 2017, which preceded those in many neighboring countries, and enabled financial institutions' customers to make payments and transfers by scanning QR codes.

In October 2021, the FISC established a shared platform for cross-institution e-payments to facilitate the interconnection of information and cash flows between e-payment institutions, as well as between financial institutions and e-payment institutions, which further expanded the scope of retail fast payment services. This platform subsequently served various additional functions, such as cross-institutional e-transfers, e-payments for taxes and utility bills. In October 2023, the function of e-payments for shopping went live on the platform. Meanwhile, Taiwan's common QR code payment standard was officially labeled as "TWQR" (Chart B1.1), and the FISC collaborated with financial institutions as well as e-payment institutions to jointly promote TWQR on the platform, marking the beginning of participation by both financial institutions and e-payment institutions in the TWQR payment ecosystem.

Chart B1.1 TWQR label

Source: Official TWQR website.

3. Future development of TWQR

In the future, the FISC will continue to extend the usage scenarios of TWQR, including facilitating its adoption by the transportation industry so that the public can use TWQR on e-payment or mobile banking apps when taking public transportation. Furthermore, in December 2021, the FISC teamed up with its Japanese counterpart and launched a TWQR-based cross-border e-payment for shopping services, which was later expanded to South Korea in January 2024. Taiwanese citizens are expected to benefit from enhanced security and convenience of mobile payment through this service when traveling abroad.

Notes: 1. A fast payment system refers to a system in which the transmission of the payment message and the availability of the final funds to the payee occur in real time or near real time on a 24/7 basis. For more detail, please see Bech, Morten and Jenny Hancock (2020), "Innovations in Payments," *BIS Quarterly Review*, March.

2. See Yulius, Davids Tjhin et al. (2023), "Interoperable QR Code Payment Ecosystem in ASEAN: What It Means for the World," BCG and ASEAN Business Advisory Council, September.

3.3.2 Taiwan set out to align with IFRS Sustainability Disclosure Standards

To increase comparability of cross-country sustainability information and prevent greenwashing, the IFRS Foundation's International Sustainability Standards Board (ISSB) issued IFRS Sustainability Disclosure Standards S1 General Requirements for Disclosure of Sustainability-related Financial Information and S2 Climate-related Disclosures in June 2023. The above-mentioned standards require an entity to provide sustainability disclosures about governance, strategy, risk management, and metrics and targets. Among them, IFRS S1 emphasizes the connection between sustainability information and financial statement information, including the consistency of reporting entity, materiality criteria, and disclosure timing. S2 highlights that an entity should develop transition plans, use climate-related scenario analysis to assess its climate resilience, and disclose climate-related information relevant to the cross-industry and industry-based metrics and targets, as well as the targets set by itself.

After gathering stakeholder feedback, the FSC released the Roadmap for Taiwan Listed Companies to Align with the IFRS Sustainability Disclosure Standards in August 2023, which aimed for direct adoption of the IFRS Sustainability Disclosure Standards.[62] According to the Roadmap, starting from 2026 (financial year), the FSC will take a phase-in approach for listed companies to adopt the IFRS Sustainability Disclosure Standards in three phases depending on capital size.[63] Moreover, in line with the spirit of information connectedness between S1 and disclosures in the financial statements, listed companies are required to disclose sustainability information in a dedicated chapter in their annual reports and to publish ahead of time the sustainability information in concurrence with their financial statements. Meanwhile, the FSC also set up a task force to promote the adoption of the IFRS Sustainability Disclosure Standards to help companies with smooth adoption of the Standards.

3.3.3 The Bank and the FSC strengthened the research and action related to climate change scenario analysis of the banking industry

Since the release of the CBC Strategic Plan to Address Climate Change Issues in December 2022, the Bank has initiated research on climate risk assessment and measurement methodologies. The international practices and experiences of major economies (e.g., the US,

[62] Starting from 2026, the initial application of IFRS Sustainability Disclosure Standards will include S1 and S2, and the FSC will continue assessing and endorsing each upcoming set of standards issued by the ISSB, based on the development of IFRS Sustainability Standards.
[63] Listed companies with capital over NT$10 billion, over NT$5 billion and less than NT$10 billion, and other listed companies will be required to adopt from 2026, 2027, 2028, respectively.

UK, EU, France, Japan and Australia) in developing climate risk-related macro-stress tests have been collected and studied to serve as an important reference in the future.

Meanwhile, to review the risks and capabilities of the domestic financial industry, the FSC required domestic banks to disclose climate-related financial information from 2023 onwards. Furthermore, the FSC took climate-related factors into account for prudential supervision in the Green Finance Action Plan 2.0. It also commissioned the BAROC to develop a climate change scenario analysis module applicable to all domestic banks.

Following international practices, the aforementioned module assumes three stress scenarios (Table 3.3) covering two physical risk factors (i.e., extreme torrential rain /flood and drought) and one transition risk factor (i.e., carbon price). Risk assessment for all the three scenarios is made for two horizons, 2030 and 2050, using bottom-up and static balance sheet approaches for analysis.

Table 3.3 Scenarios used in domestic banks' climate change scenario analysis modules

Scenarios	Corresponding scenarios	Analysis objectives
Orderly transition	The NGFS Net Zero 2050 scenario and the IPCC RCP 2.6 scenario	To assess the potential risks of the gradual implementation of global transition policies to achieve net zero emissions by 2050
Disorderly transition	The NGFS delayed transition scenario and the IPCC RCP 2.6 scenario	To assess the potential risks of meeting the 2050 net zero emissions target despite the delayed transition
No policy	The NGFS current policies scenario and the IPCC RCP 8.5 scenario	To assess the potential risks of no transition policies (only physical risks in this scenario)

Notes: 1. The corresponding scenarios in this Table refer to the NGFS Phase II and IPCC AR5 scenarios.
2. Based on the severity of climate change at the end of the century, the IPCC AR5 scenarios divide the trends of greenhouse gas concentrations into Representative Concentration Pathway (RCP) 8.5, RCP 6.0, RCP 4.5 and RCP 2.6 scenarios, where the RCP 8.5 scenario represents no transition policies and the highest physical risks, and the RCP 2.6 represents the most aggressive transition scenario to control carbon emissions.

Source: FSC.

The banking industry completed a pilot climate change scenario analysis in 2023 and reported their results. In the "deployment" aspect of the Green Finance Action Plan 3.0, the FSC planned to urge individual financial institutions to conduct and modify their stress tests or scenario analyses associated with climate change. In 2024, the BAROC was commissioned to further improve the existing scenario analysis modules, including how to incorporate the scenarios of the Network for Greening the Financial System (NGFS) Phase IV and of the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) into the existing modules, so as to improve the granularity of the modules and make the assessment more closely represent the real situation.

3.3.4 The FSC announced transitional measures for the adoption of IFRS 17 and TW-ICS for insurers

In order to assist domestic insurers to smoothly adopt the IFRS 17 (Insurance Contracts) and the new-generation solvency regime for the insurance industry, referred to as TW-ICS, by 2026, the FSC has successively released transitional measures aligned with the international system. In July 2023, the FSC devised the localization and transitional measures pertaining to the adoption of market risk components within TW-ICS, specifically addressing equity, real estate, and policy-based infrastructure for insurers (as shown in Table 3.4).

Table 3.4 The investment items for the adoption of the localization and transitional measures aligned with TW-ICS

Investment items	RBC risk factor	TW-ICS risk factor
Stocks listed on TWSE/TPEx	TWSE stocks: 21.65% TPEx stocks: 30%	35% (Average increment and alignment over 15 years starting from 2026)
Real estate	7.81%	15% (Average increment and alignment over 15 years starting from 2026)
Policy-based infrastructure	1.28%	Years 2026-2030: 1.28% (Localized risk factor will be separately mulled with reference to international standards and local conditions, by an average increment over 10 years)

Source: FSC.

Furthermore, the FSC proposed an interest rate shift measure for the adoption of IFRS 17 and Phase 2 transitional measures of TW-ICS by insurers in November 2023. The content of the measure included the following: (1) a 50 bps illiquidity premium is given to liability discount rates on interest rate policies with reserve rates above 6% or higher (i.e., high interest rate policies); (2) setting a 15-year phase-in period starting from the date of TW-ICS adoption (i.e., 2026) for insurers to increase through linear increment the interest rate risk factor from 50% of the TW-ICS risk factor to 100%; (3) allowing insurers to recognize the net asset effect (i.e., the net effect resulting from the recognition of assets and liabilities at fair value) in a 15 year period starting from the date of adoption.

To encourage domestic insurers to continuously improve their financial and business development and asset-liability management capabilities, the FSC proposed Phase 3 localization and transitional measures, as well as differentiated management measures in April 2024 as follows: (1) allowing callable bonds, held by insurers prior to the end of 2023, to be included in eligible assets; (2) allowing insurers to linearly increase their capital charge for emerging risks[64] (including longevity, policy surrender, expenses and catastrophe risks) from 0% to 100% over the course of 15 years; (3) adding a support measure of increasing insurer's asset allocation flexibility and an incentive measure of decreasing the risk factor for insurers who endeavor to increase both capital and the contractual service margin (CSM), so as to help insurers gradually align with international standards.

In the future, the FSC will conduct system reviews based on the actual implementation status of insurers every 5 years after the adoption of TW-ICS. In addition, the FSC will continue to pay attention to the latest development of international systems as published by the International Association of Insurance Supervisors (IAIS) and will accordingly adjust and review the relevant systems in a timely manner.

3.3.5 Strengthening the management of platforms involving crypto assets and digital lending

In light of foreign crypto asset service providers successively filing for bankruptcy in recent years, such as the collapse of the crypto asset exchange FTX in November 2022 that took a financial toll on domestic investors, the Executive Yuan designated the FSC as the competent authority for platforms involving financial investments or payment-related crypto assets in March 2023. Accordingly, the FSC released the *Guiding Directions for the Administration of Virtual Asset Platform or Transaction Service Providers (VASPs)* (hereinafter the *Guiding Directions*) in September 2023. The *Guiding Directions* covers transaction information transparency, the methods for custody of customer assets, VASP internal controls and audits, and assistance from external experts.[65] Moreover, the FSC encouraged VASP-related industry associations to formulate self-disciplinary rules in compliance with the aforementioned *Guiding Directions*, so as to lead VASPs to strengthen internal controls and thereby enhance protections for the rights and interests of their customers. In addition, the *Guiding Directions* confine virtual assets, which can be issued through the platforms, to non-stablecoins first. Should stablecoins be used widely as payment tools, they could influence Taiwan's currency sovereignty, monetary and FX policies, and financial stability. In this view, the management of domestic stablecoins will be discussed as appropriate in the future.

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64 Longevity risk refers to the risk of adverse effects such as insufficient premium income and inadequate reserves resulting from average life expectancies exceeding expectations. Policy surrender risk refers to the risk of policies becoming invalid or being surrendered prematurely.

65 The *Guiding Directions* consists of 10 items, including (1) management of crypto assets issuance; (2) review procedures for listing and delisting of crypto assets; (3) separate custody of VASP assets and customer assets; (4) transaction fairness and transparency; (5) making contracts, advertising solicitation, and complaints handling; (6) operating systems, information security, and cold/hot wallet management; (7) information disclosures; (8) internal control systems and institutional audits; (9) individual VASPs; and (10) foreign VASPs.

Moreover, after reviewing relevant domestic operational practices and taking reference at regulatory requirements internationally, the FSC issued the *Guidelines for Peer-to-Peer Lending Platform Operators* (hereinafter referred to as the *Guidelines*) in October 2023. The *Guidelines* serve as a reference for P2P platform operators in conducting business, for financial institutions and platform operators in engaging in business transactions, and for consumers in assessing and choosing transaction platforms. The primary scope covered by the *Guidelines* is as follows: (1) stipulating that services provided by a P2P operator may not involve any financial business for which special approval is required, such as accepting deposits or receiving stored funds; (2) risk management mechanisms to be adopted by P2P operators, such as a real-name account system for borrowers and lenders, segregation of P2P operators' own funds from customer funds, control of borrowing caps, and measures to prevent illegal activities; (3) consumer protection measures required of P2P operators, such as a mechanism for confirming the veracity of creditor claims, protection of personal data, information disclosure, security of data transmission, and customer dispute handling mechanisms. Furthermore, in order to assist P2P operators in enhancing their risk management mechanisms and consumer protection measures, the FSC mandates that financial institutions should understand P2P operators' actual situation in operation, assess their risks, and conduct anti-money laundering reviews when engaging in transactions (e.g., deposits, loans, payment services, and fund custody) with them.

3.3.6 The FSC published the core principles and guidelines for AI applications of financial institutions

In recent years, financial institutions have increasingly used AI. Although AI technology brings benefits to financial institutions and consumers, it has also given rise to many problems and risks. Consequently, how to appropriately supervise AI usage to ensure consumer rights and financial stability has become a key issue for supervisory authorities around the world. In order to help financial institutions leverage the benefits of AI technology while effectively managing related risks, international organizations and major central banks have successively proposed regulatory requirements or guidelines for the use of AI by financial institutions. The FSC also published the *Core Principles and Policies for AI Applications in the Financial Industry* in October 2023, which outlined six core principles and eight supporting policies. In December 2023, the FSC released a draft of the *Guidelines for AI Applications in the Financial Industry* based on the aforementioned six principles. The aforementioned draft *Guidelines* lay out the key points and feasible measures to serve as a reference for financial institutions to follow when using AI, so as to encourage them to introduce, use and manage AI systems in the context of controllable risks (Box 2).

Box 2
Potential risks and supervision trends in the use of artificial intelligence (AI) technology by financial institutions

In recent years, financial institutions have increasingly used artificial intelligence (AI). AI technology can effectively improve operational efficiency and customer service experience and thereby benefit financial institutions and consumers, but it may also pose problems such as financial exclusion,[1] privacy infringement, black box operations, high outsourcing concentration and herd behavior, which could affect financial stability. Therefore, while AI technology innovation is encouraged, how to appropriately regulate AI to ensure consumer rights and stability of the financial system has become an important issue for supervisory authorities across the world. The following section briefly describes the benefits and potential risks of AI, introduces the international trends in the supervision of the use of AI in the financial industry, and gives account of Taiwan's policies and guidelines for AI usage in financial institutions devised by referencing international supervision trends.

1. Benefits and potential risks of AI

At present, there is no consistent definition of AI accepted by supervisory agencies around the world. The most commonly cited one is from the Financial Stability Board (FSB):[2] "the theory and development of computer systems able to perform tasks that traditionally required human intelligence." Generative Artificial Intelligence (GenAI), which has been booming recently, refers to related AI systems that can generate content simulating human intelligence. The content in GenAI includes articles, images, audio, videos, and program codes, but it is not limited to the above-mentioned applications.

AI technology can process large amounts of data quickly through strong computing power and produce great benefits such as improving forecasting capabilities, optimizing operations and customizing services. Related applications include automating internal processes, analyzing customer information to provide customized suggestions, and streamlining the processes of customer services through technologies such as facial recognition and image recognition. GenAI technology, which has emerged in recent years, has also brought substantial changes to human life. People are able to obtain results in a very short time by simply inputting their needs and related data into the GenAI system, significantly reducing manual work time.

Although the use of AI technology has many benefits, its applications in the financial industry may bring about the following potential risks, which, if not properly supervised and managed, could harm financial consumer rights and financial stability.

(1) For financial consumers: There are concerns such as breach of personal privacy, bias or discrimination in prediction results.

(2) For financial institutions: They face risks such as AI black-box operations, unclear responsibilities, and concentration in operations outsourced to a limited number of third-party providers.

(3) For financial markets: AI applications such as high-frequency program trading may cause herd behavior or increase market connectivity.

In addition, “The Global Risk Report 2024”[3] (hereinafter referred to as the Report) released by the World Economic Forum (WEF) in January 2024 listed “AI-generated misinformation and disinformation” as the second largest risk in the world in 2024 and the top risk in the next two years. The Report pointed out that if AI is not properly managed and thus misused, it might cause concerns such as hate crimes and terrorism, loss of job opportunities, crime and cyber-attacks, prejudice and discrimination, and even impact the global political system, economic markets and national security.

2. International supervisory trends in the use of AI in the financial industry

As the use of AI in the financial industry becomes increasingly popular, how to regulate it appropriately to safeguard consumer rights and financial stability has caused greater attention from international organizations and financial authorities around the world. In 2019, the Organization for Economic Cooperation and Development (OECD) first proposed the “Recommendation of the Council on Artificial Intelligence,”[4] listing five important principles, including: (1) inclusive growth, sustainable development and well-being, (2) human-centered values and fairness, (3) transparency and explainability, (4) robustness, security and safety, and (5) accountability. The five principles have been adopted by the G20 members. Since then, international financial organizations have successively issued supervisory recommendations for AI usage by financial institutions, and the EU has passed the *Artificial Intelligence Act*. Major countries have also successively proposed supervisory principles or guidelines for AI applications by taking reference from the recommendations of international organizations.

2.1 International financial organizations proposed principles or recommendations for the use of AI by financial institutions

The International Organization of Securities Regulators (IOSCO) issued a guidance document in September 2021,[5] proposing six supervisory measures for the use of AI by market intermediaries and asset management institutions. The six measures included requiring financial institutions to: (1) establish appropriate governance, control and supervision structures; (2) continuously monitor the development, testing, operation and performance of AI; (3) ensure that personnel have sufficient knowledge, skills and experience to use and supervise the outputs from AI systems; (4) understand their dependence on third-party AI service providers and establish appropriate management and supervision mechanisms; (5) provide sufficient transparency and information disclosure to investors, competent authorities and stakeholders; and (6) establish appropriate control mechanisms to ensure that bias in data and system performance is minimized.

Moreover, the Financial Stability Institute (FSI) under the BIS released an AI supervision report in August 2021,[6] recommending that financial supervisory agencies should adopt AI-related supervision measures based on four principles: (1) transparency, (2) trustworthiness and soundness, (3) accountability, and (4) fairness and ethics, and should consider proportionality. The report also recommended that the use of AI in the financial sector should be divided into two categories based on whether it interacts with customers. For AI systems that face customers, supervisory agencies should adjust the intensity of supervision based on the systems' impacts on consumers (for instance, chatbots have a lower impact and credit scores have a higher impact). If AI systems do not face customers, supervisory agencies should strengthen supervision of systems requiring approval (such as statutory capital adequacy assessment), while adopting moderate supervision of those without requirement (such as internal operations).

2.2 Major countries/regions published supervision principles or guidelines for AI applications in the financial industry

In December 2023, the EU passed the *Artificial Intelligence Act*,[7] dividing AI systems into four supervision levels according to risk levels. The government can supervise AI systems with specific risk levels when necessary and should appropriately retain space for technological innovation. The four supervision levels are as follows: (1) unacceptable risk level, (2) high risk level, (3) limited risk level, and (4) low risk level: not subject to mandatory regulation.

Many developed countries or regions, such as the US, the UK, Singapore, Hong Kong, France, and the Netherlands, have issued relevant principles or guidelines for AI applications in the financial sector, taking into account the recommendations of international organizations. These guidance documents include five common principles: (1) reliability and robustness, (2) accountability, (3) transparency, (4) fairness, and (5) ethics. The first three principles are similar to the traditional model supervision concepts, allowing supervisory agencies to fine-tune based on the standards of traditional models. The principles of "fairness" and "ethics," whose concepts are to prevent AI models from producing discriminatory or biased results, may require newly-formulated standards. Moreover, "data privacy," "third-party dependency," and "operational resilience" are also key concerns in many guidance documents.

In addition, in order to establish a risk management framework for the use of GenAI in the financial industry, the Monetary Authority of Singapore (MAS) released an executive summary of the "Emerging Risks and Opportunities of GenAI for Banks" whitepaper in November 2023,[8] which is the world's first guidance document for GenAI applications in the financial industry. The whitepaper covered seven dimensions of risks while using GenAI in the financial industry: (1) fairness and bias, (2) ethics and impact, (3) accountability and governance, (4) transparency and explainability, (5) legal and regulatory, (6) monitoring and stability, and (7) cyber and data security, aiming to enable the banking industry to use GenAI in a responsible manner. The MAS will gradually apply the seven-dimension risk framework to the entire financial system in the future.

3. Taiwan's FSC also looked at related international principles and published the core principles and guidelines for AI applications in the financial industry

According to a survey conducted by the FSC in May 2023, about 36% (63 financial institutions) of the 175 financial institutions surveyed have adopted AI technology. The application fields included customer relationship management (such as intelligent customer service), risk management and legal compliance (such as suspicious transaction analysis), process optimization (such as back-office process automation), and data analysis. As for GenAI applications, most financial institutions and related units were in the evaluation stage. Only a few planned to introduce GenAI into their financial business or internal operations, but these plans have not yet been officially executed.

In order to assist financial institutions leverage the advantages of AI technology and effectively manage potential risks therefrom, the FSC, taking into account the recommendations of international organizations such as the OECD, released the *Core Principles and Policies for AI Applications in the Financial Industry* in October 2023,[9] which outlined six core principles for the use of AI in the financial industry, including: (1) establishing governance and accountability mechanisms; (2) emphasizing fairness and human-centric values; (3) safeguarding privacy and customer rights; (4) ensuring system robustness and security; (5) emphasizing transparency and explainability; and (6) promoting sustainable development. The document also included eight supporting policies, such as formulating guidelines, adjusting regulations, and supervising the development of self-regulatory norms.

In addition, the FSC further issued a draft of the *Guidelines for AI Applications in the Financial Industry* (hereinafter referred to as the *Guidelines*) in accordance with the six core principles mentioned above in December 2023. Based on the AI life cycle[10] and the assessed risks, the *Guidelines* proposed key concerns and feasible measures so as to encourage financial institutions to introduce, use, and manage AI systems under the premise of controllable risks. The regulatory direction of the *Guidelines* is broadly the same as the FSI and IOSCO recommendations and the practices of major countries. The FSC also called for relevant associations in the financial industry to formulate new self-disciplinary rules for AI by consulting the FSC's *Guidelines*, or to incorporate the concept into their existing rules.

4. Conclusion

AI technology has great potential in improving the efficiency of financial services, promoting financial inclusion, and deepening customer relationships. However, it should be used properly, and potential risks need to be sufficiently addressed to safeguard consumer rights and financial stability. In response to the increasing influence of AI on the financial system, the FSC has taken into account the recommendations of international organizations and the practices of major countries to gradually strengthen the supervision of AI usage in the financial industry. Based on macro-prudential supervision purposes, the Bank will continue to pay close attention to the development of international supervision, and study and analyze the application and possible impact of AI in the domestic financial industry to ensure a balance between the benefits and risks of AI applications so as to maintain sound development of the financial sector.

Notes: 1. Financial exclusion refers to the phenomenon of economically disadvantaged groups being unable to access mainstream financial products and services. Take credit granting for example: groups that are underrepresented in the AI model dataset may find it difficult to obtain a favorable credit score because the model has learned that these applicants did not obtain enough loans in the past.
2. FSB (2017), "Artificial Intelligence and Machine Learning in Financial Services," November.
3. WEF (2024), "The Global Risks Report 2024," January.
4. See OECD (2019), "Recommendation of the Council on Artificial Intelligence," May. In May

2024, the OECD proposed an updated version. See OECD (2024), "Recommendation of the Council on Artificial Intelligence," May.

5. IOSCO (2021), "The use of artificial intelligence and machine learning by market intermediaries and asset managers," September.
6. Jermy Prenio and Jeffery Yong (2021), "Humans keeping AI in check – emerging regulatory expectations in the financial sector," *FSI Insights on policy implementation No. 35*, BIS, August.
7. Council of the European Union (2024), "Artificial Intelligence Act," January.
8. MAS (2023), "Emerging Risks and Opportunities of Generative AI for Banks – Executive Summary," November.
9. FSC (2023), "Core Principles and Policies for AI Applications in the Financial Industry," October.
10. The life cycle of an AI system can be divided into four stages: (1) system planning and design, (2) data collection and input, (3) model establishment and verification, and (4) system deployment and monitoring.

3.4 General assessment of Taiwan's financial system

From the beginning of 2023 onwards, various factors such as the banking crises in the US and Europe, ongoing tightening monetary policies by major central banks, a downturn in China's real estate market, and the heightened geopolitical risks from the Israel-Palestine conflict, have caused significant turbulence in global financial markets. Nonetheless, the abovementioned impacts on Taiwan's financial system have been relatively moderate.

In Taiwan's financial markets, the outstanding amount of bill issuance expanded, and that of bond issuance reached a historical high. The secondary markets for bills kept growing, while the bond trading volumes remained roughly unchanged. The stock indices fluctuated upward, repeatedly hitting historical highs, with volatility rising after falling, and saw brisk trading. The FSC has successively adopted relevant supervisory measures to address issues in the ETF market. Meanwhile, the foreign exchange market reported an increase in trading volumes and the NT dollar exchange rate remained relatively stable.

Regarding financial institutions, domestic banks' asset quality improved, and their profits reached a new high. The capital adequacy ratio continued to rise with liquidity risk remaining relatively low. Yet, the overhang of hiking loan rates and the clearance of unsold newly built residential houses on banks' real estate credit quality deserves close attention. Meanwhile, insurance companies' profitability recovered from a substantial decline, accompanied by an improvement in their average capital adequacy ratio. Nonetheless, they faced higher market risk in foreign investment positions. On the other hand, considering that insurers' premium income was mostly lower than insurance benefits, their future cash flows are worthy of continual close attention. Bills finance companies' guarantee business recovered and the concentration of credit secured by real estate declined; however, they saw substantial reductions in profitability, along with higher liquidity and interest rate risks.

The domestic payment and settlement systems operated smoothly and the shared infrastructure for retail payments was further strengthened. In order to promote sustainable financial development, the FSC advanced climate change scenario analysis in domestic banks, released the adoption of IFRS Sustainability Disclosure Standards in Taiwan, and strengthened self-management of platforms involving crypto assets and digital lending. Moreover, the FSC launched the policies and guidelines for AI applications of financial institutions so as to enhance transaction security and effectively manage risks.

Overall, financial markets in Taiwan kept functioning smoothly, with financial institutions maintaining robust operations, and domestic systemically important payment systems functioning in an orderly manner. In general, the financial system remained stable.

Nevertheless, some direct and indirect effects on the financial markets and financial institutions, which could arise from factors such as the trajectory of major central banks' monetary policies, geopolitical risks, the spillover effect of economic downturn in China, global economic fragmentation and climate change risks, deserve closer attention.