Central Bank of the Republic of China (Taiwan)

Financial Stability Report

May 2021 | Issue No. 15

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About the Financial Stability Report

Key points of the task to promote financial stability

Promoting financial stability not only is one of the operational objectives pursued by the Central Bank of the Republic of China (Taiwan), but also lays the cornerstone for the effective implementation of monetary policy. To achieve this objective, in addition to serving as lender of last resort when necessary, the Bank regularly monitors the financial system and the overall economic and financial environment. This allows it to be constantly aware of the potential vulnerabilities and risks that could threaten financial stability so that the relevant financial authorities and market participants can respond in a timely manner to avoid financial turbulence.

In its work to promote financial stability, the Bank focuses primarily on the risks that could affect the stability of the overall financial system. Nevertheless, the Bank still pays close attention to the status of individual institutions as their weaknesses can trigger systemic risks.

Purpose of this report

The Financial Stability Report is issued annually. The aims of this report are to offer insight into the state of Taiwan's financial system and its potential vulnerabilities and risks, and to spark broad-based discussion that will enhance awareness of risk among market participants and spur them to take responsive action in a timely manner. This does not mean, however, that the risks mentioned in this report are sure to occur. Furthermore, this report is intended to serve as a reference for financial authorities, market participants, and others interested in the subject. Readers are advised to interpret or quote the information contained herein with caution.

Definition of financial stability

There is as yet no universally accepted definition of "financial stability." Defined positively, "financial stability" can be thought of in terms of the financial system's ability to: (1) facilitate an efficient allocation of economic resources both spatially and intertemporally; (2) assess and manage financial risks; and (3) withstand adverse shocks. From a negative view, "financial instability" refers to the occurrence of currency, banking, or foreign debt crises, or inability of the financial system to absorb adverse endogenous or exogenous shocks and allocate resources

efficiently, with the result that it cannot facilitate real economic performance in a sustained manner.

Note: ***Except as otherwise noted, all data and information cited in this report are current as of April 30, 2021.***

Abstract

In 2020, affected by the outbreak of the coronavirus disease 2019 (COVID-19) pandemic, the global economy fell into recession and financial vulnerability continued to build up. Nevertheless, thanks to the government's well-developed support measures for addressing the pandemic, the domestic economy grew moderately along with mild inflation. The performance of the corporate and household sectors also remained sound. In addition, as the real estate market showed signs of heating up, the government implemented several measures to ensure the soundness of the market. Against this backdrop, financial institutions were in good health and financial markets kept operating smoothly. On the whole, the financial system remained stable; however, the subsequent impacts of global and domestic pandemic developments on Taiwan's economic and financial conditions warrant close attention.

The impacts on international and domestic macro environments arising from the COVID-19 pandemic took divergent paths

With regard to the global economy, while the COVID-19 pandemic caused a severe recession in 2020, central banks in major economies have adopted more accommodative monetary policies and taken further fiscal stimulus so as to mitigate downside risks to the economy. From 2021 onwards, thanks to massive fiscal and monetary policies adopted by major economies and expanded vaccinations, IHS Markit anticipates that the global economy will regain momentum. Nevertheless, the International Monetary Fund (IMF) warned that the most noteworthy uncertainty surrounding the global economy still derives from uncertainties around the pace of vaccine rollout and efficacy. When it comes to financial markets, extremely easy financial conditions have elevated nonfinancial private sector debt. Moreover, a stark divide between financial markets and economic conditions has fueled financial vulnerabilities. Once a quicker Fed normalization triggers a sharp rise in interest rates, it could induce a correction in financial markets and, in turn, hamper market confidence and endanger financial stability.

Regarding the domestic economy, as Taiwan was less impacted by the COVID-19 pandemic, the economy grew mildly and domestic prices rose moderately in 2020. External debt expanded slightly but foreign exchange (FX) reserves remained ample, indicating that external debt-

servicing capacity stayed strong. Fiscal deficits reached record highs because of measures launched by the government to mitigate the impact of the pandemic. Government debt increased yet still stayed within a manageable level. Benefitting from the stellar performance of the electronics industry, the profitability of Taiwan Stock Exchange (TWSE) listed and Over-the-counter (OTC) listed companies ascended remarkably. Although household borrowing expanded, the household sector continued to have a high net worth and satisfactory credit quality. Real estate market trading volume and housing prices both surged, while the mortgage burden escalated. To curb speculation in housing market transactions, the government initiated the Healthy Real Estate Market Plan. In response, the Bank also revised targeted macroprudential measures governing real estate loans twice. With the evolution of the pandemic globally and domestically, its impact on the debt-servicing capacity of the corporate and household sectors warrants close attention.

Financial markets, institutions, and infrastructures operated smoothly

Bill and bond issuance in the primary market reached a record high in 2020, while their trading volume in the secondary market took divergent directions. The outright turnover rate of bonds initially rose but turned to stay at a low level thereafter. Stock prices fell back after reaching historical highs, coupled with amplifying volatility. FX markets remained dynamically stable. The profitability of domestic banks decreased in 2020. However, their capital levels increased with satisfactory liquidity, and asset quality remained sound. Life insurance companies exhibited a sharp increase in profitability and a rebound in their capital levels but were exposed to higher equity risk and interest rate risk. Bills finance companies showed significant expansion in profits, although liquidity risks remained high.

Domestic systemically important payment systems functioned in an orderly manner and have not been affected by the COVID-19 pandemic. The Bank also launched the second phase program on a general purpose central bank digital currency (CBDC) in response to digital innovations and relaxed some restrictions for banks engaging in FX business. Meanwhile, the Financial Supervisory Commission (FSC) continued putting forward several policy measures such as green finance and open banking. Furthermore, the FSC revised regulations governing capital requirements of real estate exposures in accordance with international standards and launched a new wealth management scheme underpinned by the enhancement of relevant financial supervision.

The Bank and the FSC took measures to promote financial stability, and the government's economic relief measures showed to be effective

To mitigate the impact of the COVID-19 pandemic on the domestic economy and employment, the Bank cut policy rates in March 2020 and then launched a special accommodation facility to support bank credit to small and medium-sized enterprises (SMEs). The Bank also implemented open market operations for the purpose of adjusting funds in the banking system so as to keep ample liquidity in financial markets. Besides this, the Bank adjusted targeted macroprudential measures twice to attain efficient allocation of banks' credit resources as well as adopting flexible FX policies to safeguard the dynamic stability of the NT dollar exchange rate. Meanwhile, the FSC took timely and flexible measures to respond to the impact of the pandemic on financial markets and required financial institutions to conduct stress tests to assess their ability to weather the impact of the pandemic. Moreover, the FSC strengthened risk management of financial institutions on real estate loans and reinforced the risk bearing capacity of insurance companies to promote financial stability. A number of economic relief measures launched by the Taiwanese government in 2020 effectively mitigated the adverse impact of the pandemic on the domestic macro economy and financial system. In light of recent evolution of the domestic pandemic situation, the aforementioned relief measures have been extended and expanded.

The Bank will continually take measures to promote financial stability as needed

Despite the impact of the pandemic, Taiwan's financial system remained stable in 2020. In the future, the Bank will continually adopt appropriate monetary, credit, and foreign exchange policies. Meanwhile, the FSC will continue to revamp financial regulations and enhance financial supervisory measures in the hope of facilitating sound operations of financial institutions and promoting financial stability. However, considering that international economic and financial developments are still surrounded by many uncertainties and the domestic pandemic has not yet eased, the Bank will continue to pay close attention to the impacts of relevant subsequent developments on domestic economic and financial conditions so as to take appropriate response measures in a timely manner to promote financial stability.

I. Overview

Potential macro environmental risk factors

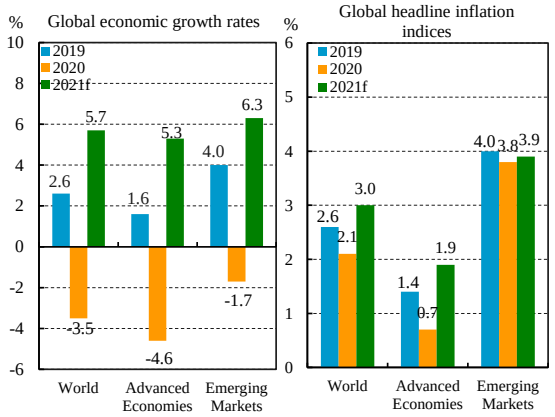
International economic and financial conditions

The global economy is expected to recover after a substantial contraction, but financial vulnerabilities continue to accumulate

In 2020, the COVID-19 pandemic had a severe impact on economic activity. Against the backdrop of shrinking global trade, subdued economic activity, and supply chain disruptions, the global economy contracted by 3.5% in 2020, the worst recession since the Great Depression. Economic growth rates in advanced economies and emerging economies both sank into negative territory. The global consumer price index (CPI) inflation rate also decelerated to 2.1% in 2020 with a fall in the prices of crude oil and other energy sources (Chart 1.1).

Looking ahead to 2021, thanks to expanded vaccinations, loosened COVID-19 restrictions, extraordinary fiscal and monetary policy support, and a relatively low base period, IHS Markit anticipates that the global economic growth rate will surge notably to 5.7%. Meanwhile, the global headline inflation rate is projected to lift to 3.0%, driven by the continued rise in commidity prices (Chart 1.1). Nevertheless, the IMF warned that logistical problems with delivering the vaccines, [1] together with uncertainties surrounding the pace of vaccine

Chart 1.1 Global economic growth rates and headline inflation indices



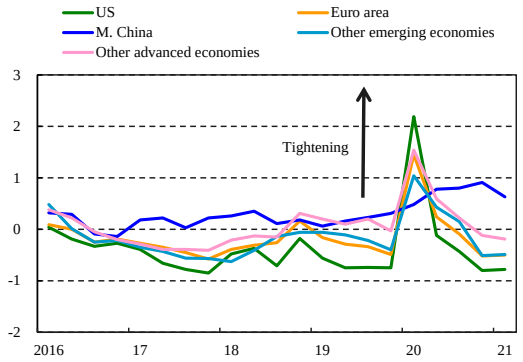
Note: Figures for 2021 are IHS Markit estimates.
Source: IHS Markit (2021/5/15).

[1] IMF (2021), *World Economic Outlook*, April.

rollout and efficacy, could again cause deep wounds to the global economy.

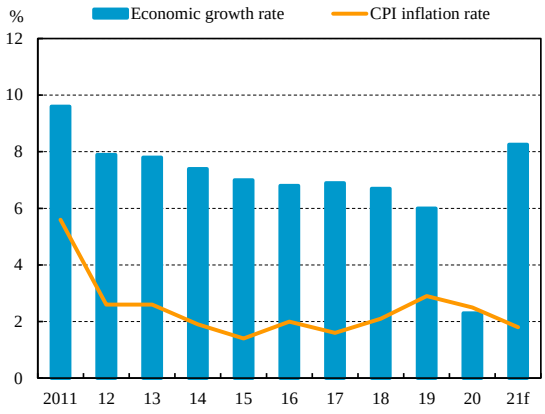
The escalation of the COVID-19 pandemic in the beginning of 2020 induced mounting panic sentiment among investors, resulting in stock market crashes and widening corporate bond spreads. As a result, financial conditions tightened abruptly. Since the second half of 2020, extraordinary monetary and fiscal policy support launched by national authorities, and new vaccine development in positive progress have led to elevated financial market prices. Cosequently, financial conditions turned to loosen (Chart 1.2). However, extremely accommodative monetary policies pushed the debt level of the nonfinancial private sector higher. Moreover, a stark divide between financial markets and economic conditions fueled financial vulnerabilities. Once real interest rates rise rapidly and persistently, it could trigger an abrupt correction in financial markets, and in turn hamper market confidence and endanger financial stability.

Chart 1.2 Global financial conditions indices



Notes: 1. Financial conditions indices are gauged by standard deviations from the means.
2. Other advanced economies comprise 11 economies, such as Australia, Canada, and the UK, etc.
3. Other emerging economies include 6 economies, such as Brazil and India, etc.
Source: IMF (2021), *Global Financial Stability Report*, April.

Chart 1.3 Economic growth rate and CPI inflation rate of Mainland China



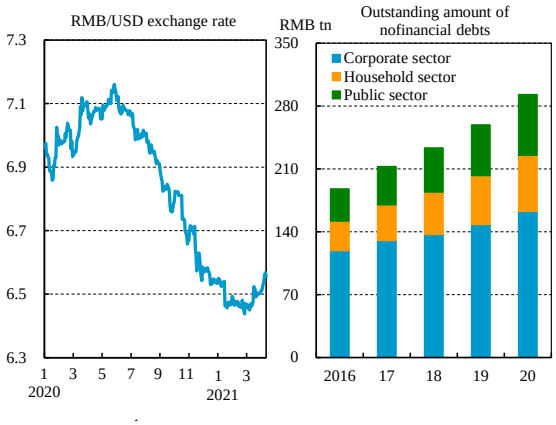
Note: Figures for 2021 are IHS Markit projections.
Sources: National Bureau of Statistics of China and IHS Markit (2021/5/15).

Mainland China experienced a gradual economic recovery with higher potential risks

Affected by the pandemic, Mainland China's economic growth significantly dropped to 2.3% in 2020 with the annual CPI inflation rate declining to 2.5%. IHS Markit projects that the economic growth rate will rise dramatically to 8.3% in 2021, resulting from the effective control of the pandemic and a lower base period. Meanwhile, the annual CPI inflation rate is forecast to decline to 1.8% owing to weak private consumption momentum (Chart 1.3).

Considering that a gradual rise in housing prices since the second half of 2020 showed more signs of financialization and bubbles in the housing market, Mainland China's government successively enhanced supervision measures for housing loans so as to reduce the risks of housing bubbles. Regarding the FX market, with gradual economic recovery in Mainland China and a widening of interest rate spreads between the US and Mainland China, the RMB exchange rate against the US dollar turned to appreciate and rose throughout the year (Chart 1.4, left panel). Besides this, thanks to effective control of COVID-19 and a massive inflow of foreign capital, the SSE Composite Index rebounded significantly and fluctuated upwards. In early 2021, the RMB exchange rate against the US dollar rose continually but turned to weaken from March 2021 on account of elevated US Treasury yields. Over the same period, owing to rising concerns about inflation in the US, the SSE Composite Index slid.

Chart 1.4 RMB/USD exchange rate and outstanding amount of nonfinancial debts in Mainland China



Sources: CBC and BIS.

Aggregate financing to the real economy in Mainland China continued its upward trend in 2020, while vulunerability of small and medium financial institutions escalated. The outstanding debt for nonfinanical sectors, including the corporate, household, and government sectors, continuously reached record highs at the end of the year (Chart 1.4, right panel), reflecting a rise in potential risks.

Major economies maintained accommodative monetary policies and adopted further fiscal stimulus to mitigate economic downside risks

Following the COVID-19 outbreak in the beginning of 2020, central banks in major economies adopted more accommodative and aggressive policies so as to cushion the pandemic's impact. In the second half of the year, since the global economy had not fully regained momentum, most central banks maintained accommodative monetary policies by providing low interest rates.

In addition, for the purpose of mitigating the impacts from the pandemic, major economies

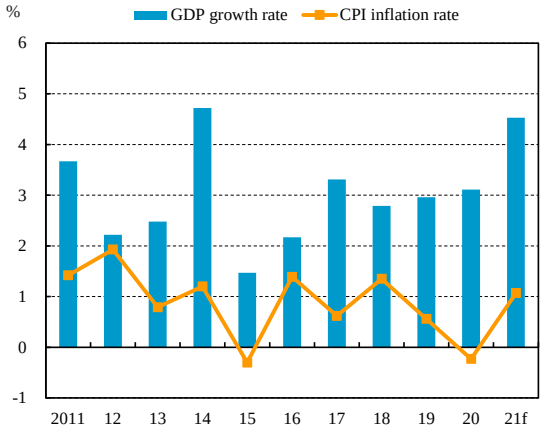
deployed extraordinary fiscal policy support in the first half of 2020. From the second half of the year onwards, most economies continuously launched fiscal stimulus packages amid the evolution of the pandemic. For example, the US passed the second-largest pandemic aid bill in March 2021, totaling US$1.9 trillion. The European Union (EU) agreed to a €750 billion COVID-19 recovery fund. The Japanese government also launched a new round of stimulus worth roughly ¥73.6 trillion.

Domestic macro environment

The domestic economy grew mildly, while consumer prices rose moderately and external debt servicing capacity remained sound

In 2020, as exports rose against the trend, the annual economic growth rate in Taiwan reached 3.11%, higher than the 2.96% of the previous year. The economy maintained moderate growth for the whole year. With regard to consumer prices, annual CPI inflation registered -0.23% in 2020, lower than the 0.56% of the previous year (Chart 1.5). However, a resurgence of the pandemic internationally and an upsurge in domestic COVID-19 cases from mid-May 2021 onwards might have negative effects on economic growth momentum and thus warrant closer attention.

Chart 1.5 Economic growth rate and CPI inflation rate of Taiwan



Note: Figures for 2021 are CBC forecasts released on March 18, 2021
Sources: DGBAS and CBC.

In addition, Taiwan's external debt[2] rose to US$189.9 billion at the end of 2020, but FX reserves remained at a sufficient level of US$529.9 billion, implying a robust capacity to service external debt. The amount of the fiscal deficit reached a record high in 2020, equivalent to 2.28%[3] of annual gross domestic product (GDP) for the year, and the ratio of total public debt to annual GDP rebounded to 33.76%. Nevertheless, total government debt

[2] External debt refers to the combined amount owed to foreign parties by Taiwan's public and private sectors, including long-term debt with a maturity of greater than one year and short-term debt with a maturity of one year or less. The term "public external debt" refers to debt that the public sector is either obligated to repay directly or has guaranteed. The term "private external debt" refers to private-sector foreign debt not guaranteed by the public sector.

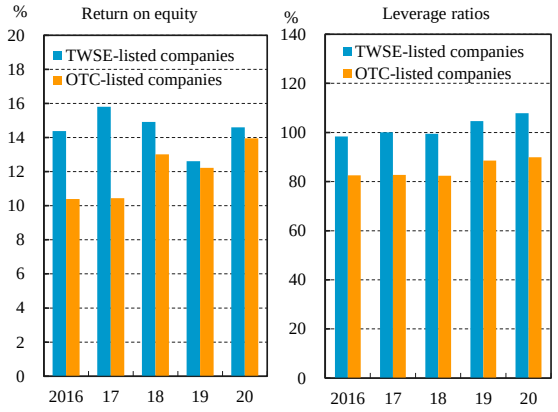
[3] As a comparison, fiscal deficits in EU member nations are not allowed to exceed 3% of GDP according to the *Maastricht Treaty* and the subsequent *Stability and Growth Pact*.

stayed within a manageable level.[4]

Corporate sector saw a sharp rise in profitability

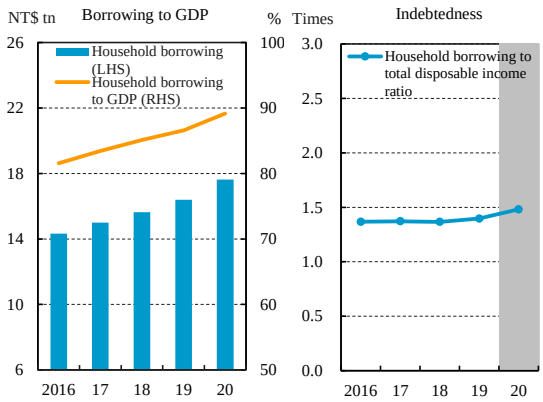
In 2020, the COVID-19 pandemic drove up remote business opportunities, inducing demand for semiconductors, information and communications technology, and 5G applications to spring up. As a result, the profitability of TWSE-listed and OTC-listed companies ascended remarkably (Chart 1.6, left panel). Their short-term debt servicing capacity remained at an adequate level, although leverage ratios elevated (Chart 1.6, right panel). The non-performing loan (NPL) ratio for corporate loans from financial institutions rose slightly to 0.28% at the end of the year, while the overall credit quality for the corporate sector stayed satisfactory.

Chart 1.6 Return on equity and leverage ratios in corporate sector



Notes: 1. Return on equity = net income before interest and tax/average equity.
2. Leverage ratio = total liabilities/total equity.
Source: TEJ.

Chart 1.7 Household indebtedness



Note: Total disposable income in shadow area is a CBC estimate.
Sources: CBC, JCIC, and DGBAS.

Household financial conditions remained sound

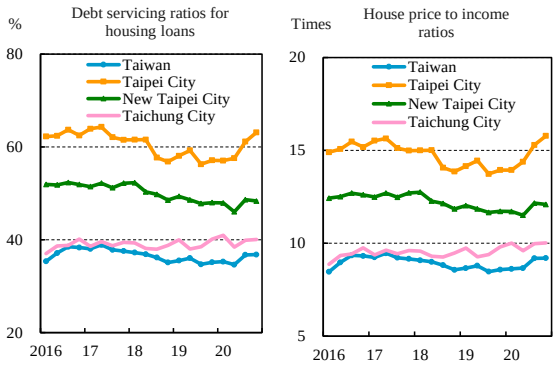
Total household borrowing expanded and reached NT$17.63 trillion at the end of 2020, equivalent to 89.15% of annual GDP (Chart 1.7, left panel). The ratio of household borrowing to total disposable income also increased to 1.48, reflecting a rising household debt burden (Chart 1.7, right panel). Nonetheless, in Taiwan, household net worth[5] has been held at more than 8.3 times the GDP in recent years, indicating

[4] As a comparison, outstanding government debt in EU member nations is not allowed to exceed 60% of GDP according to the *Maastricht Treaty* and the subsequent *Stability and Growth Pact*.

[5] Household net worth includes household net non-financial assets and net financial assets. Net non-financial assets include produced assets (buildings and constructions, transport equipment, machinery equipment, etc.) and non-produced assets (construction land, non-construction land, and other assets). Net financial assets are domestic and foreign financial assets minus liabilities (deposits, loans, shares of listed companies or other enterprises, life insurance reserves, etc.).

a healthy financial condition and a sustained debt servicing capacity of households. Meanwhile, the NPL ratio of household borrowing decreased to a new low of 0.17%, showing satisfactory credit quality.

Chart 1.8 Debt servicing ratios for housing loans and house price to income ratios



Notes: 1. Debt servicing ratio for housing loans = median monthly housing loan payment/median monthly household disposable income.
2. House price to income ratio = median house price/median annual household disposable income.
Source: Housing Price Affordability Indicator Statistics, Construction and Planning Agency of the MOI.

Real estate market saw an increase in both trading volume and housing prices, and mortgage burden rebounded

Trading volume in the housing market increased in 2020, as the total number of building ownership transfers for transaction increased by 8.76% year on year. Meanwhile, the national housing price index released by the Ministry of the Interior (MOI), the Sinyi housing price index (for existing residential buildings), and the Cathay housing price index (for new residential buildings) also reached historical high levels. Nevertheless, the pressure on reducing the mounting number of unsold new residential properties remained. In 2020 Q4, the debt servicing ratio for housing loans and the house price to income ratio in Taiwan ascended marginally year on year to 36.81% and 9.20, respectively, demonstrating a rebound of the mortgage burden. Among the six metropolitan areas, Taipei City showed the heaviest mortgage burden (Chart 1.8).

To curb speculation in the housing market, the government initiated the Healthy Real Estate Market Plan in December 2020 and the relevant ministries and agencies successively amended the regulations to refine management schemes on the housing market as well as applying a reasonable property tax. The Bank twice revised targeted macroprudential measures on real estate loans as well, aiming to foster a sound real estate market.

Financial system assessment

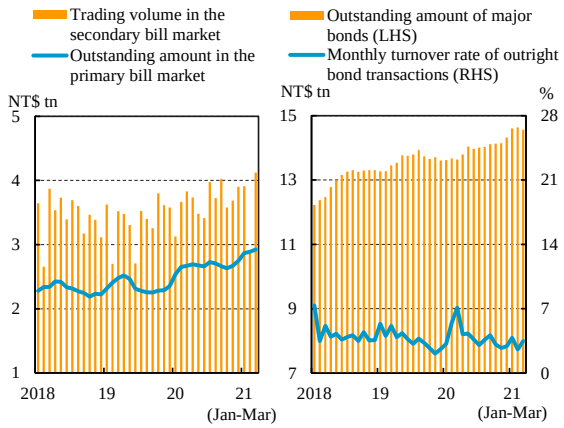
Financial markets

Bill and bond issuance in the primary market hit a new high, while their trading volume in the secondary market took divergent directions

The outstanding amount of bill issuance in the primary market increased markedly by 16.75% year on year at the end of 2020, owing to the fact that corporates significantly increased commercial paper (CP) issuance for fund raising. The bill trading volume in the secondary market also saw a rise of 8.97% in 2020 (Chart 1.9, left panel). As for the bond market, the outstanding amount of bond issuance increased marginally by 5.32% at the end of the year because bond interest rates hit a record low, which attracted corporates to increase bond issuance. However, trading volume in the secondary bond market[6] decreased by 9.30% as repurchase agreement (repo) transactions saw diminishing trading volumes. The average monthly outright turnover rate of major bonds[7] elevated to a recent high of 7.11% in March 2020 (Chart 1.9, right panel), and turned to fall afterwards.

Considering that the recent rise in US inflation expectations could push up US government bond yields and, in turn, propel Taiwan's 10-year government bond yields to increase further, interest rate risks related to bond investments might elevate and warrant close attention.

Chart 1.9 Primary and secondary bill and bond markets



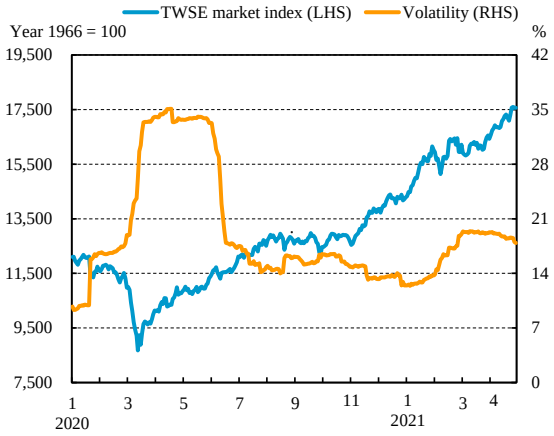
Notes: 1. Major bonds include government bonds, international bonds, corporate bonds, and financial debentures.
2. Monthly turnover rate = trading value in the month/average outstanding amount of bonds issued. Average outstanding amount of bonds issued = (outstanding amount at the end of the month + outstanding amount at the end of last month)/2.

Sources: CBC and FSC.

[6] Includes repo and outright transactions.
[7] Includes government bonds, international bonds, corporate bonds, and financial debentures.

Stock indices successively reached their historical highs with increased volatility

Chart 1.10 TWSE market index and volatility



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

In March 2020, owing to the impact of the pandemic, the Taiwan Stock Exchange Weighted Index (TAIEX) of the TWSE market dropped significantly to a recent low of 8,681. Afterwards, thanks to the quantitative monetary easing policies and the fiscal relief measures implemented by major economies, along with the strong recovery exhibited by the domestic economy, the TAIEX rebounded sharply and posted an annual increase of 22.80% in 2020, higher than the major indices in other international stock markets. In the beginning of 2021, the TAIEX fluctuated with an upward trend and registered 17,567 at the end of April, surging by 19.24% compared to the end of 2020 (Chart 1.10). Nevertheless, with market expectations of interest rate hikes by the Fed and the resurgence of the pandemic globally and domestically, the TAIEX saw a decline in the middle of May.

Volatility in the TWSE market surged sharply in the first half of 2020, and then dropped to 12.55% at the end of the year, still higher than the 9.71% of the previous year. In the beginning of 2021, owing to significant fluctuations in global stock markets triggered by rapidly elevating US bond yields, volatility of the TWSE market increased to 17.91% at the end of April (Chart 1.10), and further jumped above 20% in May.

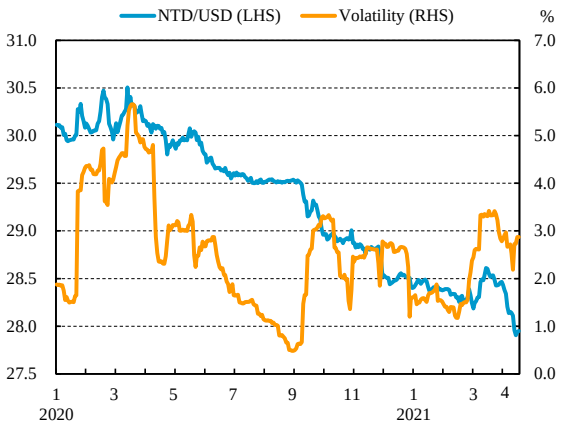
The NT dollar broadly strengthened against the US dollar, while its volatility remained relatively stable

In the beginning of 2020, the NT dollar exchange rate against the US dollar depreciated owing to the impacts of the COVID-19 pandemic and the outward remittance of foreign capital. Afterwards, as exports and the economy demonstrated stellar performance, the NT dollar appreciated steadily and stood at 28.508 at the end of 2020, gaining by 5.61% year on year.

The NT dollar exchange rate by and large moved along an appreciating path from the beginning of 2021 onwards, and closed at 27.950 as of the end of April, increasing in value by 2.00% compared to the end of 2020 (Chart 1.11).

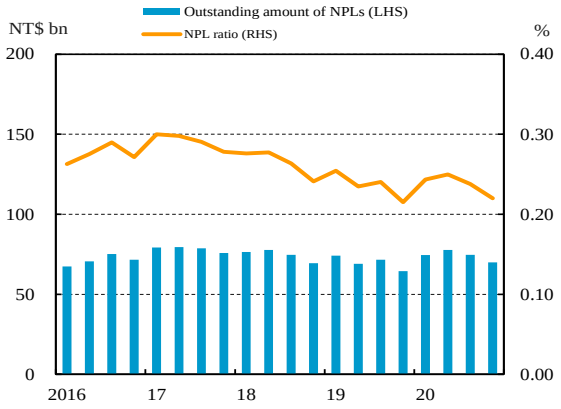
Furthermore, volatility in the NT dollar exchange rate against the US dollar shifted between 0.49% and 5.66% in 2020 and registered an annual average of 2.66%. During January to April 2021, volatility in the NT dollar exchange rate against the US dollar registered between 1.17% and 3.42% (Chart 1.11). Compared to major currencies such as the Japanese yen, the euro, the Singapore dollar, and the Korean won, the NT dollar exchange rate has stayed relatively stable against the US dollar.

Chart 1.11 Movements of NT dollar exchange rate against US dollar



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

Chart 1.12 NPLs of domestic banks



Note: Excludes interbank loans.
Source: CBC.

Financial institutions

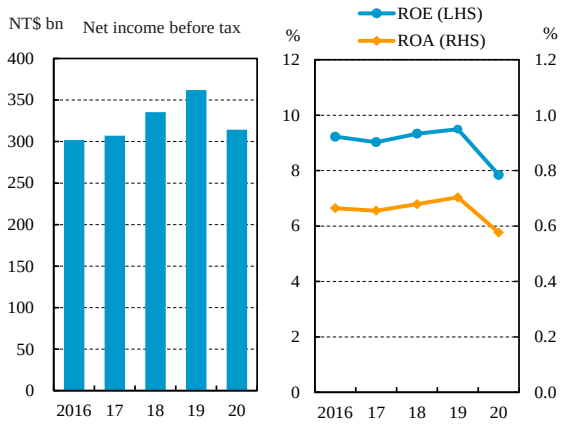
The profitability of domestic banks decreased, while capital levels increased with satisfactory asset quality

Customer loans of domestic banks kept rising in 2020, while the credit concentration in corporate and real estate loans went up marginally. The NPL ratio recorded 0.22% at the end of the year (Chart 1.12), reflecting satisfactory credit quality, and provisions for loan losses remained sufficient. Nevertheless, the impact of the COVID-19 pandemic on banks' credit quality warrants close attention. Meanwhile, the aggregate amount of exposure to Mainland China contracted in 2020, and the ratio of the exposures to banks' net worth dropped to 39% at the end of the year, hitting the lowest level in recent years. Nevertheless, the potential risks in

Mainland China still need to be closely monitored. Moreover, banks are facing risks of the London Interbank Offered Rate (LIBOR) cessation, which should be carefully evaluated and responded to appropriately.

The net income before tax of domestic banks decreased by 13.19% to NT$314.3 billion in 2020, the sharpest fall in 10 years (Chart 1.13, left panel). The average return on equity (ROE) and return on assets (ROA) also went down to 7.84% and 0.58%, respectively (Chart 1.13, right panel), showing weakening profitability. However, the average capital adequacy ratio of domestic banks ascended dramatically to 14.84% at the end of 2020, with satisfactory capital quality.

Chart 1.13 Profitability of domestic banks

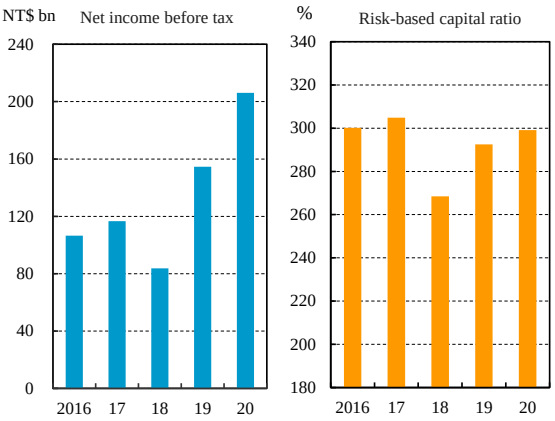


Notes: 1. ROE = net income before tax/average equity.
2. ROA = net income before tax/average total assets.
Source: CBC.

Life insurance companies posted elevated profitability and capital levels, but face higher market risk

Life insurance companies reported a record-high net income before tax of NT$206.1 billion in 2020, a substantial year-on-year increase of 33.26% (Chart 1.14, left panel). This was mainly contributed to by an increase in investment revenue as life insurance companies actively realized capital gains of stock and bond investments. Additionally, at the end of the year, the average risk-based capital (RBC) ratio and the average equity to asset ratio[8] of life insurance companies significantly rebounded to 299.13% (Chart 1.14, right panel) and 8.57%, respectively.

Chart 1.14 Net income before tax and risk-based capital ratio of life insurance companies



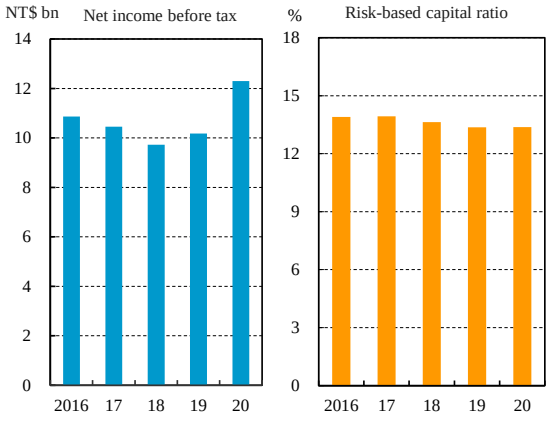
Note: Figures for risk-based capital ratios exclude insurance companies taken into receivership by the FSC.
Source: FSC.

Foreign portfolio positions of life insurance companies grew to NT$18.66 trillion at the end of 2020. However, from the beginning of 2021 onwards, the stock indices rebounded strongly in some financial markets, which seemed to have decoupled from the real economy and, in turn,

[8] Assets are exclusive of separated account products assets.

increased the risk of bubbles in some assets. Meanwhile, US government bond yields rose significantly, which was unfavorable to the valuation of bond positions. As a result, life insurance companies still faced higher equity risk and interest rate risk.

Chart 1.15 Net income before tax and capital adequacy ratio of bills finance companies



Source: CBC.

Liquidity risk of bills finance companies remained high, but their profitability improved markedly

CP guaranteed by bills finance companies expanded in 2020, mainly because corporates increased CP issuance to raise funds on the back of a new low level of interest rates in the money market. The credit quality of bills finance companies remained sound as the guaranteed advances ratio declined consecutively to 0.01% at the end of the year; however, the impact of the evolution of the pandemic on their credit quality warrants close attention. Meanwhile, maturity mismatches between long-term assets and short-term liabilities persisted, reflecting a still high liquidity risk in bills finance companies.

Bills finance companies posted a net income before tax of NT$12.3 billion in 2020, increasing remarkably by 20.79% year on year (Chart 1.15, left panel) mainly owing to a decrease in interest expenses of bill and bond repo transactions deriving from lower interest rates. The average capital adequacy ratio of bills finance companies rose slightly to 13.38% at the end of 2020 (Chart 1.15, right panel), and the capital adequacy ratio for each company remained well above the statutory minimum of 8%.

Financial infrastructure

Domestic payment and settlement systems functioned well, and the penetration rate of mobile payments rose

The CBC Interbank Funds Transfer System (CIFS) functioned smoothly in 2020, settling funds worth a total of 25.5 times the GDP for the year. Affected by the pandemic, the overall

consumption expenditure via various electronic payment tools[9] deceased slightly by 0.37% year on year. However, the amount of mobile payment transactions has grown rapidly, and its penetration rate[10] reached 67.5% in September 2020. With an aim to increase the penetration of mobile payments, the Bank urged the Financial Information Service Co., Ltd. (FISC) to set up an inter-institutional electronic payment institutions platform, which allowed inter-institutional interconnection between banks and non-bank payment institutions, and thus promoted the efficiency of the overall payment market.

The Bank initiated programs on CBDC research and experimentation in response to the advent of the digital payment era

In response to the global trends of digital payment innovations by central banks, the Bank completed the first phase program with a technical report on the feasibility of a wholesale CBDC in June 2020 and moved on to the second phase program on a general purpose CBDC in September of the same year.

Other measures to strengthen the financial system

To ensure the competitiveness of the domestic financial system and comply with international standards, the FSC revised the regulations governing risk weights of real estate exposures on domestic banks by adopting a Loan-to-Value (LTV) approach at the end of 2020. The FSC also launched "Corporate Governance 3.0" and "Green Finance Action Plan 2.0" in 2020 in order to promote the sustainable development of corporates and financial institutions. Moreover, the FSC encouraged banks to promote open banking services to speed up the process of financial data sharing as well as launching the "New Wealth Management Scheme" to increase the competitiveness of the domestic wealth management industry.

Moreover, to cope with the trends of financial digitalization and FX business development, as well as to promote the diversification of domestic financial bond markets and financial products, the Bank amended the *Regulations Governing Foreign Exchange Business of Banking Enterprises* in January 2021 to relax some restrictions for banks engaging in FX business.

[9] Electronic retail payment tools include credit cards, debit cards, electronic tickets, electronic payment accounts, and ACH interbank collection.

[10] The National Development Council has set the mobile payment penetration rate as the ratio of the number of users who have used mobile payments to the number of active mobile phone users within a specific period.

Measures to promote financial stability and address the COVID-19 pandemic

Measures undertaken by the Bank and the FSC to promote financial stability

Measures undertaken by the Bank to promote financial stability

To alleviate the impact of the pandemic on the domestic economy and employment, the Bank cut the discount rate, the rate on refinancing of secured loans, and the rate on temporary accommodations each by 25 basis points (bps) in March 2020. Besides this, the Bank initiated a special accommodation facility for SMEs from April 2020 onwards, and successively conducted rolling reviews on the contents of the facility as needed in order to facilitate banks' financial intermediary function and funding access for SMEs. Furthermore, to maintain sufficient liquidity of the financial market, the Bank conducted open market operations, and flexibly adjusted the issuance frequency and total amount of negotiable certificates of deposit (NCDs) from April onwards. The Bank also regularly conducted small-scale testing of repo operations with counterparties.

In addition, with the aim of precluding an excessive flow of bank credit into the real estate market, the Bank adjusted targeted macroprudential measures twice in December 2020 and March 2021, respectively. The Bank also continually adopted flexible FX rate policies and undertook appropriate FX management measures, such as reinforcing off-site monitoring efforts on forward transactions and urging authorized FX banks to enhance their exchange rate risk management, to safeguard the dynamic stability of the NT dollar exchange rate and aptly maintain FX market order.

Measures undertaken by the FSC to maintain financial stability

From 2020 onwards, to assist the stable development of Taiwan's financial industry, the FSC continued putting forward several measures focusing on capital markets, green finance, corporate governance, and trust services. In addition, to mitigate the impact of the COVID-19 pandemic on domestic stock markets, the FSC launched several flexible measures in March 2020, such as putting restrictions on the short selling of securities, for the purpose of

maintaining orderly stock markets. The measures were then repealed in June 2020 and reverted to regular regulations when the stock markets gradually stabilized.

Moreover, the FSC required domestic banks and insurers to conduct supervisory stress tests, for the purpose of evaluating the risk bearing capacities of financial institutions amid the pandemic shock. The FSC also adopted several measures, including targeted examinations, to enhance risk control of real estate lending for financial institutions. Additionally, the FSC promoted the New Generation Insurance Solvency Regime, as well as adding provisions setting out the net worth ratio as dual supervisory indicators, so as to reinforce the risk bearing capacity of insurance companies.

Effectiveness of Taiwan's measures to address the COVID-19 pandemic

In response to the impact of the COVID-19 pandemic on the domestic economy and society, Taiwan's government launched economic relief measures sequentially with a total of NT$1.26 trillion, equivalent to 6.1% of GDP. The Bank also launched the special accommodation facility to support SMEs to access the working capital needed to weather the pandemic. Thanks to the effectiveness of those economic relief measures, Taiwan sustained economic growth at 3.11% in 2020, better than major economies in Europe, North America, and Asia. The unemployment rate gradually declined from its peak, and the number of employees who agreed on negotiated reductions of working hours with their employers also decreased significantly. Meanwhile, the corporate sector saw a sharp rise in the profitability of TWSE-listed and OTC-listed companies, driving the domestic stock market to record highs.

Moreover, despite the impact of the pandemic, financial institutions in Taiwan continued to make profits in 2020. Among them, life insurance companies and bills finance companies even registered dramatic growth in profits. Meanwhile, the average NPL ratios of domestic financial institutions remained at a low level, reflecting satisfactory credit quality, and their capital levels remained adequate and well above the statutory minimum. All of the aforementioned performance shows that financial institutions still operated soundly amid the pandemic shock. Moreover, Taiwan's financial markets saw limited impact from the COVID-19 pandemic. Domestic systemically important financial infrastructures, which were not affected by the pandemic, still functioned well and steadily.

In response to the global pandemic resurgence and the evolution of the domestic pandemic in the middle of May 2021, the Legislative Yuan passed amendments to some articles of the *Special Act for Prevention, Relief and Revitalization Measures for Severe Pneumonia with Novel Pathogens* on May 31, 2021. The amendments extended the applicable period until June 30, 2022 and raised the special budget ceiling to NT$840 billion with an aim to reduce the impact of the pandemic on the domestic economy and society.

The Bank will continue to adopt measures to promote financial stability when necessary

Overall, in 2020, Taiwan's financial system remained stable amid the COVID-19 pandemic. In response to the impact of the pandemic on the domestic economy and the financial system, the Bank continually adopted appropriate monetary, credit, and foreign exchange policies. The FSC also continued to revamp financial regulations and enhance financial supervisory measures in the hope of facilitating sound operations of financial institutions and promoting financial stability.

However, considering that international economic and financial developments are still surrounded by many uncertainties and the domestic pandemic has not yet eased, the Bank will continue to pay close attention to the impacts of relevant subsequent developments on domestic economic and financial conditions so as to take appropriate response measures in a timely manner to promote financial stability.

II. Potential macro environmental risk factors

2.1 International economic and financial conditions

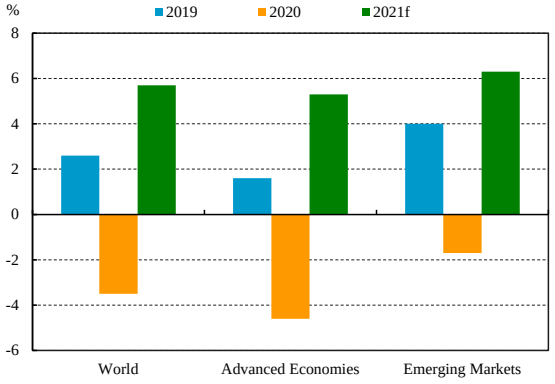
2.1.1 International economic and financial conditions

The COVID-19 pandemic had a severe impact on economic activity in 2020. Against the backdrop of shrinking global trade, subdued economic activity, and supply chain disruptions, global economic growth rates sunk deeply into negative territory. In 2021, with wider vaccine coverage across countries and continuous accommodative monetary policies employed by central banks, global economic growth is expected to gather momentum. However, the most considerable uncertainty surrounding the global economy is still derived from an unpredictable pandemic outlook and the pace of vaccine rollout. When it comes to financial markets, extremely accommodative monetary policies gave stock market investment a boost, resulting in a stark divide between financial markets and economic conditions. Once a quicker Fed normalization triggers a sharp rise in interest rates, it may put financial stability at risk.

The pandemic considerably jeopardized global growth momentum in 2020, and vaccine coverage will play a role in the speed of recovery in 2021

In the beginning of 2020, the COVID-19 pandemic broke out in Mainland China and rapidly spread across the world, derailing global economic growth momentum. On the supply side, the COVID-19-induced confinement measures caused stagnant business operations and declined productive capacity and resulted in supply chain disruptions. On the demand side, associated lockdowns and lower expenditure stemming from vulnerable confidence of households and firms during the pandemic have greatly

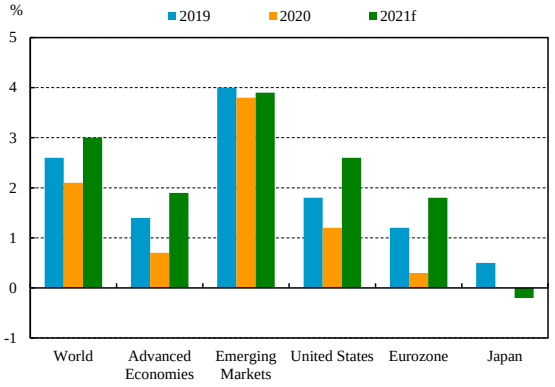
Chart 2.1 Global economic growth rates



Note: Figures for 2021 are IHS Markit estimates.
Source: IHS Markit (2021/5/15).

reduced global demand. Affected by these negative factors, global growth moved into negative territory, contracting by 3.5% [11] during 2020 (Chart 2.1). It was the worst recession since the Great Depression, and far worse than the Global Financial Crisis (GFC) in 2008.[12]

Chart 2.2 Global headline inflation indices



Note: Figures for 2021 are IHS Markit estimates.
Source: IHS Markit (2021/5/15).

Looking ahead to 2021, thanks to expanded vaccinations, loosened COVID-19 restrictions, extraordinary fiscal policy support, and a relatively low base period, global growth is projected to surge notably to 5.7%, while economic growth rates in advanced economies and emerging economies are expected to accelerate to 5.3% and 6.3%, respectively (Chart 2.1). Nevertheless, the IMF warned that logistical problems with delivering vaccines, together with uncertainties around coverage and efficacy of vaccines, could again cause deep wounds to the economy.[13] The IMF estimated that in the downside scenario, which explores the possibility that vaccine coverage is lower than expected and that variants are more resistant to vaccines, global GDP growth in 2021 could slow by roughly 1.5 percentage points (pps) more than in the baseline scenario.

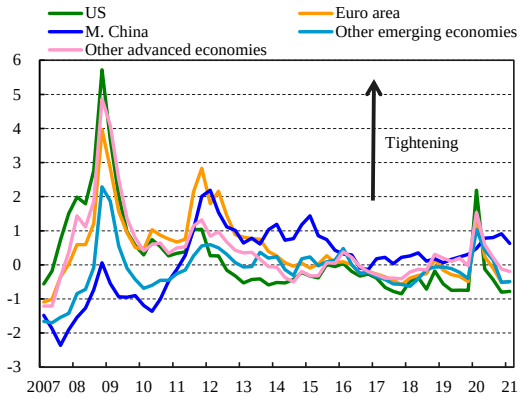
Supported by global economic recovery, global inflation is expected to rise

In the first half of 2020, following lower oil demand amid an escalation of the COVID-19 pandemic and the collapse of the supply cut agreement, international oil prices crashed. Prices of some oil futures contracts even plunged into negative territory in April. Afterwards, Organization of the Petroleum Exporting Countries Plus (OPEC+) approved a historic agreement to cut output by a record amount. This, together with the manufacturing recovery in Europe and the US, policy support deployed across economies, and greater progress with vaccine trials, have finally stabilized the struggling oil market. Nonetheless, the average annual Brent crude oil spot price still dropped by over 35% to US$41.69 per barrel compared to the level of 2019. Moreover, with other energy prices also oscillating along a downward path, the global CPI inflation rate decelerated to 2.1% in 2020. The headline inflation rates in advanced and emerging economies decreased to 0.7% and 3.8%, respectively (Chart 2.2).

[11] IHS Markit estimate on May 15, 2021.
[12] According to data from IHS Markit, the world economy contracted by 1.7% in 2009 after the 2008 GFC.
[13] IMF (2021), *World Economic Outlook*, April.

Since the beginning of 2021, the easing of lockdowns amid vaccine rollout, along with sizable fiscal policy support from the US, have boosted the global economy as well as oil demand. Meanwhile, OPEC+ agreed to extend most oil output cuts into April. This, together with Saudi Arabia extending its voluntary oil output cut and a shutdown of the oil refineries in Texas arising from frigid weather, had an impact on oil supply and buoyed crude prices. On March 5, the Brent crude oil spot price settled at its highest level since the pandemic began, hitting US$69.95 per barrel. With the pandemic shock subsiding, an increase in demand also led other commodity prices to firm up further. As a result, IHS Markit anticipates that commodity prices will continue their upward trend and lift the global headline inflation rate to 3.0% in 2021. The headline inflation rate in advanced economies will increase to 1.9%, whereas the rate in emerging economies will only slightly pick up to 3.9% owing to weaker inflation in Mainland China (Chart 2.2).[14]

Chart 2.3 Global financial conditions indices



Notes: 1. Financial conditions indices are gauged by standard deviations from the means.
2. Other advanced economies comprise 11 economies, such as Australia, Canada, and the UK, etc.
3. Other emerging economies include 6 economies, such as Brazil and India, etc.

Source: IMF (2021), *Global Financial Stability Report*, April.

Highly accommodative financial conditions fueled financial vulnerabilities

Financial conditions have eased

In the beginning of 2020, the escalation of the COVID-19 pandemic induced mounting panic sentiment among investors, resulting in stock market crashes and widening corporate bond spreads. Consequently, financial conditions tightened abruptly (Chart 2.3). In the context of tighter financial conditions, the corporate sectors reduced investment because of rising funding costs and individuals postponed their consumption, thus putting financial stability at risk.

Since the second half of 2020, extraordinary monetary and fiscal policy support launched by national authorities has helped mitigate the impact of the pandemic. On the back of the aforementioned policies and other positive news regarding progress in vaccine development, investors expected that the global economy would be on track for recovery. As a result, excessive capital flowed into stock markets, leading to a sharp rise in stock prices and higher

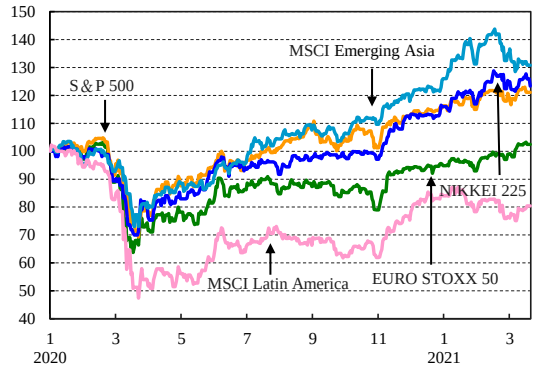
[14] In 2020, pork prices in Mainland China oscillated at a high level amid an outbreak of swine fever. IHS Markit anticipates that pork prices will drop in 2021, while the CPI inflation rate will decline from 2.5% recorded in 2020 to 1.8% over the same period.

corporate valuations. Reflecting this, financial conditions loosened, notably in the US. The US financial conditions index reached its loosest level ever following an evident jump in its stock markets (Chart 2.3).

The disconnect between financial markets and the real economy resulted in a K-shaped recovery

In March 2020, the spread of COVID-19 and plummeting oil prices led to panic sentiment among investors and sharp falls in global stock markets. From April onwards, monetary policy accommodation and fiscal stimulus measures were successively adopted by governments. Moreover, growing optimism on COVID-19 vaccines also boosted investors' confidence. As a result, vast capital inflows to stock markets fueled a sharp rally globally, especially in the US, Japan, and Asian emerging markets.[15] On the other hand, euro equity markets had very limited growth owing to Brexit and the resurgence of the pandemic at the end of 2020 (Chart 2.4).

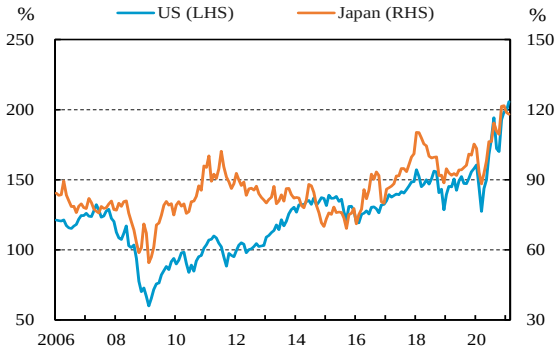
Chart 2.4 Performance of key international equity indices



Notes: 1. January 1, 2020 = 100.
2. The Euro STOXX 50 refers to a stock index consisting of the largest 50 stocks in the 12 major economies of the euro area.

Source: Bloomberg.

Chart 2.5 Stock market capitalization-to-GDP ratios



Source: Bloomberg.

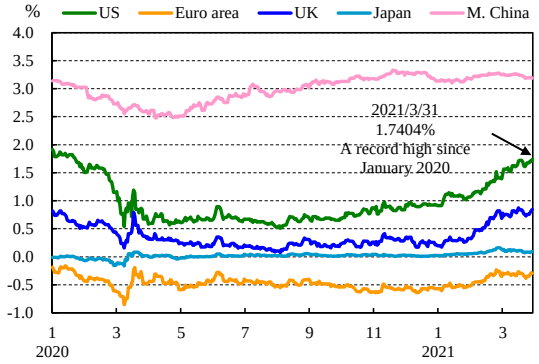
Recently, asset valuations in financial markets (e.g., stock markets) have fully recovered, but labor markets and economic activity have only partially bounced back, generating a K-shaped recovery. For instance, the stock market capitalization-to-GDP ratios for the US and Japan grew drastically to 198% and 122%, respectively, at the end of 2020 (Chart 2.5). Under this circumstance, worse-than-expected evolution of the pandemic and slower-than-anticipated economic revival in the future, or an earlier-than-expected tightening of monetary policies, may sharply heighten risk aversion and induce a sudden asset-price correction in financial markets. The abrupt correction could rattle the real economy and add to market pessimism, increasing the likelihood of adverse macro-financial feedback loops.

[15] On March 17, 2021, the S&P 500, Nikkei 225, and MSCI Emerging Asia increased by 74.9%, 76.2%, and 79.2%, respectively, compared to their lowest level of 2020. Among them, stock market indices in South Korea, Taiwan, and India have set all-time record highs.

Reflecting stronger inflation expectations, government bond yields in major economies surged

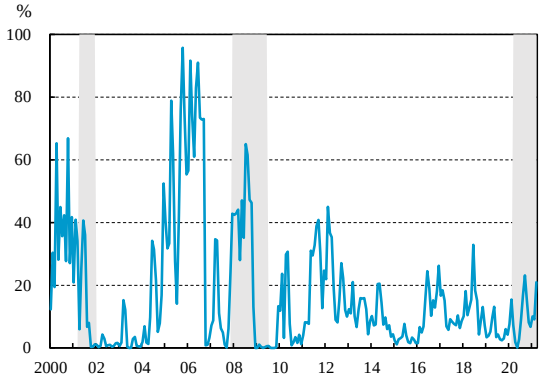
In 2020, in light of the deteriorating COVID-19 pandemic, government bond yields in the US, the UK, and the euro area fell to the lowest level recorded since 2016. From 2021 onwards, global vaccine rollout and brighter economic prospects have fed into inflation expectations, spurring a spike in bond yields, particularly those in the US (Chart 2.6). Compared to its lowest level in 2020, the 10-year Treasury yield rose by 120 basis points and stretched to a recent high of 1.74% at the end of March 2021.

Chart 2.6 10-year government bond yields in major economies



Source: Bloomberg.

Chart 2.7 Fed's price pressures measure



Notes: 1. The PPM measures the probability that the expected PCEPI inflation rate over the next 12 months will exceed 2.5%.
2. Shaded areas represent recessions defined by the National Bureau of Economic Research (NBER).

Source: St. Louis Fed.

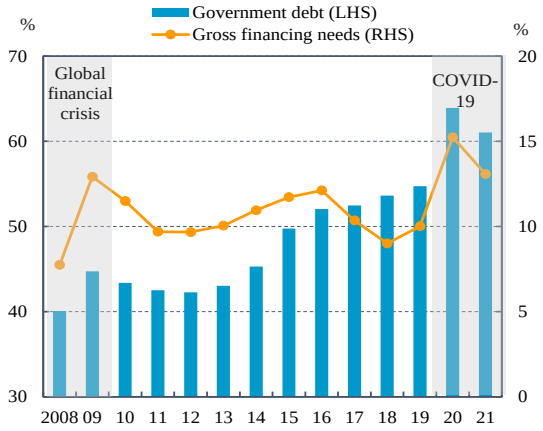
The surging inflation expectations were mainly driven by multiple factors, such as easy financial conditions, massive fiscal policy responses, pandemic alleviation, rising commodity prices, and economic recovery. Nonetheless, the negative output gap in the US persisted. This, together with structural disinflationary factors, including globalization, technology development, and an aging population, have continuously restrained long-term inflation expectations in the US. According to the St. Louis Fed's price pressures measure (PPM) in March 2021,[16] there was only a 20% probability that the expected personal consumption expenditures price index (PCEPI) inflation rate would average more than 2.5% over the next 12 months (Chart 2.7), indicating that the rise in inflation expectations is likely to be temporary.

Although the surge in US government bond yields was likely to prove non-permanent, a significant increase in yields after mid-February 2021 triggered a correction in stocks. Global stock markets dropped after carving out fresh records. Against this backdrop, once real interest

[16] The PPM index is constructed from a model augmented with nine factors (e.g., consumer price indexes). Please see Jackson, Laura E., Kevin L. Kliesen, and Michael T. Owyang (2015), "Introducing the St. Louis Fed Price Pressure Measure," *St. Louis Fed Economic Synopses*, November.

rates rise rapidly and persistently, it could bring about a repricing in financial markets and tightening financial conditions. In turn, it may hamper market confidence and endanger financial stability.

Chart 2.8 Government debt and gross financing needs of emerging economies (percent of GDP)



Note: This chart includes 51 emerging economies, excluding Mainland China.
Source: IMF (2021), *Global Financial Stability Report*, April.

Global debt soared to a new record high, and non-financial private sector debt warrants close attention

After the 2008 GFC, the influence of expansionary monetary policy on lowering borrowing costs provided stronger incentives for the non-financial sector to increase leverage. More recently, households and firms have taken on more debt to cover lost income following the COVID-19 outbreak. Both resulted in elevating private sector debt. With regard to government debt, massively scaled-up fiscal support at the national level to address the pandemic[17] also led public debt to mount rapidly. According to the statistics of the Institute of International Finance (IIF), global debt across all sectors hit US$281 trillion at the end of 2020, topping 355% of GDP, which was 35 pps higher than that of 2019.[18]

In the short term, policymakers will be faced with difficult trade-offs between providing monetary policy assistance for the economy and a withdrawal of policy support aimed at preventing debt overhang in the private sector. In the future, as soon as the economy is on track to recovery from the onslaught of the pandemic, macroprudential policies should be employed adequately to contain financial stability risks caused by high leverage.

Monetary policy normalization in advanced economies may cause portfolio outflows from emerging economies

The economic recovery is expected to be divergent because of uneven vaccine distribution and availability across regions. Since growth in emerging markets is forecast to be slower than in advanced economies, governments will face considerable financing needs. IMF staff analysis[19] suggests that gross financing needs in emerging markets (excluding Mainland China) are anticipated to remain elevated at 13% of GDP in 2021, and government debt is expected to

[17] Global fiscal support has already reached nearly US$16 trillion. Please see IMF (2021), *Fiscal Monitor*, April.
[18] IIF (2021), *Global Debt Monitor: COVID Drives Debt Surge – Stabilization Ahead?* February.
[19] IMF (2021), *Global Financial Stability Report*, April.

reach 61% of GDP. Both of these are beyond levels reported during the 2008 GFC (Chart 2.8).

In emerging markets, given that most of them have high debt and large financing needs, a move toward policy normalization or rising long-term interest rates in advanced economies could result in tighter financial conditions and significant capital outflows. Countries with poor economic fundamentals and limited access to vaccines may face massive capital outflows.

2.1.2 Mainland China's economic and financial conditions

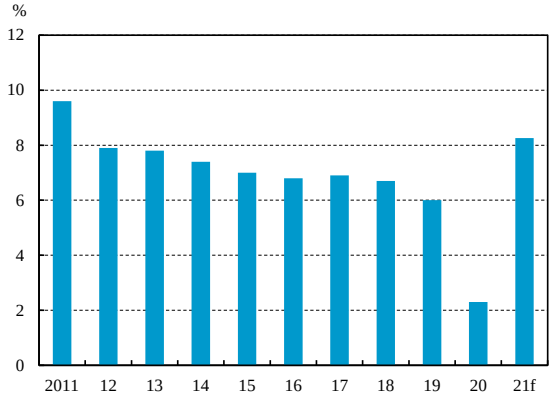
As the COVID-19 pandemic subsided, economic growth gradually picked up

In the beginning of 2020, the momentum of economic growth in Mainland China was battered severely by the outbreak of the COVID-19 pandemic. As a result, the growth rate declined to -6.8% in 2020 Q1. Afterwards, with the pandemic having abated, most regions successively eased their lockdowns and resumed production, leading to a stable recovery in Mainland China.[20] The GDP growth rate stood at 2.3% in 2020, a significant decrease of 3.7 pps compared to a year earlier (Chart 2.9). Looking ahead to 2021, owing to accelerating economic recovery and a lower base period of the previous year, IHS Markit forecasts that the economic growth rate will sharply surge to 8.3% (Chart 2.9).

Consumer prices continued to fall, while producer prices bounced back and housing prices showed moderate growth

Owing to slower growth in food prices, the CPI inflation rate of Mainland China was 2.5% throughout 2020, a decrease of 0.4 pps compared to a year earlier. IHS Markit projects the annual CPI inflation rate throughout 2021 will continue to fall to 1.8%. In addition, affected by the COVID-19 pandemic, the producer price index (PPI)

Chart 2.9 Economic growth rate of Mainland China



Note: Figure for 2021 is an IHS Markit estimate.
Sources: National Bureau of Statistics of China and IHS Markit (2021/5/15).

[20] According to the statistics of the National Bureau of Statistics of China, in 2020 Q2 and Q3, the annual growth rate in Mainland China rose to 3.2% and 4.9%, respectively. The economy advanced further to 6.5% in 2020 Q4 and gradually returned to its pre-pandemic level.

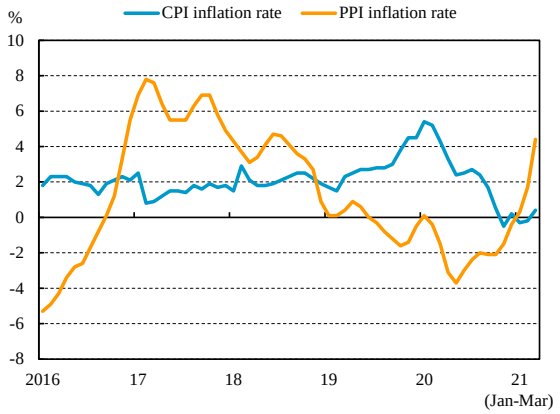
inflation rate dropped to -1.8% throughout 2020. Nonetheless, since the beginning of 2021, the PPI inflation rate has returned to positive territory and climbed to a recent high of 4.4% in March (Chart 2.10).

With regard to the housing market, in light of the spread of COVID-19 and associated lockdowns in the beginning of 2020, the transaction volume in the first half of the year shrunk significantly, coupled with a moderate increase in housing prices. However, in the second half of the year, a more accommodative monetary policy adopted by the People's Bank of China (PBC) led to speculative trading, fueling a gradual rise in housing prices (Chart 2.11). Considering that there were more signs of financialization and bubbles in the housing market, Mainland China's government successively required banks to comply with enhanced supervision measures for housing loans from December 2020 onwards so as to reduce bubble risks.

The PBC moved toward a neutral stance after implementing highly accommodative monetary policies

In early 2020, the escalation of the COVID-19 pandemic triggered financial market turmoil. The Shanghai interbank offered rate hiked rapidly. In response, the PBC substantially injected liquidity into markets by means of policy tools such as cuts in reserve requirement ratios. Moreover, the PBC led the market interest rates to drop by cutting rates of the medium-term lending

Chart 2.10 CPI and PPI inflation rates of Mainland China

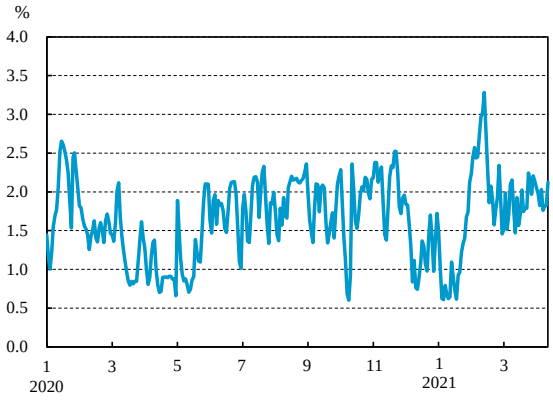


Source: National Bureau of Statistics of China.

Chart 2.11 Average annual growth rates of residential building sales prices in 70 medium-large cities of Mainland China

Source: Refinitiv Datastream.

Chart 2.12 Overnight Shanghai Interbank Offered Rate



Source: China Foreign Exchange Trading System & National Interbank Funding Center.

facilities (MLFs) and reverse repo operations. In the second half of the year, with effective control of the pandemic, the PBC moved toward a neutral stance and held an adequate level of liquidity for the financial system. As a result, the interbank overnight call loan rate picked up slightly and fluctuated in a range-bound band (chart 2.12).

Chart 2.13 Shanghai Stock Exchange Composite index

Source: Bloomberg.

SSE Composite Index and RMB FX rate both jumped substantially

Owing to the spread of COVID-19 in the beginning of 2020, the SSE Composite Index plummeted amid a plunge in global stock prices during March. However, from 2020 Q2 onwards, thanks to effective control of COVID-19 and a massive inflow of foreign capital, the SSE Composite Index rebounded significantly and fluctuated upwards. At the end of December, the index surged by 13.87% year on year. Nevertheless, the Index slid in early 2021, along with tumbling global stock markets owing to rising concerns about inflation in the US (Chart 2.13).

Chart 2.14 RMB/USD exchange rate

Source: CBC.

Regarding the FX market, in the beginning of 2020, soaring panic sentiment in international financial markets triggered a rise in the US Dollar Index, leading to a notable depreciation of the RMB exchange rate against the US dollar. Afterwards, with gradual economic recovery in Mainland China and a widening of interest rate spreads between the US and Mainland China, the RMB exchange rate against the US dollar turned to appreciate and rose by 6.52% throughout the year. However, the rate weakened against the US dollar from March 2021 on account of elevated US Treasury yields (Chart 2.14).

Aggregate financing to the real economy grew constantly

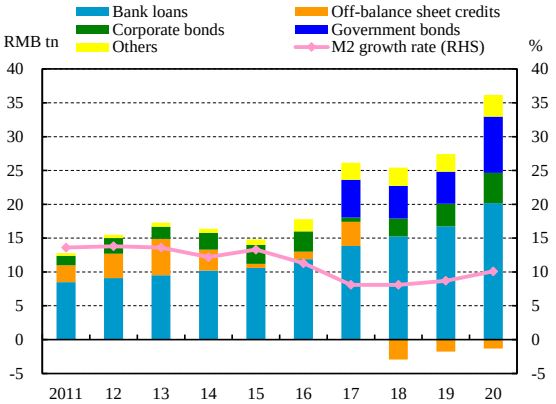
In 2020, against a backdrop of easy monetary policy by the PBC, the annual growth rate of broad money supply M2 rose by 1.4 pps to 10.1% from 8.7% a year before. The increment in aggregate financing to the real economy also markedly climbed to RMB34.9 trillion. Among them, only off-balance sheet credit continued to shrink by RMB1.3 trillion (Chart 2.15). At the end of 2020, the outstanding amount of financing to the real economy stood at RMB284.8 trillion, an annual increase of 13.3% compared to a year earlier.

At the end of 2020, the NPLs of commercial banks in Mainland China stood at RMB2.70 trillion, a striking increase of 11.93% year on year. On the other hand, the NPL ratio slightly dropped to 1.84% (Chart 2.16). If special-mention loans with a total amount of RMB3.78 trillion were included, the outstanding amount of classified assets would rise to RMB6.48 trillion, equivalent to 4.41% of total loans, reflecting unsound credit quality.

Mainland China's potential risks mounted with rising debt

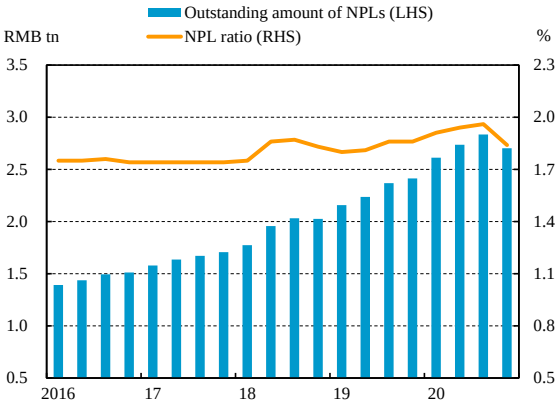
According to the statistics of the BIS, the outstanding debt for nonfinancial sectors in Mainland China continually reached a record high of RMB292.9 trillion at the end of 2020,

Chart 2.15 Increment of financing to the real economy and annual growth rate of M2 in Mainland China



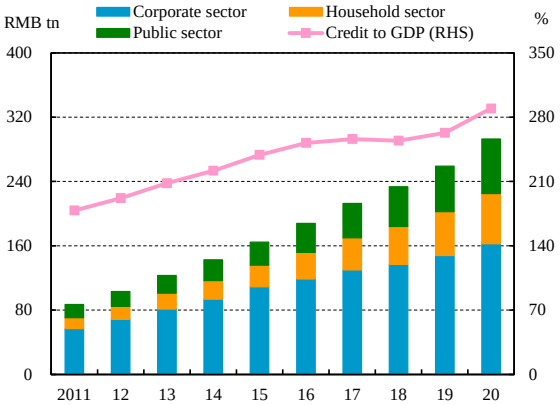
Source: PBC.

Chart 2.16 NPLs of Mainland China's commercial banks



Source: China Banking and Insurance Regulatory Commission.

Chart 2.17 Outstanding amount of debts for nonfinancial sectors and credit-to-GDP ratio in Mainland China



Source: BIS.

equivalent to 289.5% of annual GDP, indicating a considerable increase of 26.6 pps year on year (Chart 2.17). Among them, corporate sector debt continued its upward trend. For large enterprises (mainly state-owned enterprises), their outstanding debt financing from banks was more than RMB3 trillion, with the NPL ratio hitting over 16%. It put downward pressure on financial institutions' asset quality. Furthermore, the outstanding debt of the household sector, which was highly concentrated in mortgages, increased by 14.24% from a year before and stood at RMB34.5 trillion at the end of 2020. To make matters worse, some buyers purchased real estate with loans for personal consumption or for working capital, raising concerns about excessive financing.

According to the statistics from the Ministry of Finance of China, the outstanding amount of local government debt totaled RBM25.66 trillion at the end of 2020, a significant increase of 20.41% year on year. In addition, with more local government debt financing through other vehicles, the debt servicing pressure may mount further in the future.

2.1.3 Fiscal and monetary policies in major economies since the second half of 2020

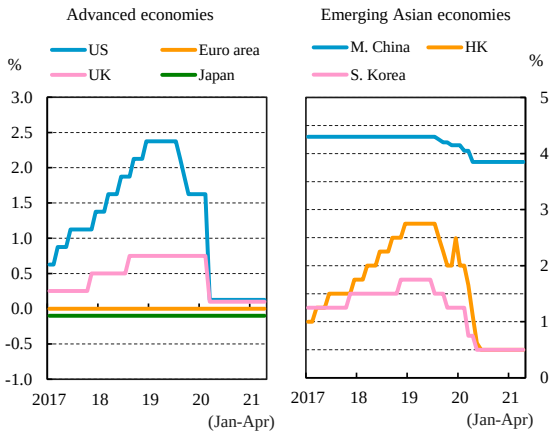
Following the COVID-19 outbreak in the beginning of 2020, central banks in major economies have adopted more accommodative and aggressive policies, or so-called unconventional policies, so as to cushion the pandemic's impact. Since the global economy has not fully regained momentum, most central banks have maintained accommodative monetary policies by providing low interest rates. Besides this, governments continued their massive fiscal policy responses to mitigate downside risks to the real economy.

Major economies maintained accommodative monetary policies

Major central banks mostly kept interest rates low. Among them, after making rate cuts by a total of 150 bps throughout March 2020, the Fed held the target range for the federal funds rate at 0.00-0.25%. The Fed also announced the extension of its US dollar liquidity swap lines and left asset purchases unchanged. From 2020 onwards, the European Central Bank (ECB) kept interest rates steady owing to the unfolding of the pandemic and the persistence of below-target inflation outcomes. Furthermore, the ECB decided to extend the period of refinancing operations and to increase the size of its bond buying program. The Bank of Japan not only continued to apply a negative interest rate, but also extended the duration of the program

regarding special funds-supplying operations to facilitate corporate financing. The Bank of England ramped up its government and corporate bond-buying program to respond to the impact of the pandemic. Mainland China stopped its monetary expansion and moved toward a stable and neutral policy stance from the second half of 2020, as well as successively putting an end to various COVID-related support measures. Lastly, some Asian economies (such as Hong Kong and South Korea) kept policy rates unchanged from the second half of 2020 onwards, sustaining accommodative monetary policies (Chart 2.18).

Chart 2.18 Policy rates in major economies



Notes: 1. Advanced economies: figure for the US is based on the target federal funds rate; for the euro area, the main refinancing operations fixed rate; for the UK, official bank rate; for Japan, interest rate on excess reserves.
2. Emerging Asian economies: figure for Mainland China is based on one-year loan prime rate; for Hong Kong, base rate; for South Korea, Bank of Korea base rate.
3. Figures are as of April 30, 2021.

Sources: Central bank and monetary authority websites.

Major economies announced further fiscal stimulus

In the first six months of 2020, widespread lockdowns amid the COVID-19 outbreak resulted in serious impacts on the real economy and posed downside risks to the global economic outlook. In order to assist vulnerable households and firms to weather the COVID-19 crisis, major economies deployed extraordinary fiscal policy support. In the second half of the year, high uncertainty around the evolution of the pandemic hindered economic growth. Accordingly, most economies continuously launched fiscal stimulus packages, focusing on unemployment benefits, extension of the loans to businesses, and vaccine distribution. For example, the US passed the second-largest pandemic aid bill in March 2021, totaling US$1.9 trillion. The European Union agreed to a € 750 billion COVID-19 recovery fund. The Japanese government launched a new round of stimulus worth roughly ¥73.6 trillion.

2.2 Domestic macro environment

2.2.1 Domestic economic and fiscal conditions

Although private consumption, which was affected by the COVID-19 pandemic, turned to decline in 2020, the domestic economy grew moderately and inflation remained stable thanks

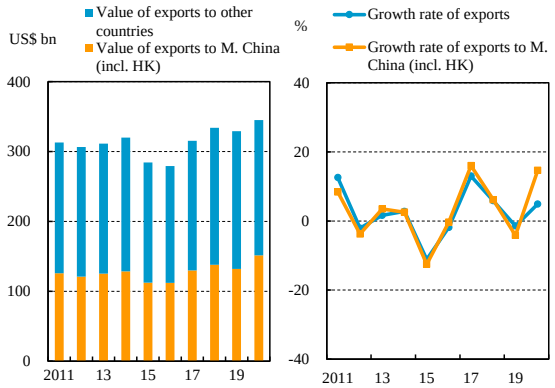
to positive growth in exports and an increase in private investment. External debt servicing capacity stayed robust on the back of a persistent surplus in the balance of payments and ample FX reserves. With the government's fiscal deficits rising again, outstanding public debt marginally expanded but still stood within a manageable level. However, from mid-May 2021 onwards, the impacts of a global recurrence of the COVID-19 pandemic and an upsurge in domestic COVID-19 cases on economic growth momentum warrant close attention.

Taiwan was less impacted by the COVID-19 pandemic, and the domestic economy remained on a mild growth path

In 2020, benefiting from the leading advanced manufacturing process technologies of Taiwan's semiconductor industry and a partial order transfer effect, the annual growth rate of exports rose against the trend.[21] For the year as a whole, exports increased by 4.90%, reaching a record high of US$345.2 billion (Chart 2.19), mainly owing to the export value of electronic components creating a new high. Among Taiwan's major trading partners, the growth rate of exports to Mainland China (including Hong Kong) turned positive, growing by 14.64%, chiefly because of a larger increase in exports of integrated circuits to Mainland China (Chart 2.19).

The domestic economy maintained moderate growth in 2020, thanks to booming exports, coupled with the stable demand from government consumption and a rise in the investment by state-owned enterprises, as well as the three major programs for investing in Taiwan[22] promoted by the government which helped to increase private investment. Despite private consumption being constrained by the pandemic and decreasing by 2.75% year on year, the annual economic growth rate reached 3.11%,[23] slightly higher

Chart 2.19 Total value and annual growth rates of exports



Source: MOF.

[21] In 2020, the annual growth rate of exports in Taiwan registered 4.90%, outperforming Hong Kong (-0.5%), Singapore (-4.3%), and South Korea (-5.5%). Analyzed by export regions, Taiwan's exports to Mainland China (including Hong Kong), the United States, and Japan reached record highs of US$151.4 billion, US$50.6 billion, and US$23.4 billion, respectively; however, exports to the ten ASEAN member states registered US$53.2 billion, which was the lowest in the past four years.

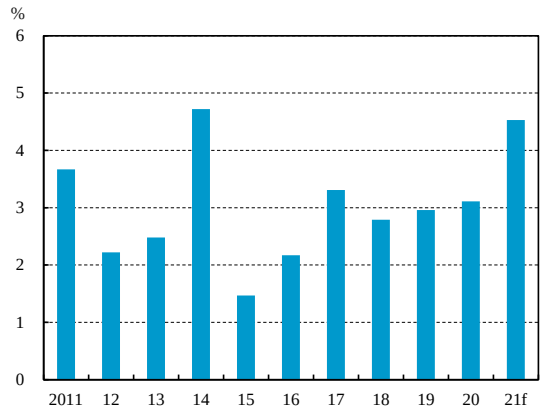
[22] From January 2019 onwards, the Executive Yuan promoted the *Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan*, and in June 2019, approved the *Action Plan for Accelerated Investment by Domestic Corporations* and the *Action Plan for Accelerated Investment by SMEs*. Such programs not only attracted enterprises to return to invest in Taiwan but also accelerated guiding the upgrading and transformation of domestic corporations.

[23] Press release of the DGBAS on February 20, 2021.

than the 2.96% of the previous year (Chart 2.20).

Looking ahead to 2021, the Bank predicts that the annual economic growth rate will continue to rise to 4.53% (Chart 2.20). However, from mid-May onwards, the negative effects of a global resurgence of the pandemic and an upsurge in domestic COVID-19 cases on economic growth momentum merit closer attention.

Chart 2.20 Economic growth rate in Taiwan

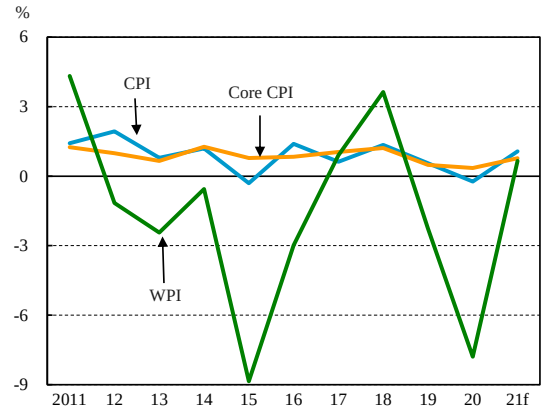


Note: Figure for 2021 is a CBC forecast released on March 18, 2021; other figures are released by DGBAS.
Sources: DGBAS and CBC.

Domestic prices remained stable

In 2020, on account of the pandemic and a decline in international crude oil prices, annual wholesale price index (WPI) inflation declined to -7.79%, much lower than -2.26% recorded in 2019. The DGBAS projected that annual WPI inflation would rebound to 0.66% in 2021. With regard to consumer prices, annual CPI inflation registered -0.23% in 2020, lower than the 0.56% of the previous year, owing to the impact of the pandemic and a fall in fuel prices coupled with discount promotions offered by the hospitality industry. Core CPI inflation, which excludes fruits, vegetables and energy, increased mildly and reached 0.35% in 2020, lower than the 0.49% of the previous year (Chart 2.21).

Chart 2.21 Consumer and wholesale price indices (% change, yoy)

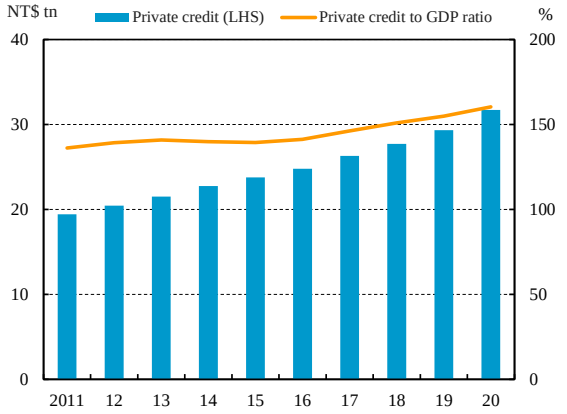


Note: Figures for CPI and Core CPI in 2021 are CBC forecasts released on March 18, 2021; other figures are DGBAS statistical data and a forecast released on February 20, 2021.
Sources: DGBAS and CBC.

Annual CPI inflation in the first quarter of 2021 registered 0.80%, but it rose to 2.09% in April, and was expected to be higher than 2% in May, mainly because of an increase in the international prices of raw materials such as crude oil as well as a lower base period deriving from the impact of the COVID-19 pandemic in the same period of the previous year, which should be a short-term phenomenon. In the second half of 2021, owing to the factor of a lower base period gradually fading, annual CPI inflation is expected to decrease at a gradual pace.

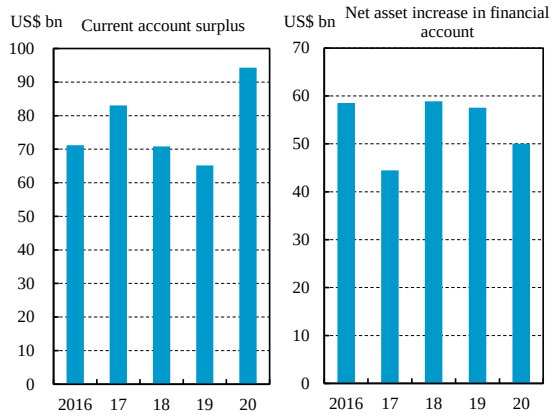
The Bank forecasted that the annual CPI and core CPI inflation rates would remain at about 1.5% and 1%, respectively, with little concern of inflation.

Chart 2.22 Private credit provided by financial institutions



Source: CBC.

Chart 2.23 Current account surplus and net asset increase in financial account



Source: CBC.

Credit to the private sector provided by financial institutions increased continually

Private credit[24] to private enterprises and households provided by financial institutions rose continually in 2020, reaching NT$31.71 trillion at the end of the year, an increase of 8.10% year on year, and the ratio of credit to GDP registered 160.36% (Chart 2.22). It showed that the credit supply provided by domestic financial institutions was sufficient to support economic activity.

Current account sustained a surplus and FX reserves stayed ample

In 2020, the merchandise trade surplus expanded, and service trade turned to a surplus, as well as Taiwanese nationals inwardly remitted more income from overseas direct investments, leading to an expansion in the income surplus. As a result, the annual current account surplus rose to US$94.3 billion, or 14.09%[25] of the year's GDP, a sharp increase of 44.68% compared to 2019. An increase in foreign securities investments by the banking sector and insurance companies boosting foreign assets, coupled with the reduced holdings of Taiwanese stocks by foreign institutional investors, caused a decrease in foreign liabilities. Accordingly, the financial account posted an increase of US$50 billion throughout the year (Chart 2.23), while the Bank's reserve assets increased

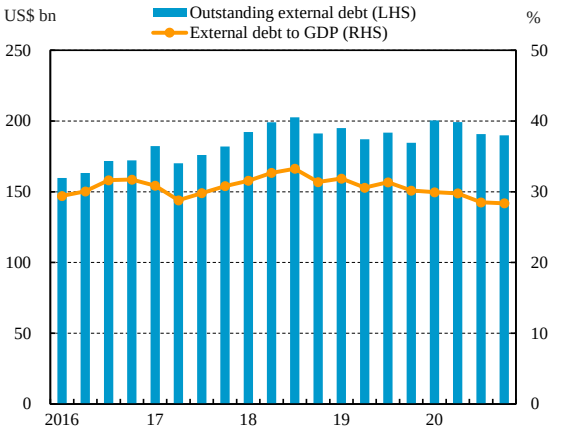
[24] Private credit refers to the loans granted by major financial institutions to various private enterprises, individuals, and non-profit organizations in Taiwan, as well as the purchases of securities such as stocks, corporate bonds, commercial paper, acceptance bills, beneficiary certificates issued by private enterprises, and the equities of long-term investments in private enterprises.

[25] For the ratio of current account deficit to GDP, it is generally deemed that its critical value as a risk measure is 3%. A country in which the reading is greater than 3% and has risen by at least 5 pps from the previous year is considered to be relatively high risk.

by US$48.3 billion.

FX reserves climbed to US$529.9 billion at the end of 2020, rising by 10.83% from a year earlier, mainly supported by the accumulation of earnings from portfolio investment operations of FX reserve assets, and the intervention operations by the Bank because of a large amount of capital inflows that caused excessive volatility in the FX market. At the end of April 2021, the FX reserves continuously increased to US$541.1 billion.

Chart 2.24 External debt servicing capacity

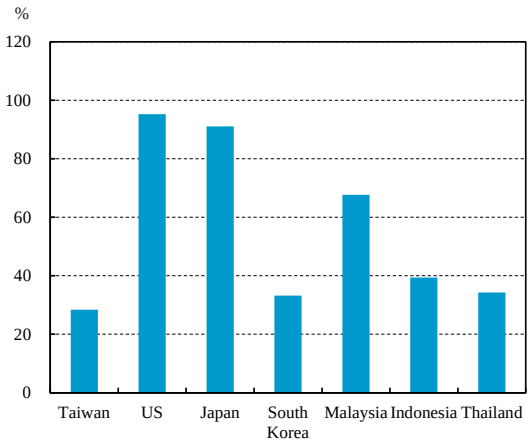


Notes:1. Figures for outstanding external debts are on an end-of-period basis.
2. Figures for GDP are on an annualized basis.
Sources: CBC and DGBAS.

The scale of external debt expanded, while debt-servicing capacity remained strong

Primarily because of an increase in the long-term external debt of the banking sector, Taiwan's external debt[26] rose to US$189.9 billion at the end of 2020 (Chart 2.24), increasing by 2.82% compared to a year earlier. The largest share of external debt went for the private sector, registering US$188.4 billion, while the public sector share only reached US$1.5 billion. Taiwan's external debt stood at 28.37% of the year's GDP at the end of 2020, lower than the internationally recognized alert threshold,[27] and much lower than those in the US, Japan, and Malaysia (Chart 2.25).

Chart 2.25 External debt to GDP in selected countries



Note: Figures for the United States and Thailand are as of the end of 2019; other figures are as of the end of 2020.
Source: CEIC.

[26] See Note 2.
[27] The general international consensus is that a country with a ratio of external debt to GDP lower than 50% is deemed to be relatively low risk.

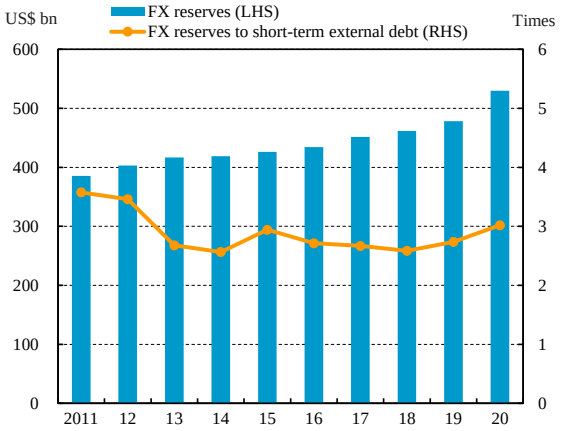
Furthermore, at the end of 2020, the ratio of FX reserves to short-term external debt rose to 3.02 times owing to an increase in FX reserves and a decline in short-term external debt. It was much higher than the internationally recognized alert threshold,[28] implying that Taiwan's FX reserves have a robust capacity to meet payment obligations (Chart 2.26).

Fiscal deficits reached a record high and government debt also increased

In 2020, the government compiled a special budget of about NT$420 billion to mitigate the impact of the pandemic, and actively promoted several measures, such as the *Forward-looking Infrastructure Development Program*, leading to an expansion of annual expenditures. As a result, the government budget turned to a deficit of NT$451 billion or 2.28%[29] of GDP for the year, from a surplus of NT$20.2 billion recorded in the previous year (Chart 2.27).

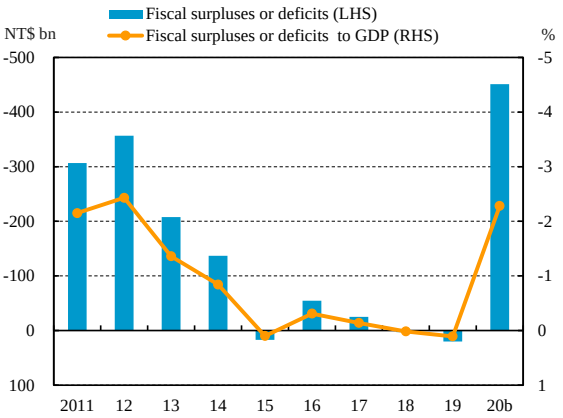
With fiscal deficits expanding, the outstanding public debt at all levels of government[30] rose to NT$6.68 trillion at the end of 2020, increasing by 7.86% year on year. Despite the ratio of total public debt to the year's GDP also

Chart 2.26 Short-term external debt servicing capacity



Source: CBC.

Chart 2.27 Fiscal deficits



Notes: 1. Fiscal position data include those of central and local governments.
2. Figures for 2020 are final accounts for the central government and budgets for local governments.

Sources: MOF and DGBAS.

[28] The general international consensus is that a country with a ratio of FX reserves to short-term external debt higher than 100% is deemed to be relatively low risk.
[29] See Note 3.
[30] The term "outstanding debt at all levels of government" as used in this report refers to outstanding non-self-liquidating debt with a maturity of one year or longer.

rebounding to 33.76% [31] (Chart 2.28), government debt still stayed within a manageable level.

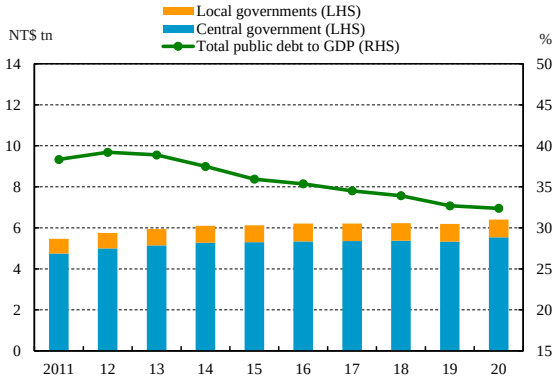
2.2.2 Corporate sector[32]

The profitability of TWSE- and OTC-listed companies greatly enhanced in 2020, attributable to several factors including the stellar performance of the electronics industry spurred by strong demand for emerging technology applications. Meanwhile, their financial leverage ratios elevated, but short-term debt servicing capacity remained adequate. Although the NPL ratio for corporate loans granted by financial institutions rose slightly, the credit quality for the corporate sector stayed satisfactory.

Profitability of both TWSE- and OTC-listed companies spiked despite the impact of the COVID-19 pandemic

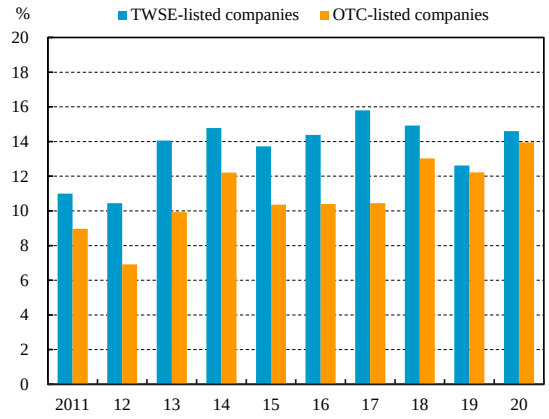
In 2020, the corporate sector in Taiwan faced the challenge of the global spread of the COVID-19 pandemic, and foreign demand for some traditional manufacturing products waned significantly. However, the COVID-19 pandemic drove up remote business opportunities, inducing demand for semiconductors, information and communications technology, and 5G applications. Consequently, the average ROEs of TWSE- and OTC-listed

Chart 2.28 Public debt



Notes: 1. Outstanding public debt refers to non-self-liquidating debt with a maturity of one year or longer, excluding external debt.
2. Figures for 2020 are preliminary final accounts for the central government and budgets for local governments.
Sources: MOF and DGBAS.

Chart 2.29 Return on equity in corporate sector



Note: Return on equity = net income before interest and tax/average equity.
Source: TEJ.

[31] See Note 4.
[32] Corporate sector section only includes the non-financial industrial data of TWSE-listed companies and OTC-listed companies. Figures for listed companies are consolidated financial data; the data for 2011 are on the basis of generally accepted accounting principles in the Republic of China (Taiwan) (ROC GAAP), while from 2012, the data are on the basis of International Financial Reporting Standards as endorsed for use in Taiwan (TIFRSs). In light of changes in accounting treatment and presentation, readers should interpret these figures prudently when comparing statistics before and after IFRSs adoption.

companies jumped to 14.60% and 13.95% from 12.62% and 12.23%, respectively, in the previous year (chart 2.29). Their overall profitability ascended remarkably.

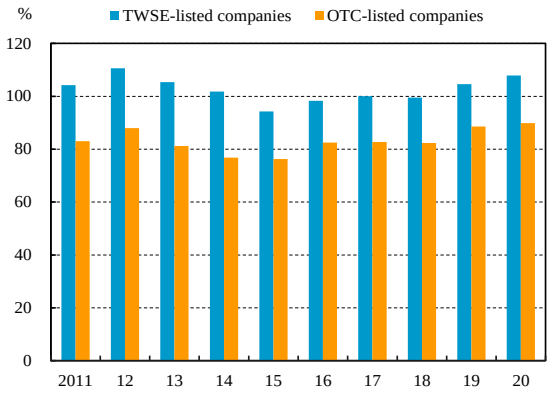
Leverage ratios elevated, while short-term debt servicing capacity remained at an adequate level for listed companies

At the end of 2020, the average leverage ratios for TWSE- and OTC-listed companies rose to 107.85% and 89.88% from 104.61% and 88.55%, respectively, a year eariler (Chart 2.30). Leverage ratios increased mainly owing to the the fact that market interest rates trended downward, which attracted companies to increase borrowing from banks and the issuance of CP and corporate bonds.

Meanwhile, the current ratio for TWSE-listed companies rose slightly to 152.43%, but that for OTC-listed companies decreased mildly to 179.14% (Chart 2.31). However, the current assets of both types of companies are still sufficient to support short-term debt. With a substantial increase in profits, their interest coverage ratios climbed to 15.70 and 21.99 (Chart 2.32), respectively, implying that the capacity to pay interest with profits was greatly improved. Overall, short-term debt servicing capacity for listed companies remained at an adequate level in 2020.

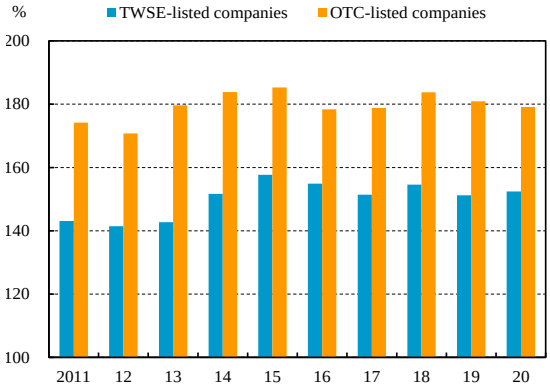
Pandemic caused a slight increase in the NPL ratio of the corporate sector,

Chart 2.30 Leverage ratios in corporate sector



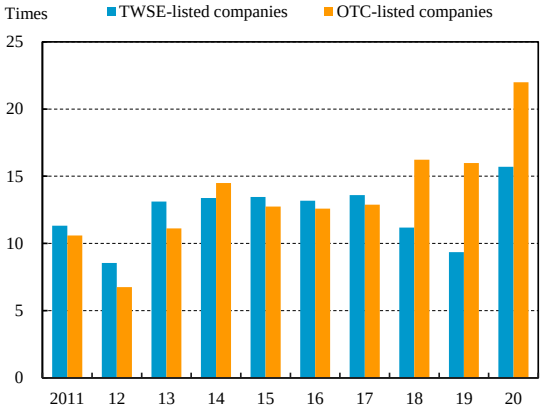
Note: Leverage ratio = total liabilities/total equity.
Source: TEJ.

Chart 2.31 Current ratios in corporate sector



Note: Current ratio = current assets/current liabilities.
Source: TEJ.

Chart 2.32 Interest coverage ratios in corporate sector



Note: Interest coverage ratio = income before interest and tax/interest expenses.
Source: TEJ.

while credit quality of corporate loans remained satisfactory

Affected by the COVID-19 pandemic, the NPL ratio for corporate loans [33] from financial institutions edged up to 0.28% at the end of 2020 from 0.26% a year earlier, while the overall credit quality for the corporate sector remained satisfactory (Chart 2.33).

2.2.3 Household sector

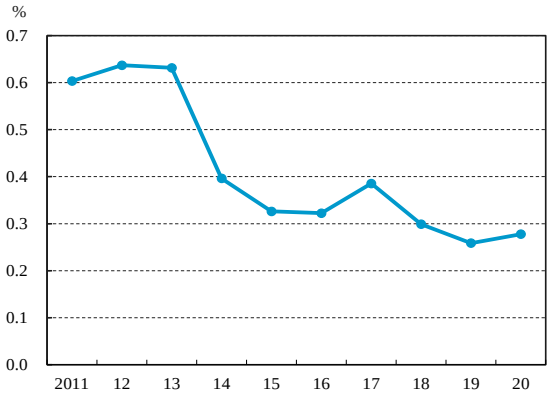
The balance of total household borrowing expanded continually, while the household debt burden rose in 2020. However, the household net worth to GDP ratio was high, reflecting that the debt servicing capacity of households remained sound. Moreover, the credit quality of household borrowing from financial institutions remained satisfactory.

Household borrowing grew continually

Total household borrowing expanded and reached NT$17.63 trillion at the end of 2020, equivalent to 89.15% of the GDP for the whole year (Chart 2.34). The purchase of real estate accounted for 62.72%, the major share of household borrowing.

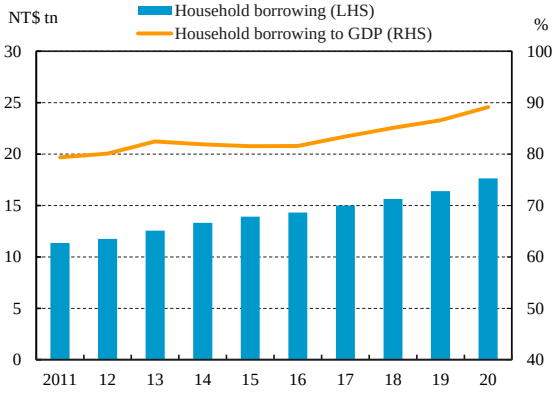
The annual growth rate of household borrowing rose to 7.54% in 2020, mainly attributed to the purposes of purchase of real estate and working capital needs. Compared to

Chart 2.33 NPL ratio of corporate loans



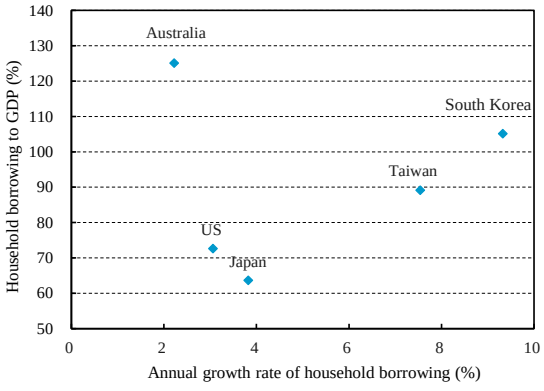
Source: JCIC.

Chart 2.34 Household borrowing to GDP



Sources: CBC, JCIC, and DGBAS.

Chart 2.35 Household indebtedness in selected countries



Note: Figures are as of the end of 2020.
Sources: Fed, BOJ, BOK, ABS, IMF, DGBAS, JCIC, and CBC.

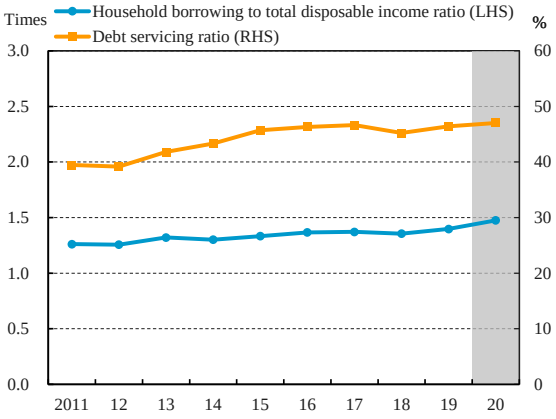
[33] The data for the corporate sector herein are on the basis of listed and unlisted corporations provided by the Joint Credit Information Center (JCIC), excluding the data of overseas branches of domestic banks.

other countries, the growth rate of total household borrowing in Taiwan was lower than that in South Korea, but higher than those in Japan, the US, and Australia. As for household borrowing to GDP, Taiwan's ratio was lower than those in Australia and South Korea, but higher than those in the US and Japan (Chart 2.35).

Household debt burden increased, while net worth was high

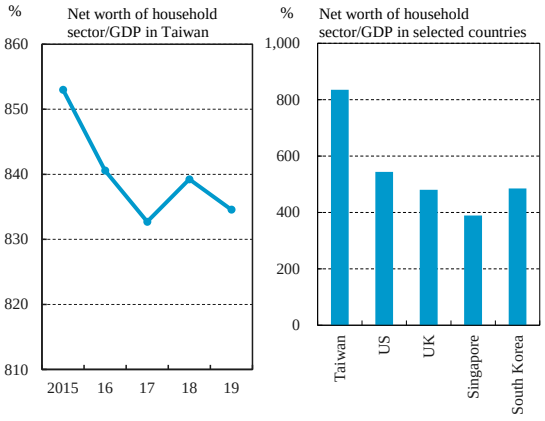
The ratio of household borrowing to total disposable income [34] increased to 1.48 in 2020, reflecting a rising household debt burden. Moreover, the debt servicing ratio also climbed marginally to 47.03% (Chart 2.36), thereby indicating that short-term household debt servicing pressure tightened. Nonetheless, household net worth [35] in Taiwan has been remarkable over the past decades, which has been held at more than 8.3 times the GDP in recent years. Compared to other countries, the household net worth to GDP in Taiwan was higher than those in the UK, the US, South Korea, and Singapore (Chart 2.37), reflecting that the financial health of households in Taiwan was still sound with fair debt servicing capacity.

Chart 2.36 Household indebtedness and debt servicing ratio



Notes: 1. Total disposable income in shaded area is a CBC estimate.
2. Debt servicing ratio = borrowing service and principal payments/total disposable income.
Sources: CBC, JCIC, and DGBAS.

Chart 2.37 Household net worth to GDP



Notes: 1. The household sector herein includes households and non-profit organizations.
2. In the right panel, figures are as of the end of 2019.
Sources: DGBAS and official websites of selected countries.

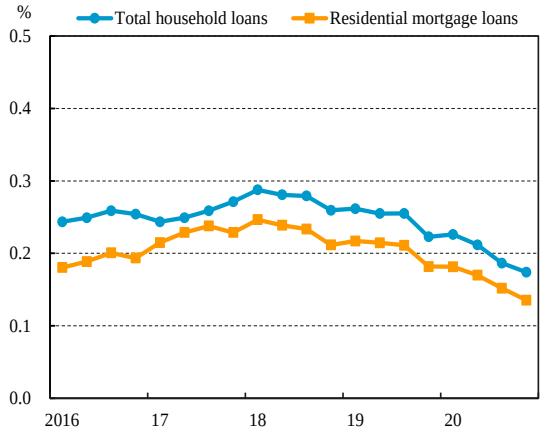
Credit quality of household borrowing remained satisfactory

In the second half of 2020, with the domestic COVID-19 situation brought under control, economic activity gradually picked up, the unemployment rate fell back to 3.68% in December, and the actual number of employees working reduced hours as previously determined through

[34] Total disposable income = disposable income + rental expenses + interest expenses.
[35] See Note 5.

employer-employee negotiations also significantly dropped to 6,463, indicating that the impact of COVID-19 on the household sector shrank noticeably. These factors, coupled with persistently low interest rates, were helpful to reduce the household debt burden. As a result, the NPL ratios of household borrowing and loans for purchase of real estate decreased to new lows of 0.17% and 0.14%, respectively, at the end of the year (Chart 2.38), reflecting satisfactory credit quality.

Chart 2.38 NPL ratios of household borrowing

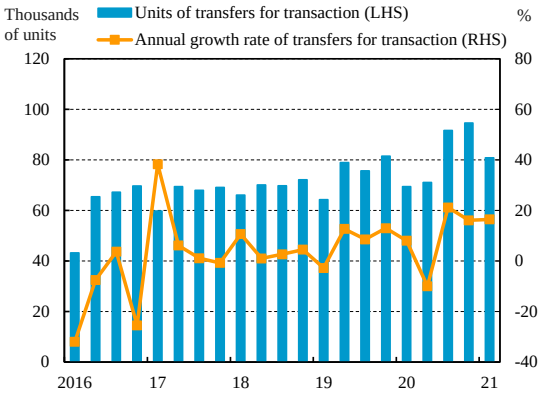


Source: JCIC.

2.2.4 Real estate market

With house and land transactions bouncing back, house prices rose in the second half of 2020. New housing and construction loans extended by banks grew at a faster pace, and the mortgage burden slightly increased. To curb speculation in the housing market, the government initiated the Healthy Real Estate Market Plan in December 2020. The relevant ministries and agencies launched and put numerous measures into practice accordingly to foster a sound real estate market.

Chart 2.39 Building transfers for transaction and annual growth rate



Source: Monthly Bulletin of Interior Statistics, MOI.

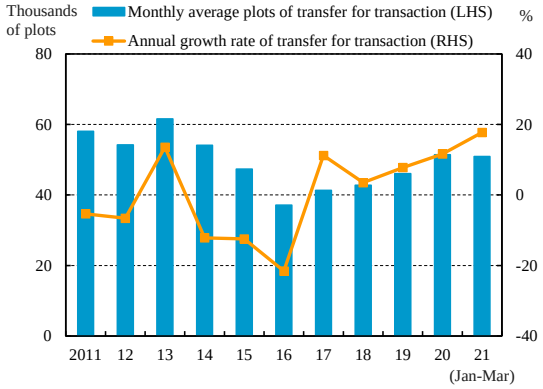
Trading volumes in the real estate market increased

In the first half of 2020, the total number of building ownership transfers for transaction decreased by 1.94% compared to the same period of the previous year because of the pandemic. In the second half of the year, the annual growth rate rose back up and registered 18.51%, as restored consumer sentiment led to a pickup in housing market transactions amid the well-contained domestic pandemic situation, coupled with firms' expanded investment and the successive handover of new buildings. For the whole year, the annual growth rate increased to 8.76% year on year (Chart 2.39). When moving into 2021, following the CBC's revision of

mortgage rules and the government's joint audits targeting pre-sold houses, housing market sentiment cooled down. However, the annual growth rate of building ownership transfers for transaction reached 16.42% in 2021 Q1, mainly owing to a lower base period and the increased handover of new buildings.

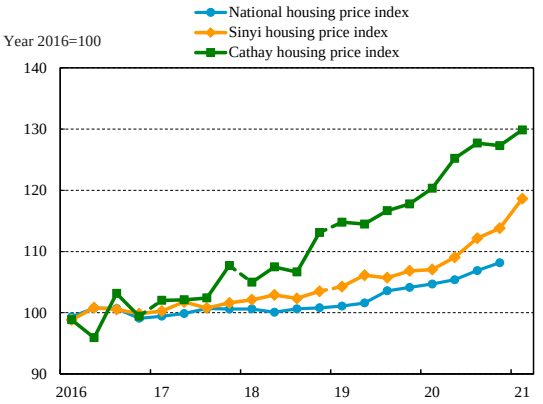
A buoyant housing market, coupled with stronger demand for factory buildings owing to firms' expanded investment, the eager purchase of vacant land by firms in the real estate industry, as well as increased domestic real estate investments by life insurance companies, led the total number of land ownership transfers for transaction to rise by 11.62% year on year (Chart 2.40).

Chart 2.40 Land transfers for transaction and annual growth rate



Note: Figures are the monthly average of each year. Data of 2021 are the monthly average for the period of January to March.
Source: Monthly Bulletin of Interior Statistics, MOI.

Chart 2.41 House price indices



Notes: 1. In 2018 Q1, the Cathay housing price index model's parameters were revised, and from January 2017 the opening price, transaction price, and index of each quarter were recalculated. In 2021 Q1, the time variable was removed from the model for potential transaction prices.
2. For comparison purposes, all three indices use the same base year of 2016 (2016 average = 100).
Sources: MOI, Cathay Real Estate, and Sinyi Real Estate Inc.

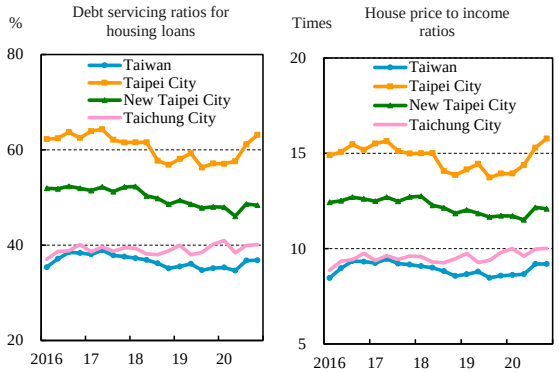
Real estate prices hit an all-time high

The national housing price index released by the Ministry of the Interior (MOI) rose gradually from early 2020 onwards. It reached a record high of 108.17 as of the end of Q4 (Chart 2.41), increasing by 3.87% year on year. The Sinyi housing price index rose in 2020 and reached a historical high level in 2021 Q1. The Cathay housing price index also trended upwards to hit a historical high level in 2021 Q1 (Chart 2.41), while the annual growth rate slowly fell to 7.92% quarter on quarter from 9.47% in 2020 Q3.

Mortgage burden rebounded

The debt servicing ratio for housing loans declined to 34.64% in 2020 Q2, the lowest level since 2014 Q2. However, from Q3 onwards, the ratio rose mildly to 36.81% in Q4 following rising housing prices quarter on quarter, and increased by 1.66 pps from the previous year. Among them, Taipei City showed the heaviest mortgage burden with its ratio registering 63.12% (Chart 2.42, left panel). The house price to income ratio also rose to 9.20 times in 2020 Q4 (Chart 2.42, right panel), increasing 0.62 times year on year.

Chart 2.42 Debt servicing ratios for housing loans and house price to income ratios

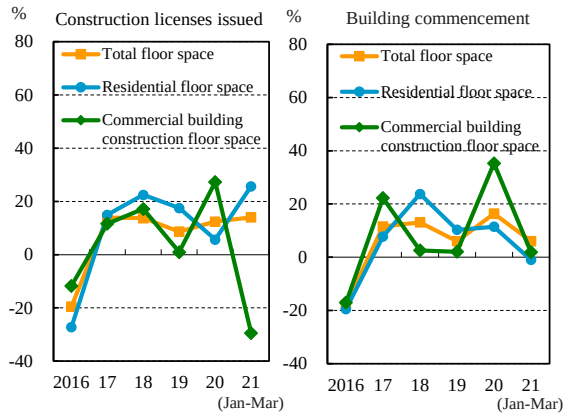


Notes: 1. Debt servicing ratio for housing loans = median monthly housing loan payment/median monthly household disposable income.
2. House price to income ratio = median house price/median annual household disposable income.
Source: Housing Price Affordability Indicator Statistics, Construction and Planning Agency of the MOI.

The total floor space of construction licenses issued and building commencement expanded substantially, while pressure from the expansion of unsold new residential properties remained

With the housing market gathering momentum, the total floor space of construction licenses issued increased by 12.44% in 2020. For the period of January to March 2021, total floor space continued to increase by 14.02% year on year (Chart 2.43, left panel). Furthermore, the total floor space of building commencement also increased by 16.38% in 2020. It was mainly underpinned by an abundance of marketing projects for residential properties, construction of commercial and industrial buildings, as well as successive commencement of social housing and reconstruction of old and dangerous buildings. For the period of January to March 2021, total floor space continued to increase by 6.07% year on year (Chart 2.43, right panel).

Chart 2.43 Annual growth rates of floor space of construction licenses issued and building commencement



Note: Commercial building construction includes buildings for commerce, industry, storage, business and service.
Source: Monthly Bulletin of Interior Statistics, MOI.

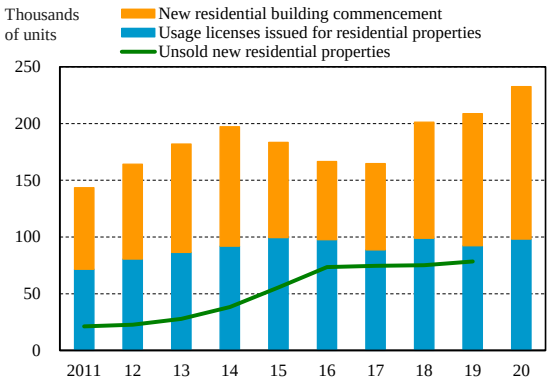
In 2020, the supply of new residential buildings increased as the annual growth rate of usage licenses and commencement for new residential buildings increased and reached 6.48% and 15.27%, respectively (Chart 2.44). With an increase in sales for some construction projects in the second half of 2020, the inventory of unsold new residential properties mildly reduced. However, given the successive release and high prices of new residential buildings as well as no signs of a pickup in their sale rates, the pressure on reducing the mounting number of unsold new residential properties remained.

Real estate loans grew but mortgage interest rates trended downward

With transactions in the housing market expanding, the total new housing loans granted by the top five banks[36] registered NT$629.5 billion in 2020, increasing by 6.23% year on year. In the first three months of 2021, the figure reached NT$152.7 billion, an increase of 10.39% year on year, owing to loan demand for reconstruction of old and dangerous buildings (Chart 2.45). After the Bank cut policy rates in March 2020, the average interest rate for new housing loans granted by the top five banks trended downward and dropped to 1.357% in March 2021, a decrease of 0.251 pps compared to the level in December 2019 (Chart 2.45).

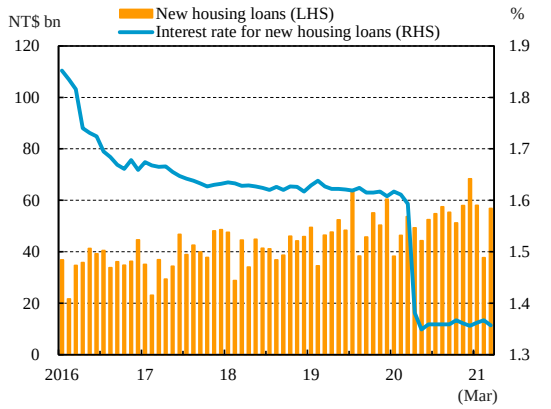
From August 2020 onwards, the annual growth rate of outstanding loans for house purchases and refurbishments granted by banks[37] trended upwards and registered 9.02% at the end of March 2021. Meanwhile, outstanding construction loans expanded with double digit growth and reached an annual

Chart 2.44 New residential buildings and unsold properties



Note: The MOI uses data from land registration, Taiwan Power Company, and house tax registration to classify residences that have been registered for the first time within the last 5 years and have an average electricity consumption of less than 60 kWh as unsold new residential properties.
Source: Real Estate Information Platform, MOI.

Chart 2.45 New housing loans – amount and interest rate

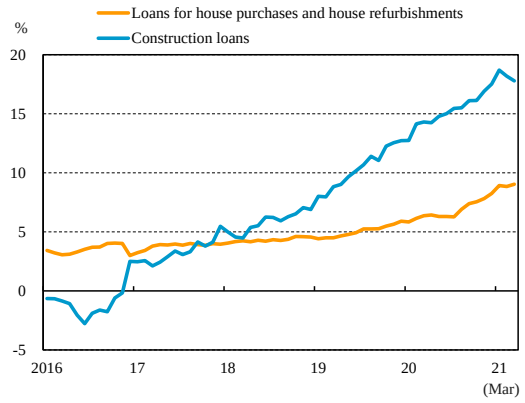


Source: CBC.

[36] The top five banks refer to the Bank of Taiwan, Taiwan Cooperative Bank, First Commercial Bank, Hua Nan Commercial Bank, and Land Bank of Taiwan.
[37] Refers to domestic banks and the local branches of foreign and Mainland China's banks.

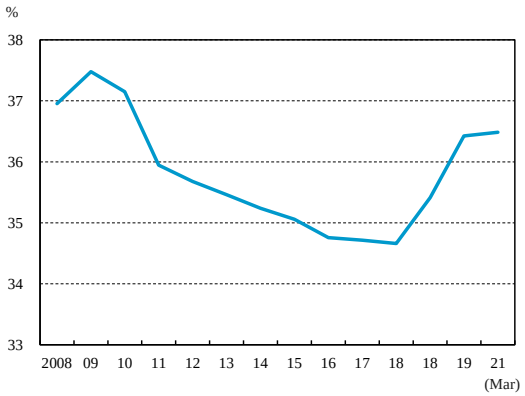
growth rate of 17.79% at the end of March 2021 (Chart 2.46). The aggregate amount of the aforementioned real estate loans amounted to NT$10.79 trillion and the share of total loans continually rose to 36.48% in March 2021 (Chart 2.47). However, the ratio was still lower than the historical high level of 37.90% at the end of October 2009.

Chart 2.46 Annual growth rates of real estate loans



Source: CBC.

Chart 2.47 Real estate loans to total loans



Notes: 1. Real estate loans refer to the aggregate amount of loans for house purchases, house refurbishments, and construction loans.
2. Figures are end-of-year data, except for figure of 2021, which is end-March data.

Source: CBC.

Banks' risk management on real estate loans remained satisfactory

In 2020, the average LTV ratio for new housing loans rose quarter by quarter and registered 72.64% in Q4, while the annual average LTV ratio recorded 71.79%, higher than the 70.58% in 2019. Moreover, the ratio for high-value housing loans[38] rose slightly to 57.00% in 2020 and then further ascended to 58.12% in 2021 Q1 (Chart 2.48).

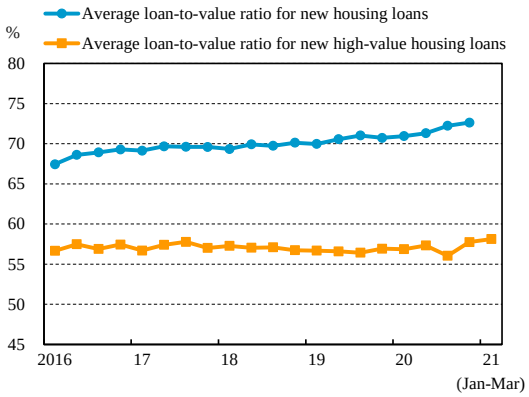
From the second half of 2020 onwards, the mortgage lending standards of some banks showed signs of loosening. However, the lending standard turned to tighten following the Bank's adjusted mortgage rules. Moreover, the NPL ratios of housing loans and construction loans granted by domestic banks dropped to 0.12% and 0.15%, respectively, at the end of March 2021. Both of the ratios were much lower than the overall NPL ratio of total loans, which revealed that the risk management of domestic banks on real estate loans remained satisfactory.

[38] Figures prior to 2021 include data from natural persons and companies, while the figure of 2021 includes data from natural persons only.

The government earnestly worked to fulfill the Healthy Real Estate Market Plan to foster a sound real estate market

In December 2020, the government initiated the Healthy Real Estate Market Plan in response to the real estate market situation (Box 1). Furthermore, the Bank revised mortgage rules twice to protect the housing market from excessive inflows of capital. The FSC also implemented a targeted inspection toward mortgage loans to strengthen risk management of real estate lending. All these efforts helped to foster a sound real estate market. Nevertheless, the supply and demand of the housing market adjusted slowly. The relevant ministries and agencies should continually collaborate with local governments to improve related systems, so as to realize the goal of sound development in the real estate market.

Chart 2.48 Average loan-to-value ratios for new and high-value housing loans



Sources: JCIC and CBC.

Box 1
The Healthy Real Estate Market Plan in Taiwan

In December 2020, the National Development Council under the Executive Yuan proposed the Healthy Real Estate Market Plan, which included two types of measures. The short-term or immediate implementation measures aimed at achieving four major goals, including curbing speculation in the housing market, preventing tax evasion, preventing the housing market from being flooded by capital, and creating quality homes to achieve housing justice. Among them, some measures, such as pre-sold housing audits and mortgage loans related policies, were effective at curbing market sentiment on speculative transactions, while the performance of the other measures would be revealed over time. The mid- and long- term measures are to continue improving the real estate management system so as to foster a sound real estate market. Specific measures of the Healthy Real Estate Market Plan are summarized in Table B1.1.

Table B1.1 Structure of the Healthy Real Estate Market Plan

Short-term/ Mid- and long-term	Goals	Policies	Specific measures
Short-term or immediate implementation	Curbing speculation in the housing market	●Inspecting the housing market situation regularly ●Curbing pre-sold houses and housing market speculation	●Actual price registration of real estate transaction 2.0 related acts were passed by the Legislative Yuan at the end of 2020 and came into effect on July 1, 2021. ●Amendments to the provisions of the *Income Tax Act* on the consolidated house and land transaction income tax were passed in April 2021 and came into effect on July 1, 2021. ●Establishing diagnostic indicators to point out whether the real estate market's supply and demand and transactions are healthy. ●Establishing a pre-sold house management team to enhance audits on pre-sold house transactions. ●The Ministry of Finance launched a task force to enhance audits on income from real estate transactions.
	Preventing tax evasion	●Preventing individuals from using companies to evade taxes ●Preventing single units from being divided into separate	●The amendments to the *Basic Income Tax Act* were passed by the Legislative Yuan at the end of 2020, reverting to the previous requirement to include income

		properties to evade taxes	from transactions of unlisted stocks in the taxable amount of basic income. The amendments came into effect on January 1, 2021. ●The Ministry of Finance proposed the amendments to the *House Tax Act* to revise the current house value tax exemption standard in March 2021. ●Implementing the auditing project of real estate transactions by profit-seeking enterprises.
	Preventing the housing market from being flooded by capital	●Preventing the housing market from being flooded by capital ●Mortgages should be within borrowers' ability ●Building a sound credit system	●The Bank revised targeted prudential measures on real estate lending twice (see Chapter 4). ●The capital requirements of real estate loans will adopt a loan-to-value (LTV) approach. ●Adopting targeted examinations to strengthen risk management of financial institutions and financial inspection of real estate lending.
	Creating quality homes to achieve housing justice	●Expanding social housing and rent subsidies	●Direct construction of 40,168 units of social housing at the end of October 2020. ●Increasing the number of rent subsidy recipients from 60,000 to 120,000 housing units in 2020. ●Providing landlords with incentives to accelerate the implementation of social housing subletting management.
Continued implementation and mid- and long-term discussion		●Preventing actual house usage from violating requirements ●Curbing pre-sold house and housing market speculation ●Setting reasonable house tax ●Establishing a system for approving residential housing purchases by private legal persons	●Intensifying inspections of house usage and applicable tax rate. ●Deliberating a law amendment to reinforce the management of real estate market information and pre-sold house transactions. ●Continuing to review the house tax rate. ●Deliberating to revise the *Equalization of Land Rights Act*, adding a system for approving residential housing purchases by private legal persons.

Source: National Development Council.

III. Financial system assessment

3.1 Financial markets

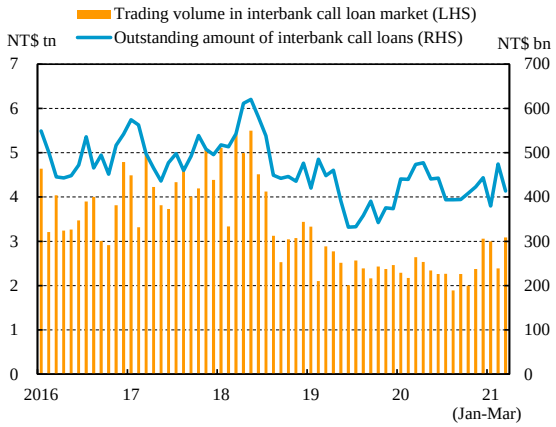
In 2020, the outstanding amount of interbank call loans expanded, while their trading volume shrank. The outstanding amount of bill issuance in the primary market reached a historical high mainly because of a greater increase in CP issuance. Propelled by the expansion in the primary market, the bill trading volume in the secondary market also increased. The outstanding amount of bond issuance increased significantly with corporate bond issuance registering the largest increment. Nevertheless, the turnover rate of outright transactions in the secondary bond market fell back after rising. Short-term market rates decreased marginally after the Bank cut the policy rates, while long-term interest rates dropped before rebounding. As for stock markets, stock prices slumped and fluctuated dramatically in the beginning of 2020 owing to the COVID-19 pandemic. Subsequently, with the strong recovery of the domestic economy and other favorable factors, the stock indices rebounded sharply and recorded new highs repeatedly. However, volatility in the stock market has intensified again since mid-May 2021, owing to expectations of US interest rate hikes and the COVID-19 pandemic resurgence worldwide. In the FX market, the NT dollar oscillated and appreciated against the US dollar in 2020, while the volatility was relatively low.

3.1.1 Money and bond markets

Outstanding amount of interbank call loans elevated, while their trading volume shrank

In 2020, overall domestic funds were abundant, but the fund levels across financial institutions were divergent. The average daily outstanding amount of interbank call loans increased by 9.78% and registered NT$430.9 billion, driven by the fact that some banks increased interbank borrowing to fulfill higher

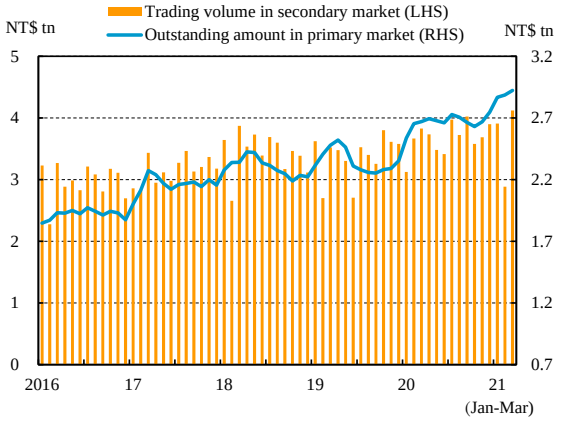
Chart 3.1 Interbank call loan market



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

demand by corporates for loans. Although the average outstanding amount of interbank call loans expanded, the trading volume decreased continually by 6.38% year on year in 2020, given that the proportion of interbank overnight call loans in the market decreased and financial institutions reduced the frequency with which they rolled over their interbank borrowing. In 2021 Q1, the outstanding amount of interbank call loans and their trading volume continued to stay at a low level (Chart 3.1).

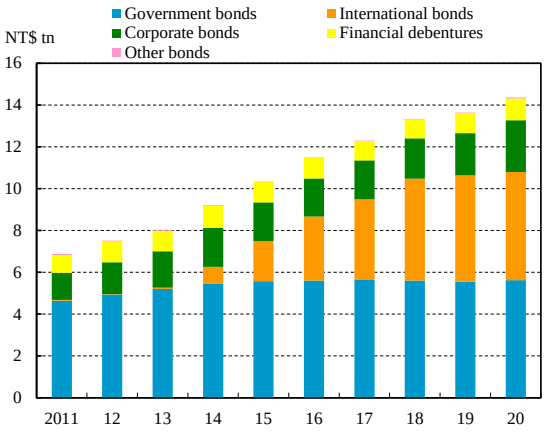
Chart 3.2 Primary and secondary bill markets



Source: CBC.

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

Chart 3.3 Total amount of 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$2.75 trillion at the end of 2020, increasing markedly by 16.75% year on year. The main reason was that interest rates trended downward to new record lows and low issuance costs attracted corporates to significantly increase CP issuance for fund raising. In 2021 Q1, the outstanding amount of bill issuance continued to grow because of the increase in the issuance of treasury bills and CP (Chart 3.2).

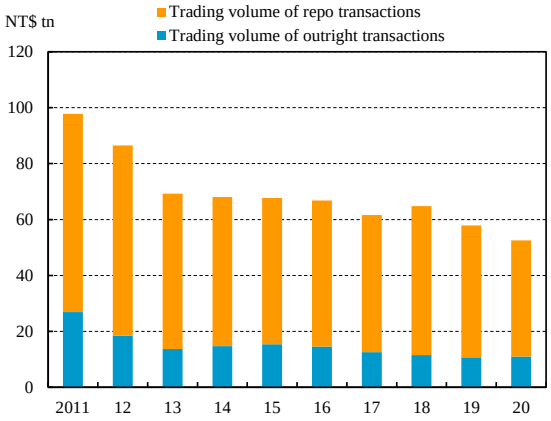
Impelled by the expansion in the primary market, the bill trading volume in the secondary market also increased in 2020. The trading volume increased by 8.97% year on year and amounted to NT$44.14 trillion with CP constituting the largest share of 95.21%. In 2021 Q1, the bill trading volume continued its upward trend (Chart 3.2).

Bond issuance expanded remarkably, while the turnover rates of outright transactions dropped after hitting a recent high

The outstanding amount of bond issuance increased by 5.32% and reached a new high of NT$14.36 trillion at the end of 2020, because record low interest rates attracted corporates to increase bond issuance. Major bonds all saw increasing issuance. Among them, the outstanding amount of corporate bond issuance significantly increased by 23% year on year, followed by financial debentures, which registered an annual growth rate of 9.60%. Meanwhile, the outstanding amount of international bond and government bond issuance increased year on year by 1.58% and 1.32%, respectively (Chart 3.3).

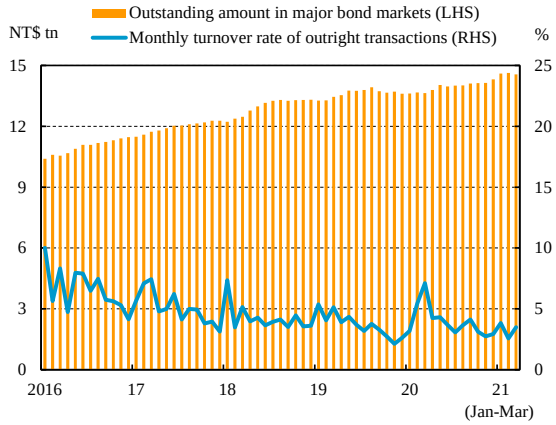
However, the trading volume in the secondary bond market recorded NT$52.50 trillion in 2020, decreasing by 9.30% year on year (Chart 3.4). Analyzed by trading types, repo transaction volume shrank by 12.12% year on year, while outright transactions volume increased marginally by 3.16%. Although the average monthly outright turnover rate of major bonds elevated to a recent high of 7.11% in March 2020, it declined later and continued to stay at a low level in 2021 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 outright turnover rate



Notes: 1. Major bonds include government bonds, international bonds, corporate bonds, and financial debentures.
2. Monthly turnover rate = trading value in the month/ average outstanding amount of bonds issued. Average outstanding amount of bonds issued = (outstanding amount at the end of the month + outstanding amount at the end of last month)/2.

Source: FSC.

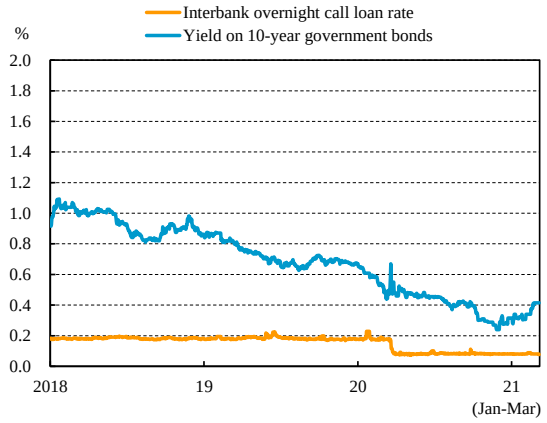
Short-term market rates descended marginally, while long-term market rates rose after declining

In terms of short-term market rates, in 2020, the interbank overnight call loan rate descended gradually and hit a recent low of 0.072% on May 4 after the Bank lowered the policy rates and

the interest rate of the Bank's certificates of deposit (CDs) in March. Afterwards, the interbank overnight call loan rate stabilized at a low level, reflecting ample liquidity in financial markets (Chart 3.6).

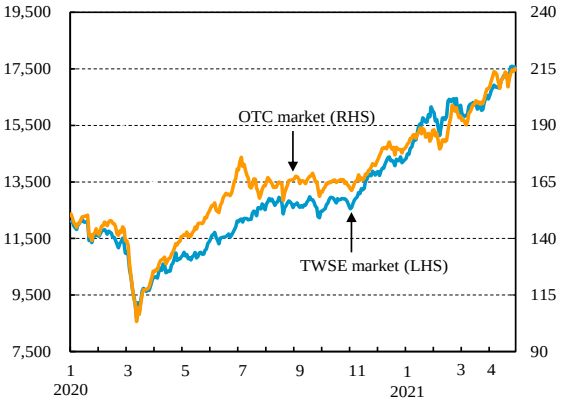
As for long-term market rates, in the beginning of 2020, the COVID-19 pandemic triggered panic selling in the bond market, propelling 10-year government bond yields to rise sharply in March. However, the yields fell back following the Bank's rate cut, and fluctuated downwards as risk-aversion sentiment in the market increased and financial institutions saw increasing pressures to dispose their idle funds. However, the yields have rebounded since December, following the sharp rise of US government bond yields (Chart 3.6). Considering that the recent rise in US inflation expectations could push up US government bond yields and, in turn, propel 10-year government bond yields to increase further, interest rate risks related to bond investments might elevate and warrant close attention.

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



Source: Bloomberg.

Chart 3.7 Taiwan's stock market indices



Sources: TWSE and TPEx.

3.1.2 Equity markets

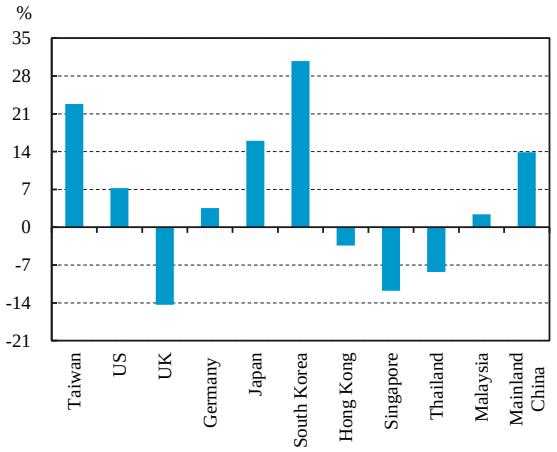
Stock indices successively reached their historical highs

Owing to the impact of the pandemic on global financial markets in the beginning of 2020, international stock markets plunged. The TAIEX of the TWSE market also saw a significant drop from above the 12,000 mark and closed at the year's lowest level of 8,681 on March 19. However, driven by the quantitative monetary easing policies and fiscal relief measures subsequently implemented by major countries along with the strong recovery exhibited by the domestic economy, the TAIEX rebounded significantly (Chart 3.7), posting an increase of 22.80% year on year. Under the support on the economic and capital fronts, the TAIEX surged

higher than the major indices in the US, Japan, and other international stock markets, except for South Korea (Chart 3.8).

In the beginning of 2021, induced by the economic relief plans in the US and the better-than-expected economic performance in Taiwan, the TAIEX went up steadily, surging by 19.24% in the first four months of 2021 (Chart 3.7). Nevertheless, with market expectations for interest rate hikes by the Fed and the resurgence of the pandemic globally and domestically, the TAIEX saw a deep decline and then rebounded toward stability. The Taipei Exchange Capitalization Weighted Stock Index (TPEX) of the OTC market closely tracked the movements of the TAIEX (Chart 3.7).

Chart 3.8 Major stock market performance

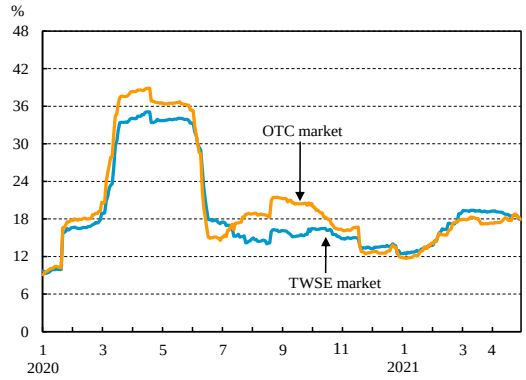


Notes: 1. Changes are figures at the end of 2020 compared to those at the end of 2019.
2. Market performance is based on TWSE Weighted Index for Taiwan, DJIA Index for the US, FTSE-100 Index for the UK, DAX Index for Germany, NK-225 Index for Japan, KOSPI Index for South Korea, Hang Seng Index for Hong Kong, Straits Times Index for Singapore, SET Index for Thailand, Kuala Lumpur Composite Index for Malaysia, and SSE Composite Index for Mainland China.
Source: TWSE.

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

The intensified panic sentiment in financial markets drove volatility in the TWSE and the OTC markets surging sharply in March 2020. As major stock markets stabilized, volatility of the two markets dropped and registered 12.55% and 11.79%, respectively, at the end of December. However, affected by the significant fluctuations in global stock markets at the beginning of 2021, volatility of the TWSE and the OTC markets increased, registering 17.91% and 17.97%, respectively, at the end of April (Chart 3.9).

Chart 3.9 Stock price volatility in Taiwan's markets



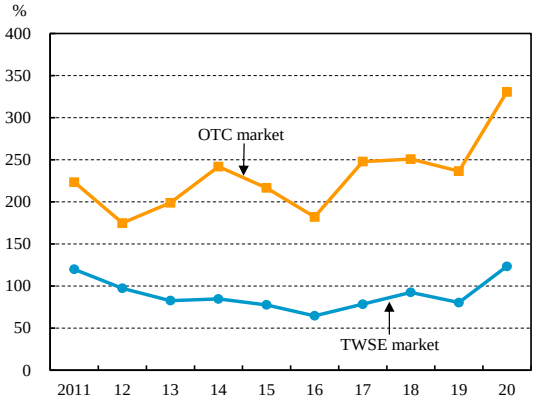
Note: Volatility refers to the annualized standard deviation of 60-day daily index returns.
Sources: TWSE, TPEx, and CBC.

Owing to the surging indices of the two domestic stock markets and expanding trading volume, the trading value in both the TWSE and the OTC markets increased to NT$45.7 trillion and

NT$12.1 trillion in 2020, respectively, reaching individual historical highs. The annual turnover rates in terms of trading value also rose to 123.34% and 330.63% (Chart 3.10), respectively, higher than those in most of the major international stock markets (Chart 3.11). Domestic stock markets were boosted by sound economic fundamentals; however, owing to their high correlations with international stock markets, coupled with the stock prices staying high and amplifying volatility, the potential impacts of the pandemic and the movements of foreign investments in and out of domestic stock markets warrant close attention.

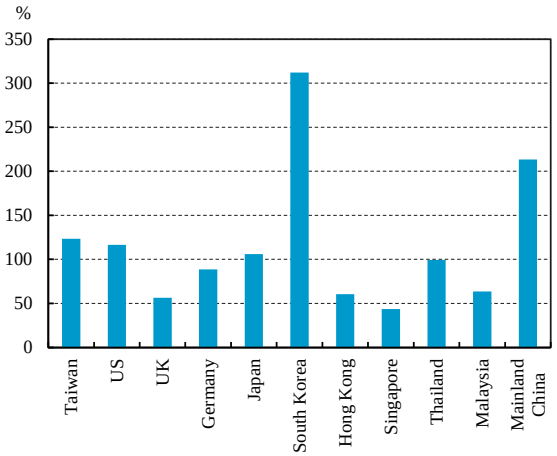
Furthermore, the scale of domestic mutual funds raised and issued by securities investment trust companies increased continually in recent years. Among them, exchange-traded funds (ETFs) grew most swiftly, reaching NT$ 1.74 trillion at the end of 2020. However, with the diversification in the issuance of domestic ETFs, complexity and investment risks of such products mounted, and the systemic risk that might be incurred by ETF investments in particular warrants close attention (Box 2).

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 2020.
Source: TWSE.

3.1.3 FX market

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

The NT dollar exchange rate against the US dollar depreciated in 2020 Q1, owing to the impacts of the COVID-19 pandemic, interest rate cuts in major countries, and the outward remittances of foreign capital. Later on, as an appropriate domestic pandemic response led to

stellar performance of exports and the economy, the NT dollar appreciated steadily and stood at 28.508 at the end of 2020, rising by 5.61% for the year. The exchange rate further strengthened, closing at 27.950 as of the end of April 2021, which was ignited by the inward remittances of foreign capital and the US dollar sell-off by exporters as the US dollar weakened (Chart 3.12); therefore, the NT dollar increased in value by 2.00% compared to the end of 2020. In comparison with major Asian currencies, the extent of NT dollar appreciation against the US dollar was more than the Japanese yen, the Singapore dollar, and the Malaysian ringgit in 2020; however, it was less than the Korean won and the RMB. From January to April in 2021, the value of the NT dollar was relatively stable compared with other currencies (Chart 3.13).

In addition, the scale of trading in Taiwan's FX market slightly expanded in 2020, with average daily trading volume amounting to US$33.1 billion from US$32.5 billion a year earlier, or rising by 1.85%, primarily because of an increase in interbank dealings (Chart 3.14). A breakdown by counterparty in 2020 exhibited that the daily trading volume in the interbank market mainly accounted for 67.07% of the total; as for type of transactions, FX swap deals accounted for the largest share of 49.70% of the total.

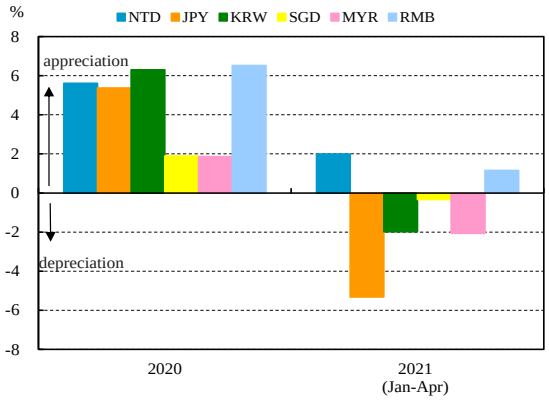
NT dollar exchange rate volatility remained relatively stable

Even though global FX markets fluctuated

Chart 3.12 NTD/USD exchange rate

Source: CBC.

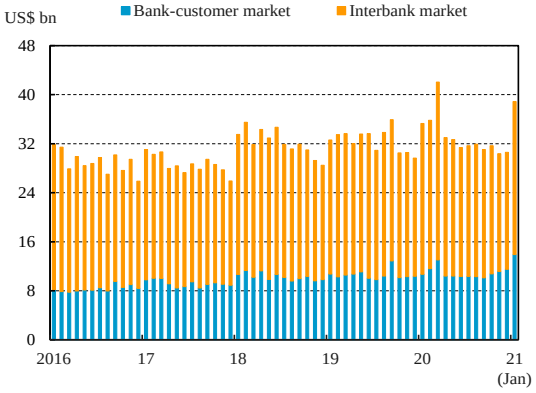
Chart 3.13 Exchange rate changes of major Asian currencies against the US dollar



Note: Changes in the year 2020 are figures at the end of 2020 compared to those at the end of 2019; changes in the period of Jan-Apr 2021 are figures at the end of April 2021 compared to those at the end of 2020.

Source: CBC.

Chart 3.14 FX market trading volume

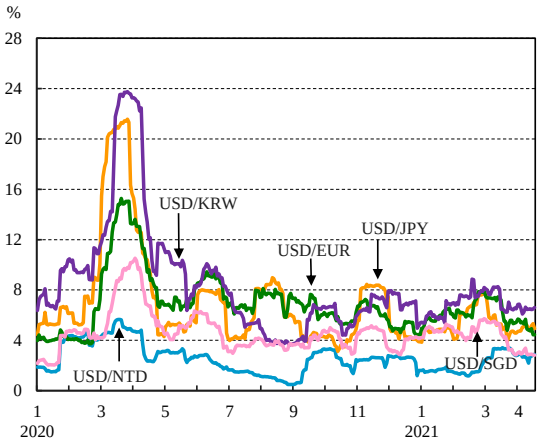


Notes: 1.Trading volume is the monthly average of daily data.
2. The latest data for trading volume are as of January 2021.

Source: CBC.

dramatically in 2020 owing to the impacts of the pandemic, volatility in the NT dollar exchange rate against the US dollar shifted between 0.49% and 5.66% and registered an annual average of 2.66%, which was relatively lower than those in other major currencies. During January to April 2021, volatility in the NT dollar exchange rate registered between 1.17% and 3.42%. Compared to major currencies such as the Japanese yen, the euro, the Singapore dollar, and the Korean won, the NT dollar exchange rate stayed relatively steady against the US dollar (Chart 3.15).

Chart 3.15 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.

Box 2
The impacts of substantial growth of Taiwan's exchange-traded funds on financial markets

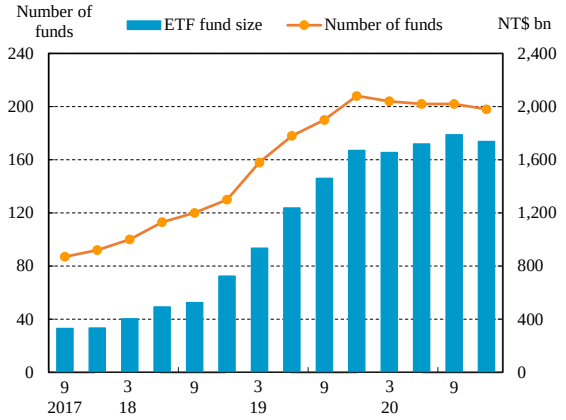
Exchange-traded funds (ETFs) that possess the characteristics of low transaction costs, risk diversification, high transparency of investment portfolios, and passive management have widely won the favor of international and domestic investors in the past ten or more years. Global ETF assets have grown considerably, while the fund sizes, number of investors, and transaction volumes of domestic ETFs have also multiplied. However, potential risks lurking in the ETF market to investors and the financial system still warrant close attention.

1. ETF market development in Taiwan

1.1 ETF fund size and trading volume greatly expanded

The first ETF listed on the Taiwan Stock Exchange Corporation (TWSE) was the Yuanta/P-shares Taiwan Top 50 ETF issued in June 2003. With a relaxation of pertinent regulations by the FSC, the domestic ETF market progressively unfolded. Industrial funds, umbrella funds, and funds with linkages to overseas targets were issued successively. In addition, various types of ETF products, for example leveraged, reversed, and futures ETFs, have been allowed to be issued by investment trust companies since 2014. Coupled with the advantages of low transaction costs and investment diversification, the products have been increasingly appreciated by investors. Therefore, the fund size of ETFs rose hugely, registering NT$1.74 trillion at the end of 2020, which was 12 times compared with that of NT$131.9 billion at the end of 2011. The number of funds increased sharply from 87 at the end of September 2017 to 198 at the end of 2020 (Chart B2.1). ETF beneficiaries also largely rose to 1.52 million, an increase of 3.8 times compared to that at the end of 2017. ETF products have become quite well accepted investments in Taiwan.

Chart B2.1 ETF fund size and number of funds in Taiwan



Source: SITCA.

The trading value of domestically listed ETFs was NT$2.84 trillion in 2020, a huge

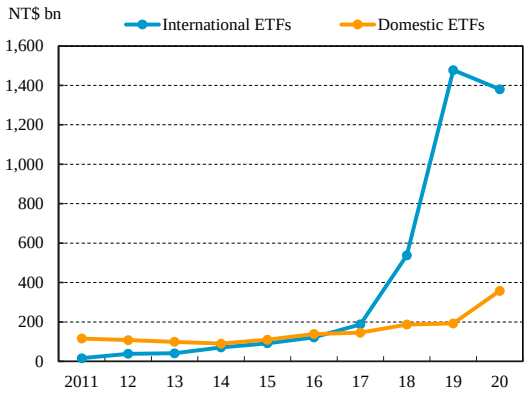
increase of 7.9 times compared to that in 2011. The transaction amount of ETFs to that of the whole stock markets reached 5.8% in 2020, sharply rising from the 1.3% in 2011. The turnover rate of ETFs reached 163.36% in 2020, much higher than that of 123.34% in TWSE stock trading. This showed that transactions in the ETF market have been booming.

1.2 ETF investments linked to overseas targets have been all the rage

In order to pursue better returns, cross-border investments in ETFs linked to overseas targets have become mainstream. The fund size of those ETFs reached NT$1.38 trillion at the end of 2020, largely increasing 85 times compared to that at the end of 2011, much higher than that of NT$357.4 billion for the ETFs investing in domestic targets (Chart B2.2).

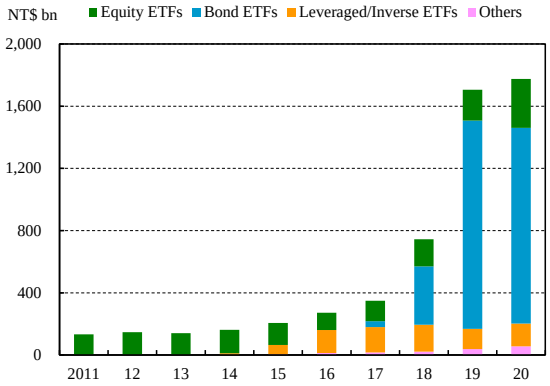
1.3 Bond ETF assets rose quickly because of the huge investments of life insurance companies

Chart B2.2 International ETFs and domestic ETFs in Taiwan



Source: SITCA.

Chart B2.3 Types of ETFs in Taiwan



Source: FSC.

In recent years, the fund size of bond ETFs increased massively, reaching NT$1.34 trillion at the end of 2019, growing by 36 times compared to that at the end of 2017, largely surpassing the size of equity ETFs (Chart B2.3). The major reason was that the amounts life insurance companies invested in TWSE- and OTC-listed securities were excluded from the amounts subject to the overseas investment ceiling.[1] Hence, life insurance companies made huge investments in NTD-dominated offshore bond ETFs. However, as the FSC successively took measures to control the risks of life insurance companies investing in offshore ETF funds starting from October 2019,[2] their investments in bond ETFs shrank gradually in 2020. Nevertheless, equity ETFs have still grown rapidly while the indices of stock markets continually reached historical highs.

2. ETFs may pose potential risks to investors and the financial system

2.1 Potential risks to investors

The Bank for International Settlements (BIS) (2020)[3] points out that the market value of ETFs has been more informative than the NAV (net asset value). When the market volatility rises sharply, the discount or premium to the NAV of ETFs may change rapidly. Investors will take higher price volatility risks if they buy shares in the secondary market at a bigger discount or premium to the NAV. In addition, though ETFs have traced specific stock price indices, changes of indices may not be entirely replicated owing to numerous reasons and caused mis-tracing risks. Also, with the increasing complexity of ETFs, it has drawn wide attention that investors may not fully understand the potential risks of ETF products, especially complex and special ETFs.

Moreover, investing in equity ETFs is similar to investing a basket of equities. When equity ETFs overly increase their share in the whole equity market, it will cause trading behavior such as transaction volumes and prices among the stocks within the basket to be more convergent. As a consequence, the risk diversification effect of holding multiple stocks may be compromised, with the price correlation increasing via co-movements up and down. Furthermore, when ETFs are approved by regulatory authorities to delist from an exchange, investors who buy shares at a premium will bear liquidation risks.

2.2 Potential risks to financial systems

2.2.1 Equity ETFs increased their impacts on stock markets, augmenting the correlation of asset prices

The turnover rates of equity ETFs are higher than those of general common stocks, and the proportion of transaction amount of ETFs to the trading volumes of stock markets is high. Especially during market turmoil, ETFs will have greater trading value and thus increase their influence on financial markets. ESRB (2019)[4] also points out that ETFs lead to greater asset price co-movement, which might result in losses for many investors and further trigger bankruptcy and fire sale of assets. This would undermine the stability of financial markets and heighten systemic risks.

2.2.2 The large investment in ETFs in the short term may induce contagion risks

ESRB (2019) also indicates that investors might take large and same direction short-term ETF positions on account of the high liquidity and trading boom. Once investors unwind the huge positions, it may lead to an upheaval in the ETF market and transmit to the indices themselves owing to arbitrage trading, resulting in remarkable elevation of the volatility

of the indices and the correlation of individual securities in the indices. Furthermore, certain types of ETFs have merely a few counterparties. When the counterparties are unable to fulfill their obligations under surging financial stress, ETFs may be subject to counterparty risks which also raise systemic risk concerns.

3. Conclusions

ETFs were classified as passive investment products originally. However, the product complexity and potential risks rose when the types of ETFs issued in Taiwan diversified. While some local investors buy ETFs as short-term investments, there is a need to enhance the financial literacy of investors and pay attention to ETF product types and information transparency so as to reduce consumer financial disputes. Moreover, the size of the global ETF market has expanded substantially in recent years. It is crucial for regulatory authorities to monitor systemic risks potentially raised by ETFs and take responsive measures early to preserve financial stability.

Notes: 1. Investments of life insurance companies in bond ETFs were merely NT$0.37 trillion at the end of 2018. The amount reached NT$1.3 trillion at the end of 2019, increasing by 2.5 times.

2. The FSC required life insurance companies investing in NTD-dominated offshore bond ETFs to control FX risks in October 2019, adding an additional FX risk capital charge on those ETFs with a risk weight of 6.61% when calculating their risked-based capital (RBC) ratios. Credit ratings of underlying bonds held by bond ETFs invested by life insurance companies should not be below BBB- based on the regulations implemented in December 2019.

3. BIS (2020), "The Recent Distress in Corporate Bond Markets: Cues from ETFs," *BIS Bulletin*, April.

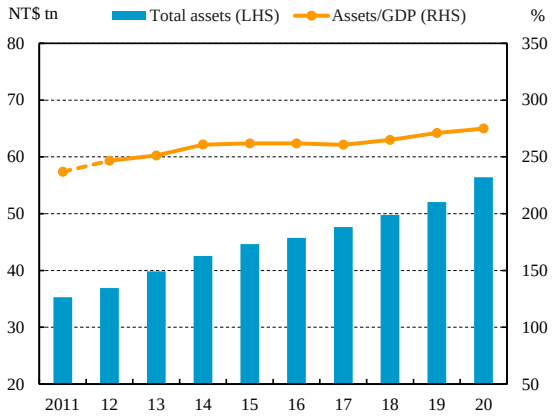
4. ESRB (2019), "Can ETFs Contribute to Systemic Risk?" *Reports of the Advisory Scientific Committee*, June.

3.2 Financial institutions

3.2.1 Domestic banks

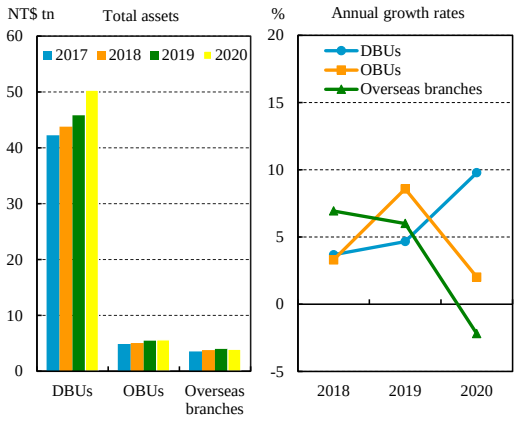
Owing to the growth in loans, the total assets of domestic banks[39] continually expanded in 2020. Asset quality remained sound and exposures to Mainland China continuously decreased, while concentration in corporate loans and loans related to real estate increased slightly. The estimated value at risk (VaR) of market risk exposures increased, but the impacts of market risk on capital adequacy ratios were limited. Liquidity in the banking system was ample, with overall liquidity risk remaining relatively low. Although profitability of domestic banks decreased in 2020, the average capital adequacy ratio increased, indicating satisfactory capacity to bear losses.

Chart 3.16 Total assets of domestic banks



Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Sources: CBC and DGBAS.

Chart 3.17 Total assets of domestic banks by sector



Note: Figures for total assets are inclusive of interbranch transactions.
Source: CBC.

Total assets grew apace

The total assets of domestic banks kept growing and reached NT$56.4 trillion at the end of 2020, equivalent to 285.24% of annual GDP (Chart 3.16). The annual growth rate of the total assets rose at a faster pace of 8.35%, mainly driven by a greater increase in loans by domestic banking units (DBUs). Broken down by sector, the annual asset growth rate of DBUs steadily rose to 9.78% on the back of loan growth. However, those of offshore banking units (OBUs) and overseas branches trended down instead or even slipped into negative territory as their loan policies turned conservative in view of increasing credit defaults (Chart 3.17).

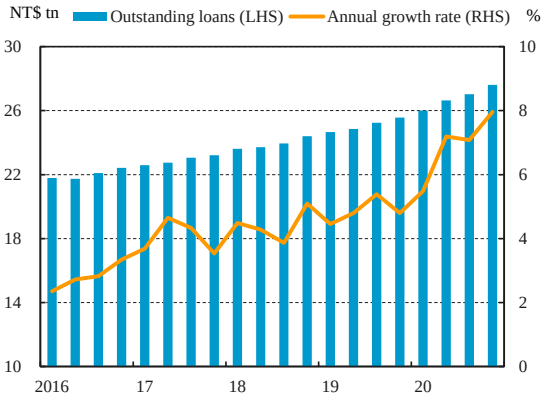
[39] Includes Agricultural Bank of Taiwan but not Rakuten International Commercial Bank because the latter launched internal operations on Dec. 30, 2020 and officially opened for business on Jan. 19, 2021.

Credit risk

Customer loans growth accelerated

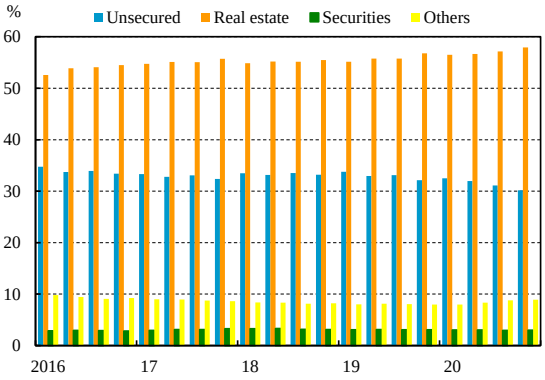
Customer loans[40] granted by the DBUs of domestic banks stood at NT$27.61 trillion at the end of 2020, accounting for 48.95% of total assets, with the annual growth rate increasing to 7.96% (Chart 3.18). Among them, the annual growth rate of household borrowing rose to 8.99% owing to an increase in mortgage loan demand. The annual growth rate of corporate loans rose to 6.38%, largely driven by rising demand for purchasing offices and production plants as well as the extension of relief loans to SMEs. The annual growth rate of government loans also rose to 11.25% mainly because of the implementation of relief and revitalization measures by the government.

Chart 3.18 Outstanding loans in domestic banks



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

Chart 3.19 Credit by type of collateral in domestic banks



Source: CBC.

The share of real estate-secured credit continuously increased

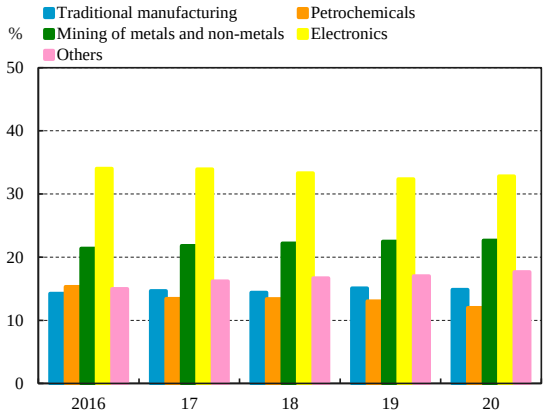
At the end of 2020, real estate-secured credit granted by domestic banks aggregated NT$19.29 trillion, accounting for 57.94% of total credit,[41] with an increase of 1.16 pps over the previous year (Chart 3.19). In view of continued housing market buoyancy, theBank and the relevant government ministries and agencies introduced a series of measures from December 2020 onwards to foster a sound real estate market. However, real estate related credit risks warrant continuous monitoring as the above-mentioned measures will need some time before showing results.

[40] The term "customer loans" herein refers to discounts, overdrafts, other loans, and import bills purchased. It excludes export bills purchased, non-accrual loans and interbank loans.
[41] The term "credit" herein includes loans, guarantee payments receivable, and acceptances receivable.

Credit concentration in corporate loans slightly increased

For the DBUs of domestic banks, corporate loans stood at NT$11.79 trillion at the end of 2020, of which loans to the manufacturing sector accounted for the largest share at 37.40%. Within the manufacturing sector,[42] the largest proportion of loans was in the electronics industry with a share of 32.81% that slightly increased over the previous year. This reflected that credit concentration of corporate loans mildly rose (Chart 3.20).

Chart 3.20 Exposure to the manufacturing sector by domestic banks



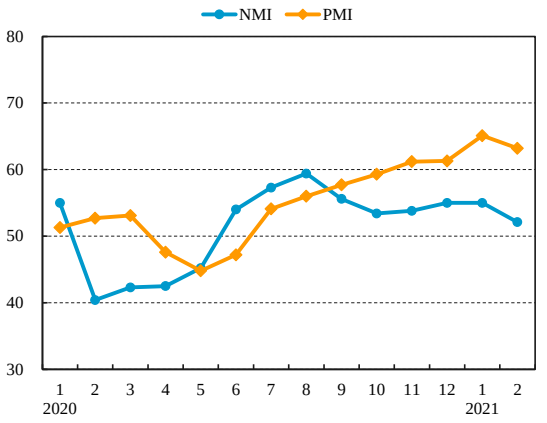
Notes: 1. Exposure to each sector = loans to each sector/loans to the whole manufacturing sector.
2. Exposures of OBUs and overseas branches were excluded.

Source: CBC.

The impact of the COVID-19 pandemic on banks' credit quality should be closely monitored

From the second half of 2020 onwards, with the COVID-19 pandemic easing worldwilde and vaccination accelerating in major countries, domestic economic activity gradually recovered. Taiwan's Purchasing Managers' Index (PMI) and Non-Manufacturing Index (NMI) entered into the expansion zone (Chart 3.21), reflecting an abatement in the pandemic's impact on domestic industries. Nonetheless, as the current pandemic still raises concerns over the outlook of foreign and domestic economic growth, the impact therefrom on banks' credit quality should be closely monitored.

Chart 3.21 Taiwan's PMI and NMI



Source: CIER.

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

At the end of 2020, the exposures of domestic banks to Mainland China stood at NT$1.51 trillion, decreasing by NT$136.6 billion or 8.30% from a year earlier mainly owing to a

[42] 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.

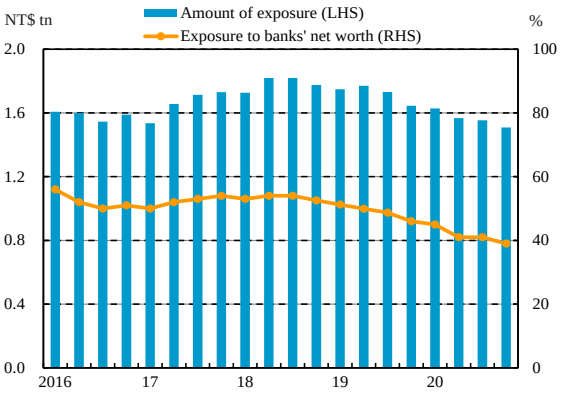
decline in the credit granted. The ratio of the exposures to banks' net worth continued to fall to a new low of 39% (Chart 3.22), far below the highest ratio of 69% in 2014.

Considering that spillovers of risk deriving from Mainland China would have a greater impact on Taiwan, coupled with weakening credit quality of local borrowers recently, domestic banks should closely monitor the developments in Mainland China's economic and financial conditions and prudently manage the risks of such exposures.

Asset quality was satisfactory, but still faced uncertainties

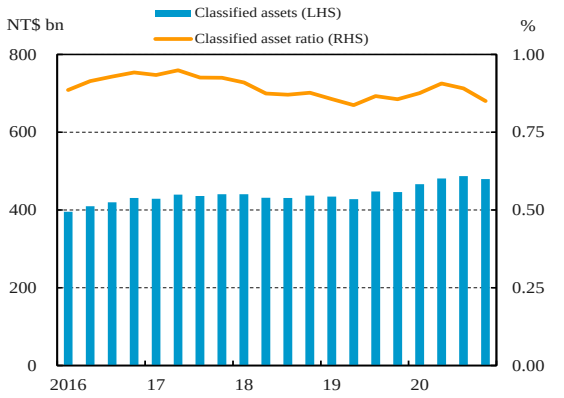
Owing to weakened debt-servicing capacity of overseas borrowers, outstanding classified assets [43] of domestic banks increased by 7.59% from a year earlier and stood at NT$479.7 billion at the end of 2020. However, owing to a greater rise in total assets, the average classified asset ratio stood at 0.85%, slightly decreasing by 0.01 pps compared to the end of 2019 (Chart 3.23), showing that the asset quality of domestic banks was satisfactory. Meanwhile, the expected losses of classified assets [44] decreased by NT$6.6 billion from a year earlier to NT$51.9 billion, accounting for 10.77% of loss provisions, indicating that domestic banks had sufficient

Chart 3.22 Exposures to Mainland China of domestic banks



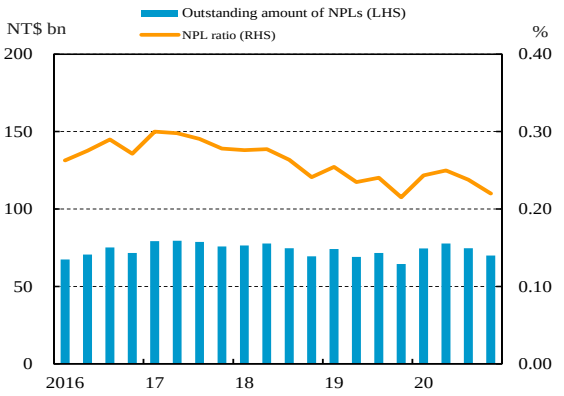
Source: FSC.

Chart 3.23 Classified assets of domestic banks



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

Chart 3.24 NPLs of domestic banks



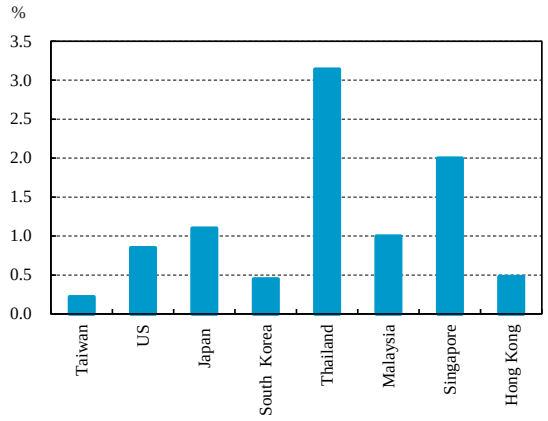
Note: Excludes interbank loans.
Source: CBC.

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

provisions to cover expected losses.

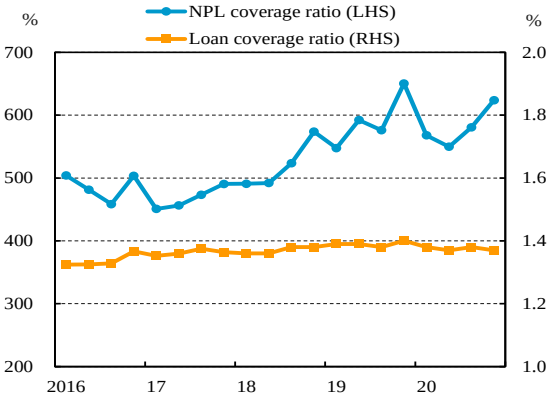
The outstanding NPLs of domestic banks registered NT$69.9 billion at the end of 2020, increasing by 8.44% from the previous year. Owing to an increase in both NPLs and loans, the average NPL ratio remained at a historical low of 0.22% (Chart 3.24), much lower than those in the US and neighboring Asian countries (Chart 3.25). In addition, at the end of 2020, because of a greater rise in loans and NPLs, the loan coverage ratio and the NPL coverage ratio declined to 1.37% and 623.74% respectively from 1.40% and 650.30% a year earlier (Chart 3.26). Nevertheless, the capability of domestic banks to cope with potential loan losses remained satisfactory.

Chart 3.25 NPL ratios of banks in selected countries



Note: Figures for Japan and South Korea are end-September 2020 data, while the others are end-December 2020 data.
Sources: CBC, FDIC, FSA, FSS, BOT, BNM, MAS and HKMA.

Chart 3.26 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.

Almost all banks had NPL ratios of less than 0.5% at the end of 2020. In terms of borrowers, the NPL ratio for individual loans declined by 0.05 pps to 0.16% compared to the previous year. However, the NPL ratio for corporate loans, which were affected by the pandemic more significantly, rose by 0.02 pps to 0.27% over the same period. Among corporate loans, those to the wholesale & retail trade industry saw a drop in the NPL ratios, while the NPL ratios of loans to other industries mostly increased (Chart 3.27). Nevertheless, the overall NPL ratio stayed at a low level.

Considering that uncertainties surrounding the global pandemic outlook remained high, and the relief loans[45] extended by domestic banks in line with government policies will be withdrawn going forward, closely monitoring the above-mentioned impact on banks' credit quality is warranted.

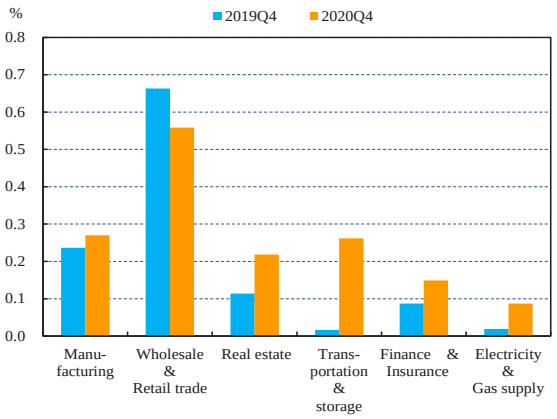
[45] According to the statistics of the FSC, as of April 7, 2021, domestic banks provided relief loans with a total amount of NT$3.2 trillion.

Market risk

Estimated value-at-risk for market risk exposures increased

Based on the Bank's VaR model,[46] the estimated total VaR for market risk exposures of domestic banks stood at NT$159.8 billion at the end of 2020, increasing by NT$27.8 billion or 21.06% compared to a year earlier. Among the market risk exposures, the interest rate VaR increased by 24.96% year on year in 2020. The main reasons were that bond market volatility surged because of the COVID-19 pandemic and the net position of debt securities increased. Meanwhile, the equities VaR decreased by 10.08%, reflecting reductions in the net position of equity securities. The FX VaR diminished by 2.86%, owing to decreasing volatility in the NT dollar exchange rate against the US dollar (Table 3.1).

Chart 3.27 NPL ratios of domestic banks in selected industries



Note: Excludes interbank loans.
Source: JCIC.

Table 3.1 Market risks in domestic banks

Unit: NT$ bn

Type of risk	Item	End-Dec. 2019	End-Dec. 2020	Changes	
				Amount	pps; %
Foreign exchange	Net position	173.5	201.8	28.3	16.31
	VaR	3.5	3.4	-0.1	-2.86
	VaR/net position (%)	2.02	1.68		-0.34
Interest rate	Net position	1,957.2	1,986.5	29.3	1.50
	VaR	116.6	145.7	29.1	24.96
	VaR/net position (%)	5.96	7.33		1.37
Equities	Net position	86.8	78.0	-8.8	-10.14
	VaR	11.9	10.7	-1.2	-10.08
	VaR/net position (%)	13.71	13.72		0.01
Total VaR		132.0	159.8	27.8	21.06

Source: CBC.

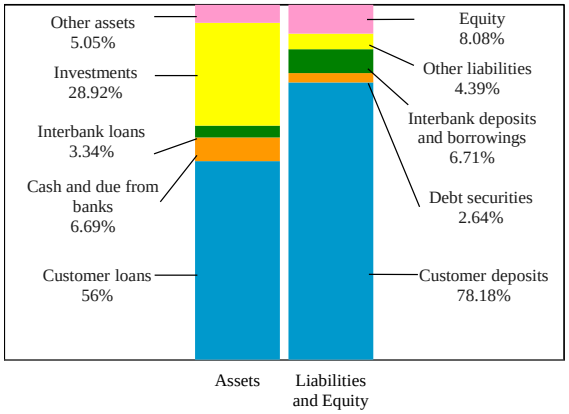
[46] For more details about the Bank's VaR model, please see CBC (2016), Box 2, *Financial Stability Report*.

From early 2021 onwards, boosted by optimism over a firming US economy and rising inflation expectations, US bond yields rose sharply, exacerbating volatilities in both bond and stock market prices. This could in turn increase the VaR for relevant exposures of domestic banks and thus warrants close attention.

The impacts of market risk on capital adequacy ratios were limited

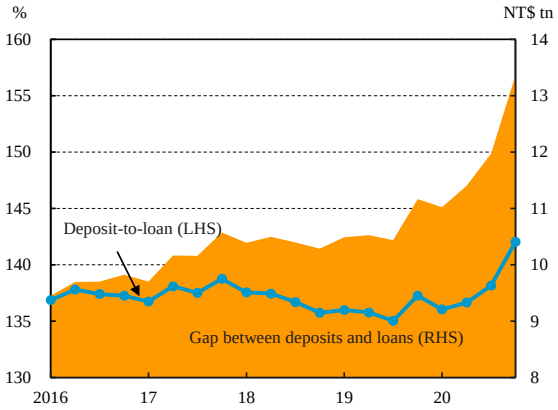
According to the estimation mentioned above, the total VaR would lead to a decrease of 0.44 pps[47] in the average capital adequacy ratio of domestic banks, causing the ratio to drop from the current 14.85% to 14.41%. Nevertheless, it would still be higher than the statutory minimum of 10.5%.

Chart 3.28 Asset/liability structure of domestic banks



Notes: 1. Figures are as of end-December 2020.
2. Equity includes loss provisions. Interbank deposits include deposits with the CBC.
Source: CBC.

Chart 3.29 Deposit-to-loan ratio of domestic banks



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

Liquidity risk

Liquidity in the banking system remained ample

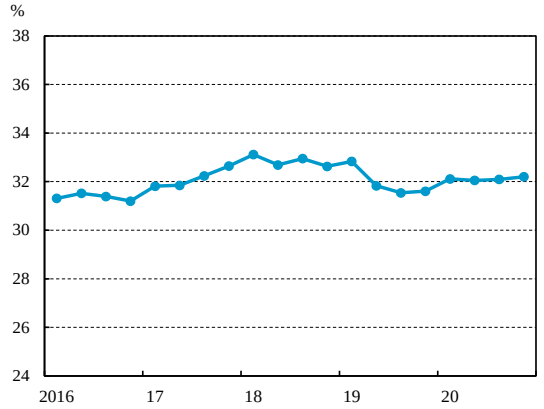
The asset and liability structure of domestic banks remained roughly unchanged in 2020. For the sources of funds, customer deposits, which tend to be relatively stable, still made up the largest share with 78.18% of the total, while for the uses of funds, customer loans accounted for the biggest share with 56% (Chart 3.28). At the end of 2020, the average deposit-to-loan ratio of domestic banks rose to 142.04%, and the funding surplus (i.e., deposits exceeding loans) increased to NT$13.36 trillion. The overall liquidity of domestic banks remained abundant (Chart 3.29).

[47] 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 capital shortfalls after considering the aforementioned capital.

Overall liquidity risk remained relatively low

The average NT dollar liquid reserve ratio of domestic banks was well above the statutory minimum of 10% in every month of 2020 and stood at 32.20% in December (Chart 3.30). Looking at the components[48] of liquid reserves in December 2020, Tier 1 liquid reserves, mainly consisting of CDs issued by the Bank, accounted for 82.74% of the total. The quality of liquid assets held by domestic banks remained satisfactory.

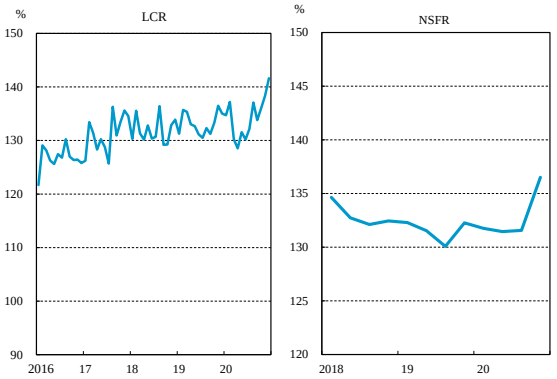
Chart 3.30 Liquid reserve ratio of domestic banks



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

Moreover, the average liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) of domestic banks rose to 142% and 137%, respectively, at the end of 2020 (Chart 3.31). Meanhwhile, all banks met the minimum LCR and NSFR requirements in 2020, indicating that the overall liquidity risk of domestic banks was relatively low.

Chart 3.31 LCR and NSFR of domestic banks



Notes: 1. LCR and NSFR were implemented in 2015 and 2018, respectively.
2. LCR is reported on a monthly basis; NSFR is reported on a seasonal basis.
Source: CBC.

Risks of LIBOR cessation

To avoid undue market disruption caused by an unexpected cessation of LIBOR, the UK regulatory authority announced that it would no longer require banks to submit LIBOR settings from January 2022 onwards. The forthcoming cessation of the LIBOR settings and the transition of interest rate benchmarks posed challenges for financial markets.

Being a participant in the global financial market, the Taiwanese banking industry has widely used LIBOR in their daily operations. In response to LIBOR cessation, the Bank and the FSC

[48] According to the *Directions for Auditing Liquidity of Financial Institutions*, liquid reserve assets can be classified as: (1) excess reserves, net lending to financial institutions in the call loan market, re-deposits at designated banks with a maturity not exceeding one year, CDs issued by the Bank, government bonds and treasury bills; (2) negotiable certificates of deposit issued by banks, banker's acceptances, commercial paper, commercial acceptances, bank debentures, corporate bonds, NTD-denominated bonds issued in Taiwan by international financial organizations and foreign issuers; and (3) other assets as approved by the Bank.

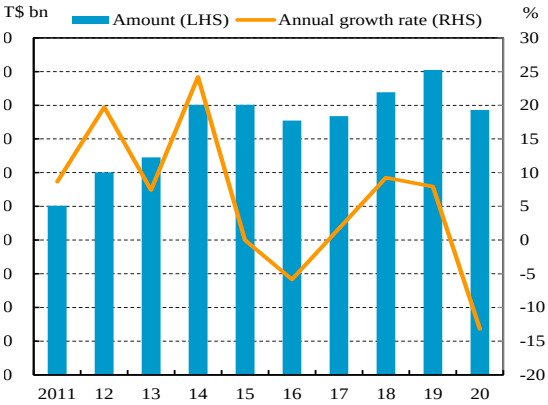
successively implemented various measures from February 2020 onwards with the aim of urging banks to carefully assess the associated risks and address them appropriately. Although most banks established dedicated committees or task forces to actively address this issue, they are advised to carefully make and execute LIBOR transition plans and carry out the transition process as soon as possible so as to reduce potential risks arising from LIBOR cessation (Box 3).

Profitability

Profitability declined

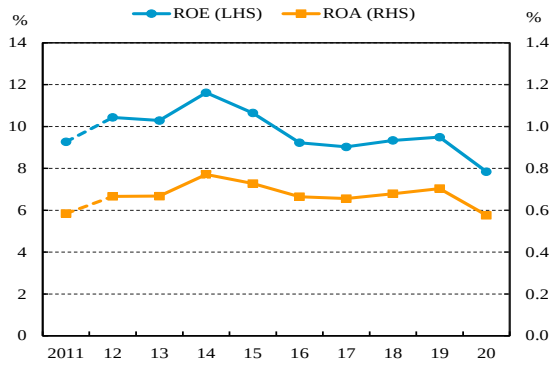
In 2020, the net income before tax of domestic banks fell to NT$314.3 billion, significantly decreasing by NT$47.8 billion or 13.19% year on year, the sharpest fall in 10 years (Chart 3.32). The contraction was mainly caused by a decrease in profits from investment such as equities and financial derivatives, as well as an increase in loan loss provisions for their overseas branches. The average ROE and ROA of domestic banks went down to 7.84% and 0.58% from the 9.49% and the 0.70% of the previous year (Chart 3.33), respectively, indicating a deterioration in profitability. Compared to other economies, the average ROE of domestic banks was higher than those of the US, Thailand, South Korea, and Japan. However, the average ROA of domestic banks still lagged behind those of many other countries, outperforming just a few ones such as South Korea and Japan (Chart 3.34).

Chart 3.32 Net income before tax of domestic banks



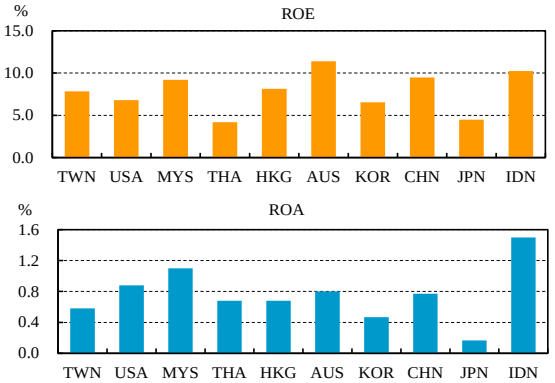
Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Source: CBC.

Chart 3.33 ROE & ROA of domestic banks



Notes: 1. ROE = net income before tax/average equity.
2. ROA = net income before tax/average assets.
3. Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Source: CBC.

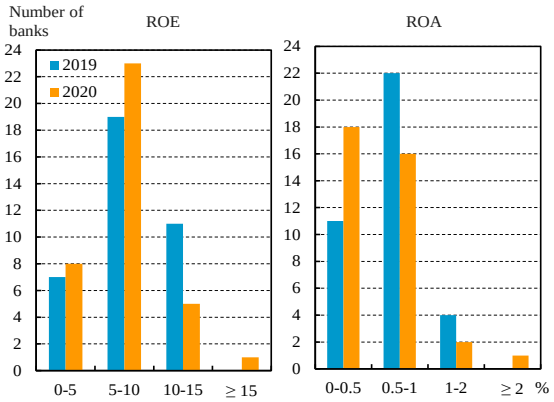
Chart 3.34 ROEs and ROAs of banks in selected economies



Note: Figures for Japan are 2020Q3 data, others are 2020 Q4 data.
Sources: CBC, FDIC, BNM, BOT, APRA, FSS and IMF.

All domestic banks were profitable in 2020. Among them, only six banks achieved a profitable ROE of 10% or more, decreasing from 11 banks in 2019. Meanwhile, the number of banks with ROAs above the international standard of 1% also saw a decrease from four to three (Chart 3.35). In 2020, the number of banks with higher ROEs and ROAs than the previous year were down to 11 and seven, respectively.

Chart 3.35 Domestic banks classified by ROE and ROA

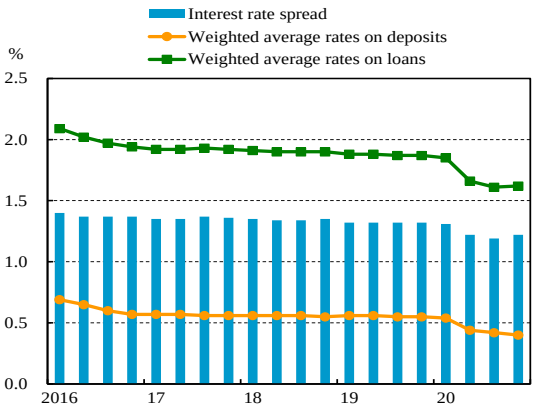


Source: CBC.

Factors that might affect future profitability

The impact of the COVID-19 pandemic resulted in the decline in domestic banks' profits in 2020. The uncertainties around future profitability warrant close attention, including: (1) the rising financial vulnerabilities of distressed firms and individuals after the withdrawl of the Taiwan's government's financial relief measures, which could weaken banks' asset quality and thus undermine their profits; and (2) the average interest rate spread between deposits and loans of domestic banks sliding to a low of 1.19 pps in 2020 Q3 (chart 3.36). This, together with accommodative monetary policy stances expected to be continued by major economies, will affect those domestic banks with net interest income as a major revenue resource and dampen growth momentum for their future profits.

Chart 3.36 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 preferred deposits of retired government employees and central government loans.

Source: CBC.

Capital adequacy

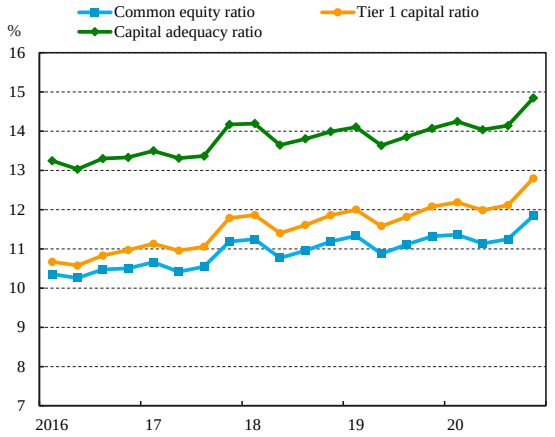
Capital ratios trended up significantly

In 2020, underpinned by accumulated earnings, and captial injections with cash or the issuance of subordinated debt by several banks, the requlatory capital of domestic banks increased. Moreover, some banks assigned lower risk weights to their real-estate exposures with the early adoption of the LTV approach [49] under Basel III in 2020 Q4, leading to a reduction in their risk-weighted assets. As a result, the average common equity ratio, Tier 1 capital ratio, and capital adequacy ratio of domestic banks reached 11.84%, 12.79%, and 14.84% (Chart 3.37), respectively, at the end of 2020, all above those ratios a year before. However, compared to some Asia-Pacific economies, Taiwan's banking industry had relatively lower capital levels (Chart 3.38).

Further broken down by component of regulatory capital, common equity Tier 1 (CET 1) capital, featuring the best loss-bearing capacity, accounted for 79.77% of eligible capital. This showed that the capital quality of domestic banks was satisfactory.

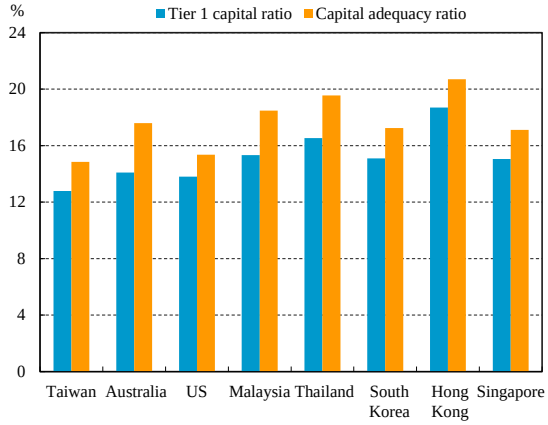
Moreover, at the end of 2020, the average leverage ratio of domestic banks stood at 6.82%, higher than 6.71% a year before and also above the 3% statutory standard,

Chart 3.37 Capital ratios of domestic banks



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

Chart 3.38 Capital ratios of banking industry in selected economies



Note: Figures for Singapore are end-September 2020 data, while the others are end-December 2020 data.
Sources: CBC, APRA, FDIC, BNM, BOT, FSS, HKMA and MAS.

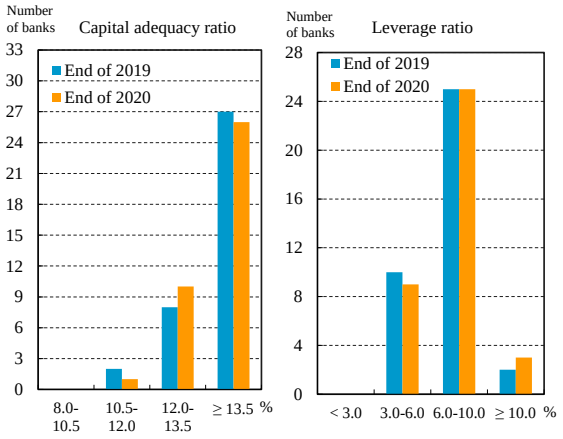
[49] Regarding banks' adoption of the new version of the LTV approach in assessing their real estate exposures, please refer to Chapter 3 for more details.

indicating that financial leverage remained sound.

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

At the end of 2020, the capital ratios of six domestic systemically important banks (D-SIBs), including CTBC Bank, Cathay United Bank, Taipei Fubon Commercial Bank, Mega International Commercial Bank, Taiwan Cooperative Bank, and First Bank, and non-D-SIBs were all above the relavant FSC statutory minimum standards or additional capital buffer requirements[50] (Chart 3.39). Leverage ratios of all domestic banks were also above the 3% statutory standard (Chart 3.39).

Chart 3.39 Distribution of domestic banks' capital adequacy ratios and leverage ratios



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

Table 3.2 Systemic risk indicators for the banking system

Banking System	Standard & Poor's		Fitch	
	BICRA		BSI/MPI	
	2020/2	2021/2	2019/10	2020/8
Singapore	2	2	aa/2	aa/1
Hong Kong	2	2	a/2	a/2
Japan	3	3	a/2	a/2
South Korea	3	3	a/1	a/1
Taiwan	**4**	**4**	**bbb/2**	**bbb/2**
Malaysia	4	4	bbb/1	bbb/1
Philippines	5	5	bb/1	bb/1
Mainland China	6	6	bb/1	bb/1
Thailand	6	6	bbb/1	bbb/1
Indonesia	6	6	bb/1	bb/1

Sources: Standard & Poor's and Fitch Ratings.

Credit ratings

Average credit rating level remained steady

Of the overall risk assessments of Taiwan's banking system made by credit rating agencies, Standard & Poor's kept Taiwan's Banking Industry Country Risk Assessment (BICRA)[51] unchanged at Group 4 with moderate risk. Compared to other Asian economies, the risk level of Taiwan's banking system was the same as that of Malaysia, but much lower than those of Mainland China, Thailand, the Philippines and Indonesia. Moreover, the

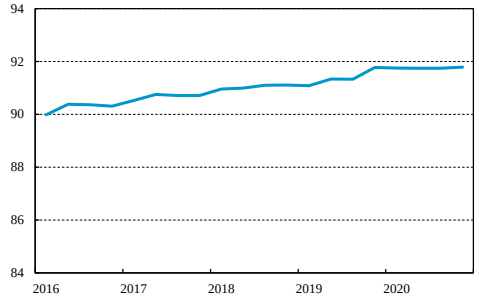
[50] For all D-SIBs, excluding the First Bank which was just designated as a D-SIB at the end of 2020, the common equity ratio, Tier 1 capital ratio and capital adequacy ratio should reach 7.5%, 9% and 11%, respectively. The statutory standards for the aforementioned three ratios of non-D-SIBs are 7%, 8.5% and 10.5%, respectively.

[51] 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.

assessment of Taiwan's banking system by Fitch Ratings in its Banking System Indicator/Macro-Prudential Indicator (BSI/MPI)[52] also remained unchanged at level bbb/2 (Table 3.2).

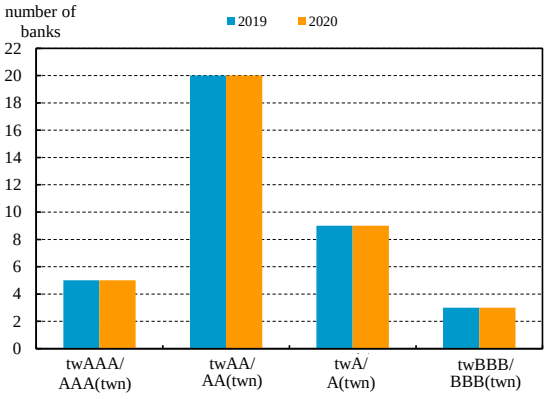
Among 38 domestic banks, except for one bank which had its credit rating upgraded, the others remained unchanged at the end of 2020. The weighted average credit rating index[53] remained the same as the previous year, indicating a limited impact of the COVID-19 pandemic on banks. Overall, the average credit rating level remained stable (Chart 3.40).

Chart 3.40 Credit rating index of domestic banks



Sources: Taiwan Ratings Corporation, Fitch Ratings and CBC.

Chart 3.41 Number of domestic banks classified by credit ratings



Sources: Taiwan Ratings and Fitch Ratings.

Rating outlooks for most domestic banks remained stable

Most domestic banks maintained credit ratings of twAA/twA (Taiwan Ratings) or AA(twn)/A(twn) (Fitch Ratings) and none had credit ratings lower than twBB/BB(twn) at the end of 2020 (Chart 3.41). Ten banks received a negative rating outlook caused by the impact of the pandemic or weakening capital levels, while rating outlooks for the other banks remained stable or positive.

Taiwan's strong economic growth momentum despite the pandemic disrupting the global economy, coupled with an improvement in the operational environment of the banking industry, would help buttress domestic banks' capital levels and profitability. Reflecting this, Taiwan Ratings announced in March 2021 that Taiwan's banking industry outlook was stable, and Moody's also adjusted the outlook of Taiwan's banking industry from negative to stable.[54]

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

[53] 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.

[54] Press releases by Taiwan Ratings and Moody's on March 29, 2021.

3.2.2 Life insurance companies

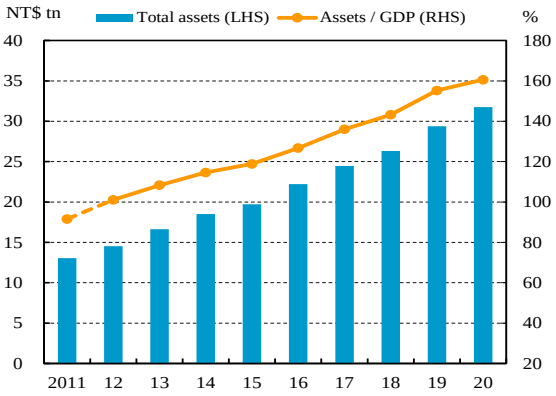
In 2020, total assets of life insurance companies kept growing, though at a slower pace. Moreover, pretax income reached a record high, while the average RBC ratio further improved and overall credit ratings held stable. However, owing to the expansion of foreign investment positions, life insurance companies still faced higher FX risk, interest rate risk and equity risk.

Assets grew at a slower pace

The total assets of life insurance companies reached NT$31.75 trillion at the end of 2020, equivalent to 160.59% of annual GDP (Chart 3.42). The annual growth rate of total assets decreased to 8.03%, reflecting a slower pace of growth. The top three companies in terms of assets made up a combined market share of 55.29%. The market structure of the life insurance industry remained roughly unchanged in 2020.

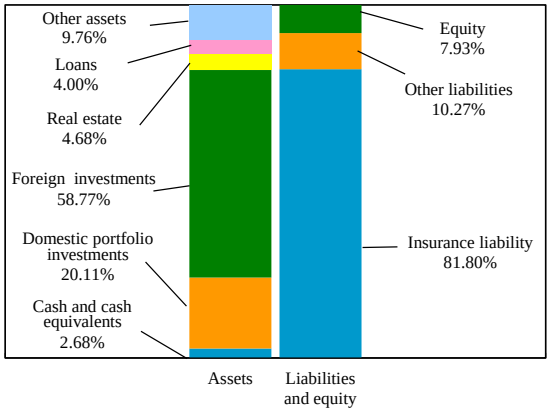
Foreign investments remained the primary usage of funds

Chart 3.42 Total assets of life insurance companies



Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Sources: FSC and DGBAS.

Chart 3.43 Asset/liability structure of life insurance companies



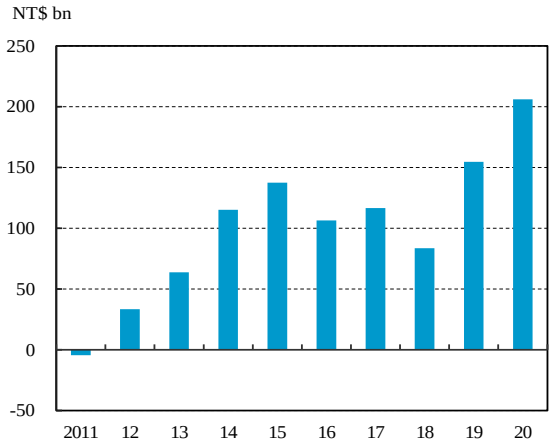
Note: Figures are as of the end of 2020.
Source: FSC.

In terms of the usage of funds of life insurance companies at the end of 2020, foreign investments and domestic portfolio investments continued to account for the primary shares of total assets. Among them, the share of foreign investments decreased to 58.77% owing to a contraction in international bond investments, whereas that of domestic portfolio investments rose to 20.11% as life insurers increased investments in Taiwan's stock markets. As for the sources of funds, insurance liabilities accounted for 81.80%, the largest share of total liabilities and equity, while the share of equity increased to 7.93%, mainly supported by the accumulation of earnings and a strong expansion of unrealized securities investment profits (Chart 3.43).

Pretax income continued to reach a record high

Life insurance companies reported a record-high net income before tax of NT$206.1 billion in 2020 from NT$154.7 billion a year before, a substantial year-on-year increase of 33.26% (Chart 3.44). This mainly resulted from an increase in investment revenue as life insurance companies actively realized their capital gains of stock and bond investments. Accordingly, their average ROA increased markedly to 0.67% from 0.56% a year earlier, whereas the ROE declined to 9.27% from 10.24% (Chart 3.45) because of a greater rise in equity.

Chart 3.44 Net income before tax of life insurance companies

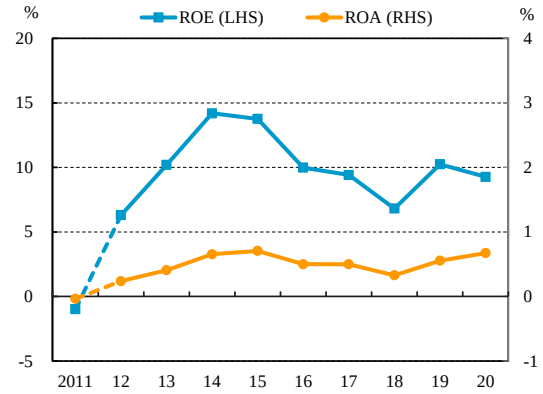


Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Source: FSC.

Average RBC ratio rebounded, while equity to asset ratio continued to rise

Thanks to higher valuations of their stock holdings in 2020, capital levels of life insurance companies rose in the year, and the average RBC ratio rebounded to 299.13% at the end of the year from 292.54% the previous year (Chart 3.46). Furthermore, the average equity to asset ratio rose significantly to 8.57% from 7.1% the previous year (Chart 3.47).

Chart 3.45 ROE & ROA of life insurance companies



Notes: 1. Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
2. ROE = net income before tax/average equity.
3. ROA = net income before tax/average assets.
Source: FSC.

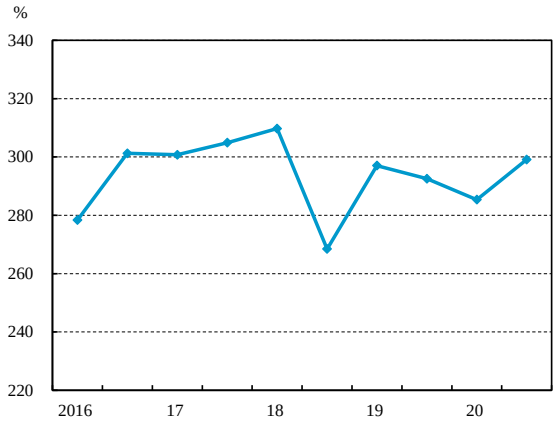
Overall credit ratings remained stable, and downside risks to rating outlooks diminished

Among the 11 life insurance companies rated by credit rating agencies,[55] none received rating adjustments in 2020, except for one life insurance company receiving an upgrade from twA+

[55] The majority of rated life insurance companies received issuer ratings from the Taiwan Ratings Corp.; therefore, this section is based primarily on the Taiwan Ratings' ratings, and secondarily on the ratings by other credit rating agencies.

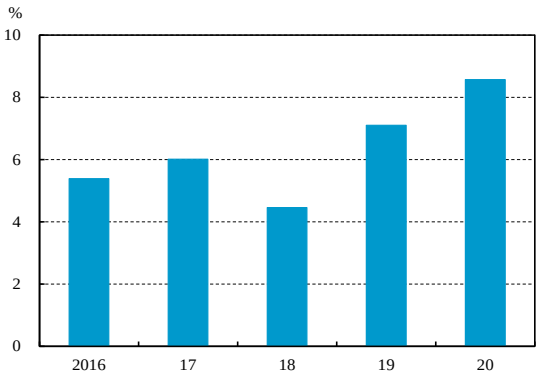
to twAA. As of the end of the year, all rated life insurance companies maintained credit ratings above twA or its equivalent, with the ratings of the top three companies in terms of assets holding at twAA. However, many companies were rated with a negative outlook in consideration of increasing volatility in financial markets and a weakening global economic outlook amid the pandemic, which might pose a negative impact on their capital levels. Nevertheless, downside risks to their rating outlooks diminished, supported by the assessment that a record high of pretax income in 2020 could help sustain their capital levels.

Chart 3.46 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.

Chart 3.47 Equity to asset ratios of life insurance companies



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

First-year premiums declined dramatically

From the beginning of 2020 onwards, a cut in credited interest rates by insurance companies and a new measure implemented by the FSC to enhance sound management of investment-linked insurance policies linked to target maturity bond funds, affected consumers' willingness to purchase new insurance policies. As a result, the first-year premiums (FYPs) from traditional as well as investment-linked insurance policies markedly dropped by 28.08% year on year. In 2021 Q1, the FYPs from traditional insurance policies continued to shrink. However, the FYPs from investment-linked insurance policies rebounded significantly, fueled by buoyant buying sentiment in such policies as stock markets in the US and Taiwan hit new highs. As a result, the FYPs from traditional and investment-linked insurance policies picked up and increased by 10.19% year on year.

In view of increasing demand for foreign currency-denominated insurance policies and with the aim of enhancing asset-liability allocation efficiency for life insurance companies that offer

such products, the FSC announced in March 2021 its intention to amend the *Regulations Governing Foreign Investments by Insurance Companies*. The amendments proposed a change to the current percentage for the reserves for non-investment-linked life insurance business to be exempted from the allowed foreign investment amount, raising it from 35% to 40%. Furthermore, the FSC proposed to strengthen the disclosure of the FX risk in foreign currency-denominated traditional insurance policies to policyholders.

Foreign investment positions expanded, with higher equity risk and interest rate risk

Foreign investment positions of life insurance companies grew continually and reached NT$18.66 trillion at the end of 2020, of which more than 90% was invested in USD-denominated financial products. In order to alleviate the impacts of exchange rate fluctuations, life insurance companies actively used derivative financial instruments for FX hedges and accelerated the accumulation of FX valuation reserves to adhere to relevant regulations. However, the FX risk inherent in open FX positions for life insurance companies still warrants close attention.

In the foreign investments of insurance companies, securities investments constituted the largest share, of which about 90% were invested in bills and bonds and 10% in equities. With respect to bond investments, US government bond yields trended downwards significantly from 2020 Q1 onwards, triggering a massive wave of calling back international bonds by their issuers to be replaced with new issues. The redemption amount of international bonds in total reached US$45.8 billion throughout 2020, mostly held by life insurance companies that would face reinvestment risks. However, as the FSC expected the redemption amount of international bonds to shrink substantially in 2021, the reinvestment risks were to diminish. Moreover, recently, the stock indices, which seem to have decoupled from the real economy, rebounded strongly in some financial markets and, in turn, inflated the bubbles in some asset categories. In addition, US government bond yields rose significantly, which was unfavorable to the valuation of bond positions. Therefore, life insurance companies still face elevated equity risk and interest rate risk.

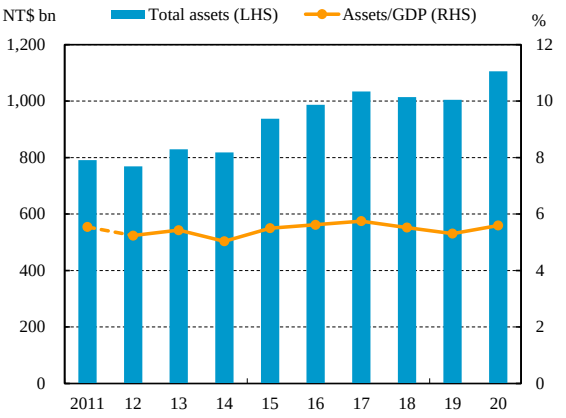
3.2.3 Bills finance companies

The total assets of bills finance companies expanded substantially in 2020. Their guarantee business increased and credit asset quality remained sound. Profitability improved markedly and the average capital adequacy ratio edged up. However, liquidity risk remained high.

Total assets expanded substantially

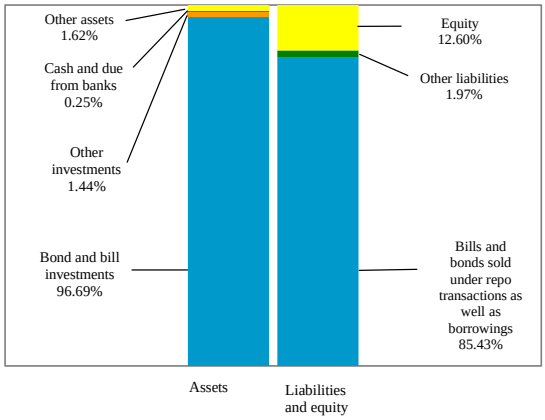
The total assets of bills finance companies expanded substantially by NT$100.8 billion or 10.03% in 2020 and stood at NT$1,105.3 billion at the end of the year, mainly owing to increases in bill and bond investments. The ratio of total assets to annual GDP rose to 5.59% from 5.31% the previous year (Chart 3.48).

Chart 3.48 Total assets of bills finance companies



Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Sources: CBC and DGBAS.

Chart 3.49 Asset/liability structure of bills finance companies



Note: Figures are as of the end of 2020.
Sources: CBC and FSC.

With respect to the asset and liability structure of bills finance companies, bill and bond investments constituted the largest share of 96.69% of total assets as of the end of 2020, an increase of 2.04 pps compared to a year earlier. On the liability side, bills and bonds sold under repo transactions as well as borrowings accounted for 85.43% of total assets, while equity accounted for 12.60% (Chart 3.49). The asset and liability structure remained roughly unchanged.

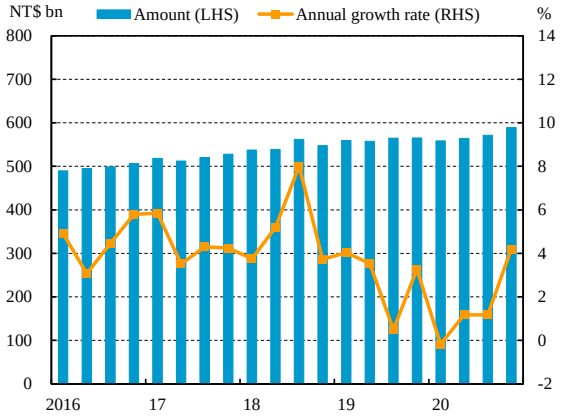
Credit risk

Guarantee liabilities expanded and the share of credit secured by real estate increased steadily

CP guaranteed by bills finance companies registered NT$589.1 billion at the end of 2020,

increasing by 4.19% year on year (Chart 3.50). The increase was mainly because corporates increased CP issuance to raise funds on the back of a new low level of interest rates in the money market. However, the average ratio of guarantee liabilities to equity decreased to 4.89 times owing to a greater increase in equity, and the ratio of each company remained below the regulatory ceiling of 5 or 5.5 times.

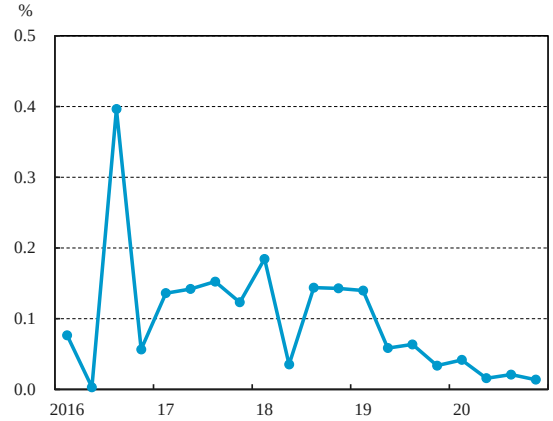
Chart 3.50 Outstanding CP guaranteed by bills finance companies



Source: CBC.

At the end of 2020, guarantees granted to the real estate and construction industries and credit secured by real estate increased to 30.81% and 42.11%, respectively, of the total credit of bills finance companies. Both ratios remained at recent high levels. As pressures on reducing unsold residential properties remain a concern and the government's recent measures to improve the health of the housing market will take time to show results, the credit risk of mortgage-related credit remains high. Bills finance companies should closely monitor the impacts of housing market trends on mortgage-related credit.

Chart 3.51 Guaranteed advances ratio of bills finance companies



Notes: 1. Guaranteed advances ratio = overdue guarantee advances/(overdue guarantee advances + guarantees)
2. The guaranteed advances ratio rose at the end of September 2016 because bills finance companies faced a dispute over the right to dispose of collateral.

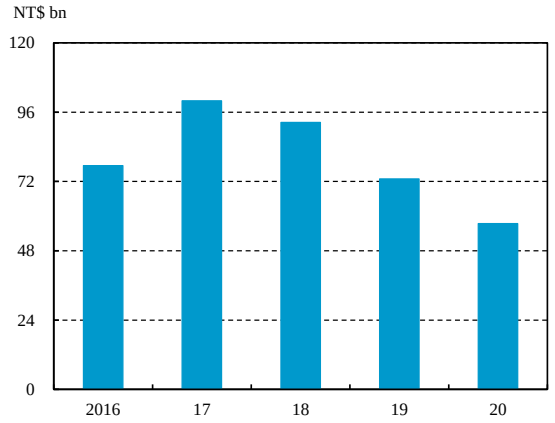
Source: CBC.

To strengthen the risk control on mortgage-related credit of bills finance companies, in December 2020, the Bank suggested the FSC consider preventing bills finance companies from allocating excessive credit resources in the real estate market. In response, the FSC included the guarantee business for the real estate industry as a focus of financial inspection on bills finance companies in 2021, initiated related targeted examinations, and proposed measures for preventing excessive credit resource allocation to the real estate market, so as to help enhance the risk control of mortgage-related credit of bills finance companies.

Credit quality remained sound as guaranteed advances ratio declined further

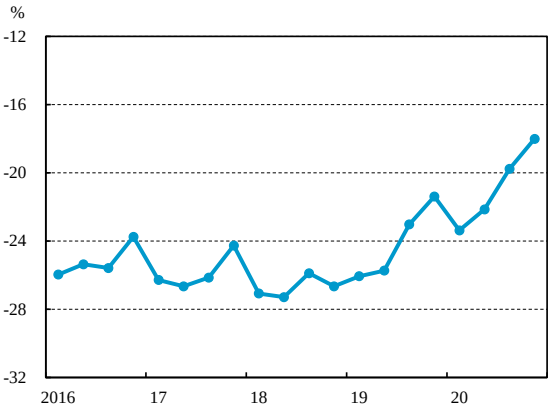
The credit quality of bills finance companies remained sound in 2020, as the guaranteed advances ratio declined further, reaching 0.01% at the end of the year (Chart 3.51). Moreover, the credit loss reserves to guaranteed advances ratio[56] expanded to 99.31 times, indicating sufficient reserves to cover potential credit losses. However, the risk of the COVID-19 pandemic resurging may add to concerns about a highly uncertain outlook for both domestic and global economic growth, which could weaken the credit quality of bills finance companies going forward, and thus warrant continuing attention.

Chart 3.52 Non-guaranteed CP investments of bills finance companies



Source: CBC.

Chart 3.53 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.

Investment in non-guaranteed CP issued by the leasing industry accounted for a higher share, and its potential credit risks warrant attention

The outstanding amount of non-guaranteed CP investment by bills finance companies stood at NT$57.4 billion at the end of 2020, decreasing by 21.22% year on year (Chart 3.52). Each company's ratio of non-guaranteed CP investment to equity remained below the self-disciplinary ceiling of 2 times. However, the outstanding amount of investment in non-guaranteed CP issued by the leasing industry doubled compared to the previous year and accounted for more than 10% of total non-guaranteed CP investment. Considering that the leasing industry tends to rely on short-term sources for funding long-term investments, bills finance companies should pay attention to the potential credit risk associated with such investment.

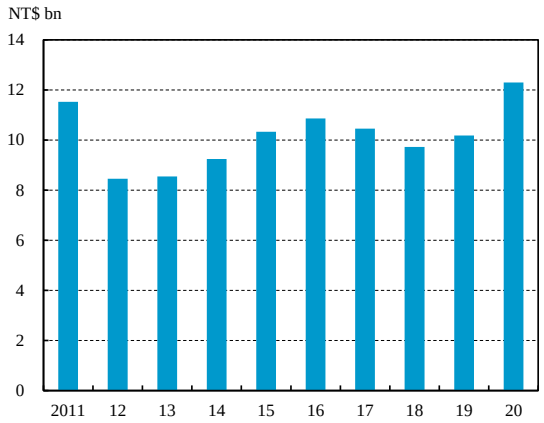
[56] Credit loss reserves to guaranteed advances ratio = (provisions + loss reserves to guarantees)/guaranteed advances

Liquidity risk remained high

In 2020, bills finance companies still faced a significant maturity mismatch between assets and liabilities, as more than 90% of their assets were invested in bills and bonds at the end of the year, 45.22% of which were long-term bonds. Meanwhile, more than 80% of their liabilities were from short-term interbank call loans and repo transactions. Nevertheless, their 0-30 day maturity gap to total assets denominated in NTD shrunk continually and registered -18.01% at the end of the year (Chart 3.53), reflecting a decreasing but still high liquidity risk in bills finance companies.

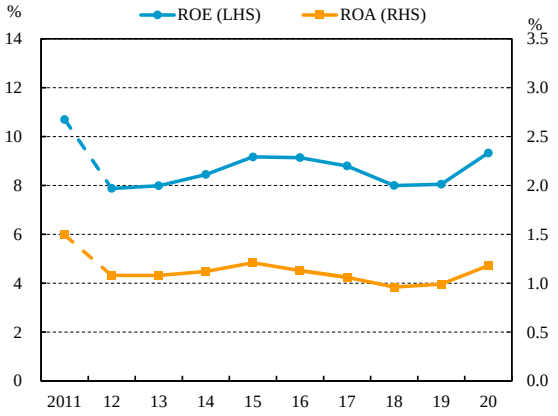
The outstanding amount of major liabilities[57] increased by 10.23% in 2020 and the average ratio of major liabilities to equity also increased to 7.88 times at the end of the year, reflecting a higher degree of financial leverage. However, the leverage ratios of all bills finance companies stayed below the regulatory ceilings of 10 or 12 times.

Chart 3.54 Net income before tax of bills finance companies



Note: Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
Source: CBC.

Chart 3.55 ROE & ROA of bills finance companies



Notes: 1. Figures from 2012 forward are on the TIFRSs basis; figure of 2011 is on the ROC GAAP basis.
2. ROE = net income before tax/average equity.
3. ROA = net income before tax/average assets.
Source: CBC.

Profitability enhanced substantially

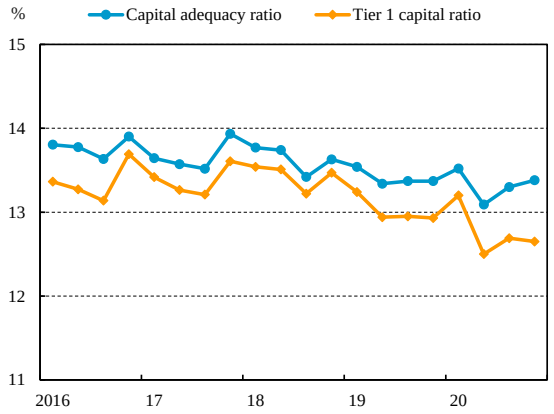
Bills finance companies posted a 10-year high net income before tax of NT$12.3 billion in 2020, markedly increasing by 20.79% year on year (Chart 3.54), mainly owing to a decrease in interest expenses of bill and bond repo transactions. The average ROE and ROA rose to 9.33% and 1.18% (Chart 3.55), respectively, reflecting a sharp increase in profitability.

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

Average capital adequacy ratio rose marginally

At the end of 2020, the average Tier 1 capital ratio of bills finance companies declined marginally to 12.65%, while their average capital adequacy ratio rose slightly to 13.38% (Chart 3.56). Moreover, the capital adequacy ratio for each company remained well above the statutory minimum of 8%.

Chart 3.56 Average capital adequacy ratios of bills finance companies



Source: CBC.

Box 3
LIBOR cessation: Impacts on Taiwanese banking industry and reponse measures

The London Interbank Offered Rate (LIBOR) is the main reference rate for pricing various financial instruments in global financial markets. After the 2008 financial crisis, there were multiple scandals related to LIBOR manipulation around the world. Moreover, the rapid shrinking of the interbank call loan market has affected the willingness of banks to submit LIBOR settings. To avoid undue market disruption caused by an unexpected cessation of LIBOR, the UK Financial Conduct Authority (FCA) stated that panel bank submissions for all LIBOR settings will no longer be required from January 2022 onwards. As a result, the approaching cessation of publication of the LIBOR settings and the transition of interest rate benchmarks posed challenges for financial markets. Against this backdrop, the way that the Taiwanese banking industry addresses the risks of LIBOR cessation warrants attention.

1. Background and developments of LIBOR cessation

1.1 Background of LIBOR cessation

LIBOR, calculated from estimates of unsecured interbank call loan rates submitted by a panel of banks, is widely used in the pricing and evaluation of various financial products. After the 2008 financial crisis, it was discovered that several banks had reported false interest rates to manipulate LIBOR to their own advantage. The scandal prompted a wave of financial benchmark rate reforms around the world. Although the LIBOR management mechanism was improved after the reforms, the interbank call loan markets in major economies continued to shrink over the same period. It not only affected the willingness of panel banks to submit LIBOR settings, but also led most LIBOR submissions to be reliant on assumptions or expert judgments. As a result, LIBOR submissions remained vulnerable to manipulation. Meanwhile, given shrinking interbank call loan markets, the scale of which fall disproportionately far below the amount of LIBOR-linked financial products globally, doubts about the representativeness of LIBOR in financial markets have been raised.

In order to avoid undue market disruption caused by an unexpected cessation of LIBOR and to promote the reform of alternative reference rates (ARRs), the UK FCA announced in July 2017 that it would no longer require banks to submit settings of LIBOR after the end of 2021 and jurisdictions are encouraged to establish robust ARRs to replace LIBOR. Then, with a view to reducing the burden of contract conversion on financial institutions, in March 2021, the FCA announced that it had decided to extend the cessation date of some

USD LIBOR settings to the end of June 2023. However, regulatory authorities such as the US Fed still encouraged financial institutions to cease entering into new contracts that use USD LIBOR as a reference rate for various tenors of financial instruments by the end of 2021.

1.2 Alternative reference rates for LIBOR

LIBOR is currently calculated for five currencies (USD, GBP, EUR, CHF, and JPY) and seven tenors (ranging from overnight to 12 months) with respect to each currency, resulting in the publication of 35 individual rates.[1] For those five currencies, ARRs were identified and recommended in respective jurisdictions. Unlike LIBOR, which represents an unsecured interest rate with a complete forward-looking term structure, ARRs are backward-looking overnight interest rates, relying entirely on transaction data. Among them, the Secured Overnight Financing Rate (SOFR) and the Swiss Average Rate Overnight (SARON) are secured rates calculated on the basis of repo transaction data, whereas the other three ARRs are unsecured rates.

2. Impacts of LIBOR cessation on Taiwanese banking industry

2.1 LIBOR exposure of Taiwanese banking industry

LIBOR has been a long-established benchmark interest rate with the most influence on the world. Being a participant in the global financial market, the Taiwanese banking industry has widely used LIBOR in their daily business. Considering that LIBOR and ARRs are essentially different, it is necessary for the banking industry to align relevant systems and operating procedures with the characteristics of ARRs. However, this may impact product design and trading system in the front office, asset and liability valuation, capital allocation, and risk analysis models in the middle office, and collateral management, settlement, and hedge accounting in the back office. According to a survey conducted by the Bankers Association of the Republic of China (BAROC), in terms of the LIBOR exposures of the Taiwanese banking industry, the notional position of financial derivatives accounted for the largest share of approximately 60% of the total at the end of June 2020, while the rest mostly went to cash products in assets. Compared with Japan and Hong Kong, the Taiwanese banks' overall exposures to LIBOR-linked products and contracts were limited. However, an estimated more than 60% of current LIBOR exposures will successively mature after January 1, 2022. It is higher than the levels of major economies, ranging from 40% to 50%.[2] Considering that more than 90% of such exposures lack appropriate fallback language in contracts, banks may find it difficult to apply fallback mechanisms or adopt ARRs after LIBOR cessation.

2.2 Major LIBOR cessation risks to the banking industry

LIBOR cessation risks are widely present in various bank operations. In general, there are six key risks faced by the banking industry, including profit and capital risk, market risk, liquidity risk, operational risk, legal risk, and reputational risk. According to a Sionic research,[3] financial derivatives trades posed lower LIBOR cessation risks as most market participants adhere to the International Swaps and Derivatives Association protocol, whereas cash products, such as loans and bonds, may have higher legal and operational risks owing to the lack of standardized contracts that incorporate fallback language.

3. LIBOR cessation response measures in Taiwan

3.1 Measures taken by the Bank and the FSC

In order to ensure that all banks are fully prepared for LIBOR cessation, in February 2020, the Bank and the FSC urged domestic financial institutions to carefully assess the risks of LIBOR discontinuation and address them appropriately. They are advised to: (1) make transition plans so as to shift to ARRs; (2) review legacy contracts referencing LIBOR, and actively communicate with affected customers and counterparties to negotiate relevant contract modifications; and (3) identify risks posed by LIBOR cessation and transition. In March 2020, the Bank, together with the FSC, urged the BAROC to establish a task force on LIBOR transition, which aims to investigate the impacts on and preparations by the Taiwanese banking industry and to recommend response measures for banks to make LIBOR transition plans. Currently, this task force is right on schedule in carrying out a series of working projects.

3.2 Current efforts of banks and recommendations

According to the information submitted by banks on October 30, 2020, most Taiwanese banks have set up dedicated committees or task forces for benchmark interest rate transition. They not only monitor the affected exposures regularly, but also assess potential impacts and carry out response strategies continually. In light of the wide-ranging impacts of LIBOR cessation, Taiwanese banks should conduct comprehensive impact assessments and develop complete LIBOR cessation and transition plans. In particular, they are advised to review the completeness of their own preparations and actively carry out LIBOR transition processes based on the recommendations of the aforementioned task force on eight major work items, namely governance structure and transition plans, impact assessments, new benchmark interest rate markets and product transition, contract renegotiation, customer communication, system and process adjustments, risk and

revaluation models, and financial reporting and taxation.

4. Conclusion

The Taiwanese banking industry uses LIBOR widely in their front, middle, and back office operations. Therefore, LIBOR cessation will have significant impacts on their financial product contracts, customer retention, business processes and information systems, risk management models, accounting, and taxation. Currently, some banks with LIBOR-linked financial product contracts which lack appropriate fallback language would need to actively strengthen their preparations for LIBOR cessation. With the LIBOR cessation date getting closer, banks should have adequate manpower and resources in place to formulate and execute LIBOR transition plans prudently. They are encouraged to carry out LIBOR transition processes as soon as possible so as to reduce potential risks arising from LIBOR cessation.

Notes: 1. The ARRs for USD, EUR, GBP, CHF, and JPY LIBOR are the Secured Overnight Financing Rate (SOFR), the Euro Short-Term Rate (€STR), the Sterling Overnight Index Average (SONIA), the Swiss Average Rate Overnight (SARON), and the Tokyo Overnight Average Rate (TONA), respectively.

2. Financial Stability Board (2020), "Supervisory Issues Associated with Benchmark Transition," July.
3. Sionic (2019), "Benchmark Reform – Taipei Workshop," October.

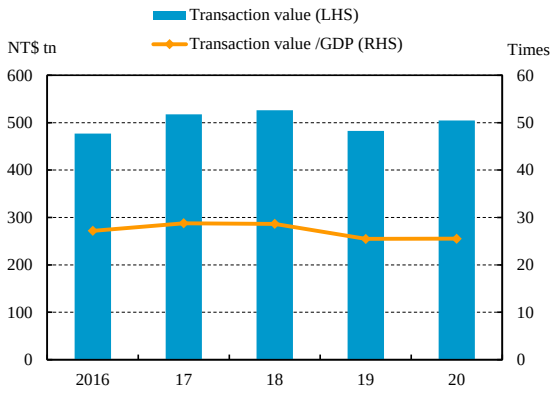
3.3 Financial infrastructure

3.3.1 Payment and settlement systems

Overview of the CIFS's operation

The CIFS uses required reserves[58] deposited with the Bank to deal with large-value interbank funds transfers, e.g., foreign exchange transactions.[59] It also electronically conducts the final settlement of NTD interbank transfers, connecting to each clearing system,[60] such as those for domestic securities, bills, bonds and retail payments. In 2020, the amount of funds settled via the CIFS was about NT$505 trillion, approximately 25.5 times the GDP for the year (Chart 3.57). The daily average reserves deposited for settlement[61] was about NT$814.1 billion, through which the transaction amount completed was approximately NT$2.01 trillion.

Chart 3.57 Funds transferred via the CIFS



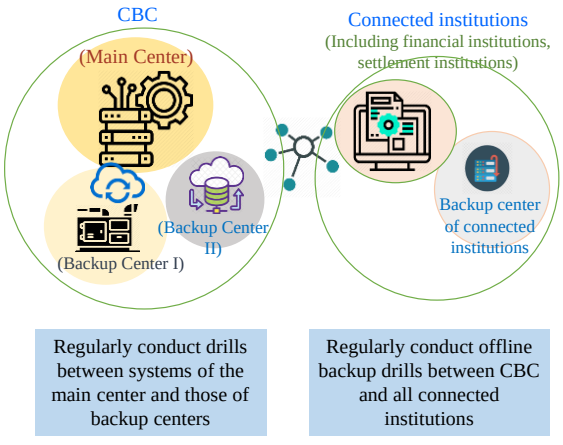
Sources: CBC and DGBAS.

In response to the pandemic, the Bank took measures to maintain the smooth operation of the payment systems as follows:

1. Preparing the onsite and offsite data backup facilities for the CIFS and performing drills on a regular basis to ensure uninterrupted system operation (Chart 3.58).

2. Working off-site and working from home. In line with the government's pandemic

Chart 3.58 Schematic diagram of CIFS backup mechanism in CBC



Source: CBC.

[58] The required reserves deposited by banks are a type of central bank money and are deemed an asset without credit risk.
[59] Large-value interbank funds transfers include foreign exchange transactions, interbank loans, interbank transfers, and book-entry central government bond payments, etc.
[60] The CIFS links every domestic clearing system, handling negotiable instruments exchanges, interbank payment services, credit cards, and clearance services of the settled amounts of bills, listed/over-the-counter (OTC) stocks, and government bonds.
[61] Refer to the balance deposited by banks in the CBC Reserves Accounts A.

prevention policies, some of the Bank's employees carried out work off-site from March 6, 2020 and then resumed normal work back to the office on June 1 as the pandemic eased. However, in mid-May 2021, owing to an upsurge of domestic cases, the mechanism of working off-site and working from home (WFH) was reinstated.

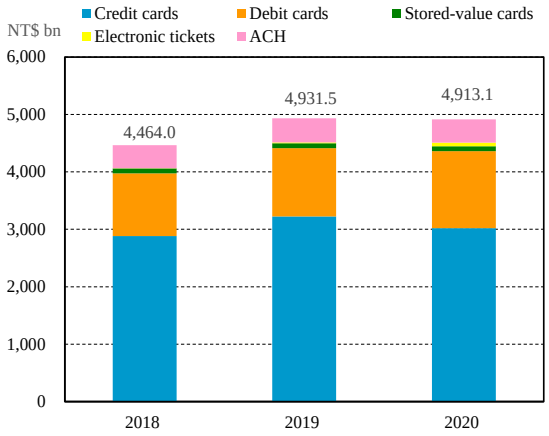
3. Formulating the *Precautions for the Implementation of the CIFS and Open Market Operation System in Response to a Major Epidemic*. Financial institutions were required to adopt relevant measures[62] in unison, ensuring normal functioning of liquidity management.

The FISC's Inter-bank Financial Information System (hereinafter abbreviated as FIS) uses the funds of the Interbank Funds Transfer Guarantee Special Account (referred to as the Guarantee Account)[63] under the CIFS to clear and settle one by one interbank payment transactions of remittances, automated teller machines (ATM) withdrawals, transfers, etc. The annual transaction amount in 2020 was approximately NT$174.8 trillion. As the demand for interbank electronic payment transactions increased, the daily average balance of the Guarantee Account in 2020 amounted to about NT$302.2 billion, while the average daily transaction amount of the FIS using the funds of the Guarantee Account was about NT$699.1 billion.

Consumption via domestic electronic payment instruments

In 2020, the overall consumption expenditure via various electronic payment tools[64] was NT$4.91 trillion (Chart 3.59), decreasing slightly by 0.37% year on year. Among them, the consumption amount via credit cards, ACH interbank collection, and electronic ticketing declined by about NT$200 billion, NT$12.5 billion, and NT$4.4 billion, respectively. The declines were mainly caused by the impact of the pandemic under

Chart 3.59 Overview of electronic retail payment transactions



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

Sources: CBC, FSC and FISC.

[62] Relevant measures include: (1) to prepare an offsite backup system and operating manpower; (2) to transfer funds via offline media or by manual billing if the connection is interrupted; (3) to avoid relevant personnel from being quarantined, thus affecting fund dispatching, another financial institution can be entrusted to appropriate funds on its behalf; (4) to notify the Bank as soon as possible when the headquarters initiates the mechanism of working off-site or entrusts another financial institution to appropriate funds.

[63] To deal with the clearance and settlement of retail interbank payment transactions, the Bank agrees all banks shall jointly open an Interbank Funds Transfer Guarantee Special Account at the Bank. The Guarantee Account is a collective account within the sub-account of each bank. Each bank can transfer funds from its reserves account to this special account as a guarantee for clearing of interbank payments on a one by one basis.

[64] See Note 9.

which people could not travel abroad and face-to-face transactions in physical stores reduced.

Overview of the development of domestic mobile payment in 2020

In order to promote the use of mobile payment, the National Development Council has set a target of 90% penetration rate of mobile payment in 2025. According to a survey,[65] the penetration rate[66] in September 2020 was 67.5% as the public mindful of pandemic prevention tended to reduce cash transactions and stores used related promotion schemes to lure customers, boosting the willingness to use mobile payments. In order to improve the domestic mobile payment environment, the Bank urged the FISC to establish a common QR Code payment standard,[67] and promoted it jointly with banks. Since its launch in September 2017, the accumulated number of transactions processed using this common standard has exceeded 40 million with a total value of approximately NT$153.7 billion at the end of December 2020. The number and the value of transactions in 2020 increased respectively by 130% and 74%[68] year on year.

To facilitate inter-institutional connection between banks and non-bank payment institutions and thus promote the efficiency of the overall payment market, the FSC completed the amendment to the *Act Governing Electronic Payment Institutions,*[69] *to* be enacted on July 1, 2021, along with its sub-regulations. The Bank had already instructed the FISC to establish an inter-institutional electronic payment platform and to complete the development of functions such as fund transfers and shopping payments. Once the relevant sub-regulations are amended, the FISC will apply to the competent authority for this business and begin to accept participation by electronic payment institutions in the platform.

The role of central banks and new currency paradigms in the era of digital payment

As digital innovations are changing the landscape of payment service, central banks in many countries have actively embraced payment innovations, continued to improve payment systems,

[65] MIC survey data from the Institute for Information Industry.
[66] See Note 10.
[67] Competition in the domestic mobile payment market is fierce. In order to seize the market opportunities, telecommunication industries have developed their own brands, resulting in incompatibility of specifications, which hinders the long-term development. With the support and assistance of the Ministry of Finance, the FISC and government-owned banks launched the common QR Code payment standard in September 2017.
[68] The analysis of transactions processed via the common QR Code payment standard in 2020 shows: 1.in terms of the number of transactions, transfers were the most (accounting for about 44%), while shopping grew the fastest (doubling); 2. in terms of transaction amounts, transfers were still the most (about 69%) and shopping also grew the fastest (multiplying 1.8 times).
[69] The key points of the amendment include: (1) to abolish the *Act Governing Issuance of Electronic Stored Value Cards*, and to include issuing institutions of the electronic stored value cards in the scope of the amended *Act*; (2) to expand the scope of services, which include cross-institutional money transfer services and small amount remittances services.

and started research on CBDCs. In terms of research progress on a CBDC, the Bank was in step with the world and had completed the first phase program in June 2020 with a technical report on the feasibility of a wholesale CBDC, and moved on to the second phase program on a general purpose CBDC in September of the same year (Box 4).

3.3.2 The FSC revised the regulations governing risk weights of real estate exposures on domestic banks

The Basel Committee on Banking Supervision (BCBS) issued the Basel III final reform document in December 2017.[70] The revised capital requirements of real estate exposures applied different risk weights according to loan-to-value ratios of the exposures (hereinafter referred to as the LTV approach), with an addition of the capital requirement for "land acquisition, development and construction" (ADC) exposures.

In view of the new BCBS capital requirements being more sensitive to risks, the FSC amended the capital requirements for real estate exposures for domestic banks in December 2020, effective at the end of June 2021. However, well prepared banks were permitted to early adopt the new approaches by the end of 2020.[71] The revised risk weights of real estate exposures are shown in Table 3.3. The main amendments are as follows:

- Domestic banks may choose to either adopt the new LTV approach for residential and commercial real estate exposures or apply the current simplified method.
- Residential and commercial real estate exposures may be either general or income-producing exposures, depending on whether repayments of the loans rely on cash flows generated by the real estate. The risk weights assigned to these exposures will be determined based on their LTV ratios.
- Risk weights assigned to exposures with LTV ratios below 80% will be lower; whereas risk weights will be increased for exposures with LTV ratios higher than 80%.
- The new ADC exposures will be risk-weighted at 150% in general, which will be higher than the existing risk weight of 100% assigned to corporate exposures without external credit ratings.

Eleven banks were permitted to adopt the new LTV approach by the end of 2020 based on the

[70] Basel Committee on Banking Supervision (2017), "Basel III: Finaliing post-crisis reforms," December.
[71] The adoption of a new LTV approach for overseas exposures (including exposures of overseas branches and subsidiaries) will be postponed until January 2023.

pilot test results that the adoption will be favorable to the calculations of capital ratios.[72] The FSC will require the banks to apply the simplified method again, to make an improvement or to raise additional capital charges when banks fail to meet the minimum operation requirements.

Table 3.3 The newly revised risk weights of real estate exposures

Type of exposures	Risk weights based on LTV ratios							
	Applicable exposures							Inapplicable exposures
Residential real estate exposures	LTV ratios		≤50%	50%-60%	60%-80%	80%-90%	90%-100%	
	General	LTV approach	20%	25%	30%	50%	70%	Risk weight of the counterparty
	Income-producing	LTV approach	30%	35%	45%	75%	105%	150%
Commercial real estate exposures	LTV ratios		≤60%		60%-80%	>80%		Inapplicable exposures
	General	LTV approach	60% or the risk weight of the counterparty (whichever is lower)		Risk weight of the counterparty			Risk weight of the counterparty
	Income-producing	LTV approach	70%		90%	110%		150%
ADC exposures	At 150%, in principle; at 100%, for those meeting the criteria in Basel III							

Notes: 1. "Applicable exposures" are real estate exposures which meet the following six requirements: (1) the properties securing the exposures are finished properties; (2) any claims on the properties taken must be legally enforceable in all relevant jurisdictions; (3) the exposures are claims over the properties; (4) borrowers are able to repay; (5) properties must be valued according to specific criteria; (6) documentation requirements are met.
2. Risk weights of exposures to individuals are 75% and those to SMEs are 85%; for exposures of other corporate counterparties, the risk weights applied would be those assigned to corporate exposures.

Source: FSC.

3.3.3 Financial institutions actively advanced sustainable development in unison

In recent years, as international investment institutions and global industrial chains have increasingly attended to sustainability-related issues, corporate governance and responsible investment have gradually become important drivers in major global capital markets. In order to promote the sustainable development of corporates, establish a competent environmental,

[72] Banks that adopted the LTV approach earlier include: Taiwan Cooperative Bank, Taipei Fubon Commercial Bank, Cathay United Bank, Shin Kong Commercial Bank, Yuanta Commercial Bank, Bank SinoPac, E.Sun Commercial Bank, Taishin International Bank, Jih Sun International Bank, CTBC Bank, and Sunny Bank, amounting to 11 banks.

social, and governance (ESG) ecosystem, and strengthen the international competitiveness of Taiwan's capital markets, the FSC officially launched the Corporate Governance 3.0 - Sustainable Development Roadmap (hereinafter referred to as CG 3.0) in August 2020. The CG 3.0 centers on the following five action plans: (1) strengthening the duties and functions of the boards; (2) enhancing information transparency; (3) strengthening communication with stakeholders; (4) encouraging stewardship; (5) deepening a corporate culture of governance and sustainable development.

In addition, considering that green finance is an integral part of the government's overall environmental, economic, and industrial policies, the FSC formulated the Green Finance Action Plan 1.0 in November 2017, encouraging financial institutions to provide the green energy industry with investment and financing, with the aim of enhancing effective operation of the domestic green finance market and advocating overall developments in sustainable finance. Furthermore, in order to achieve Taiwan's carbon reduction and sustainable development goals, the FSC proposed the Green Finance Action Plan 2.0 (hereinafter referred to as Action Plan 2.0) in August 2020. The Action Plan 2.0 expanded the scope of sustainable finance and included a total of 38 measures that cover the following eight aspects: credit, investment, capital market fundraising, professional development, information disclosure, promotion of further development of green financial products or services, prudential supervision, international connections, and incentive mechanisms.

However, financial institutions still face some challenges in the course of promoting sustainable finance, such as harmonizing the definitions of sustainable finance, improving the quality of ESG disclosure, removing in-house hindrances to the advancement of sustainable finance, and synchronizing stakeholder engagement. The FSC is establishing Taiwan's classification standards for sustainable firms and planning a database platform for sustainable development of industries, which could serve as a reference for financial institutions in choosing investment and financing targets or cooperation partners and in disclosing relevant information. Looking forward, it is hoped that the vision of sustainable finance ecosystem can be achieved through close cooperation between the public and private sectors in the future (Box 5).

3.3.4 Encouraging banks to engage in Open Banking data sharing services

To speed up the process of Taiwan's financial data sharing, the FSC encourages banks to initiate open banking services based on their business needs in a voluntary, self-disciplined and

progressive manner. In cooperation with Third-party Service Providers (TSPs), the open banking services would help banks to provide more innovations in financial services and enable digital finance transformation so as to promote the development of financial inclusion.

The FSC planned to promote open banking in three phases that would be reviewed on a rolling basis. The focus of planning and the current status for each phase are as follows:

1. Phase I - "public information inquiry": the first phase aims at facilitating the inquiry of non-transactional financial information. Consumers can compare goods and services of each bank through a third-party platform developed by TSPs by accessing such information as interest rates, exchange rates, ATM locations, branch status, and financial products. In September 2019, the FSC approved the applications of 25 banks to launch Phase I service in cooperation with seven TSPs.

2. Phase II - "customer information inquiry": the second phase focuses on the information of financial transactions, such as bank savings account balance and transaction details. Since this type of information involved customer data ownership, personal information protection, customer interests, dispute resolution mechanisms, and standards for the management of TSPs, the FSC assigned the Bankers Association and the FISC to formulate guidance on institutional and technical standards for banks and TSPs to follow. In December 2020, the FSC approved the applications of seven banks to conduct Phase II service in cooperation with two TSPs. More banks have filed applications and are waiting for approval.

3. Phase III - "transaction information": the third phase mainly involves the process of banking transactions and payments. Bank customers, after giving consent for TSPs to consolidate their personal accounts across banks, may make a debit, payment, adjustment, or disbursement of account funds through an account-linked app. The FSC will review the outcomes of Phase II operations before moving on with Phase III.

3.3.5 The relaxation of wealth management regulations and the enhancement of related supervisory measures are expected to increase the competitiveness of the domestic wealth management industry

To meet the needs of high-net-worth customers for investment and wealth management, and in light of a wave of offshore funds repatriation, the FSC launched the New Wealth Management

Scheme in 2020 and relaxed the relevant regulations. The deregulation allows financial institutions to provide more diverse financial products and consulting services to high-net-worth customers, i.e., HNW customers defined as those hold NT$100 million or above in net worth of investable assets and insurance products, possess professional knowledge and trading experience in financial products, and have adequate risk tolerance. This, coupled with the enhancement of related supervisory measures, is expected to take Taiwan's wealth management industry to a more sophisticated level.

When financial institutions apply for permission to engage in wealth management business for HNW customers, the FSC requires them to meet the standards set in accordance with the principle of differentiated supervision. Moreover, the applicants should strengthen their risk management by establishing management mechanisms related to product suitability and risk disclosure, product review and monitoring, liability for issuers of offshore financial products, internal control, cyber security, and fraud-prevention measures for digital financial services, and risk management and code of conduct. Moreover, applicants' board of directors should be responsible for building a corporate culture of integrity and establishing a comprehensive code of conduct for consumer protection, in order to fulfill the principle of treating clients fairly. The FSC also introduced the "senior manager accountability scheme" in a bid to understand the vision and commitment of senior management of financial institutions for business operations in terms of "corporate culture and code of conduct" and "treating clients fairly." Since December 2020, the FSC had approved the applications of several financial institutions to conduct such businesses.

3.3.6 FX regulation amendments

To keep up with the trends of financial digitalization and FX business development, and to promote the development of domestic bank debentures market and the diversification of financial products, the Bank amended the *Regulations Governing Foreign Exchange Business of Banking Enterprises* in January 2021 to relax some restrictions on banks' FX business. The major amendments included the following:

- Stipulating the definition of foreign currency bank debentures, relaxing the restrictions on authorized banks' issuing within the territory of the ROC foreign currency bank debentures linked to derivatives or structured notes, and amending the rules that authorized banks shall comply with.

- Simplifying qualifications for banks applying to the Bank for approval to become authorized FX banks by deleting the provision that banks shall participate in joint

processing of foreign exchange business with other authorized banks for a minimum accumulated amount.[73]

- Streamlining the application procedure for banks applying to the Bank for approval to become authorized FX banks, including deleting the provision that the application made to the Bank for reviewing the qualifications shall be forwarded via the competent authority.

- Stipulating that authorized banks shall obtain approval from the Bank to engage in FX derivatives business before offering any FX derivatives, and amending the definition of an FX swap product.

[73] In line with the digital development of financial technology and FX business trends, the amendment deleted the provision that banks shall participate in joint processing of foreign exchange business with other authorized banks for an accumulated amount up to USD 400 million or up to 7,000 transactions before applying for approval.

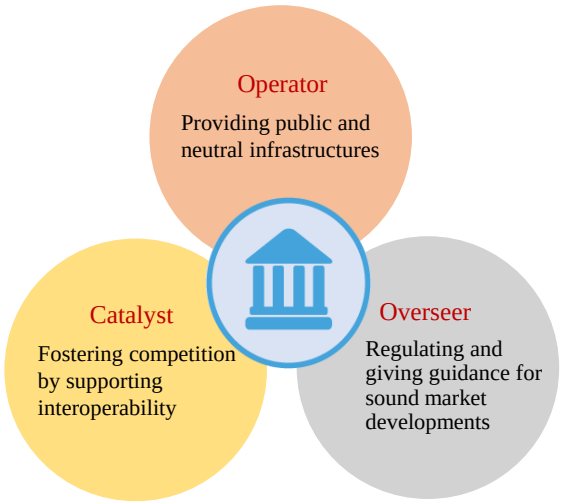
Box 4
Central banks' roles and currency forms in the digital payment era

As the world continues shifting to the digital era, the payment system has become more diverse and the environment more competitive. For the purpose of facilitating a safer and more efficient payment ecosystem, as well as fostering an environment more conducive to innovation, central banks play a pivotal role by ensuring trust in money.[1] Besides this, central banks can take advantage of the opportunities that digital technology opens up to engage in innovations as well. In particular, if experiments confirm its feasibility, the central bank digital currency (CBDC) is expected to serve as a new basis for digital payments in the future.

1. Central banks help construct a sound functioning payment system by playing three key roles

Central banks play a key role in the development of digital payments by promoting a safe and efficient payment ecosystem (Chart B4.1).

Chart B4.1 Central banks' roles in the digital payment era



Source: BIS (2020).

1.1 As an operator to provide public and neutral infrastructures

Most central banks run crucial payment infrastructures in their countries and directly provide public and neutral payment services aimed at maximizing public interest instead of pursuing commercial profits. For instance, physical cash issued by central banks can be used for various small-value retail transactions, while the Real Time Gross Settlement Systems (RTGSs) operated by central banks, which deal with interbank settlements and connect retail clearing systems, serve as a basis for private payment providers to deploy a nationwide network.

1.2 As a catalyst to promote interoperability so as to foster competition

Payment systems are supposed to be scalable in order to accommodate as many users as possible, with the intention of bringing a network effect into full play. Nevertheless, private payment providers tend to offer an independent and closed-loop network, resulting in the phenomenon of fragmented payment markets. Central banks and other authorities can

break down the barriers between payment networks and reduce the obstacles to entry by supporting the development of common standards for payment systems, thereby delivering a more competitive market.

1.3 As an overseer to regulate and guide sound market development

The regulatory approaches launched by central banks and competent authorities are keeping up with the times, especially those guarding against risks lurking around digital innovations to consumer protection and privacy. Furthermore, measures that are increasingly emphasized globally, such as know-your-customer (KYC) and anti-money laundering and combating the financing of terrorism (AML/CFT), also lay down important foundations for sound development in payment markets.

2. Central banks provide the solid foundation for payment systems by underpinning the public's trust in money

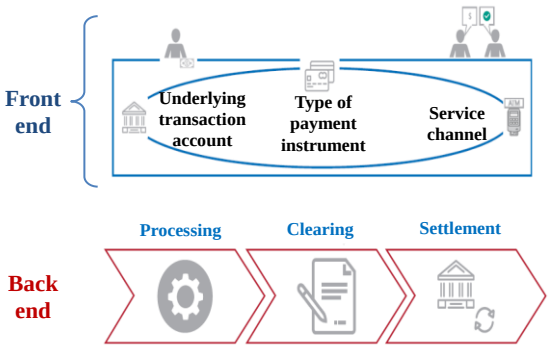
Payment systems are usually built upon a two-tier structure operated by central banks together with financial institutions. On one side, the former ensures trust in money, while the latter serves the public and is able to carry out innovations. On the other side, central banks supply the safest systems (e.g., the RTGS) and payment instruments (e.g., physical cash) for settling both wholesale and retail transactions, while financial institutions provide diverse retail electronic payment instruments, meeting the needs of various payment scenarios for the public.

Owing to the latest wave of innovation in digital payments, payment services put into contact with the public have continued to evolve in recent years. A sound payment system is still based on the trust in money ensured by the central bank. Under this condition, financial institutions are able to concentrate on the innovative development of payment services and increase users' willingness to accept such new services as well.

3. Digital innovation is radically reshaping the provision of payment services and attemping to change the forms of currency

3.1 Digital innovation is altering customer experience of payment services

Chart B4.2 Payment infrastructure elements and arrangements



Source: BIS (2020).

Digital innovation has been undergoing a comprehensive change in front-end and back-end services supported by payment systems (Chart B4.2). For the front-end services, a "transaction account" is not limited to those opened at banks but includes electronic payment accounts as well. CBDCs may be used as "payment instruments" in the future. The "service channel" includes not only physical facilities such as automated teller machines (ATMs), point-of-sale (POS) terminals, but also more popular and means that have become the leading trend, namely internet and mobile applications (apps). For the back-end services, arrangements of payment flows, including processing, clearing, and settlement, continue to improve with technological evolution. Moreover, the emergence of distributed ledger technology (DLT) has sparked off discussion on the feasibility of applying decentralized frameworks in clearing and settlement systems.

3.2 Private providers are challenging to change the form of money, while central banks continue upgrading their systems and embracing this innovation

With continuing innovation in payment services, private payment providers also begin to challenge the core foundation of payment systems, attempting to change the existing forms of money. In this view, central banks have been improving and upgrading their payment systems, actively embracing innovations. Those central banks engaging in the study of CBDCs currently account for about 86% of global peers.[2] In October 2020, the Bank for International Settlements (BIS) and seven central banks, including those of the US, the UK, Japan, and the euro area, published the *CBDC: Foundational Principles and Core Features*, which emphasizes that a central bank should not compromise monetary or financial stability by issuing a CBDC and that it should incorporate core features such as convertibility, safety and financial inclusion as a guiding principle of CBDC issuance by national authorities.[3]

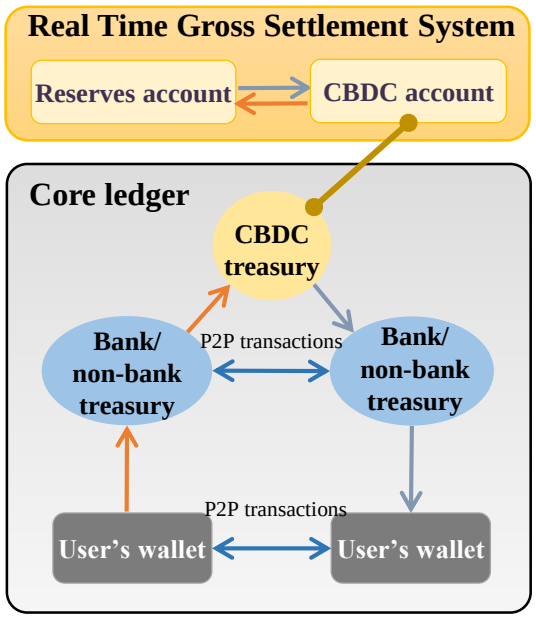
3.3 The Bank has completed research on a wholesale CBDC and proceeded to an experiment on a general purpose CBDC

With its CBDC research keeping pace with international studies, the Bank already completed the first phase program with a technical report on the feasibility of a wholesale CBDC[4] in June 2020. The results showed that DLT has the potential to increase the resilience of systems. However, when applying DLT to the financial front of a CBDC, its efficacy would be affected by the need for additional mechanisms in pursuit of privacy protection and supervision (e.g., AML/CFT).

Starting from September 2020, the Bank moved on to the second phase program on a general purpose CBDC, planning to adopt a two-tier structure under a public-private

partnership between the Bank and financial intermediaries. Its functional process is structured as the following: the Bank issues the CBDC to intermediaries, such as banks, which enables customers to hold the CBDC with these intermediaries. Financial intermediaries and end users are allowed to directly conduct peer-to-peer (P2P) transactions using the CBDC (Chart B4.3).[5] With regard to CBDC design, the Bank would use a "centralized system with partial functions operated through DLT." In other words, the plan is to establish a centralized transaction platform, aiming at achieving efficacy in dealing with large-sum and high-frequency transactions through a general-purpose CBDC while fulfilling the need for privacy and supervision. In addition, the DLT is used to store transaction data with the aim of building operational resilience and avoiding business interruption. The whole program is expected to be completed within two years, and the Bank will continuously reassess the timetable with a rolling review, depending on the progress of the trial and global CBDC development trends. Three main test scenarios preliminarily planned are as follows: (1) large-sum transactions under the delivery versus payment (DvP) mechanism; (2) domestic consumption and transfers; and (3) cross-border outward remittances in small amounts.[6] These scenarios would cover the major application fields of a general purpose CBDC.

Chart B4.3 The concept of the CBC's general purpose CBDC



Note: In the core ledger, the wallets of CBDC treasury, bank/non-bank treasury and user's wallet, which belong to the Bank, intermediaries and customers, respectively, store information about CBDC account balances.
Sources: CBC.

Notes: 1. BIS (2020), "Central Banks and Payments in the Digital Era," *BIS Annual Economic Report*, June.
2. Boar, Codruta and Andreas Wehrli (2021), "Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency," *BIS Papers*, No. 114, January.
3. BOC, ECB, BOJ, Riksbank, SNB, BOE, Fed and BIS (2020), "Central Bank Digital Currencies: Foundational Principles and Core Features," October.
4. In comparison to traditional central bank money, which include cash for retail payment use and reserves for wholesale payment use, the CBDC can be split into two categories: general purpose and wholesale. A general purpose CBDC is widely accessible in all payment scenarios, while a wholesale one mainly serves for interbank payments.
5. Money transfers can be directly conducted using a CBDC wallet on a P2P basis, while the RTGS

would only allow CBDC transactions among financial institutions.

6. With regard to experimentation on cross-border outward remittances in small amounts, the Bank would focus on reducing the inconvenience and costs arising from domestic cash payment based on its preliminary plan. Cross-border and overseas transactions would be operated under the current mechanism. For instance, foreign workers may be able to send the CBDC money to companies in charge of small-amount foreign remittances without the need to send their own remittances through convenience stores or via authorized institutions engaging in collecting and making payment as an agent.

Box 5
The development and challenges of sustainable finance in Taiwan

Financial institutions, which take in funds from the public and manage and utilize those funds by undertaking activities such as lending and investment, are a key force in steering public attention toward sustainable development. Against this backdrop, in recent years, more and more economies have incorporated sustainable finance as a core strategy of their financial development policies. In order to ensure that the financial system plays its role and function of driving the society in the pursuit of sustainable development in Taiwan, the FSC adopted several measures. The Bank also continued to pay attention to international trends of sustainable finance. However, domestic financial institutions still face some challenges to their efforts of promoting sustainable finance. It is thus hoped that a vision of sustainable finance ecosystem will be achieved through close coordination and cooperation among relevant government agencies, the private sector, and international organizations.

1. The definition of sustainable finance

The research on sustainable finance is still in the early stages, so there is no universal definition or taxonomy for sustainable finance. According to the IMF,[1] sustainable finance is defined as the incorporation of environmental, social, and governance (ESG) principles into business decisions, economic development, and investment strategies. Furthermore, promoting economic and financial stability is also the objective pursued by various competent authorities to support sustainable finance.

Sustainable finance not only focuses on the environmental and climate issues related to green and climate finance but also values social finance so as to enhance social well-being. In some cases, it even extends to cover "impact finance," which incorporates both financial aspects mentioned above.

2. The development of sustainable finance in Taiwan

2.1 The FSC implemented green finance and revised the relevant regulation

In order to enhance effective operation of the domestic green finance market and promote comprehensive development in sustainable finance, the FSC formulated the Green Finance Action Plan 1.0 in November 2017, encouraging financial institutions to provide the green energy industry with investment and financing. Furthermore, the FSC proposed the Green Finance Action Plan 2.0 (hereinafter referred to as Action Plan 2.0) in August 2020, with the range further expanded to cover sustainable finance. The short-term focus of Action

Plan 2.0 is to develop a clear definition and taxonomy for sustainable development industries, and enhance the quality and transparency of ESG disclosure in corporate financial reporting. The mid- to long-term action will be establishing an ESG data integration platform and a database for sustainable development to resolve the pending issues related to sustainable development.

Action Plan 2.0 included a total of 38 measures that cover the following eight aspects: credit, investment, capital market fundraising, professional development, information disclosure, promotion of further development of green financial products or services, prudential supervision, international connections, and incentive mechanisms. The FSC will study the international development trends, and establish the relevant regulations and guidelines based on the legal environment and the directions of industrial development in Taiwan.

2.2 Financial institutions have actively complied with international principles for sustainable finance and incorporated ESG factors into their risk management strategies

In recent years, financial institutions in Taiwan have actively complied with international trends, cooperated with the government to promote sustainable finance, and established dedicated units or teams to promote the relevant policies. Moreover, some financial institutions also have voluntarily supported or adopted internationally sustainable finance standards, such as the Equator Principles (EPs), the recommendations by the Task Force on Climate-Related Financial Disclosure (TCFD), and the Principles for Responsible Banking (PRB). In addition, some financial institutions have incorporated ESG factors into their risk management strategy so as to raise awareness of sustainable finance-related issues and strengthen governance effectiveness within the organization. As of the end of March 2021, eight domestic financial institutions[3] have adopted the EPs, while 16 domestic financial institutions have embraced the TCFD framework.

In addition, some financial institutions have worked together with academic institutions to assess the potential impacts of climate-related risks on their own financial positions, and sought to enhance their resilience to weather the climate risk and to address those impacts in a timely manner.

2.3 The Bank has increasingly taken sustainable finance into consideration for policymaking

As many central banks have incorporated green bonds in their investment portfolios recently, the Bank has also gradually included ESG financial products as part of its FX

reserves investment strategy, such as ESG bonds issued by international organizations like the World Bank, the Asian Development Bank, and the European Investment Bank. Furthermore, if needed, the Bank is ready to act as the lender of last resort should financial institutions suffer significant losses from climate-related risks and face liquidity problems.

In light of the fact that the approaches to assessing climate-related risks are still in their infancy, coupled with unavailability of the relevant data, the Bank will continue to pay attention to international development trends and domestic implementation of green finance and climate risk disclosure conducted by financial institutions, and utilize the information for assessing related risks in the future.

3. Challenges facing financial institutions in promoting sustainable finance

3.1 Inconsistencies in the definitions of sustainable finance

As sustainable finance involves a wide range of issues and exhibits high complexity, relevant information seems to be under continuous development. However, some economies have developed the taxonomy for sustainable economic activities in recent years. Currently, Taiwan does not yet have uniform and clear definitions or criteria to determine whether an economic activity or asset qualifies as green or sustainable. As a result, there is a lack of reliable and consistent information and criteria as the basis for financial institutions to make judgement upon, and this is also unfavorable for the competent authority to make peer comparisons.

3.2 Quality improvement in corporate ESG disclosure

The global sustainable finance initiatives and related principles proposed by international organizations as well as the FSC's Action Plan 2.0 tend to require or encourage financial institutions to disclose ESG-related information of their investment and financing targets and of the customers getting credit from them. However, listed companies in Taiwan have not fully disclosed the aforementioned information, which makes it difficult for financial institutions to acquire related information in full. This could create hurdles when they attempt to comply with international principles.

3.3 Hindrances to the advancement of sustainable finance within organizations

For financial institutions, the path to sustainable finance within the organization tend to involve hefty costs such as internal communication, organization restructuring, and employee training. Among them, the processes of internal communication and organization restructuring are time consuming. Moreover, cultivating expertise in sustainable finance and building professional capabilities are neither easy tasks. All of

these increase the difficulty of promoting related practices within financial institutions.

3.4 Difficulties in stakeholder engagement

When promoting sustainable development in the corporate sector, on the one hand, financial institutions need to engage with their stakeholders. For example, they are expected to share experiences with enterprises on ESG issues, jointly respond to sustainable initiatives with their customers, and encourage enterprises to embark on gradual transformation towards low-carbon industries. However, on the other hand, in order to comply with ESG principles or standards, enterprises would have to change their business models, resulting in a substantial increase in operating costs. Since domestic enterprises are mainly small and medium-sized enterprises, the additional costs deriving from ESG implementation might have a great impact on their revenue. This therefore dampens the willingness of enterprises to change, increasing the difficulty for financial institutions to engage with them towards sustainable development.

4. Conclusion

In order to help domestic enterprises and the financial industry clearly understand the scope of sustainable economic activities, communicate in a common language, and avoid green washing, the FSC and the Environmental Protection Administration, Executive Yuan jointly commissioned a research project on the sustainable finance taxonomy, which is expected to be completed by the end of 2021. In addition, the FSC proposed to integrate climate and environmental information from relevant government agencies to build a database platform for sustainable development of industries. Such a platform will serve as a basis for enterprises and the financial industry to conduct risk assessments and scenario analysis.

In the future, it is expected that relevant parties will jointly discuss and learn about international development trends through close coordination and cooperation among agencies, the private sector, and international organizations so as to fine-tune their legal systems as well as the directions of industrial development in Taiwan and establish effective frameworks and foundations for promoting markets for green and sustainable finance. Furthermore, it is also expected that the role of financial institutions in the financial markets may be leveraged to raise the awareness of enterprises and investors regarding ESG issues, thereby bringing about a healthy cycle of investment and sustainable development and helping the country attain emissions reductions and sustainable development goals.

Notes: 1. IMF (2019), *Global Financial Stability Report*, October.

2. Impact finance is the financing of businesses or economic activities which could generate verifiable, direct, and positive impacts on society and/or the environment based on agreed metrics and benchmarking while also seeking market aligned or better financial returns. See ICMA (2020), "Sustainable Finance: High Level Definition," May.
3. As of the end of March 2021, 16 domestic financial institutions have adopted TCFD recommendations, including 14 life insurance companies and financial holding companies, as well as one management consulting company and one vehicle financing company.
4. Stakeholders here include employees, shareholders, investors, customers, suppliers, academics and experts, government, competent authorities, and other financial institutions.

IV. Measures to promote financial stability and address the COVID-19 pandemic's impact

4.1 Measures taken by the Bank and the FSC for promoting financial stability in 2020

4.1.1 Measures taken by the Bank to promote financial stability

In 2020, considering that the domestic economy still suffered from the COVID-19 pandemic, the Bank cut policy rates and introduced a special accommodation facility to support bank credit to SMEs. Furthermore, to avoid excessive flows of bank credit into the real estate market, the Bank twice adjusted targeted macroprudential measures regarding real estate loans. The Bank also continued to adopt flexible FX rate policies to maintain dynamic stability of the NT dollar exchange rate and to duly review relevant FX regulations.

Reducing the policy rates in March 2020 to mitigate the impact of the pandemic

Impacted by the pandemic that broke out in China in the beginning of 2020, Taiwan's manufacturing industries faced interruptions in supply chains, from which SMEs suffered the greatest. In order to mitigate the pandemic's repercussions on the domestic economy and employment, the Bank cut the discount rate, the rate on refinancing of secured loans, and the rate on temporary accommodations each by 25 bps to 1.125%, 1.5%, and 3.375% in March 2020.

Introducing a special accommodation facility for SME loans

In view of the economic impacts arising from the pandemic, the government consecutively launched relief loan programs both for enterprises and for workers. The Bank also initiated the Special Accommodation Facility to Support Bank Credit to SMEs ("the Facility") in April 2020, followed by a rolling review of the details of the Facility, the deadline of applicable preferential interest rates, total amount of the Facility's accommodations, and the application deadline (Table 4.1) in order to help banks better serve as financial intermediaries and to provide SMEs with easier access to funding. As of the end of 2020, banks had received 195,075 applications with the amount totaling NT$248.8 billion, and the annual growth rate of SME loans extended

by domestic banks stood at 13.17% at the end of December 2020.

Table 4.1 Key points of amendments to the CBC's special accommodation facility for SMEs

Date of announcement	Content	Effective date
Mar. 31, 2020	Formulating the *Regulations for the CBC's Handling of the Special Accommodation Facility to Support Bank Credit to SMEs Affected by the Coronavirus Disease (COVID-19)*	Apr. 1, 2020
Apr. 17, 2020	Adding a program for relief lending to small-scale business entities (Program C) so that banks would be able to better help them acquire working capital as soon as possible	Apr. 20, 2020
Apr. 23, 2020	Lowering the interest rates applicable under the Facility from 0.25% to 0.1% to further incentivize banks to lend to SMEs	Apr. 27, 2020
Apr. 23, 2020	Allowing community financial institutions to engage in relief lending to small-scale business entities, thereby enhancing the effectiveness of the Facility	May 4, 2020
Jul. 22, 2020	Adjusting the maximum credit lines for each applicant: Program A (those cases with at least 90% guarantees covered by Taiwan Small & Medium Enterprise Credit Guarantee Fund (SMEG)): Amount raised from NT$2 million to NT$4 million; Program B (those provided with collateral, including at least 80% guarantees covered by Taiwan SMEG): Amount raised to NT$16 million from NT$6 million	Jul. 24, 2020
Aug. 10, 2020	Extending the deadline for preferential interest rates to apply to newly-filed loan applications to June 30, 2021	Aug. 10, 2020
Sep. 22, 2020	Raising the total amount of the Facility to NT$300 billion from NT$200 billion	Sept. 22, 2020
Dec. 10, 2020	Extending the deadline for SMEs to apply for credit support from December 31, 2020 to June 30, 2021, and the deadline for preferential interest rates to apply to newly-filed loan applications to December 31, 2021	Dec. 10, 2020
Mar. 19, 2021	Extending the deadline from March 27, 2021 to December 31, 2021 for accommodations and applicable preferential interest rates for cases that banks applied during the period from April 1, 2020 to August 9, 2020 for the approval of the Bank	Mar. 19, 2021

Source: CBC

Conducting open market operations to manage market liquidity

To maintain sufficient liquidity in the financial market, the Bank conducts open market operations and manages reserve money at an appropriate level by issuing NCDs. At the end of 2020, the total outstanding amount of NCDs issued by the Bank was NT$9,168 billion, while the average annual growth rate of reserve money registered 8.59% for the year 2020.

Furthermore, from April 2020 onwards, the Bank adjusted the issuance frequency of NCDs to strengthen the effect of NCD rates on market rates. The Bank also flexibly adjusted the total issuance amount of CDs so as to maintain ample funds in the banking system. As a result, the weighted average overnight call loan rate was 0.167% during January and March in 2020 and held at about 0.080% starting from April. To improve the operational readiness and ensure the completeness of the various instruments used for open market operations, the Bank regularly conducted small-scale testing of repo operations with counterparties from April 2020 onwards.

Adjusting targeted macroprudential measures twice to guide efficient allocation of bank credit

In order to promote financial stability and sound banking operations and to preclude excessive flow of bank credit into the real estate market, the Bank used moral suasion at meetings with banks in November 2020 and carried out on-site inspections. Furthermore, it amended the *Regulations Governing the Extension of Mortgage Loans by Financial Institutions* twice in December 2020 and March 2021, introducing LTV ratio caps on and cancelling the grace periods for housing loans granted to corporate entities, the third (or more) housing loans to natural persons, high-value housing loans, land loans, unsold housing unit loans, and idle industrial land mortgage loans (Table 4.2) to attain efficient allocation and proper use of credit resources outlined in the government's Healthy Real Estate Market Plan and to help banks enhance risk management of real estate lending.

Table 4.2 The CBC adjusted twice the *Regulations Governing the Extension of Mortgage Loans by Financial Institutions*

Loan items		Loan conditions	
		2020.12.7 amendement[1]	2020.3.18 amendement[1]
Corporates	The first housing loan	LTV cap of 60%, no grace period	LTV cap of 40%, no grace period
	The second (or more) housing loan	LTV cap of 50%, no grace period	LTV cap of 40%, no grace period
Natural persons	The third housing loan	LTV cap of 60%, no grace period	LTV cap of 55%, no grace period
	The fourth (or more) housing loan	The same as the third housing loan, no other requirements	LTV cap of 50%, no grace period
	High-value housing loans	LTV cap of 60%, no grace period	● No house-purchasing loans or below two housing loans: LTV cap of 55%, no grace period ● Over three housing loans: LTV cap of 40%, no grace period
Land loans		● LTV cap of 65%, 10% may not be disbursed until construction begins ● Submit substantive plan for construction	No change
Unsold housing unit loans		LTV cap of 50%	No change
Idle industrial land mortgage loans		Banks internal rules	LTV cap of 55%[2]

Notes: 1. The 2020.12. 7 amendment took effect on December 8, 2020; the 2021.3.18 amendment took effect on March 19, 2021.

2. It shall not apply if mortgaged land is already under construction, or if the borrower already submits a substantive plan for construction and pledges that construction will begin within a certain period of time.

Source: CBC.

Additionally, the Bank has consecutively conducted targeted examinations of real estate lending business since January 2021 to encourage banks to abide by the Bank's regulations. The Bank also invited ten banks in Q1 for communication to further understand their viewpoints on the real estate market and opinions about carrying out the Bank's regulations. The Bank will closely monitor the developments in the real estate market and financial institutions' credit risk management in real estate lending, examine and evaluate the effectiveness of the relevant regulations, and timely revisit and fine-tune the regulatory measures via a rolling process.

Adopting flexible FX rate policies to safeguard the dynamic stability of the NT dollar exchange rate

As Taiwan is a small open economy that is highly interconnected through trade with other economies, the Bank suitably adopts a managed float exchange rate regime to contain sharp fluctuations in exchange rates. Under this regime, the exchange rate of the NT dollar is in principle decided by market forces. Nevertheless, when seasonal factors (such as massive inflows or outflows of short-term capital) lead to excess volatility and disorderly movements in the NT dollar exchange rate with adverse implications for domestic economic and financial stability, the Bank will, in line with its mandate, aptly maintain FX market order.

In recent years, the huge and frequent movements of international short-term capital flows have superseded international trade and economic fundamentals and become the key factor influencing the volatility of exchange rates. With a view to avoiding disturbance from the abovementioned factor on the domestic FX market, the Bank conducts "leaning against the wind" operations to maintain order in the FX market when necessary so as to mitigate volatile movements of the NT dollar exchange rate and foster FX market efficiency. The dynamic stability of the NT dollar exchange rate is conducive to the long-term sound development of the domestic economy.

Additionally, the Bank continued to undertake appropriate management measures in 2020 to safeguard FX market order and promote its sound development. These measures mainly included: (1) taking hold of the updated transaction information in the FX market through the Real-Time Reporting System for Large-Amount FX Transactions; (2) reinforcing off-site monitoring efforts made to ensure that forward transactions were based on genuine needs, so as to curb FX speculation; (3) urging authorized FX banks to enhance their exchange rate risk management, thereby reducing FX exposures of individual banks and systemic risks in the FX market; and (4) strengthening targeted examinations on FX businesses in order to maintain the discipline of the FX market.

4.1.2 Measures undertaken by the FSC to maintain financial stability

To assist the sound development of Taiwan's financial industry, from 2020 onwards, the FSC launched several measures, including "Capital Market Roadmap," "Green Finance Action Plan 2.0," "Corporate Governance 3.0 - Sustainable Development Roadmap," "Trust 2.0 - The Promotion Plan for Full Functions of Trust Services," and "FinTech Development Roadmap," among others. In addition, the FSC revised financial regulations in accordance with

international standards, such as adopting the LTV approach for capital requirements for real estate mortgages granted by banks. Furthermore, the FSC took flexible and responsive measures in a timely manner to counter the impact of the COVID-19 pandemic on the domestic financial system. It also urged financial institutions to reinforce credit risk management of exposures to real estate lending and assessed their risk bearing abilities so as to preserve financial stability.

Measures taken in response to the impact of the COVID-19 pandemic on domestic financial markets and financial institutions

(1) To mitigate the impact of the COVID-19 pandemic on domestic stock markets, the FSC announced restrictions on the short selling of securities and expanded the range of eligible collateral for margin calls in March 2020 with a view to maintaining orderly stock markets and safeguarding investor interests. These interim measures were then repealed in June 2020 when the stock markets gradually stabilized.

(2) The requirement for D-SIBs to set aside a 2% internal capital buffer could be deferred for one year, which will then be implemented over the four years from 2021 to 2024. Meanwhile, the deadline for D-SIBs to report their contingency plans for business crises could be deferred until the end of August 2021.

(3) The FSC required insurers to report the evaluations of the pandemic's impact and the responses taken to their board of directors. In addition, it provided temporary measures to help insurers and their distressed tenants work out rent relief arrangements.

Requiring banks and insurers to conduct stress tests to evaluate their risk bearing capacities

In view of the severe impacts of the COVID-19 pandemic on international and domestic economic and financial conditions, the FSC required domestic banks to report the results of the Pillar II stress tests in April 2020 for the sake of understanding their capabilities to cope with the impacts. The stress scenarios included the impact of the pandemic and could also help reflect the effects of the relief package launched by the government. All domestic banks passed the stress tests based on the results released by the FSC in May 2020,[74] with banks showing sound risk bearing capacities. Also, to understand the impacts on the resilience of financial

[74] After the relief measures were introduced, as a test result of the minor scenarios, the average common equity ratio, Tier 1 capital ratio, capital adequacy ratio and leverage ratio of domestic banks reached 10.67%, 11.44%, 13.13% and 6.36%, respectively. As a test result of the severe scenarios, the above-mentioned four ratios reached 9.81%, 10.59%, 12.27% and 5.87%, respectively.

institutions in the context of low interest rates and a protracted pandemic, the FSC required domestic banks and insurers to conduct year 2021 supervisory stress tests, for the purpose of assessing how their capital adequacy ratios change and where their risk bearing capacities stand under consistent test scenarios.

Strengthening financial institutions' credit risk management of real estate lending and incorporating relevant measures in targeted examinations

With a view to urging financial institutions to prudently control the credit risk incurred by real estate-related exposures, the FSC adopted numerous measures successively from November 2020, which included requiring banks and bills finance companies to improve internal control and operating procedures of real estate lending and conducting targeted examinations on the risk control of banks' unsold newly-built house loans, land and construction loans, loans to real estate investors, and high-value housing loans. Targeted macroprudential measures adjusted recently by the Bank were included as part of the focus of these examinations as well.[75] Moreover, to enhance risk control for real estate lending by bills finance companies, the FSC included their business of guarantees for the real estate industry in the key items of 2021 on-site examinations, and drafted measures to prevent their credit resources from excessively flowing to the real estate market.

Continually strengthening the risk bearing capacity of insurance companies

(1) The insurers in Taiwan are expected to adopt IFRS 17 Insurance Contracts and begin to measure insurance liabilities at fair value in 2026. To align accounting standards of insurers with the solvency regime and help insurance companies fulfill asset and liability management comprehensively, the FSC, emulating the "Insurance Capital Standard (ICS) 2.0" issued by the International Association of Insurance Supervisors (IAIS), planned to implement the "new generation insurance solvency regime"[76] in three phases.[77] The regime is scheduled to be officially launched in 2026, in step with the domestic adoption of IFRS 17.

[75] Between December 2020 and March 2021, the FSC conducted targeted examinations of housing and construction loans granted by domestic banks and real estate credit extended by bills finance companies. The examinations focused on unsold newly-built house loans, land and construction loans, real estate lending to property investors, and high-value housing loans, with the aim of grasping whether banks can prudently evaluate lending purposes and repayment sources and earnestly implement loan reviews and other risk management mechanisms.

[76] The emphases of the new generation insurance solvency regime include: (1) using the market value approach, i.e., evaluation of assets and liabilities at fair value; (2) insurance capital being classified as Tier 1 and Tier 2; (3) adoption of stress scenario methods for risk capital calculation, taking the resulting changes of net worth or liabilities into consideration and including catastrophe risks.

[77] Phase I (2020-2021) is the on-site field testing period. Phase II (2022-2024) will be the parallel run period, and phase III (2025) will be the preparatory period.

(2) The FSC amended the *Insurance Act*, adding new provisions that set the net worth ratio - along with the capital adequacy ratio currently in use - as dual supervisory indicators and classification standards of capital categories in order to reinforce the risk bearing capacity of insurance companies. Also, the restrictions on insurers investing in domestic industries, public utilities, and social welfare enterprises were loosened.[78] The Legislative Yuan passed these amendments in May 2021.

[78] The basis for calculation of corporate bond investment caps has been changed from "paid-in capital" to "shareholders' equity." In addition, the restriction on the maximum number of directors and supervisors that an insurance company may appoint to the board of a public utility or a social welfare enterprise has been eased from less than 1/3 to 2/3 of the members of that board.

4.2 Effectiveness of Taiwan's measures to address the COVID-19 pandemic

In response to the impact of the COVID-19 pandemic on the domestic economy and society, Taiwan launched economic relief measures successively with a total of NT$1.26 trillion in 2020,[79] equivalent to 6.1% of GDP. The government rolled out measures to provide relief funds or subsidies to the most affected firms and employees, to facilitate pandemic containment, to deploy financial relief and economic stimulus, to offer wage support and working capital subsidies, to promote vaccine research, development, and procurement, and to continuously assist vulnerable industries. Among these measures, the Special Accommodation Facility launched by the Bank in April 2020 to support financially-distressed SMEs had approved 204,051 applications with the amount totaling NT$270.5 billion as of April 8, 2021 (Table 4.3), representing an effective effort to help vulnerable SMEs access the needed working capital to weather the pandemic.

Table 4.3 The effectiveness of the Bank's special accommodation facility to support SMEs (as of April 8, 2021)

		Program A	Program B	Program C	Total
Applications	No. of cases	48,091	34,216	127,859	210,166
	Amount (NT$bn)	88.2	136.8	60.8	285.8
Cases approved	No. of cases	46,402	32,871	124,778	204,051
	Amount (NT$bn)	83.7	128.0	58.8	270.5

Notes: 1. Program A aims at assisting SMEs to obtain financing up to NT$4 million per borrower. The program is offered at an interest rate of up to 1% per annum with 90% of credit guaranteed by Taiwan SMEG. This scheme is available from April 1, 2020 to June 30, 2021.

2. Program B aims at assisting SMEs to obtain financing up to NT$16 million per borrower. The program is offered at an interest rate of up to 1.5% per annum with collateral required by banks (or 80% of credit guaranteed by Taiwan SMEG). This program is available from April 1, 2020 to June 30, 2021.

3. Program C aims at assisting small-scale business entities to obtain financing up to NT$0.5 million per borrower. The program is offered at an interest rate of up to 1% per annum with 100% of credit guaranteed by Taiwan SMEG. This program is available from May 4, 2020 to June 30, 2021.

Source: CBC

Thanks to the effectiveness of those economic relief measures, Taiwan sustained economic growth at 3.11% in 2020, not only higher than the 2.96% in the year before the outbreak of the

[79] It included the special budget at NT$420 billion, the funds and disbursement through reprioritization at NT$140 billion, and relief funds provided by financial institutions at NT$700 billion.

pandemic, but also much better than major economies in Europe, North America, and Asia. The unemployment rate gradually declined from a peak of 4.07% in May 2020 to 3.68% at the end of the year, and the number of employees who agreed on negotiated reductions of working hours with their employers also decreased significantly from a peak of 31,816 at the end of June to 3,729 in April 2021. Meanwhile, benefiting from strong demand for telework-related products as well as for electronic parts and components amid the pandemic, the corporate sector saw a sharp rise in the profitability of TWSE-listed and OTC-listed companies in 2020, driving the domestic stock market to record highs.

Moreover, despite the impact of the pandemic, financial institutions in Taiwan continued to make profits in 2020. Among them, life insurance companies and bills finance companies registered dramatic growth in profits. Meanwhile, the average NPL ratios of domestic financial institutions remained at a low level, reflecting satisfactory credit quality, and their capital levels remained adequate and well above the statutory minimum. All of the aforementioned performance shows that financial institutions still operated soundly amid the pandemic shock.

However, new waves of the global pandemic and a surge in domestic COVID-19 cases in the middle of May 2021 could affect the economic growth momentum in Taiwan. In response, the Legislative Yuan passed amendments to some articles of the *Special Act for Prevention, Relief and Revitalization Measures for Severe Pneumonia with Novel Pathogens* on May 31, 2021. The amendments extended the applicable period until June 30, 2022 and raised the special budget ceiling to NT$840 billion with the aim of reducing the impact of the pandemic on the domestic economy and society.

4.3 The Bank will continue to adopt measures to promote financial stability when necessary

In 2020, Taiwan's financial markets and financial infrastructure were functioning well and developing steadily despite a severe global recession triggered by the COVID-19 pandemic shock. Moreover, profitability of financial institutions remained satisfactory with sound asset quality and higher capital levels. Overall, Taiwan's financial system remained stable. The Bank continued to adopt appropriate monetary, credit and foreign exchange policies in response to the impact of the pandemic on the domestic economy and the financial system. Meanwhile, the FSC revamped financial regulations and enhanced financial supervisory measures to facilitate sound operations of financial institutions and promote financial stability.

Since the beginning of 2021, global economic growth had picked up thanks to wider vaccine

coverage across countries, massively scaled-up fiscal support launched by the United States, rising inflation expectations fueled by increasing commodity prices, and abundant liquidity in global financial markets and would likely to resume positive growth. However, four major risks could still hinder this outlook, including lingering uncertainties around coverage and efficacy of vaccines, a possible deterioration of current economic and financial situations caused by the pandemic, sudden tightening of the financial situation driven by increased risk aversion in markets, and heightened uncertainty about global economic and trade policies. Should the above-mentioned risks intensify or materialize, the global economic recovery could be dampened.

In sum, the 2021 global economic growth is expected to return to positive territory on the back of such favorable developments as expanded vaccinations. However, considering that international economic and financial developments are still surrounded by many uncertainties and the domestic pandemic has not yet subsided, the Bank will continue to pay close attention to the impacts of relevant subsequent developments on domestic economic and financial conditions so as to take appropriate response measures in a timely manner to promote financial stability.

Appendix: Financial soundness indicators[80]

Table 1: Domestic Banks

Unit: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Asset size						
Assets to GDP*	-	260.61	264.95	263.00	274.97	285.24
Earnings and profitability						
Return on assets (ROA)	0.73	0.66	0.66	0.68	0.70	0.58
Return on equity (ROE) (Pretax)	10.65	9.23	9.03	9.34	9.49	7.84
Return on equity (ROE) (After tax)*	-	7.94	7.80	8.09	8.11	6.82
Net interest income to gross income	60.85	60.04	60.03	59.33	56.59	59.95
Non-interest expenses to gross income	52.62	52.01	52.74	51.55	51.30	53.93
Gains and losses on financial instruments to gross income	9.60	11.37	14.85	11.23	18.78	17.06
Employee benefits expenses to non-interest expenses	55.90	56.29	56.75	57.15	56.76	57.05
Spread between lending and deposit rates (basis points)	1.44	1.38	1.36	1.35	1.32	1.22
Spread between the highest and the lowest interest rates of interbank overnight lending*	-	0.18	0.13	0.13	0.11	0.12
Asset quality						
Non-performing loans to total loans	0.24	0.27	0.28	0.24	0.22	0.22
Provision coverage ratio	547.66	503.45	490.59	573.67	650.30	623.74
Capital adequacy						
Regulatory capital to risk-weighted assets	12.93	13.33	14.17	13.99	14.07	14.84
Tier 1 capital to risk-weighted assets	10.33	10.97	11.78	11.86	12.08	12.79
Common equity Tier 1 capital to risk-weighted assets	10.03	10.50	11.19	11.19	11.32	11.84
Non-performing loans net of provisions to equity	-3.03	-2.49	-2.18	-1.86	-1.78	-0.53
Leverage ratio	5.90	6.29	6.42	6.56	6.71	6.82

[80] In consideration of the IMF *2019 Financial Soundness Indicators Compilation Guide (FSI Guide)*, two categories of indicators comprising life insurance companies and bills finance companies have been added to the financial soundness indicators while the category market liquidity has been removed since 2020. Thus, the number of indicators increased from 42 to 58. The time series data of removed and pre-adjusted indicators are available on the CBC's website (https://www.cbc.gov.tw/tw/cp-1053-1249-81686-1.html).

Table 1: Domestic Banks (cont.)

Unit: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Liquidity						
Customer deposits to total loans	136.21	137.25	138.76	135.75	137.27	142.04
Liquid assets to total assets	12.18	10.55	9.75	9.46	9.05	9.44
Liquid assets to short-term liabilities	16.85	14.98	13.37	13.36	12.53	13.19
Liquidity coverage ratio	125.13	125.81	134.54	133.89	134.82	141.60
Net stable funding ratio	-	-	-	132.44	132.71	136.51
Credit risk concentration						
Loan concentration by economic activity*	-	69.48	71.29	70.94	71.43	71.95
Large exposures to Tier 1 capital**	-	-	-	-	-	8.60
Gross asset positions in financial derivatives to regulatory capital*	-	11.27	5.69	6.38	6.53	8.75
Gross liability positions in financial derivatives to regulatory capital*	-	11.58	7.02	8.64	7.66	9.36
Geographical distribution of loans to total loans*						
Domestic economy*	-	80.21	80.62	80.33	79.49	80.96
Advanced economies*	-	13.79	13.30	13.49	14.01	12.66
Emerging economies						
Emerging Asia*	-	4.75	4.91	5.12	5.42	5.31
Emerging Europe*	-	0.08	0.06	0.04	0.04	0.02
Latin America and the Caribbean*	-	0.54	0.48	0.44	0.40	0.37
Middle East and Central Asia*	-	0.24	0.31	0.27	0.35	0.42
Sub-Saharan Africa*	-	0.39	0.33	0.32	0.29	0.26
Credit of private sector to GDP*	-	140.73	146.27	150.92	154.94	160.36

Table 1: Domestic Banks (cont.)

Unit: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Sensitivity to market risk						
Net open position in foreign exchange to capital	2.91	4.21	3.95	3.78	3.20	3.45
Foreign-currency-denominated loans to total loans	21.55	20.80	20.35	20.14	20.67	18.80
Net open position in equities to capital	22.52	21.73	21.42	22.51	24.56	26.93
Foreign-currency-denominated liabilities to total liabilities	30.58	29.49	26.31	29.21	26.57	26.53

Notes: 1. Items with "*" and "**" are new indicators starting from 2020 with data traced back to 2016 and 2020, respectively.

2. Figures for "Spread between lending and deposit rates" exclude the data of preferred deposits rates of retired government empolyees and central government lending rates.

3. Non-performing loans net of provisions to equity:

(1) For data before 2019, specific provision for credit losses refers to the minimum provision that a bank should allocate for classified loans and liability on guarantees in accordance with Article 5 of *Regulations Governing the Procedures for Banking Institutions to Evaluate Assets and Deal with Non-performing/Non-accrual Loans*.

(2) Beginning 2020, specific provision for credit losses, based on the IFRS 9, refers to the provisions for expected credit losses of financial assets whose credit is impaired.

4. Figures for "Net stable funding ratio" are published from 2018.

5. Credit concentration:

(1) For data before 2019, large exposures prior refer to the total amount of credit exposures to the first 20 private enterprises at domestic banks (after integration).

(2) Beginning 2020, large exposures are revised to the total amount of credit exposures to an enterprise at domestic banks (after integration) exceeding 10% of its Tier 1 capital.

Table 2: Life Insurance Companies

Units: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Assets to GDP	-	126.51	136.03	143.22	155.25	160.59
Return on assets (ROA)	-	0.50	0.50	0.33	0.55	0.67
Return on equity (ROE) (pretax)	-	9.98	9.42	6.82	10.24	9.27
Return on equity (ROE) (after tax)	-	9.86	9.92	7.81	9.65	9.38
Risk based capital (RBC) ratio	-	301.25	304.90	268.43	292.54	299.13
Equity to investment assets	-	5.57	6.20	4.60	7.29	8.80

Notes: 1. FSIs of life insurance companies are newly added from 2020 with data traced back to 2016.

2. Investment assets include financial assets such as cash, bank deposits, loans, securities, derivatives, and non-financial assets for investment.

Table 3: Bills Finance Companies

Units: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Assets to GDP	-	5.62	5.75	5.52	5.31	5.59
Return on assets (ROA)	-	1.13	1.06	0.96	0.99	1.18
Return on equity (ROE) (pretax)	-	9.14	8.80	8.00	8.05	9.33
Return on equity (ROE) (after tax)	-	7.66	7.46	6.72	6.67	7.56
Capital adequacy ratio	-	13.90	13.93	13.63	13.37	13.38
0-30 day maturity gap to assets (NTD)	-	-23.76	-24.27	-26.66	-21.39	-18.01

Note: FSIs of bills finance companies are newly added from 2020 with data traced back to 2016.

Table 4: Non-financial Corporate Sector

Units: %, times

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Total liabilities to equity						
TWSE-listed companies	94.29	98.33	100.07	99.48	104.61	107.85
OTC-listed companies	76.26	82.52	82.73	82.36	88.55	89.88
Return on equity						
TWSE-listed companies	13.73	14.38	15.81	14.92	12.62	14.60
OTC-listed companies	10.36	10.39	10.44	13.02	12.23	13.95
Net income before interest and tax / interest expenses (times)						
TWSE-listed companies	13.45	13.18	13.60	11.18	9.35	15.70
OTC-listed companies	12.75	12.59	12.88	16.23	15.99	21.99
Foreign liabilities to equity**						
TWSE-listed companies	-	-	-	-	-	34.92
TPEx-listed companies	-	-	-	-	-	18.74

Notes: 1. Data of TWSE-listed and OTC-listed companies are from TEJ.

2. Item with "**" is a new indicator to be disseminated from 2020 onward and the reference date is the end of September 2020.

Table 5: Household Sector

Unit: %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
Household debt to GDP	81.54	81.57	83.43	85.26	86.74	85.15
Debt service and principal payments to total disposable income	45.70	46.32	46.67	r 45.23	r 46.62	47.03
Household debt to total disposable income*	-	1.37	1.37	1.35	1.35	1.48

Notes: 1. Figures for "total disposable income" are the sum of household disposable income, rent expense and interest expense.
2. Figure for "total disposable income" for 2020 is a CBC estimate.
3. Item with "*" is a new indicator starting from 2020 with data traced back to 2016.
4. Figures with "r" are revised data,which is based on GDP and total disposable income updating by DGBAS.

Table 6: Real Estate Market

Unit: index, %

Items \ Year (end of year)	2015	2016	2017	2018	2019	2020
National housing price index*	-	99.09	100.60	100.80	104.14	108.17
Residential real estate loans to total loans	28.96	29.35	29.82	29.73	29.44	32.04
Commercial real estate loans to total loans	15.87	16.60	17.54	17.78	17.73	19.37

Note: Item with "*" is a new indicator starting from 2020 with data traced back to 2016.

Explanatory notes: Compilation of financial soundness indicators

I. General notes

To facilitate international comparison, most items listed in "Appendix: Financial Soundness Indicators" are compiled in accordance with the compilation guide on financial soundness indicators issued by the IMF. Based on its revision of the guide, some of the indicators were added or removed, and the explanatory notes were revised in 2020. All the data were traced back to 2016 for inter-period comparison application unless otherwise stated. However, a few new indicators are not incorporated for analysis in this report owing to incomplete time series data.

Unless otherwise stated, the data of all indicators are on a year-end (stock data) or year-to-date (flow data) basis.

Compilation of Financial Institutions' Indicators

1. Coverage of Financial Institutions (As of the end of 2020)
   1.1 Domestic Banks include Bank of Taiwan, Land Bank of Taiwan, Taiwan Cooperative Bank, First Commercial Bank, Hua Nan Commercial Bank, Chang Hwa Commercial Bank, The Shanghai Commercial & Savings Bank, Taipei Fubon Commercial Bank, Cathay United Bank, The Export-Import Bank of the Republic of China, Bank of Kaohsiung, Mega International Commercial Bank Co., Agricultural Bank of Taiwan, Citibank Taiwan, O-Bank, Taiwan Business Bank, Standard Chartered Bank (Taiwan), Taichung Commercial Bank, King's Town Bank, HSBC Bank (Taiwan), Taipei Star Bank, Hwatai Bank, Shin Kong Commercial Bank, Sunny Bank, Bank of Panhsin, Cota Commercial Bank, Union Bank of Taiwan, Far Eastern International Bank, Yuanta Commercial Bank, Bank SinoPac, E.Sun Commercial Bank, KGI Bank, DBS Bank (Taiwan) Ltd., Taishin International Bank, Jih Sun International Bank, EnTie Commercial Bank, and CTBC Bank Co., Ltd., amounting to37 banks.
   1.2 Life Insurance Companies include Bank Taiwan Life Insurance, Taiwan Life Insurance, PCA Life Assurance, Cathay Life Insurance, China Life Insurance, Nan Shan Life Insurance, Shin Kong Life Insurance, Cigna Taiwan Life Assurance, AIA, BNP Paribas Cardif TCB Life Insurance, Mercuries Life Insurance, Far Glory Life Insurance, Hontai Life Insurance, Allianz Taiwan Life Insurance, Cardif Assurance Vie, Prudential Life Insurance, TransGlobe Life Insurance, Yuanta Life Insurance, Life Insurance Division of Chunghwa Post, Chubb Tempest Life Reinsurance (Taiwan Branch), Fubon Life Insurance, and First Life Insurance, amounting to 22 companies.
   1.3 Bills Finance Companies include Mega Bills Finance, China Bills Finance, International Bills Finance, Dah Chung Bills Finance, Taiwan Finance, Grand Bills Finance, Ta Ching Bills Finance, and Taiwan Cooperative Bills Finance Co., Ltd., amounting to 8 companies.
2. The financial institutions' related indicators are calculated using unaudited data submitted regularly for each category by financial institutions. The submitted data are different from those posted on these institutions' websites, which are audited and certified by certified public accountants or adjusted after the

reporting period. The statistical basis for these two types of data is different.

3. Domestic banks' related indicators are calculated by aggregating the numerators and denominators of each ratio, and then dividing the total numerator by the total denominator to obtain the peer-group ratios. This methodology differs from the Winsorized mean method used in the quarterly "Condition and Performance of Domestic Banks" report compiled by the Department of Financial Inspection of the Central Bank of the Republic of China (Taiwan).

II. Explanatory notes on the indicators

1. Domestic banks' indicators

1.1 Asset Size

This indicator is to analyze the level of domestic banks' total assets to GDP.

- GDP: annual nominal gross domestic product.

1.2 Earnings and profitability

1.2.1 Return on assets (ROA)

This indicator is to analyze domestic banks' efficiency in using their assets.

- ROA = net income before tax/average assets
  - Net income: net income before income tax.
  - Average assets: the daily average of total assets as of the end of reference date in current year.

1.2.2 Return on equity (ROE)

This indicator is to analyze banks' pre-tax (after-tax) efficiency in using their capital.

- ROE = net income before (after) tax/average equity
  - Average equity: the daily average of equity as of the end of reference date in current year.

1.2.3 Net interest income to gross income

This indicator is a measure of the relative share of net interest earnings within gross income.

- Net interest income: interest income less interest expenses.
- Gross income: net interest income plus non-interest income.

1.2.4 Non-interest expenses to gross income

This indicator is a measure of the size of administrative expenses to gross income.

- Non-interest expenses include operating expenses other than interest expenses as follows:
  - Employee benefits expenses.
  - Other expenses related to operations.
    - Expenses for property and equipment, including: purchasing, ordinary and regular maintenance and repair, depreciation, and rental thereof.
    - Other expenditure related to operations, including: purchases of goods and services

(e.g., advertising costs, staff training expenses, and royalties paid for the use of other produced or non-produced assets).
    - Taxes other than income taxes less any subsidies received from general government.
- Gross income: (same as in 1.2.3).

1.2.5 Gains and losses on financial instruments to gross income

This indicator is to analyze business revenues from financial market activities as a share of gross income.

- Gains and losses on financial instruments include the following items:
    - Realized and unrealized gains and losses arising on all financial instruments which are held at fair value through profit or loss, excluding fair value through other comprehensive income and amortized cost.
    - Foreign exchange gains and losses.
    - Excluding bond interest and dividend income.
- Gross income: (same as in 1.2.3).

1.2.6 Employee benefits expenses to non-interest expenses

This indicator is to analyze employee benefits expenses as a share of non-interest expenses.

- Employee benefits expenses: including wages and salaries, profit sharing and bonuses, allowances, pensions, social insurance, and medical insurance.
- Non-interest expenses: (same as in 1.2.4).

1.2.7 Spread between lending and deposit rates

This indicator is to analyze the effect of the interest rate spread upon net interest revenues and profitability.

- Spread between lending and deposit rates: the weighted-average loan interest rate less the weighted-average deposit interest rate. The annual interest rate spread is the average of four quarters' spreads.

1.2.8 Spread between the highest and the lowest interest rates of interbank overnight lending

This indicator is to analyze the risk of interbank overnight lending.

- Spread between the highest and the lowest interest rates of interbank overnight lending: The highest interbank rate less the lowest interbank rate of financial sector.

1.3 Asset quality

1.3.1 Non-performing loans to total loans

This indicator is to analyze asset quality in the loan portfolio.

- Non-performing loans:

  According to the *Regulations Governing the Procedures for Banking Institutions to Evaluate Assets and Deal with Non-performing/Non-accrual Loans*, non-performing loans include the following items:
    - Loans for which repayment of principal or interest has been overdue for three months or more.
    - Loans for which the bank has sought payment from primary/subordinate debtors or has

disposed of collateral, although the repayment of principal or interest has not been overdue for more than three months.

- Total loans: Total loans include bills purchased, discounts, accrual and non-accrual loans, but excluding interbank loans.

1.3.2 Provision coverage ratio

This indicator is to analyze the provision policy for loan losses.

- Provision coverage ratio: Loan loss provisions/non-performing loans

1.4 Capital adequacy

1.4.1 Regulatory capital to risk-weighted assets

This indicator is to analyze the capital adequacy of domestic banks. The minimum statutory ratio of regulatory capital to risk-weighted assets of a bank shall not be less than a certain ratio, based on the *Regulations Governing the Capital Adequacy Ratio and Capital Category of Banks*.

- Regulatory capital: the aggregate amount of net Tier 1 Capital and net Tier 2 Capital.
- Risk-weighted assets: the aggregate amount of the risk-weighted assets for credit risk together with the capital requirements for market risk and operational risk multiplied by 12.5.

1.4.2 Tier 1 capital to risk-weighted assets

This indicator is to analyze the capital adequacy of domestic banks based on the core capital concept.

- Tier 1 capital: the aggregate amount of net common equity Tier 1 and net additional Tier 1 capital (as defined by the *Regulations Governing the Capital Adequacy Ratio and Capital Category of Banks*).

1.4.3 Common equity Tier 1 capital to risk-weighted assets

This indicator is to analyze the capital adequacy of domestic banks based on the high quality capital concept.

- Common equity Tier 1 capital: includes common stock and additional paid-in capital in excess of par value of common stock, capital collected in advance, capital reserves, statutory surplus reserves, special reserves, accumulated profit or loss, non-controlling interests, and other items of interest, less supervisory deductions (as defined by the Article 9 of the *Regulations Governing the Capital Adequacy Ratio and Capital Category of Banks*).

1.4.4 Non-performing loans net of provisions to equity

This indicator is to analyze the potential impact on equity of non-performing loans.

- Non-performing loans net of provisions to equity = (non-performing loans - specific loan loss provisions)/equity
  - The provisions for expected credit losses of financial assets were estimated by the historical loss experiences of banks prior to 2019; loan loss provisions are on the IFRSs 9 basis from 2020 onward, referring to the provisions for expected credit losses of financial assets whose credit is impaired.

1.4.5 Leverage ratio

This indicator is to analyze the capital adequacy of domestic banks based on the core capital

relative to total non-risk weighted exposure.

- Leverage ratio = Tier 1 capital/total exposure
- Total exposure: the sum of on-balance sheet exposures, derivative exposures, securities financing transaction exposures and off-balance-sheet exposures.

1.5 Liquidity

1.5.1 Customer deposits to total loans

This indicator is a measure of liquidity to indicate the degree of dependence on more stable sources of funds (customer deposits) to illiquid assets (loans).

- Customer deposits: including checking deposits, demand deposits, time deposits, savings deposits, and money remittances.

1.5.2 Liquid assets to total assets

This indicator is to analyze the liquidity available to meet expected and unexpected demands for cash.

- Liquid assets: the core liquid assets comprising cash, checks for clearing, amounts due from the Central Bank, amounts due from banks, and assets with remaining maturity of no more than three months, which can be converted into cash quickly and with minimal impact to the price received.
- Total assets: the sum of financial and non-financial assets.

1.5.3 Liquid assets to short-term liabilities

This indicator is to analyze liquidity mismatch of assets and liabilities, and provide an indication of the extent to which banks could meet short-term demand for funds without facing liquidity problems.

- Short-term liabilities: liabilities with remaining maturity of no more than one year, including deposits, borrowings, debt securities issued, and the net market value of financial derivatives positions (liabilities less assets).

1.5.4 Liquidity coverage ratio

This indicator is to analyze the resilience of short-term liquidity.

- Liquidity coverage ratio = stock of high quality liquid assets/total net cash outflows over the next 30 calendar days
  - High quality liquid assets: assets with high liquidity under stress scenarios, such as cash, central bank reserves, government bonds, and qualified securities.
  - Net cash outflows over the next 30 calendar days: expected cash outflows minus expected cash inflows within the subsequent 30 calendar days under specific stress scenarios.

1.5.5 Net stable funding ratio

This indicator is to quantify long-term liquidity of banks.

- Net stable funding ratio = available stable funding/required stable funding
  - Available stable funding: the portion of capital and liabilities expected to be available to the bank to fund its operations over a one-year period.
  - Required stable funding: The amount of stable funding that is required, reflecting the

liquidity characteristics and residual maturities of each type of the bank's assets and off-balance-sheet exposures.

1.6 Credit risk concentration

1.6.1 Loan concentration by economic activity

This indicator is to analyze the concentration of credit in a specific industry or economic activity by domestic banks.

- Loan concentration by economic activity = corporate loans of domestic banks to the largest three industries/corporate loans
  - Corporate loans of domestic banks to the largest three industries: the aggregate of corporate loans of domestic banks to the largest three industries.

1.6.2 Large exposures to Tier 1 capital

This indicator is to analyze credit vulnerabilities of domestic banks arising from the concentration of credit risk on a single individual or corporate borrower.

- Large exposures: an amount of credit extended by a domestic bank to an enterprise after account integration exceeding 10% of the bank's Tier 1 capital at the end of the previous quarter.

1.6.3 Gross asset positions in financial derivatives to regulatory capital

This indicator is to analyze the effect of price changes on gross asset positions in financial derivatives relative to regulatory capital.

- Gross asset positions in financial derivatives: the aggregate amount of positive fair value in hedged and non-hedged financial derivatives such as swap, forward, and option contracts, excluding embedded derivatives inseparable from the underlying instruments.

1.6.4 Gross liability positions in financial derivatives to regulatory capital

This indicator is to analyze the effect of price changes on gross liability positions in financial derivatives relative to regulatory capital.

- Gross liability positions in financial derivatives: the aggregate amount of negative fair value in hedged and non-hedged financial derivatives such as swap, forward, and option contracts, excluding embedded derivatives inseparable from the underlying instruments.

1.6.5 Geographical distribution of loans to total loans

This indicator is to analyze the concentration of geographical distribution of loans underwritten by domestic banks.

- The regional grouping of countries is based on the classification provided in the IMF's *World Economic Outlook*, which divide countries into different groups as advanced economies, emerging Asia, emerging Europe, Latin America and the Caribbean, Middle East and Central Asia, and Sub-Saharan Africa.
  - Loans to the domestic economy: the local claims in Taiwan (on an immediate risk basis) in the Country Exposure Report of the CBC.
  - Loans to other regions: the total foreign claims (on an immediate risk basis) in the Country Exposure Report of the CBC.
  - Total loans: the sum of loans to the domestic economy, advanced economies, emerging

Asia, emerging Europe, Latin America and the Caribbean, Middle East and Central Asia, and Sub-Saharan Africa.

1.6.6 Credit of private sector to GDP

This indicator is to analyze whether credit of the private sector is overly expanded or faces a credit crunch.

- Credit of private sector: the loans to domestic private NFCs, HHs, and NPISHs; holdings of stocks issued by private NFCs, corporate bonds, commercial paper, acceptances, and beneficiary certificates; long-term investment in private NFCs' equities by main financial institutions.
- GDP: moving sum of the last four quarterly nominal gross domestic product figures.

1.7 Sensitivity to market risk

1.7.1 Net open position in foreign exchange to capital

This indicator measures the mismatch of foreign currency asset and liability positions at domestic banks to assess the potential vulnerability of capital to exchange rate movements.

- Net open position in foreign exchange: the open foreign currency positions in balance sheet and financial derivatives, which are converted into NT dollars using the exchange rates as of the reporting date.
- Capital: equity interest of owners in a bank (i.e., the difference between total assets and liabilities).

1.7.2 Foreign-currency-denominated loans to total loans

This indicator is to analyze the share of foreign currency loans within total gross loans.

- Foreign currency-denominated loans: the loans to other financial institutions, corporate entities, and individuals that are payable in foreign currency, or in domestic currency but with the amount to be paid linked to a foreign currency.
- Total loans: including loans to customers and other financial institutions, but excluding export bills purchased.

1.7.3 Net open position in equities to capital

This indicator is to analyze the effect of price changes of banks' net positions in equities compared with own equity.

- Net open position in equities: the sum of on-balance-sheet holdings of equities and notional positions in equity derivatives.

1.7.4 Foreign-currency-denominated liabilities to total liabilities

This indicator is to analyze the proportion of foreign currency funding within total liabilities.

- Foreign-currency-denominated liabilities: the liabilities that are payable in foreign currency, or booked in domestic currency but paid in an agreed foreign currency.
- Total liabilities: the total amounts of current, non-contingent liabilities, and the liabilities positions in financial derivatives.

2. Life Insurance Companies

2.1 Assets to GDP

This indicator is used to analyze the level of life insurance companies' total assets relative to GDP.

2.2 Return on assets (ROA)

This indicator is to analyze life insurance companies' efficiency in using their assets.

- ROA = net income before tax/average assets
  - Average total assets: the mean of total assets at the end of the previous and current year.

2.3 Return on equity (ROE)

This indicator is to analyze life insurance companies' pre-tax (after-tax) efficiency in using their capital.

- ROE = net income before (after) tax/average equity
  - Average equity: the mean of equity at the end of the previous and current years.

2.4 Risk based capital (RBC) ratio

This indicator is to analyze the capital adequacy of life insurance companies. The minimum statutory RBC ratio of a life insurance company shall not be less than 200%, pursuant to the *Regulations Governing Capital Adequacy of Insurance Companies*.

2.5 Equity to investment assets

This indicator is to analyze the capital adequacy and financial leverage of life insurance companies.

- Investment assets: including financial assets such as cash, deposits, loans, securities, and financial derivatives and non-financial assets held for investment purposes.

3. Bills Finance Companies

3.1 Assets to GDP

This indicator is used to analyze the level of bills finance companies' total assets relative to GDP.

3.2 Return on assets (ROA)

This indicator is to analyze bills finance companies' efficiency in using their assets.

- ROA = net income before tax/average assets
  - Average total assets: (same as in 2.2).

3.3 Return on equity (ROE)

This indicator is to analyze bills finance companies' pre-tax (after-tax) efficiency in using their capital.

- ROE = net income before (after) tax/average equity
  - Average equity: (same as in 2.3).

3.4 Regulatory capital to risk-weighted assets

This indicator is to analyze the capital adequacy of bills finance companies. The minimum statutory ratio of regulatory capital to risk-weighted assets of a bills finance company shall not be less than 8%, based

on the *Act Governing Bills Finance Business*.

- Regulatory capital: the aggregate amount of net Tier 1 capital, eligible Tier 2 capital, and eligible used Tier 3 capital.
- Risk-weighted assets: (same as in 1.4.1).

3.5 0-30 day maturity gap to assets (NTD)

This indicator is to analyze the short-term liquidity of bills finance companies' NTD funds.

- 0-30 day maturity gap to assets: maturity gaps of expected NTD cash flow over the next 30 days to total NTD assets.
- Maturity gaps of expected NTD cash flow over the next 30 days: total expected NTD cash inflows net of total expected NTD cash outflows with remaining maturity of 30 days or less.

4. Non-financial corporate sector indicators

4.1 Total liabilities to equity

This indicator is a leverage ratio which is used to analyze the extent of activities that are financed through liabilities other than own funds.

- Total liabilities: including short-term and long-term liabilities.
- Equity: including funds contributed by owners, capital surpluses, retained earnings, and other items related to owners' equity.

4.2 Return on equity

This indicator is to analyze profitability of non-financial corporations in using their capital.

- Return on equity = net income before interest and tax/average equity (the "net income before interest and tax" is based on the FSIs of the IMF).
  - Net income before interest and tax: net income before tax plus interest expenses from continuing operation units.
  - Average equity: the mean of the equity at the beginning and the end of current year.

4.3 Net income before interest and tax/interest expenses

This indicator is to analyze how well non-financial corporate income covers interest expenses.

- Interest expenses: the interest payments on debt within the specified time period of the statement.

4.4 Foreign-currency-denominated liabilities to equity

This indicator is to analyze the effect of exchange rate movements on equity.

- Foreign-currency-denominated liabilities: (same as in 1.7.4).

5. Household sector indicators

5.1 Household debt to GDP

This indicator is to analyze the level of household debt to GDP.

- Household debt: outstanding household loans and credit card revolving balances borrowed from financial institutions. Financial institutions include depository institutions and other financial

institutions (investment trust companies, life insurance companies, securities finance companies, and securities firms).

5.2 Borrowing service and principal payments to total disposable income

This indicator is to analyze the capacity of households to service their debts.

- Borrowing service and principal payments: interest and principal payments made on outstanding loans and credit card revolving balances within the specified time period of the statement.
- Total disposable income: net disposable income (i.e., the aggregate of the wages and salaries from employment, property and corporate income, and transfers receipts, less taxes on income and wealth and other transfers payments) plus expenses of interest and rent.

5.3 Household debt to total disposable income

This indicator is to analyze the degree of indebtedness in the household sector.

6. Real estate market indicators

6.1 National housing price index

This indicator is used to analyze the price movement of national housing prices.

- National housing price index: the index of national housing prices released quarterly by the Ministry of the Interior.

6.2 Residential real estate loans to total loans

This indicator analyzes the extent of concentration of domestic banks' loans in residential real estate-related lending.

- Residential real estate loans: individual loans that are collateralized by residential real estate. Residential real estate includes houses, apartments, and associated land (including owner–occupied and rental properties).
- Total loans: (same as in 1.3.1).

6.3 Commercial real estate loans to total loans

This indicator analyzes the extent of concentration of domestic banks' loans in commercial real estate-related lending.

- Commercial real estate loans: loans to corporate entities and individuals that are collateralized by commercial real estate, loans to construction companies, and loans to companies involved in the development of real estate. Commercial real estate includes buildings and associated land used by enterprises for retail, wholesale, manufacturing, or other purposes.
- Total loans: (same as in 1.3.1).

Abbreviations

ABS	Australian Bureau of Statistics
ADC	Land acquisition, development and construction
AML	Anti-money laundering
APRA	Australian Prudential Regulation Authority
APP	Application
ARR	Alternative reference rate
ASEAN	Association of Southeast Asian Nations
ATM	Automated teller machine
BAROC	Bankers Association of the Republic of China
BCBS	Basel Committee on Banking Supervision
BICRA	Banking Industry Country Risk Assessment
BIS	Bank for International Settlements
BNM	Bank Negara Malaysia
BOJ	Bank of Japan
BOK	Bank of Korea
BOT	Bank of Thailand
BPS	Basis points
BSI	Banking system indicator
CBC	Central Bank of the Republic of China (Taiwan)
CBDC	Central bank digital currency
CD	Certificate of deposit
CET 1	Common Equity Tier 1
CFT	Combating the financing terrorism
CHF	Swiss franc
CIER	Chung-Hua Institution for Economic Research
CIFS	CBC Interbank Funds Transfer System
COVID-19	Coronavirus disease 2019
CP	Commercial paper

CPI	Consumer price index
DBU	Domestic banking unit
DGBAS	Directorate-General of Budget, Accounting and Statistics of the Executive Yuan
DJIA	Dow Jones Industrial Average
DLT	Distributed ledger technology
D-SIB	Domestic systemically important bank
DvP	Delivery versus Payment
ECB	European Central Bank
EP	Equator Principle
ESG	Environmental, social, and governance
ETF	Exchange-traded fund
EU	European Union
FCA	Financial Conduct Authority
FDIC	Federal Deposit Insurance Corporation
Fed	Federal Reserve System
FinTech	Financial technology
FIS	Financial information system
FISC	Financial Information Service Co., Ltd.
FSA	Financial Services Agency, Japan
FSC	Financial Supervisory Commission
FSIs	Financial soundness indicators
FSS	Financial Supervisory Service, South Korea
FX	Foreign exchange
FYP	First-year premium
GAAP	Generally accepted accounting principles
GBP	British Pound
GDP	Gross domestic product
GFC	Global financial crisis
HKMA	Hong Kong Monetary Authority
IAIS	International Association of Insurance Supervisors
ICS	Insurance capital standard
IFRS	International Financial Reporting Standard

IIF	Institute of International Finance
IMF	International Monetary Fund
JCIC	Joint Credit Information Center
JPY	Japanese yen
KOSPI	Korea Composite Stock Price Index
KYC	Know-your-customer
LCR	Liquidity coverage ratio
LIBOR	London Interbank Offered Rate
LTV	Loan-to-value
MAS	Monetary Authority of Singapore
MLF	Medium-term lending facility
MOF	Ministry of Finance
MOI	Ministry of the Interior
MPI	Macro-Prudential Indicator
MSCI	Morgan Stanley Capital International
NCD	Negotiable certificate of deposit
NMI	Non-Manufacturing Index
NPL	Non-performing loan
NSFR	Net stable funding ratio
NTD	New Taiwan dollar
OBU	Offshore banking unit
OPEC+	Organization of the Petroleum Exporting Countries Plus
OTC	Over-the-counter
PBC	People’s Bank of China
PCEPI	Personal consumption expenditures price index
POS	Point-of-sale
PPI	Producer price index
PPM	Price pressures measure
PPS	Percentage points
PRB	Principles for Responsible Banking
P2P	Peer-to-peer
RBC	Risk-based capital
Repo	Repurchase agreement

RMB	Renminbi
ROA	Return on assets
ROC	Republic of China
ROE	Return on equity
RTGS	Real time gross settlement system
SARON	Swiss average rate overnight
SET	Stock Exchange of Thailand
SME	Small and medium-sized enterprises
SMEG	Small & Medium Enterprise Credit Guarantee Fund
SOFR	Secured overnight financing rate
SONIA	Sterling overnight index average
SSE	Shanghai Stock Exchange
TAIEX	Taiwan Stock Exchange Weighted Index
TCFD	Task Force on Climate-Related Financial Disclosure
TEJ	Taiwan Economic Journal Co., Ltd.
TIFRS	Taiwan-IFRS
TONA	Tokyo overnight overage rate
TPEx	Taipei Exchange
TPEX	Taipei Exchange Capitalization Weighted Stock Index
TSP	Third-party Service Provider
TWSE	Taiwan Stock Exchange
USD	US dollar
VaR	Value at risk
WFH	Working from home
WPI	Wholesale price index

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