Central Bank of the Republic of China (Taiwan)

Financial Stability Report

May 2019 | Issue No. 13

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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, 2019.

Abstract

In 2018, international economic growth momentum weakened and financial vulnerability continued to accumulate. However, Taiwan's economy sustained mild growth, and the corporate and household sectors as well as the real estate market remained stable. Against this backdrop, domestic financial markets operated smoothly and the health of financial institutions was sound. These circumstances, coupled with orderly functioning of payment systems, underpinned a stable financial system.

International and domestic macro environmental factors potentially affected Taiwan's financial system

Regarding the global economy, international economic growth momentum weakened in 2018. Among the world's major economies, advanced economies took divergent paths. The US economy grew steadily, while the euro area and Japan saw sluggish growth. For most Asian emerging economies, growth momentum waned as well. Among them, economic growth in Mainland China moderated continually under the pressure of the government's deleveraging policy and ongoing trade conflicts. IHS Markit predicts growth momentum in advanced and emerging economies to decrease further in 2019. With regard to international financial conditions, in 2018, global financial conditions remained accommodative and the health of the global banking industry continued improving. Nevertheless, volatility in global financial markets exacerbated, and vulnerabilities in government, corporate, and nonbank financial sectors of some major economies continued to accumulate. Should monetary policy outlooks of those economies, decelerating global economic growth, ongoing trade conflicts, and the Brexit impasse fuel market concerns and prompt investors to take action, financial conditions could tighten again and global financial risks might elevate. In addition, considering that the US-China trade dispute remains unresolved, the economic and financial risks of Mainland China might increase. Moreover, some emerging economies still face capital outflow risks, and the future developments and impacts of these risks warrant close attention.

Regarding the domestic economy, in 2018, thanks to modest momentum in private consumption and investment, Taiwan's economy grew soundly along with mild inflation.

Owing to continued balance of payments surpluses, foreign exchange (FX) reserves remained ample, and external debt-servicing capacity remained sound. The government's fiscal deficits reversed to increase while the debt scale expanded within a manageable range. The profitability of listed companies showed mixed movements but their leverage ratios decreased slightly. Moreover, their short-term debt-servicing capacity remained sound and the credit quality of corporate loans improved. Furthermore, although household borrowing grew at a slower pace and the debt burden increased mildly, credit quality remained satisfactory. Real estate market trading volumes expanded and house prices increased marginally, while the pressure on unsold new residential properties might build up. The mortgage burden alleviated slightly but still remained at a high level.

Financial markets, institutions, and infrastructure operated smoothly

As for financial markets in 2018, bill and bond issuance in the primary market increased and the bill trading volume in the secondary market rose, whereas the turnover rate of outright transactions of bonds hit a new low. Stock prices remained high and fluctuated before slumping, yet they rebounded markedly in 2019 Q1. FX markets remained dynamically stable. As for financial institutions, in 2018, the profitability and asset quality of domestic banks enhanced; capital levels remained unchanged and ample liquidity persisted. Nevertheless, domestic banks' exposures to Mainland China warrant successive attention. Life insurance companies showed a significant decline in profitability. Although the average risk-based capital (RBC) ratio and the equity to assets ratio both descended, the equity to assets ratio rebounded significantly in 2019 Q1. Their foreign portfolio investments continued expanding and faced the challenges stemming from higher FX hedging costs and heightened volatility in international stock markets. Bills finance companies saw lower profits, and liquidity risks still warrant close attention. With regard to financial infrastructure, in 2018, the major payment systems operated smoothly and the retail payment infrastructure continued strengthening. Meanwhile, the Bank and the Financial Supervisory Commission (FSC) actively responded to the Mutual Evaluation by the Asia/Pacific Group on Money Laundering (APG) and the development of domestic financial technology (FinTech).

The Bank and the FSC continually took measures to promote financial stability

From 2018 onwards, the Bank successively adopted appropriate monetary, credit, and FX policy measures in response to the uncertainties surrounding the evolution of global and domestic economic and financial conditions. The underlying measures included promoting smooth operation of interbank transactions, continuing to regulate high-value housing loans, and implementing a flexible managed float FX rate regime. Moreover, to pursue the operating objective of promoting financial stability, the Bank also revised FX regulations to keep in line with the government's anti-money laundering and combating the financing of terrorism (AML/CFT) policies. With respect to the FSC, in addition to proactively promoting financial development, the commission has also reinforced financial supervision, strengthened regulations governing AML/CFT and regulatory compliance of financial institutions, and persistently enhanced their risk control abilities and compliance effectiveness, so as to maintain financial stability.

Taiwan's financial system remained stable

In 2018, although facing changing international and domestic economic conditions, financial markets operated smoothly. The asset quality of domestic financial institutions was satisfactory. Although the profitability and capital ratios of some financial institutions moderated, the overall level remained adequate. Meanwhile, all domestic payment systems functioned in an orderly manner. With the aim of promoting financial stability, the Bank and the FSC adopted adequate policies and measures. Overall, the financial system in Taiwan remained stable. Looking ahead, the Bank and the FSC will keep closely monitoring the impact of global and domestic economic and financial conditions on the domestic financial system and implement the appropriate policy responses to promote financial stability.

I. Overview

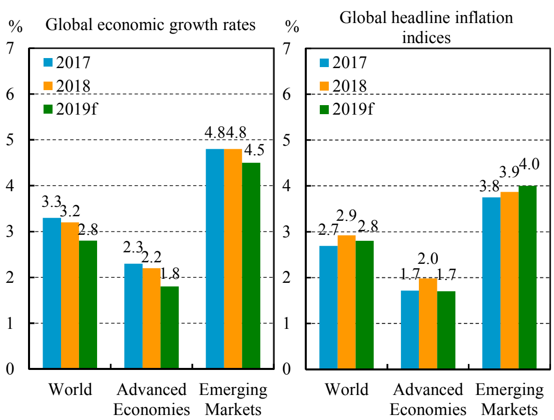
Potential macro environmental risk factors

Global economy saw mild growth, while financial vulnerabilities continued to accumulate

Global economic growth moderated in 2018 and inflation rose slightly

The global economic growth rate slightly decreased to 3.2% in 2018, and the economic growth rates in advanced economies took divergent paths. Among them, economic growth in the US accelerated, while those in the euro area and Japan waned. With regard to emerging markets, despite the fact that the economy in Mainland China slowed down as a result of deleveraging policies and trade conflicts with the US, growth momentum in India and Brazil improved. In sum, the overall economic growth rate in emerging economies leveled off. Looking ahead to 2019, IHS Markit predicts[1] that global GDP growth will continue to moderate to 2.8%. Among them, economic growth in advanced economies is projected to reduce to 1.8% with the unwinding of fiscal stimulus in the US and political disruptions in the euro area. The average growth rate in emerging economies is forecast to decrease to 4.5%, reflecting the ongoing US-China trade tensions (Chart 1.1).

Chart 1.1 Global economic growth rates and headline inflation indices



Note: Figures for 2019 are IHS Markit estimates.
Source: IHS Markit (2019/5/15).

Regarding consumer prices, in 2018, the rebounding trend of oil prices raised global inflation mildly and slightly lifted the consumer price index (CPI) inflation rate to 2.9%. Among them, the headline inflation rate

[1] IHS Markit estimate on May 15, 2019.

in advanced economies kept rising to 2.0%, and the rate in emerging economies also accelerated to 3.9%. IHS Markit predicts that in 2019 the global headline inflation rate will drop to 2.8% on the back of more stable commodity and oil prices (Chart 1.1).

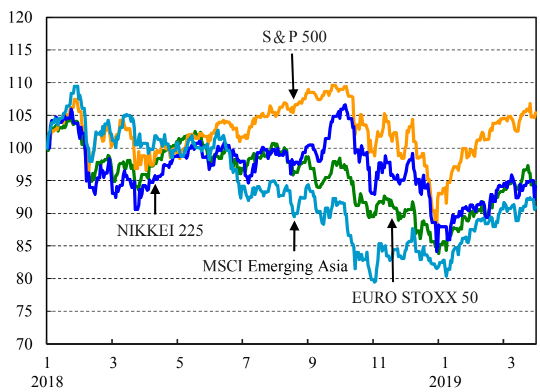
Global financial conditions remained accommodative, yet the buildup of financial vulnerabilities continued

In the beginning of 2018, global financial conditions by and large remained accommodative. However, from mid-April, yields on US bonds drifted higher and the US dollar rallied, exerting pressure on portfolio flow reversals in emerging economies with fragile fiscal balances and high external debt. Moreover, in Q4, a stock market slump in the US put selling pressure on global stock markets, resulting in tighter financial conditions. In 2019 Q1, with the dovish shift in major economies' monetary policies and the progress in US-China trade negotiations, global financial markets dramatically rebounded. As a result, tightening financial conditions attenuated and turned relatively accommodative afterwards.

In 2018, the capital levels of banks in major economies continued to trend upward and the banking industry has generally regained its health. Nonetheless, vulnerabilities in major economies' sovereign, corporate and nonbank financial sectors continued to build. Given investors' fears over the monetary policy outlooks of major economies, global economic growth slowdown, protracted trade tensions, and a no-deal Brexit contributing to selling pressures, financial conditions could tighten again and raise global financial stability risks.

In February 2018, US stock markets tumbled and induced a drop in international stock markets. The markets stabilized gradually afterwards. However, from October onwards, against a backdrop of several unfavorable conditions such as an escalation of US-China trade tensions and a slowdown in global economic growth, market volatility increased dramatically. In 2019 Q1, global stock markets gradually stabilized and then plunged again as a result of rising trade tensions in early May (Chart 1.2).

Chart 1.2 Performance of international equity indices

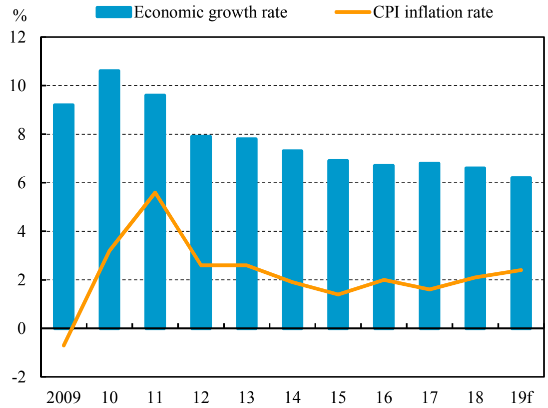


Notes: 1. January 1, 2018 = 100.
2. The EURO STOXX 50 Index is derived from 50 stock indices in 11 major economic bodies in the euro area.
Source: Bloomberg.

Economic growth slowed down in Mainland China and the renminbi depreciated sharply before witnessing a dramatic rebound

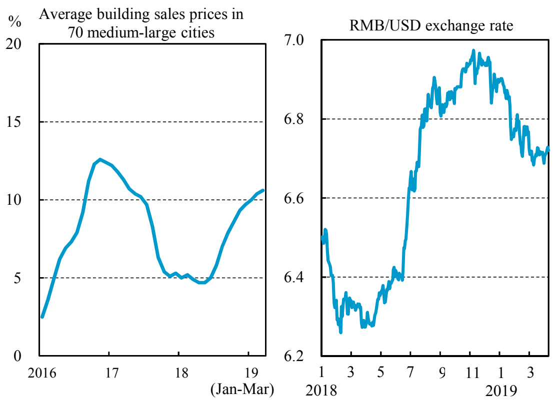
Mainland China's economic growth dropped to 6.6% in 2018, the lowest level in 28 years, from 6.8% a year earlier. IHS Markit projects that the economic growth rate will fall further to 6.2% in 2019 owing to a slowdown in global demand and uncertainties over the US-China trade dispute. Regarding consumer prices, the CPI inflation rate of Mainland China was 2.1% throughout 2018, an increase of 0.5 percentage points compared to a year earlier. IHS Markit projects the annual CPI inflation rate of 2019 to climb to 2.3% (Chart 1.3).

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



Note: Figures for 2019 are IHS Markit projections.
Sources: National Bureau of Statistics of China and IHS Markit (2019/5/15).

Chart 1.4 Building sales prices of Mainland China and renminbi exchange rate



Sources: Thomson Reuters Datastream and CBC.

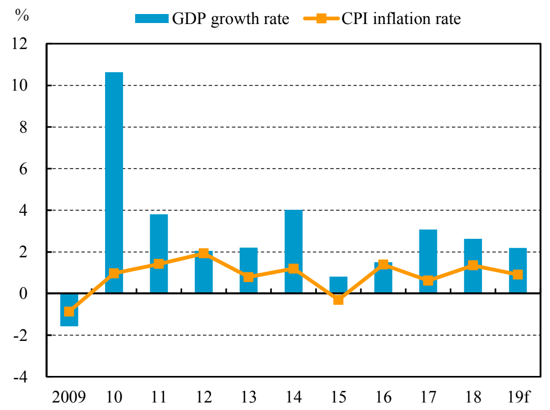
In the second half of 2018, thanks to a shift toward easier monetary policy by the People's Bank of China (PBC), the annual growth rate of housing prices significantly increased. Meanwhile, from 2018 Q2 onwards, affected by the Fed's rate hikes and the escalation of the US-China trade dispute, the renminbi depreciated substantially against the US dollar. Afterwards, owing to market expectations for a slower pace of US rate hikes, the renminbi turned to appreciate against the US dollar (Chart 1.4). In addition, the Shanghai Stock Exchange (SSE) Composite Index fluctuated with a downward trend in 2018. In 2019 Q1, stimulated by the progress in US-China trade negotiations, the SSE Composite Index rebounded sharply before an abrupt drop in early May.

The non-performing loan (NPL) ratios of commercial banks in Mainland China elevated and the outstanding debt for nonfinancial sectors constantly increased. In response, Mainland China's government successively launched various measures for monitoring nonfinancial sector debt. In the second half of 2018, however, a series of measures aiming to foster sustainable economic growth by the government could cause delays in the deleveraging schedule and a rise in potential risks, which warrant close attention.

Domestic macro environment

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

Chart 1.5 Economic growth rate and CPI inflation rate of Taiwan



Note: Figures for 2019 are CBC forecasts released on March 21, 2019.
Sources: CBC and DGBAS.

In 2018, even though the economic growth rate reached 2.63% owing to continual improvement in employment and modest momentum in both private consumption and investment, the figure was still lower than the 3.08% of the previous year. Meanwhile, domestic prices rose mildly throughout 2018. The annual CPI inflation rate registered 1.35%, higher than the 0.62% of the previous year. Taking a glance into 2019, the growth momentum of private consumption and private investment is expected to sustain. However, the slowdown in global demand could jeopardize Taiwan's exports. Therefore, the Bank forecasts Taiwan's annual economic growth rate to decline further to 2.13% in 2019.[2] On the other hand, given an outlook of mild inflation, the Bank forecasts the annual CPI inflation rate to drop to 0.91% (Chart 1.5).[3]

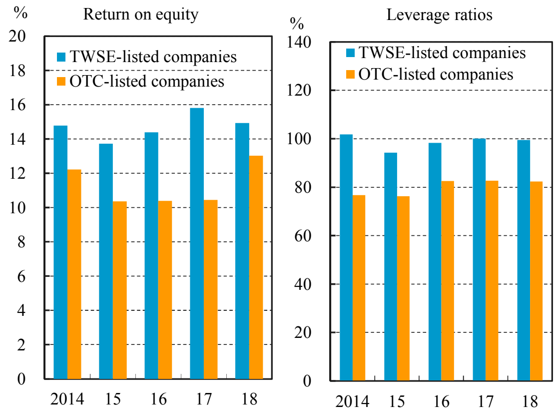
Taiwan's external debt increased marginally to US$191.2 billion at the end of 2018, but foreign exchange (FX) reserves remained at a sufficient level of US$461.8 billion, implying a robust capacity to service external debt. Meanwhile, the amount of the fiscal deficit saw a rebound, increasing to 1.32%[4] of annual GDP in 2018. The outstanding public debt at all levels of government slightly increased at the end of the year, but the ratio of total public debt to annual GDP slightly fell to 35.38% owing to a greater rise in GDP growth,[5] indicating that total government debt stayed within a manageable level.

[2] The figures are based on a CBC press release on March 21, 2019.
[3] See Note 2.
[4] As a comparison, fiscal deficits in European Union (EU) member nations are not allowed to exceed 3% of GDP according to the *Maastricht Treaty* and the subsequent *Stability and Growth Pact*.
[5] As a comparison, outstanding 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*.

The profitability of listed companies showed mixed movements and credit quality of corporate loans elevated

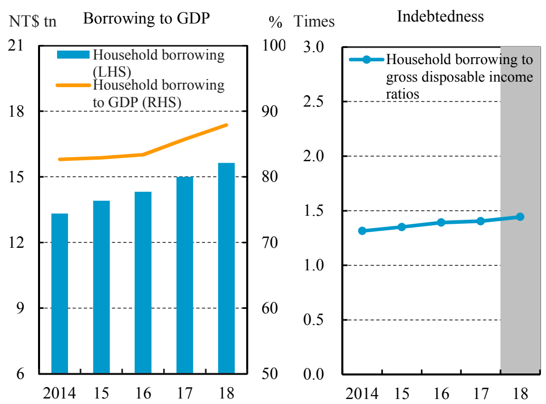
In 2018, the average return on equity (ROE) of Taiwan Stock Exchange (TWSE) listed companies abated to 14.92%, reflecting a marginal decrease in profitability. The main reason was that the profitability of the optoelectronics industry declined significantly. On the other hand, benefitting from the persistently strong demand for silicon wafers and passive components and from the increasing profitability in the biotechnology industry, over-the-counter (OTC) listed companies saw their average ROE rise to a high of 13.02%, suggesting a significant improvement in profitability. Meanwhile, the average leverage ratios for TWSE-listed companies and OTC-listed companies both moderated (Chart 1.6), and their short-term debt servicing capacity remained at an adequate level.

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



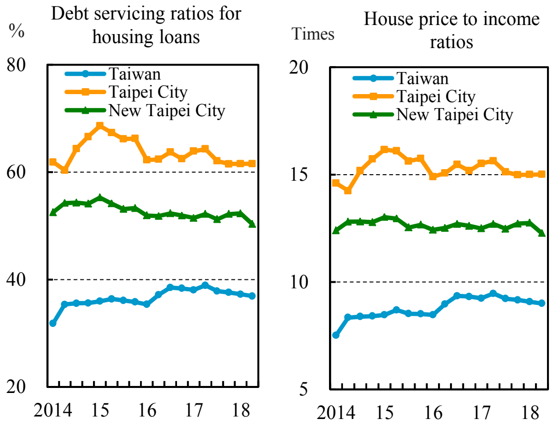
Note: Gross disposable income in shadow area is CBC estimate.
Sources: CBC, JCIC and DGBAS.

At the end of 2018, the NPL ratio for corporate loans from financial institutions fell to a 10-year-low of 0.30%. The overall credit quality for the corporate sector strengthened. However, in view of the fading momentum in global economic growth, economic slowdown in Mainland China, uncertainties over US-China trade talks, and the Brexit deadlock, the outlook for future operations of corporations in Taiwan remains challenging.

Household debt burden rose slightly, but credit quality of household borrowing improved

At the end of 2018, total household borrowing expanded and reached NT$15.64 trillion, equivalent to 87.89% of annual GDP. The ratio of household borrowing to total disposable income rose to 1.44, reflecting a moderate rise in the household debt burden (Chart 1.7). Nevertheless, prolonged low interest rates on domestic loans, together with the falling domestic unemployment rate and improving regular earnings in the industrial and service sectors, should help sustain the debt servicing capacity of households.

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.
3. The latest data are as of 2018 Q2.
Source: Housing Price Affordability Indicator Statistics, Construction and Planning Agency of the MOI.

In 2018, the NPL ratio of household borrowing decreased to 0.26% at the end of the year, reflecting an improvement in its credit quality.

Real estate market saw steady trading volume and a slight increase in housing prices, while mortgage burden moderated yet stayed high

In 2018, trading volume in the housing market grew mildly. The number of building ownership transfers for transaction increased by 4.47% year on year. The total number of building ownership transfers for transaction recorded an annual growth rate of 4.30% for the period of January to April 2019. In the second half of 2018, the Sinyi housing price index (for existing residential buildings) rose gradually. Additionally, the Cathay housing price index (for new residential buildings) increased significantly in 2018 Q4 as a result of a sharp surge in prices of new residential buildings. In 2019 Q1, the index continued to rise, but pressure from the expansion of unsold new residential properties might increase.

In 2018 Q4, the debt servicing ratio for housing loans and the house price to income ratio in Taiwan declined marginally year on year to 36.90% and 9.0, respectively, but stayed at a high level. Among all areas, the ratios in Taipei City registered 61.56% and 15.01, respectively, showing the heaviest mortgage burden (Chart 1.8). On the other hand, the NPL ratios of housing loans and construction loans decreased continually to 0.21% and 0.19% at the end of

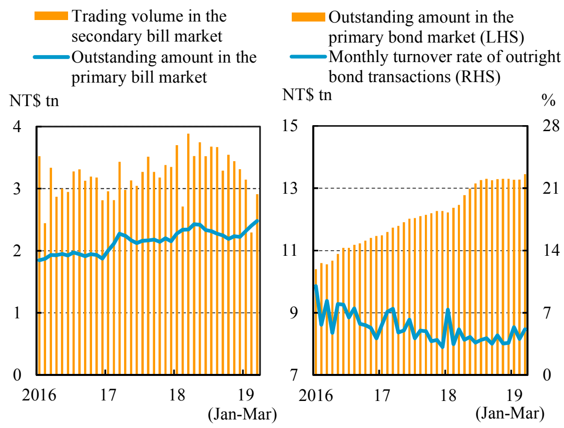
March 2019, reflecting that the risk management capability of domestic banks to cope with potential mortgage loan losses remained satisfactory.

Financial system assessment

Financial markets

Bill and bond issuance in both primary and secondary markets expanded

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.

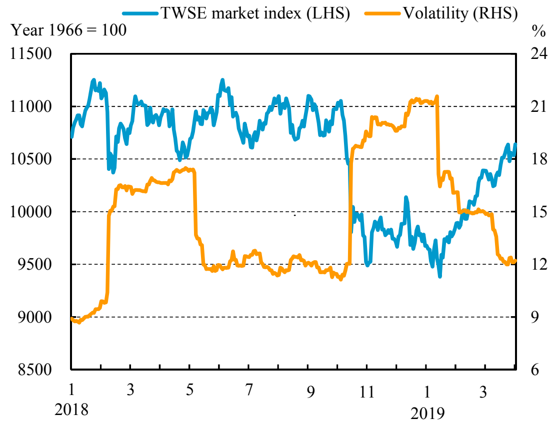
At the end of 2018, the outstanding amount of bill issuance in the primary market increased by 3.18% year on year, along with a rise of 9.68% in the bill trading volume in the secondary market. As for the bond market, the outstanding amount of bond issuance increased by 8.41% year on year, mainly driven by massive international bond issuance. Trading volume in the secondary bond market rose by 5.26% as well. Nevertheless, the monthly turnover rate of major bonds declined to a record low of 4.25%, but slightly rebounded in 2019 Q1 (Chart 1.9).

The short-term interbank overnight call loan rate remained at a low level in 2018. In addition, 10-year government bond yields moved to a relatively high level before dropping. Considering that the yields have decreased to a relatively low level recently and the possibility for them to rebound in the future increased, interest rate risks related to bond investments are still high and warrant close attention.

Stock indices slumped after experiencing fluctuations at a high level in 2018, but rebounded strongly in 2019 Q1, while volatility decreased

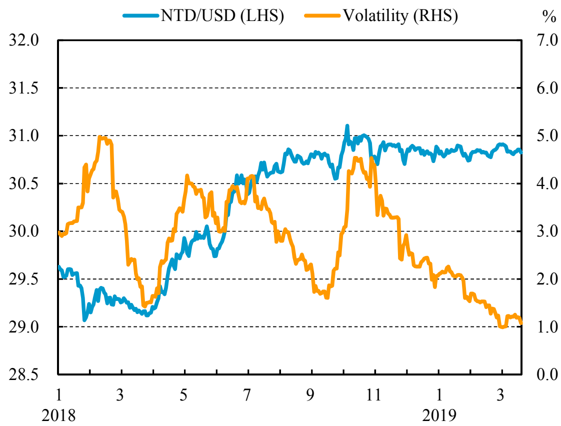
In 2018, affected by US stock market's movements, the pace of the Fed's interest rate hikes, the escalation of US-China trade tensions, and a rise in US government bond yields, the Taiwan Stock Exchange Weighted Index (TAIEX) of the TWSE market fluctuated at a high level before plunging, registering 9,727 at the end of the year and posting a decrease of 8.60% year on year. In the beginning of 2019, the TAIEX rebounded as a result of the Fed's decision to pause interest rate hikes and the progress in US-China trade talks (Chart 1.10). Nevertheless, intensified US-China trade tensions led to a fall in the TWSE market in early May.

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.

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.

In 2018 Q4, induced by a slump in international stock markets, volatility in the TWSE market surged and registered 21.29% at the end of the year. In 2019 Q1, the stock markets in Taiwan stabilized and the volatility in the TWSE market decreased significantly to 12.21% at the end of March (Chart 1.10).

The NT dollar exchange rate oscillated along a depreciating path, and its volatility remained relatively stable

In 2018, owing to the US-China trade dispute and interest rate hikes by the Fed, the NT dollar exchange rate against the US dollar followed a depreciating path during the whole year and stood at 30.733 at the end of the year, an annual depreciation of 2.88%. In the beginning of 2019, reflecting market expectations of the Fed suspending interest rate rises, the NT dollar exchange rate was relatively stable against the US dollar and stood at 30.825 at the end of March (Chart 1.11). However, intensified US-China trade tensions in early May led to the depreciation of most emerging Asian currencies including the NT dollar, which turned to weaken beyond 31 against the US dollar.

Volatility in the NT dollar exchange rate against the US dollar shifted between 1.43% and 4.97% and registered an annual average of 3.16% in 2018, before moving between 0.99% and 2.26% during 2019 Q1 (Chart 1.11). Compared to major currencies such as the Japanese yen, the euro, the Korean won, and the Singapore dollar, the NT dollar exchange rate has been relatively stable against the US dollar.

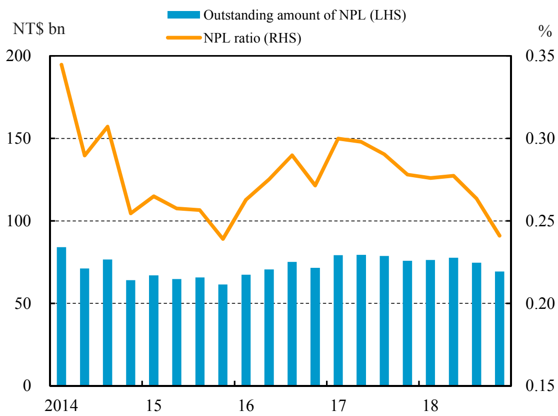
Financial institutions

Domestic banks reported better asset quality and profitability, while capital ratio leveled off

In 2018, customer loans of domestic banks kept rising. Meanwhile, the share of real estate-secured credit and the credit concentration of corporate loans both slightly descended. The average NPL ratio decreased to 0.24%, reaching a recent low (Chart 1.12), along with sufficient loss provisions. On the other hand, the aggregate amount of exposure to Mainland China continued its upward path, but the ratio of the exposures to banks' net worth dropped marginally to 53%, and none of the domestic banks exceeded the statutory limit of 100%.

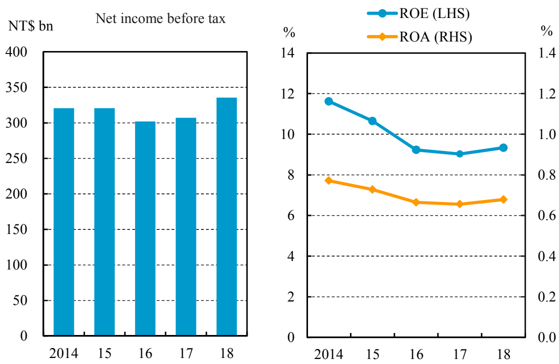
In 2018, the net income before tax of domestic banks rose to NT$335.4 billion, a significant increase of 9.26% year on year. The average ROE and return on assets (ROA)

Chart 1.12 NPL of domestic banks



Note: Excludes interbank loans.
Source: CBC.

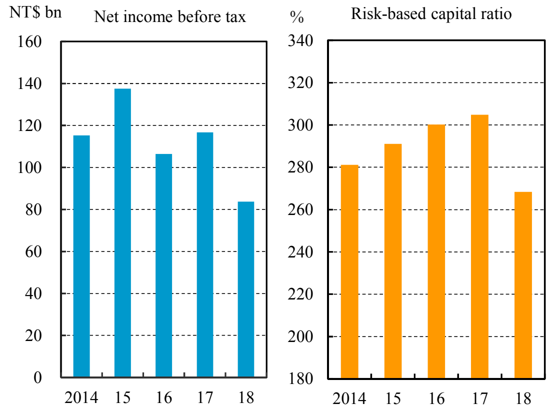
Chart 1.13 Profitability of domestic banks



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

also increased to 9.34% and 0.68% (Chart 1.13), respectively, showing improved profitability. In addition, at the end of 2018, the average capital adequacy ratio of domestic banks leveled off with satisfactory capital quality.

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.

Life insurance companies saw a decline in profitability, and their capital levels plummeted before rebounding significantly

Life insurance companies reported net income before tax of NT$83.7 billion in 2018, decreasing dramatically by 28.22% year on year (Chart 1.14). This was chiefly driven by growth in hedging costs and an increase in non-operating losses on the disposal of assets. Moreover, the comprehensive income of life insurance companies was NT$-500.7 billion in 2018, mainly owing to the substantial increase in unrealized losses on financial assets. However, it has greatly improved in 2019 Q1.

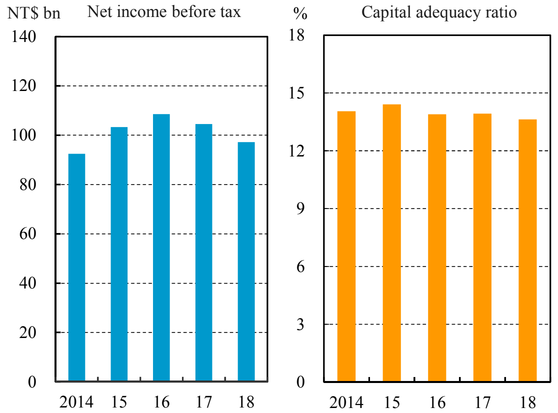
In 2018, capital levels of life insurance companies declined owing to a greater decrease in equity. As a result, the average RBC ratio descended to 268.43% at the end of the year (Chart 1.14). The equity to asset[6] ratio also decreased markedly to 4.46%, but rebounded significantly in 2019 Q1. With regard to risks, foreign portfolio positions of life insurance companies grew continually in 2018. However, FX hedging costs substantially increased owing to consecutive interest rate hikes by the Fed. Considering this, together with a still-high level of equity risk stemming from recent accelerating volatility in global stock markets, life insurance companies should prudently control related risks. Additionally, as life insurance companies' investments in exchange-traded funds (ETFs) linking to foreign bonds and denominated in New Taiwan Dollars (NTD) grew rapidly, the FX risk embedded within ETF investments warrants close attention.

[6] Asset excludes separate account products.

Bills finance companies reported lower profits and liquidity risk elevated

Owing to rising funding demands of corporates in money markets spurred by low short-term market rates, commercial paper (CP) guaranteed by bills finance companies increased and their credit quality remained sound at the end of 2018. Meanwhile, maturity mismatches between long-term assets and short-term liabilities persisted in bills finance companies, indicating an escalation in liquidity risk.

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



Source: CBC.

Bills finance companies posted a net income before tax of NT$9.7 billion in 2018, a decrease of 7% year on year. The decline was mainly driven by a rise in the yielding cost of bond investments stemming from a slight increase in the repurchase agreement (repo) rate for bills and bonds, as well as a higher base period resulting from a substantial amount of lawsuit settlement income in the previous year. The average capital adequacy ratio of bills finance companies moderately descended to 13.63% at the end of 2018 (Chart 1.15). However, the capital adequacy ratio for each company remained well above the statutory minimum of 8%.

Financial infrastructure

The trading value of mobile payments has grown steadily, and the Bank continued to strengthen the infrastructure of retail payments

In 2018, the Bank Interbank Funds Transfer System (CIFS), which provides interbank final settlement services to each clearing institution, were functioning smoothly. The trading value of electronic retail payments also increased continually. The total amount of card-based payments (such as payments by credit cards) registered NT$3.80 trillion in 2018, which accounted for 39.95% of total private consumption expenditure. In addition, the trading value of mobile payments has grown rapidly.

To strengthen the security of financial transactions, the Financial Information Service Co., Ltd. (FISC), entrusted by the FSC, established a joint financial defense system for information security (InfoSec) with financial institutions. In addition, the Bank continues to pay attention to international development trends and urges the FISC to improve its infrastructure. Moreover, the tiered preferential measures for ATM interbank transfer processing fees were implemented from April 2019 onwards so as to provide the public with a safe, efficient, convenient and low-cost service and also deepen financial inclusion.

Other measures to strengthen the financial system

To provide a friendly legal environment for mergers and acquisitions (M&As) and strengthen the competitiveness of local financial institutions, in November 2018, the FSC amended decrees relating to mergers with the aim of encouraging mergers of financial institutions. Moreover, in order to cope with digitized business opportunities, encourage financial innovation and deepen financial inclusion, the FSC proposed a new policy for internet-only banks establishment in April 2018. It is expected that the approval list will be announced by the end of July 2019. Additionally, the FSC has approved some innovative experimentation applications. Institutions such as the Taiwan Financial Services Roundtable (TFSR) also established the FinTechSpace and organized FinTech Taipei 2018 so as to foster FinTech development in Taiwan.

In response to the third-round mutual evaluations by the APG, Taiwan has recently actively implemented corresponding measures aiming at getting higher ratings in the aforementioned evaluations. Those measures included establishing an institution which is fully in charge of reinforcing the national coordination of AML/CFT, amending regulations governing AML/CFT, and organizing assessment and evaluation meetings.

Taiwan’s financial system remained stable

In 2018, in spite of slower international economic growth and mild inflation, domestic financial markets operated smoothly. The profitability of domestic financial institutions remained solid, and asset quality stood at a healthy level. Meanwhile, the capital adequacy ratio of domestic financial institutions remained satisfactory. The major payment systems also functioned along an orderly trajectory. By and large, the financial system in Taiwan remained stable.

The changes in economic and financial conditions both domestically and globally, especially the prolonged US-China trade dispute, ambiguity about the future direction of monetary policy normalization in major economies, uncertainty over Brexit policies, and an economic slowdown in Mainland China, could pose a negative impact on the global economy and increase financial market risks. Considering all these factors, the Bank will continually monitor the above impacts on the domestic economy and financial system and implement adequate monetary, credit, and FX policies as warranted. Meanwhile, the FSC will continue to revamp financial regulations and enhance financial supervisory measures in the hope of facilitating the soundness of financial institutions and promoting financial stability.

II. Potential macro environmental risk factors

2.1 International economic and financial conditions

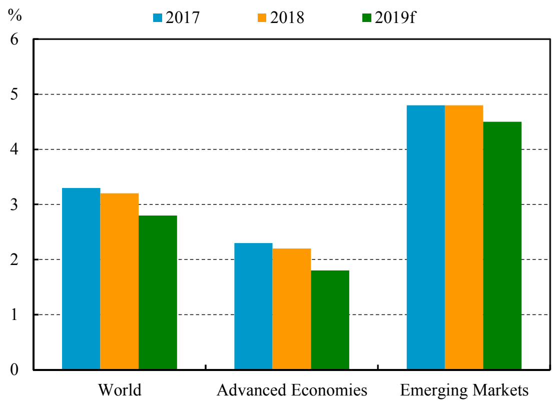
2.1.1 International economic conditions

Global economic growth moderated in 2018 and considerable uncertainty over the economic outlook for 2019 persists

In 2018, the escalation of US-China trade tensions[7] resulted in lackluster global growth in investment and trade. However, thanks to persistent growth in the US, the global economic growth rate merely decreased by 0.1 percentage points from the previous year to 3.2% (Chart 2.1). Among advanced economies, the accelerating growth momentum in the US reflected an improvement in fixed investment and personal consumption stimulated by its fiscal policies. The euro area economy lost more momentum than expected, mainly dragged by declining global exports, higher geopolitical uncertainties, and waning industrial production. Japan's economy shrank as a result of disruptions from natural disasters and sluggish growth in exports. With regard to emerging markets, despite the fact that the economy in Mainland China slowed down as a result of deleveraging policies and trade conflicts with the US, growth momentum in India and Brazil improved. In sum, economic growth rates in emerging economies leveled off.

Looking ahead to 2019, IHS Markit predicts[8] that global GDP growth will continue to moderate to 2.8% amid high trade policy uncertainty from major economies. With the unwinding of fiscal stimulus in the US and political disruptions in the euro area, economic growth in advanced economies is

Chart 2.1 Global economic growth rates



Note: Figures for 2019 are IHS Markit estimates.
Source: IHS Markit (2019/5/15).

7 From 2018 onwards, in order to reduce its trade deficit, the US imposed punitive tariffs on imports from many countries, especially on those from Mainland China.
8 See Note 1.

projected to reduce to 1.8%. In the meantime, in view of the ongoing US-China trade tensions and subdued commodity prices, the average growth rate in emerging economies is forecast to decrease to 4.5% (Chart 2.1).

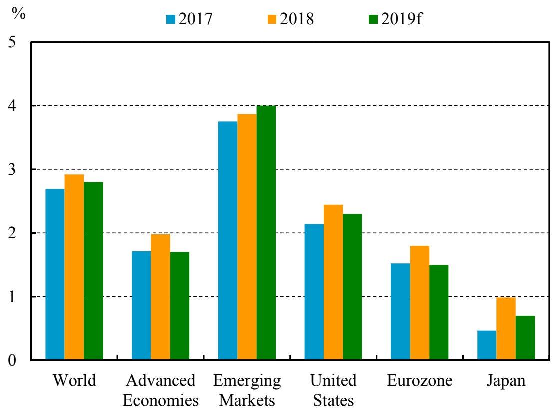
The managing director of the International Monetary Fund (IMF), Christine Lagarde, warned that “four clouds” – including financial risks from trade tensions, Brexit uncertainty, tightening monetary policy in advanced economies, and an accelerated economic slowdown in Mainland China – were undermining the global economy and might trigger an economic storm. These aforementioned factors, together with new challenges and ongoing issues arising from the legacy of the 2008 financial crisis, could pose more uncertain prospects for the global economy going forward.

Global inflation rose moderately

Although international oil prices fluctuated dramatically in 2018, the annual Brent crude oil price averaged $71.19 per barrel, posting an increase of 31.5% compared to 2017. In the meantime, most food prices, including prices of cereals, vegetable oil, dairy and meat, oscillated with a downward trend. In the first half of 2018, metal prices continued on their ascendant paths but turned to a downward trend in the second half owing to the economic slowdown in Mainland China. Nevertheless, the annual average prices were still higher than those of the previous year. As a whole, in spite of a moderate downturn in food prices, the upward trend of oil and metal prices raised global inflation mildly and lifted the CPI inflation rate to 2.9% in 2018. Among them, the headline inflation rate in advanced economies (such as the US, Japan and the euro area) kept rising to 2.0%, and the rate in emerging economies also accelerated to 3.9% (Chart 2.2).

Looking ahead to 2019, IHS Markit predicts that the global headline inflation rate will drop to 2.8% on the back of more stable commodity and oil prices. Among them, the headline inflation rate in advanced economies will decrease to 1.7%, whereas the rate in emerging economies will continue increasing to 4.0% resulting from mounting inflationary pressures in Russia and Brazil.

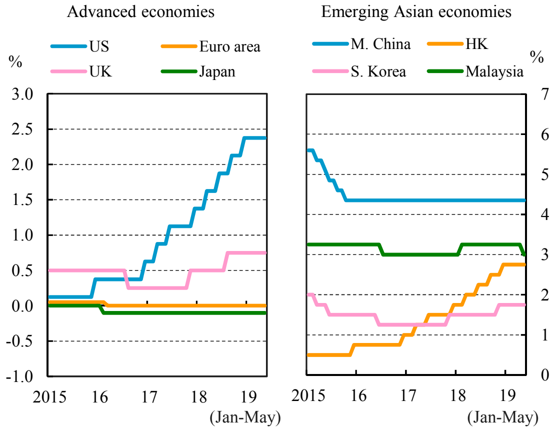
Chart 2.2 Global headline inflation indices



Note: Figures for 2019 are IHS Markit estimates.
Source: IHS Markit (2019/5/15).

Pace of monetary policy normalization in the US slowed, while other economies took divergent paths

Chart 2.3 Policy rates in selected 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 on excess reserves (before 2016/2/16, uncollateralized overnight call rate).
2. Emerging Asia: figure for Mainland China is based on financial institution one-year lending base rate; for Hong Kong, base rate; for South Korea, Bank of Korea base rate; for Malaysia, overnight policy rate.
3. Figures are as of May 15, 2019.

Sources: Central banks and monetary authority websites.

Among advanced economies, with a backdrop of solid economic activity and growth in the US labor market, the Fed hiked its target band for the federal funds rate four times in 2018 by a total of 100 basis points (bps) to 2.25-2.50%. Moreover, the Fed gradually unwound its balance sheet in March, June and September 2018, respectively. However, from 2019 onwards, amid softening global economic growth momentum and lower inflationary pressures, the Fed decided to slow down the pace of monetary policy normalization[9] by leaving the target federal funds rate unchanged in March and planned to end its balance sheet reduction in September (Chart 2.3).

In 2018, since most indicators of inflation in the euro area stayed below their targets, the ECB held interest rates steady and announced it would keep them at their present levels at least through the end of 2019. Moreover, the ECB decided to end the asset purchase program (APP) at the end of 2018 but asserted that it intends to continue reinvesting the principal payments from maturing securities purchased under the APP for an extended period of time past the date when it starts raising interest rates. The ECB also expected to launch a new series of quarterly targeted longer-term refinancing operations (TLTRO) in September 2019, each with a maturity of two years. In addition, the BOJ kept its interest rate target unchanged in 2018 as the inflation rate remained muted in Japan. Meanwhile, the BOJ continued its purchases of government bonds and announced it would undertake further monetary easing if necessary. In contrast, with inflation in the UK on course to surge above the BoE's target of 2%, the BoE hiked its official bank rate by 25 bps to 0.75% in August 2018, its second interest rate rise since the 2008 financial crisis (Chart 2.3).

Emerging Asian economies adopted different monetary policy stances. Among these countries, the PBC left interest rates unchanged but reduced required reserve ratios six times by a total of

[9] According to the dot plot describing FOMC participants' assessments of appropriate monetary policy (released on March 20, 2019), there will be no rate rises in 2019, meaning a more dovish monetary policy stance.

750-850 bps to bolster market liquidity from 2018 onwards. In addition, the PBC continued using its medium-term lending facility (MLF) and pledged supplementary lending (PSL) policy tools with the aim of reducing funding costs and supporting the growth of the real economy. South Korea and Malaysia both raised their policy rates by 25 bps in 2018 so as to mitigate the impact of capital outflows caused by US interest rate rises. The hikes were also in response to their economic turnarounds. Nonetheless, for the purpose of alleviating the impacts from unresolved trade tensions and weakening global demand, Malaysia cut its policy rates by 25 bps in 2019. The Hong Kong Monetary Authority (HKMA) followed the Fed's rate hikes and raised the base rate charged through its overnight discount window four times by 25 bps each to maintain the effective operation of the linked exchange rate system (Chart 2.3).

2.1.2 International financial conditions

Global financial conditions remained accommodative, yet the buildup of financial vulnerabilities continued

In the beginning of 2018, global financial conditions by and large remained accommodative. However, from mid-April, yields on US bonds drifted higher and the US dollar rallied, exerting pressure on portfolio flow reversals, increasing borrowing costs, and weakening the currencies of emerging economies with fragile fiscal balances and high external debt. In Q4, a sharp decline in US stock indices – triggered by the escalation of US-China trade tensions, a rise in US government bond yields and a global economic slowdown – put selling pressure on global stock markets. As a result, global financial market volatility heightened and financial conditions gradually tightened.

In 2019 Q1, with the dovish shift in major economies' monetary policies and the progress in US-China trade negotiations, global financial markets dramatically rebounded. As a result, tightening financial conditions attenuated and turned relatively accommodative afterwards. Notwithstanding, vulnerabilities in major economies' sovereign, corporate and nonbank financial sectors continued to build up. Given the market anxiety about the pace of monetary policy normalization in major economies, sharper-than-expected growth slowdown, protracted trade tensions, and a no-deal Brexit contributing to selling pressures, financial conditions could tighten again and raise financial stability risks.

Global banks' balance sheets continued to strengthen but faced a series of different vulnerabilities

Since the global financial crisis, several financial reforms have been implemented to strengthen the banking system.[10] Consequently, the capital levels of banks in major economies continued to trend upward, but weaknesses in the banking system still existed.

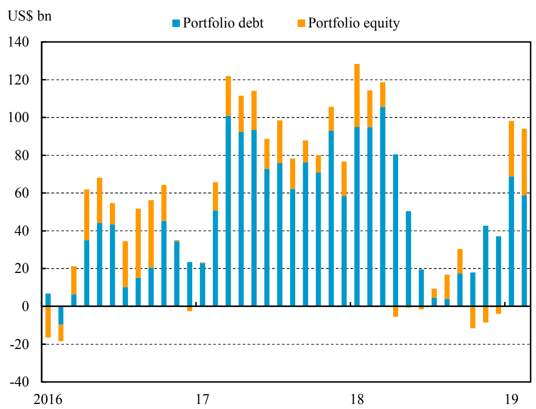
In 2018, the net income of US banks remarkably increased by 44.1% from the previous year.[11] Nonetheless, relaxation of regulatory requirements for medium-sized banks in the US recently may lower the resilience of the banking system. European banks' profits remained broadly stable, but their performances were rather heterogeneous.[12] Under the prolonged low interest rate environment, Japanese banks' profitability declined continually, which may lower banks' capital levels and risk bearing capacity.[13]

Furthermore, the debt-service ratios of the private nonfinancial sector were already higher than their long-term averages in a number of economies. Owing to an increase of credit to the private nonfinancial sector, a rise in interest rates or a fall in borrowers' incomes could strain the debt-service capacity of heavily indebted borrowers, leading to a further rise in nonperforming loans.

Some emerging economies continued to face the risks of capital flow reversals

In 2018, emerging economies faced sustained pressure of capital flow reversals after experiencing massive capital inflows in 2017, reflecting tightening financial conditions. Among them, with rising US long-term yields and a stronger dollar in April, emerging economies with weaker fiscal balances or huge external debts faced the pressure from sharp capital outflows and currency depreciation. In June, escalating trade tensions put increasing portfolio outflow pressures on export-oriented economies and Asian emerging economies. In August, mounted political risks and policy uncertainty intensified selling pressures on

Chart 2.4 Portfolio flows of emerging economies



Note: The amount of portfolio flows are 3-month rolling sums. Figures greater than 0 mean capital inflows, otherwise they mean capital outflows.
Source: IMF (2019), *Global Financial Stability Report*, April.

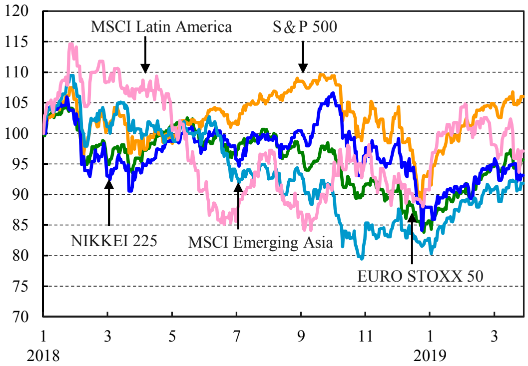
[10] For example, most countries have implemented the Basel III reforms developed by the Basel Committee on Banking Supervision and the G-SIBs regulatory measures established by the Financial Stability Board.
[11] FDIC (2019), *FDIC Quarterly Banking Profile*, February.
[12] ECB (2018), *Financial Stability Review*, November.
[13] BOJ (2018), *Financial System Report*, October.

stock markets and caused continuous capital outflows for a few major emerging economies. Since 2019, with rebounds in global financial markets, capital turned to flow into emerging economies again, which helped gradually attenuate the tightening in financial conditions (Chart 2.4).

Global financial market volatility elevated

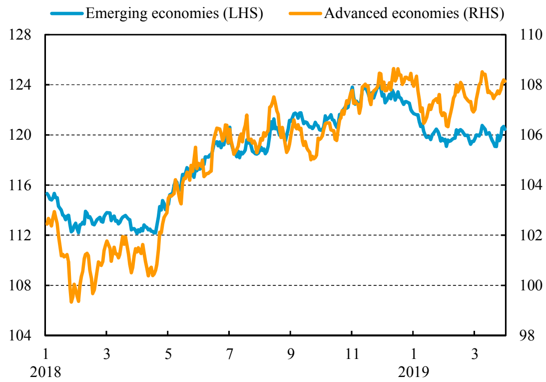
In February 2018, because of market anxiety about the Fed hiking interest rates at a faster pace, US stock markets tumbled and induced a drop in international stock markets, though the markets stabilized gradually afterwards. Since April, rising US interest rates and a strong US dollar have triggered portfolio outflows in emerging economies, leading to a sharp fall in the stock indices of some emerging economies. From October onwards, against a backdrop of an escalation of US-China trade tensions and several other unfavorable conditions, global stock market volatility fluctuated dramatically. In 2019 Q1, with the dovish shift in the Fed's monetary policy and renewed optimism about trade negotiations between the US and Mainland China, global stock markets gradually stabilized (Chart 2.5). In early May, global stock markets plunged as a result of rising trade tensions.

Chart 2.5 Performance of key international equity indices



Notes: 1. January 1, 2018 = 100.
2. The Euro STOXX 50 refers to a stock index consisting of the largest 50 stocks in the 11 major economies of the euro area.
Source: Bloomberg.

Chart 2.6 The US dollar indices of advanced and emerging economies

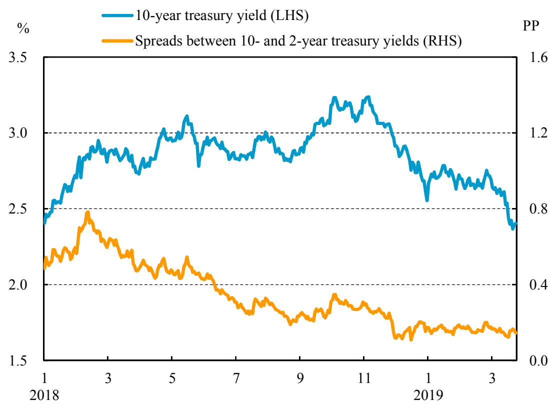


Note: The US dollar indices of advanced and emerging economies were developed by the Fed, and are weighted exchange rates of 7 and 19 trading partners, respectively. Base period is January 2006 (=100).
Source: Fed.

In early 2018, the US dollar was weaker; however, from April onwards, owing to the robust economic growth in the US and market expectations for the Fed to hike interest rates at a faster pace, the US dollar index reversed to trend upwards. Against this backdrop, exchange rates in some emerging economies depreciated. In 2019 Q1, the movements of exchange rates in advanced and emerging economies diverged. Among them, the euro and Japanese yen depreciated against the US dollar, propelling the US dollar index of advanced economies to fluctuate upwards. In contrast, the US dollar index of emerging economies moved to a downward trend, mainly because the renminbi rebounded and most emerging economies' exchange rates also appreciated against the US dollar (Chart 2.6).

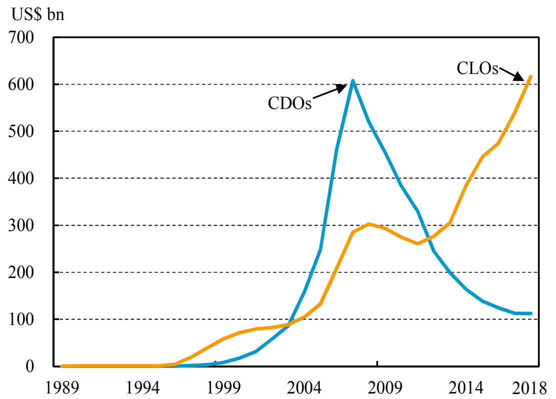
With the Fed explicitly continuing its rate-hike plan in early 2018, US 10-year government bond yields gradually trended upwards to hit their highest level of 3.23% in November. From mid-November onwards, as a result of a global economic slowdown, protracted US-China trade tensions and market expectations of a slower Fed rate-hike path, US 10-year government bond yields sharply trended downwards. On the other hand, short-term government bond yields remained at a high level derived from the effect of interest rate hikes over the previous few months. As a result, the spread between longer-dated and shorter-dated yields has narrowed and the yield curve has flattened (Chart 2.7). If the yield curve gets flatter in the future, or even becomes negatively sloped for a long time, recession and financial stability risks in the US may elevate, which warrants close attention.

Chart 2.7 US government bond yield and spread



Note: Yield curve slope is usually gauged by the spreads between 10- and 2-year government bond yields. The smaller the spreads, the flatter the yield curves. (PP=percentage point)
Source: Bloomberg.

Chart 2.8 Outstanding amounts of CLOs and CDOs



Note: "CLO" refers to Collatoralized Loan Obligation. "CDO" refers to structured finance Collateralized Debt Obligation.
Source: Sifma.

Furthermore, driven by surging investor demand for high-yield products in recent years, the outstanding amounts of collateralized loan obligations (CLOs), mainly backed by leveraged loans[14] with low credit ratings, have soared (Chart 2.8). The trend is similar to that of collateralized debt obligations (CDOs) backed by mortgages before the 2008 global financial crisis and has raised market concerns.[15] Recently, owing to loosened lending conditions for leveraged loans, the risk of CLOs has held at a relatively high level. If credit ratings of the underlying borrowers are downgraded, the CLO prices will decline at a faster pace, which may lead to adverse impacts being felt over financial markets.

[14] There is no universally accepted definition of leveraged loans. S&P defines leveraged loans as follows: (1) loan rating is equal to or lower than BB+; (2) loan rating is BBB- or no rating, but interest rate on loan is above LIBOR plus 125 basis points.

[15] BIS (2018), "International Banking and Financial Market Developments," *BIS Quarterly Review*, September; Onaran, Yalman (2018), "Can We Survive the Next Financial Crisis?" *Bloomberg*, September; Moody's (2018), "Convergence of Bonds and Loans Sets Stage for Worse Recoveries in the Next Downturn," August.

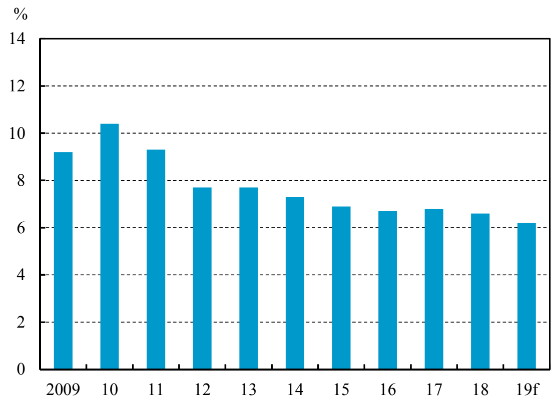
2.1.3 Mainland China's economic and financial conditions

Economic growth continued to slow down and reached a new 28-year low

In 2018, owing to the Mainland Chinese government's deleveraging measures, private consumption and investment momentum weakened. Meanwhile, affected by the US-China tariff hikes, the growth of imports and exports declined sharply in 2018 Q4. As a result, the economic growth rate dropped to 6.6% in 2018, the lowest level in 28 years, from 6.8% a year earlier (Chart 2.9).

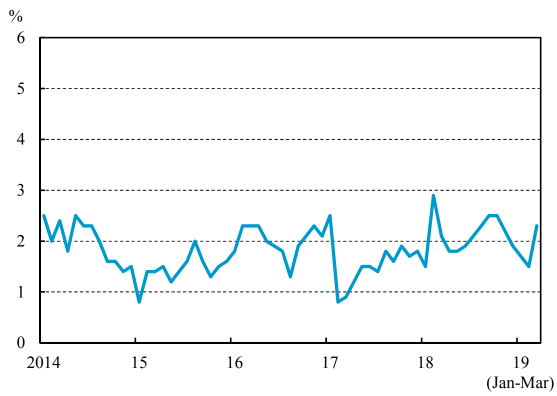
Looking forward to 2019, the slowdown in global demand and prolonged US-China trade dispute put further downward pressures on economic growth in Mainland China. IHS Markit projects that the economic growth rate will fall to 6.2% in 2019 (Chart 2.9).

Chart 2.9 Economic growth rate of Mainland China



Note: Figure for 2019 is an IHS Markit estimate.
Sources: National Bureau of Statistics of China and IHS Markit (2019/5/15).

Chart 2.10 CPI Inflation rate of Mainland China



Source: National Bureau of Statistics of China.

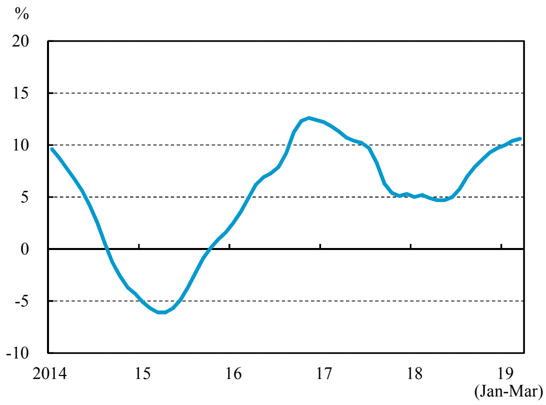
Prices rose mildly, while the growth of housing prices rebounded

Affected by an increase in food, gasoline and diesel prices, the CPI inflation rate of Mainland China was 2.1% throughout 2018, an increase of 0.5 percentage points compared to a year earlier. In March 2019, the CPI inflation rate rose to 2.3%, reflecting mild inflation outlook. IHS Markit projects the annual CPI inflation rate of 2019 to climb slightly to 2.3% (Chart 2.10).

In the first half of 2018, the average growth rate of housing prices in 70 medium-large cities held steady at 5% year on year. In the second half of 2018, thanks to the reduction in inventory of unsold residential properties, as well as a shift toward easier monetary policy by the PBC aiming to keep market liquidity at an adequate level, the annual growth rate of housing prices significantly rebounded to 9.7% in December. In March 2019, the annual growth rate rose further to 10.6% (Chart 2.11).

The PBC continued to implement sound monetary policies

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



Source: Thomson Reuters Datastream.

From 2018 onwards, in an effort to address the downward pressure on the economy and avoid financial risks, the PBC continued to implement sound monetary policies and left policy rates unchanged. However, the PBC adopted targeted or across-the-board cuts in reserve requirement ratios a total of six-times, coupled with the launch of monetary policy tools such as the MLF and targeted MLF, to help the financing needs of privately owned, small and micro-enterprises by offering stable liquidity in the medium and long term.

Mainland China's government adopted an expansionary fiscal policy

In the second half of 2018, Mainland China's government actively implemented an expansionary fiscal policy. In 2019, the government has further raised its budget deficit target to RMB2.76 trillion, or 2.8% of GDP, increasing by 0.2 percentage points year on year. The expansionary fiscal policy primarily includes: (1) proposing cuts in taxes and fees worth RMB2 trillion; and (2) raising local government's budget for the issuance of special bonds[16] to RMB2.15 trillion, and expanding the scope of their application.

SSE Composite Index and RMB FX rate both fell sharply before dramatically rebounding

From 2018 Q2 onwards, affected by the escalation of the US-China trade dispute and a sharp depreciation of the renminbi against the US dollar, the SSE Composite Index fluctuated with a downward trend. At the end of the year, the Index stood at 2,494, markedly plunging by 24.59% year on year, hitting the lowest level since 2015. In 2019 Q1, stimulated by the progress of US-China trade negotiations and the weighting increase of Mainland China A-shares in the MSCI indexes,[17] the SSE Composite Index rebounded sharply and reached 3,091 at the end of March (Chart 2.12). However, as a result of the escalating US-China trade

[16] Special bonds refer to bonds issued by local governments to fund the construction of specific projects, but they are not included in their general budgets and can be repaid by future income of the construction.
[17] In March 2019, MSCI announced that it would increase the weight of Mainland China A-shares from 5% to 20% in three phases.

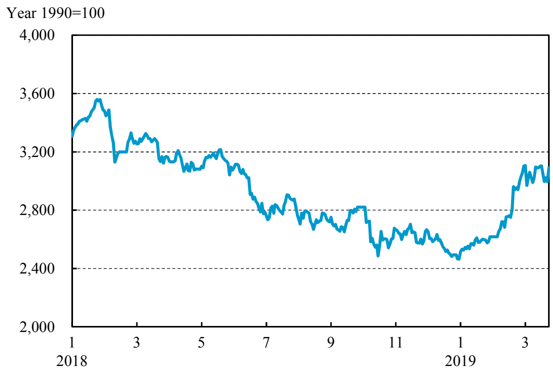
dispute in early May, the SSE Composite Index significantly fell again.

Regarding the FX market, the renminbi exchange rate against the US dollar depreciated substantially from 2018 Q2 onwards and reached 6.9734 at the end of October. Afterwards, owing to market expectations for a slower pace of the Fed's rate hikes, the renminbi turned to appreciate against the US dollar and stood at 6.6858 at the end of December; however, it still depreciated by 5.15% year on year. In the beginning of 2019, the renminbi saw a continual appreciation against the US dollar and the exchange rate registered 6.7202 at the end of March (Chart 2.13). It turned to depreciate in early May.

The increment in aggregate financing to the real economy moderated slightly, but NPLs of banks elevated

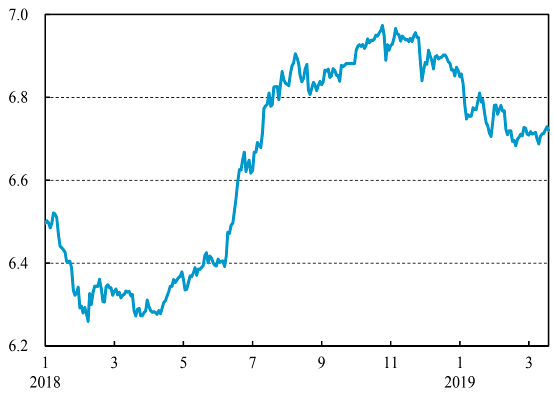
In 2018, against a backdrop of the implementation of sound monetary policies by the PBC, the annual growth rate of broad money supply M2 leveled off at 8.1%. Meanwhile, the increment in aggregate financing to the real economy slightly decreased to RMB19.3 trillion compared to a year earlier. Among them, the increment in off-balance sheet credit significantly declined, while bank loans increased owing to more stringent supervision on shadow banking (Chart 2.14). The annual growth rate of the outstanding amount continued its upward trajectory, rising by 9.8% to RMB200.8 trillion from a year earlier.

Chart 2.12 Shanghai Stock Exchange Composite index



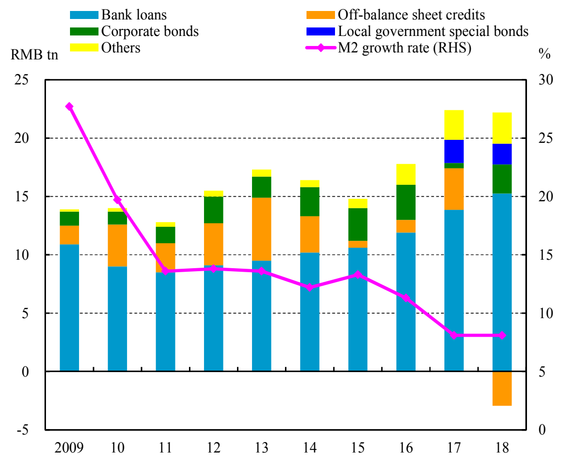
Source: Bloomberg.

Chart 2.13 RMB/USD exchange rate



Source: CBC.

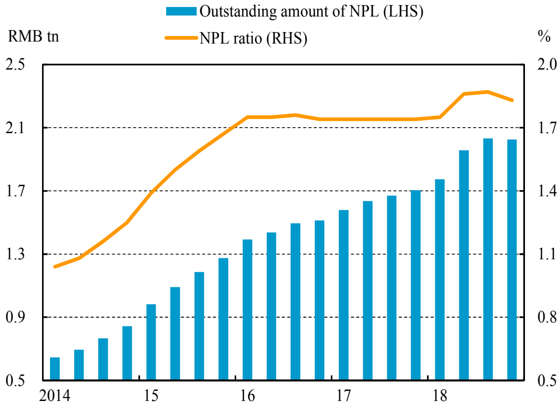
Chart 2.14 Aggregate financing to the real economy and annual growth rate of M2 in Mainland China



Source: PBC.

At the end of 2018, the NPLs of commercial banks in Mainland China stood at RMB2.03 trillion, an annual increase of 18.74%, while the NPL ratio significantly rose to 1.83% (Chart 2.15). Additionally, the outstanding amount of special-mention loans also rose to RMB3.46 trillion. In sum, the outstanding amount of classified assets expanded to RMB5.49 trillion.

Chart 2.15 NPL of Mainland China's commercial banks

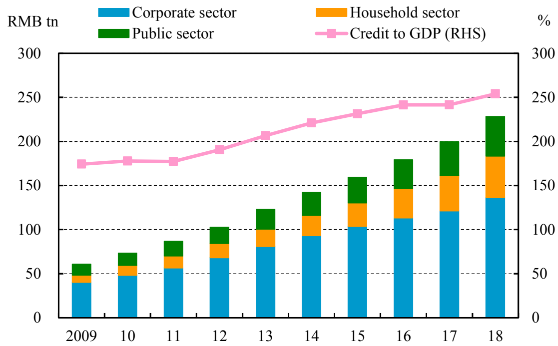


Source: China Banking and Insurance Regulatory Commission.

Mainland China's potential risks mounted with its continual debt build-up

According to the statistics of the BIS, the outstanding debt for nonfinancial sectors[18] in Mainland China has constantly increased in the last 10 years, reaching a record high of RMB223.9 trillion[19] (252.7% of GDP) at the end of September 2018 (Chart 2.16). Meanwhile, the deleveraging schedule has been delayed and the potential risks have ascended as the Chinese government has adopted a series of measures to promote steady economic growth. The analyses on each sector's debt are shown as follows.

Chart 2.16 Outstanding amount of nonfinancial debts and credit-to-GDP ratio in Mainland China



Source: BIS.

The deleveraging progress for enterprises was slower than expected, increasing the risk of corporate debt defaults

According to the statistics of the Ministry of Finance (MOF) of Mainland China, the outstanding debt for state-owned enterprises (SOEs), which is the main focus of deleveraging efforts, substantially grew to RMB115.65 trillion (128.45% of GDP) at the end of 2018. Mounting debt in SOEs could considerably affect the deleveraging schedule, inducing a surge in corporate debt defaults.[20]

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18 The nonfinancial sectors include corporate, household and public sectors.
19 Among nonfinancial sector debt, the outstanding amount of corporate sector debt registered the highest at RMB135.4 trillion (152.9% of GDP), followed by RMB45.7 trillion (51.5% of GDP) for the household sector and RMB42.8 trillion (48.3% of GDP) for the public sector.
20 The OECD warned that corporate debt repayments in Mainland China will peak in the next three years, which warrants close attention (OECD (2019), *OECD Interim Economic Outlook*, March).

With rapid growth of household mortgages, the housing bubble risk rose

According to the statistics of the PBC, personal house-purchasing loans kept hitting record highs and rose by 17.58% year on year to RBM25.75 trillion (28.60% of GDP) at the end of 2018. Moreover, household assets were highly concentrated in real estate and housing prices continued to rise, reflecting an elevated asset bubble risk in the real estate market. Given that the risk potentially transmits to the financial system, it may pose a threat to financial stability.

The potential risk of local government debt default increased

According to the statistics of the MOF of Mainland China, the outstanding amount of local government debt reached a high point of RBM18.39 trillion (20.42% of GDP) at the end of 2018, posting an increase of 11.63% year on year. Furthermore, with a serious maturity mismatch of debt, the potential default risk of local government debt elevated.

2.2 Domestic macro environment

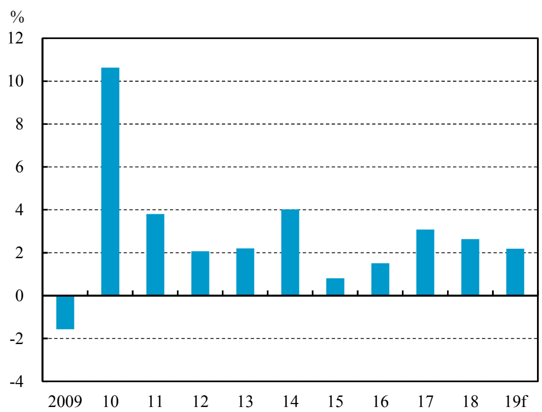
2.2.1 Domestic economic and fiscal conditions

Although the growth of exports saw a downtrend in 2018, the domestic economy grew moderately and inflation remained stable, thanks to modest momentum in private consumption and investment. Short-term external debt servicing ability remained strong on the back of a persistent surplus in the balance of payments and ample FX reserves. Although the scale of external debt slightly increased, overall external debt servicing capacity stayed robust. While the government's fiscal deficits rebounded and outstanding government public debt marginally leveled up, total government debt stayed within a manageable level.

Domestic economy grew soundly

Although the growth of Taiwan's exports experienced a slowdown in 2018, the domestic economy grew steadily, underpinned by the continual improvement of employment and modest momentum in both private consumption and investment. As a result, the annual economic growth rate in Taiwan reached 2.63%, lower than the 3.08% of the previous year (Chart 2.17).

Chart 2.17 Economic growth rate in Taiwan



Note: Figure for 2019 is forecast by CBC.
Sources: DGBAS and CBC.

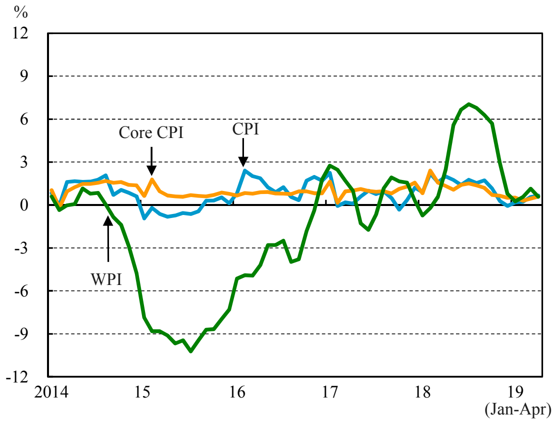
Taking a glance into 2019, the steady momentum of private consumption and the sustainable growth in private investment are expected to be the driving forces of economic growth. However, the slowdown in global demand and economic downturn in Mainland China could jeopardize Taiwan's exports. Accordingly, the Bank forecasts Taiwan's annual economic growth rate to decline to 2.13%[21] in 2019 (Chart 2.17). Moreover, since Taiwan is a small and highly open economy, the US-China trade dispute resulting in turbulence throughout the global economy and financial markets could substantially affect Taiwan's exports and economic growth. Accordingly, these factors warrant close attention (Box 1).

Domestic prices rose moderately

In 2018, affected by the rising international prices of crude oil, the annual wholesale price index (WPI) inflation rate registered 3.63%, higher than the 0.90% recorded in 2017 (Chart 2.18). The expected international prices of raw materials present a declining trend, and the DGBAS projects the annual WPI inflation rate to fall to -0.63% in 2019.[22]

The annual CPI inflation rate registered 1.35% in 2018, higher than the 0.62% of the previous year, owing to the ascending prices in fuel, cigarettes, and food away from home. Meanwhile, the core CPI inflation rate in 2018 also increased mildly and reached 1.21%, slightly higher than the 1.04% recorded in 2017 (Chart 2.18). In 2019, considering that the global prices of crude oil are expected to be lower than the previous year, along with stable domestic demand and the dissipation of effects from an earlier cigarette tax hike, the inflation outlook remains mild. Reflecting this, the Bank forecasts the annual CPI inflation rate to drop to 0.91%.[23]

Chart 2.18 Consumer and wholesale price indices (% change, yoy)



Note: Figures are measured on a year-on-year change basis.
Source: DGBAS.

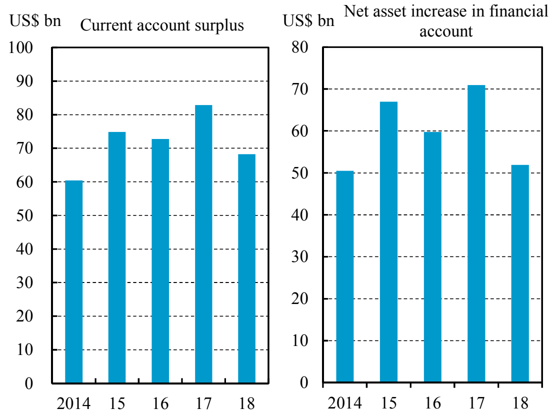
21 See Note 2.
22 The figures are based on a DGBAS press release on May 24, 2019.
23 See Note 2.

Current account displayed a sustained surplus and FX reserves stayed abundant

In 2018, the merchandise trade surplus trended down, causing the annual current account surplus to shrink to US$68.3 billion, or 11.57%[24] of annual GDP, a decrease of 17.60% compared to 2017. The financial account showed continued outflows driven by the expansion of foreign securities investments by domestic investment trust funds and insurance companies, and a reduction of investments by foreign institutional investors in Taiwan's stock markets. The annual financial account posted a net asset increase of US$51.9 billion (Chart 2.19). On account of a simultaneous fall in the current account surplus and a net asset increase in the financial account, the balance of payments surplus stayed at US$12.5 billion in 2018.

With the accumulation of earnings from portfolio investment operations of FX reserve assets, FX reserves climbed to US$461.8 billion at the end of 2018, rising by 2.28% from a year earlier. At the end of April 2019, the amount of FX reserves steadily increased to US$464.8 billion.

Chart 2.19 Current account surplus and net asset increase in financial account

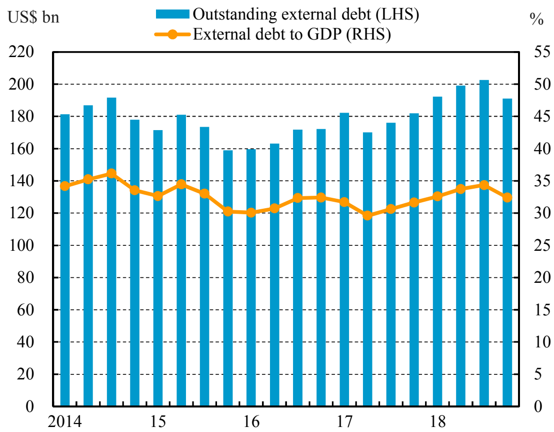


Source: CBC.

Scale of external debt expanded slightly, while debt-servicing capacity remained strong

As a result of the increase in the short-term external debt of the banking sector, Taiwan's external debt[25] showed a constantly upward trend in the first three quarters of 2018, but fell to US$191.2 billion at the end of the year (Chart 2.20), still increasing by 5.07% compared to a year earlier. Among them, private external debt

Chart 2.20 External debt servicing capacity



Sources: CBC and DGBAS.

[24] For the ratio of current account deficit to GDP, the cutoff point for risk is 3%. A country in which the reading is greater than 3% and has risen by at least 5 percentage points from the previous year is considered to be relatively high risk.

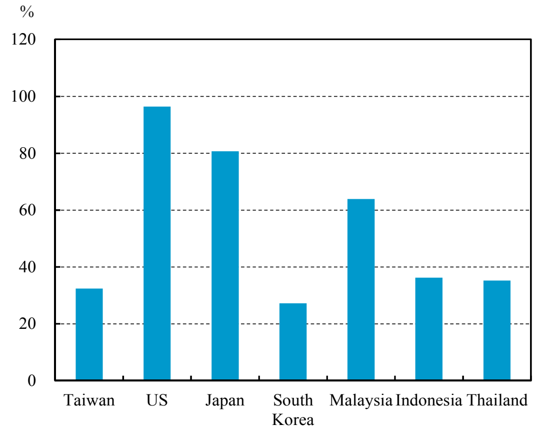
[25] External debt refers to the combined amount owed to foreign parties by Taiwan's public and private sectors, including long-term debt with a maturity of greater than one year and short-term debt with a maturity of one year or less. The term "public external debt" refers to debt that the public sector 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.

registered US$191.0 billion, but public external debt only reached US$0.2 billion. Although the scale of external debt expanded slightly, Taiwan's capacity to meet external debt was still better than internationally recognized minimum levels.[26]

Compared to the US and neighboring Asian countries, Taiwan's external debt reached 32.40% of annual GDP at the end of 2018, slightly higher than that in South Korea, but much lower than those in the US, Japan, and Malaysia (Chart 2.21).

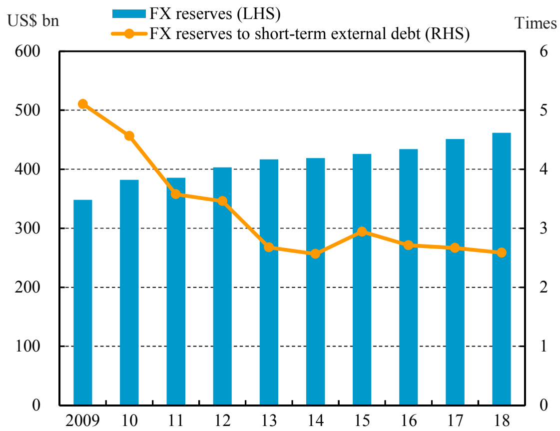
Furthermore, at the end of 2018, the ratio of FX reserves to short-term external debt fell to 2.59 times owing to a greater rise in short-term external debt. Nevertheless, it was much higher than internationally recognized minimum levels,[27] implying that Taiwan's FX reserves have a robust capacity to meet payment obligations (Chart 2.22).

Chart 2.21 External debt to GDP in selected countries



Note: Figures are as of the end of 2018.
Source: CEIC.

Chart 2.22 Short-term external debt servicing capacity



Source: CBC.

Fiscal deficits rebounded and government debt marginally increased

In 2018, the government actively promoted the *National Development Plan* and economic enhancement measures to speed up industrial innovation and structural transformation, leading to an expansion of annual expenditures for both central and local governments. As a result, fiscal deficits rebounded to NT$234.5 billion or 1.32%[28] of annual GDP (Chart 2.23).

At the end of 2018, the outstanding public debt at all levels of government[29] slightly increased to NT$6.30 trillion. However, the ratio of total public debt to annual GDP

[26] 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.
[27] 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.
[28] See Note 4.
[29] 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.

slightly fell to 35.38%[30] owing to a greater rise in GDP growth (Chart 2.24). In general, total government debt stayed within a manageable level.

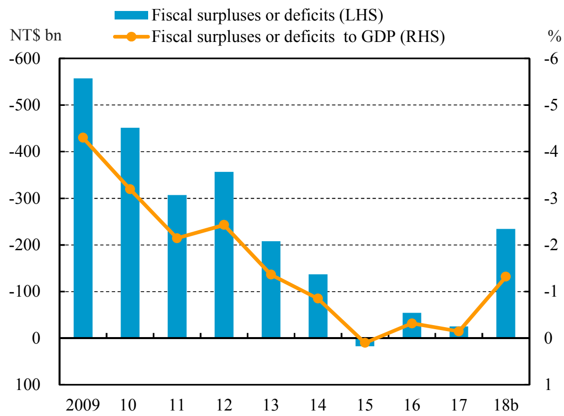
2.2.2 Corporate sector[31]

In 2018, profitability of TWSE-listed companies abated marginally, while that of OTC-listed companies enhanced markedly. Overall, listed companies saw slightly decreasing financial leverage ratios and adequate short-term debt servicing capacity. The NPL ratio for corporate loans granted by financial institutions as of the end of the year hit a record low in recent years, indicating sound credit quality of corporate loans. Nevertheless, the prospects for the corporate sector's future profits remain challenging.

Profitability of TWSE-listed companies abated marginally, while that of OTC-listed companies enhanced markedly

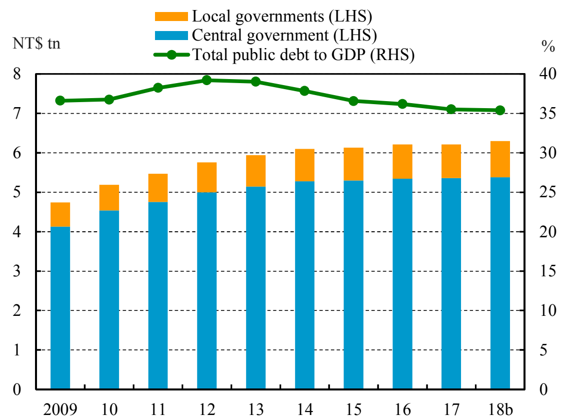
In 2018, profitability of TWSE-listed companies abated marginally as their average ROE declined to 14.92% from the 15.81% of the previous year. The main reason was that the profitability of the optoelectronics industry declined significantly, affected by the expansion of manufacturing capacity and the price cuts to reduce inventory by the red supply chain rivals in Mainland China. As for OTC-listed companies, the persistently strong demand for silicon wafers and passive components, coupled

Chart 2.23 Fiscal deficits



Notes: 1. Fiscal position data include those of central and local governments.
2. Data of fiscal deficits are annual figures. Figures for 2018 are final accounts and budgets for the central government and local governments, respectively.
Sources: MOF and DGBAS.

Chart 2.24 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 2018 are preliminary final accounts and budgets for the central government and local governments, respectively.
Sources: MOF and DGBAS.

[30] See Note 5.
[31] Corporate sector only includes the non-financial industrial data of TWSE-listed companies and OTC-listed companies. Throughout this section, figures for listed companies are consolidated financial data; prior to 2011, the data 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.

with successive developments and the launch of new biotech drugs, prompted the profitability of related industries. As a result, profitability of OTC-listed companies enhanced markedly with their average ROE soaring to 13.02% from the 10.44% of the previous year (Chart 2.25).

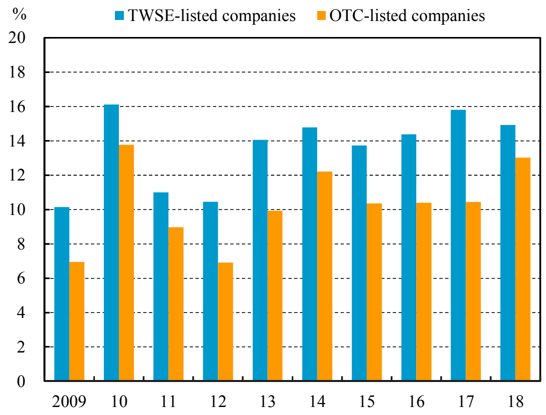
Leverage ratios decreased slightly for listed companies

At the end of 2018, the average leverage ratio for TWSE-listed companies and OTC-listed companies fell marginally to 99.48% and 82.36%, respectively (Chart 2.26). Leverage ratios moderated mainly because listed companies continued to generate earnings from operations which brought about a greater increase in equity.

Short-term debt servicing capacity for listed companies held at an adequate level

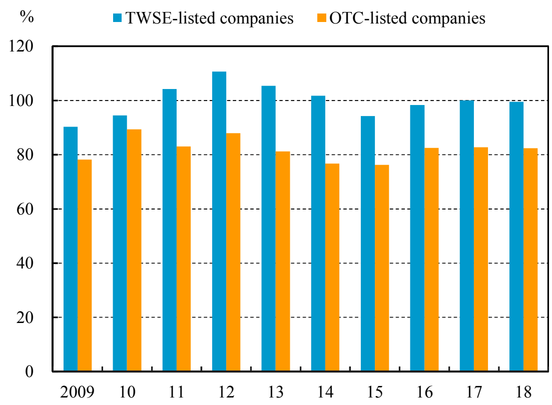
The current ratio for TWSE-listed companies rose to 154.61% at the end of 2018, indicating that their current assets were able to better meet short-term obligations. Although their interest coverage ratio dropped to 11.18 over the same period, the capacity to meet their interest obligations with operating earnings remained satisfactory. Meanwhile, the current ratio and the interest coverage ratio for OTC-listed companies elevated to 183.74% and 16.23, respectively, demonstrating a considerable enhancement in their short-term debt servicing

Chart 2.25 Return on equity in corporate sector



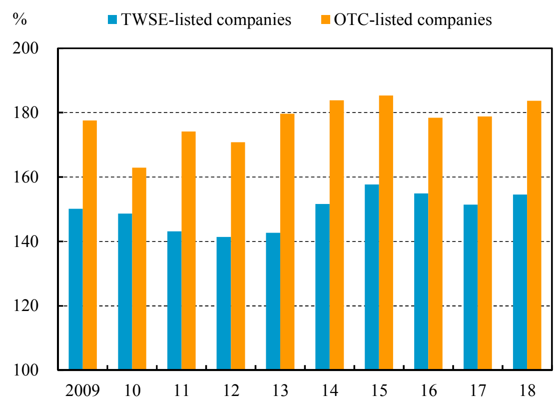
Note: Return on equity = net income before interest and tax/average equity.
Source: TEJ.

Chart 2.26 Leverage ratios in corporate sector



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

Chart 2.27 Current ratios in corporate sector



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

capacity (Chart 2.27 and 2.28). For listed companies as a whole, short-term debt servicing capacity remained at an adequate level in 2018.

Credit quality of corporate[32] loans strengthened

At the end of 2018, the NPL ratio for corporate loans from financial institutions fell to a 10-year-low of 0.30%. The overall credit quality for the corporate sector strengthened (Chart 2.29).

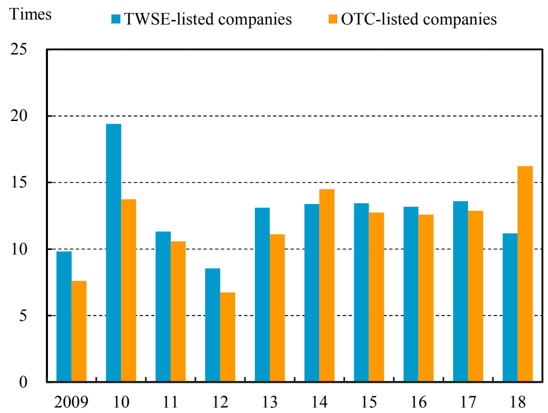
Prospects for corporate sector's future operations face challenges

The DGBAS predicts the growth rate of domestic private real investment to continue increasing to 4.48% in 2019, which should help enhance the growth momentum of corporate profits in the future (Chart 2.30). However, in view of the fading momentum in global economic growth, an economic slowdown in Mainland China, uncertainties over US-China trade talks, and the Brexit deadlock, the outlook for future operations of corporations in Taiwan remains challenging.

2.2.3 Household sector

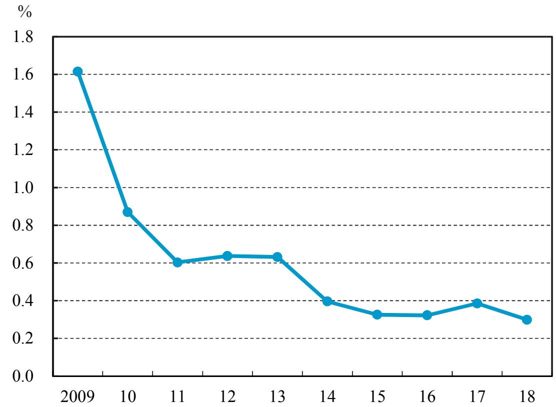
In 2018, the balance of total household borrowing expanded slowly and the overall credit quality of household borrowing improved. The household debt burden rose, yet the falling unemployment rate and growing regular earnings should help underpin the debt servicing capacity of households.

Chart 2.28 Interest coverage ratios in corporate sector



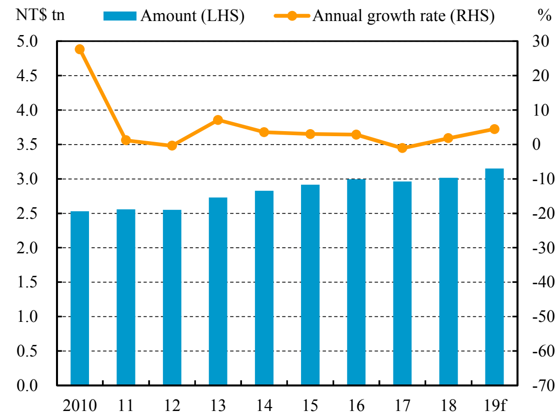
Note: Interest coverage ratio = income before interest and tax/interest expenses.
Source: TEJ.

Chart 2.29 NPL ratio of corporate loans



Source: JCIC.

Chart 2.30 Private investment



Notes: 1. Total private investment and growth rate are expressed in real terms.
2. Figures for 2019 are forecast by DGBAS.
Source: DGBAS (2019/5/24).

[32] The data for the corporate sector herein are on the basis of listed and unlisted corporations provided by the Joint Credit Information Center (JCIC).

Household borrowing growth slowed slightly

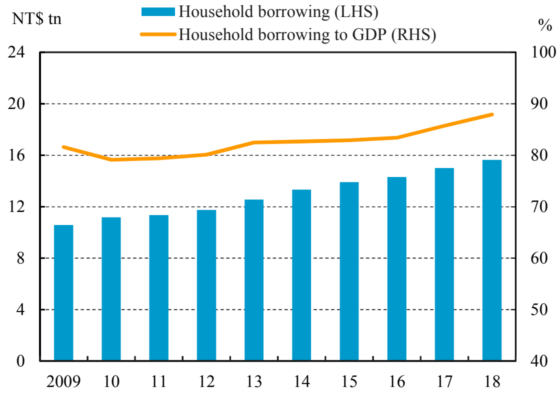
At the end of 2018, total household borrowing expanded and reached NT$15.64 trillion, equivalent to 87.89% of annual GDP (Chart 2.31). The largest share of household borrowing went for the purchase of real estate (63.08%), followed by current operation loans[33] (34.31%).

In 2018, the annual growth rate of total household borrowing decreased to 4.24%, and was mainly contributed to by an increase in the purchase of real estate and current operation loans. Compared to other countries, the growth of total household borrowing and total household borrowing as a percentage of GDP in Taiwan were both lower than those in South Korea and Australia, but higher than those in the US and Japan (Chart 2.32).

Household debt burden rose moderately

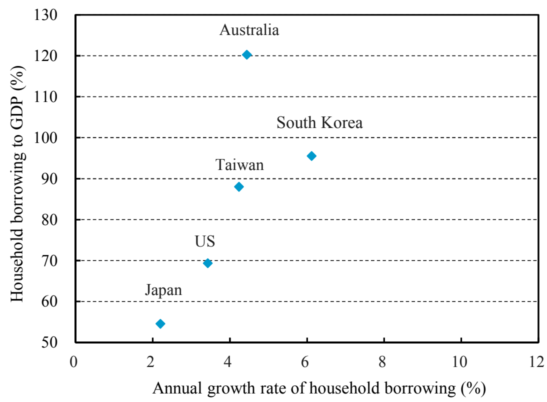
As total household borrowing grew at a faster pace than disposable income in 2018, the ratio of household borrowing to total disposable income[34] rose to 1.44 at the end of the year, reflecting a moderate rise in the household debt burden. Moreover, owing to the increase in loans for current operations, which typically have a shorter term, the debt servicing ratio also elevated to 48.15% (Chart 2.33), thereby reflecting a slight build-up of short-term

Chart 2.31 Household borrowing to GDP



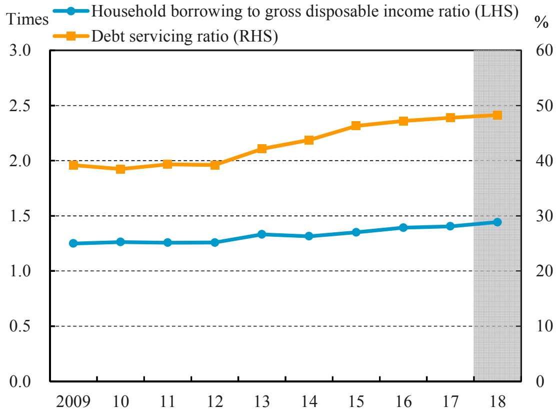
Sources: CBC, JCIC and DGBAS.

Chart 2.32 Household indebtedness in selected countries



Note: Figures are as of the end of 2018.
Sources: Fed, BOJ, BOK, ABS, IMF, DGBAS, CBC and JCIC.

Chart 2.33 Household indebtedness and debt servicing ratio



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

[33] The term "current operation loans" includes outstanding debit card loans.
[34] Total disposable income = disposable income + rental expenses + interest expenses.

household debt servicing pressure. Nevertheless, prolonged low interest rates on domestic loans in recent years, together with the falling domestic unemployment rate and improving regular earnings in the industrial and service sectors, should help sustain the debt servicing capacity of households (Chart 2.34).

Credit quality of household borrowing improved

In 2018, the NPL ratios of household borrowing and loans to purchase real estate decreased to 0.26% and 0.21%, respectively, at the end of the year. Credit quality of household borrowing improved (Chart 2.35).

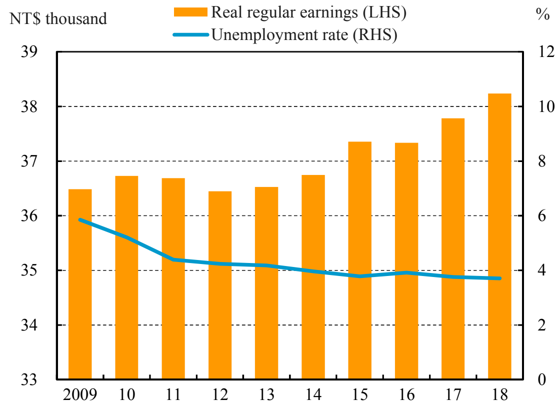
2.2.4 Real estate market

Trading volume in the housing market grew mildly and house prices rose slightly in 2018. In addition, housing loans and construction loans increased, and the mortgage burden moderately decreased but remained near its peak. Building ownership transfers for transaction continued to grow moderately from January to April 2019; however, there are very large regional differences in housing markets between northern and southern cities.

Trading volume in the real estate market grew mildly

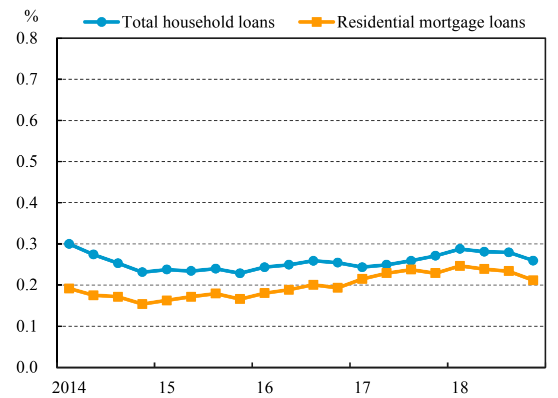
Due to the steady expansion of the domestic economy, in 2018 Q1, the total number of building ownership transfers for transaction increased by 10.63% year on year. However, the annual

Chart 2.34 Unemployment rate and regular earnings



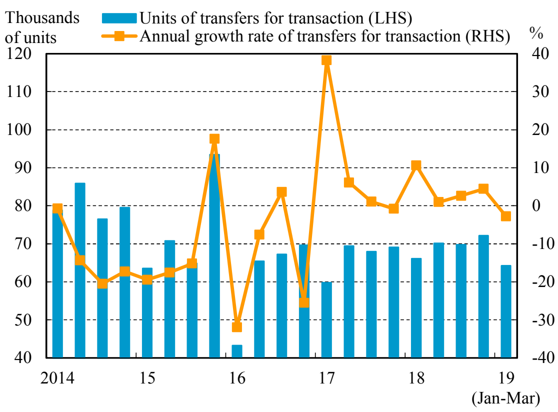
Sources: DGBAS and Ministry of Labor.

Chart 2.35 NPL ratios of household borrowing



Source: JCIC.

Chart 2.36 Building transfers for transaction and annual growth rate

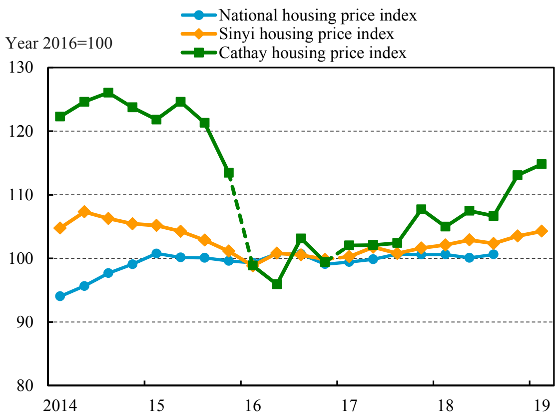


Source: Monthly Bulletin of Interior Statistics, MOI.

growth rate decreased to 0.97% in Q2 as a result of a higher base period in the previous year stemming from an improved housing market. The annual growth rate gradually increased in Q3 and rose to 4.46% in Q4, supported by a buoyant housing market owing to an increase in the delivery of new buildings as well as the elimination of uncertainties surrounding domestic elections (Chart 2.36).

For the period of January to April 2019, the total number of building ownership transfers for transaction recorded an annual growth rate of 4.30%. However, large differences exist between housing markets in northern and southern cities. The total number of building ownership transfers for transaction decreased by 4.21% year on year in Taipei, while that of Kaohsiung increased by 23.55% from a year earlier, underpinned by boosted investor confidence and an increase in the delivery of new buildings.

Chart 2.37 House price indices



Notes: 1. The Cathay housing price index adjusted the possible transaction price model from 2016 Q1. In 2018 Q1, the model's parameters were revised, and from January 2017 the opening price, transaction price, and index of each quarter were recalculated.
2. For comparison purposes, all four indices use the same base year of 2016 (2016 average = 100).

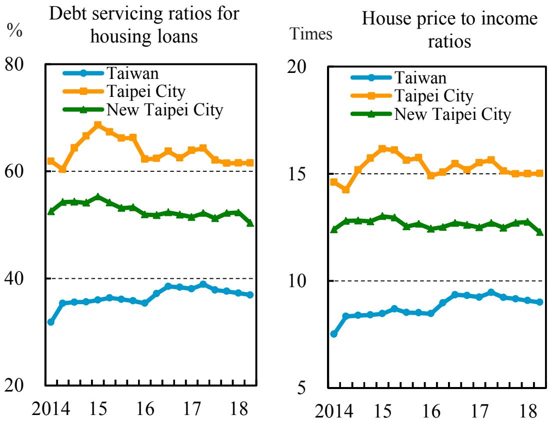
Sources: MOI, Cathay Real Estate, and Sinyi Real Estate Inc.

Real estate prices moderately increased

The national housing price index shows a relatively stable pattern from 2016 onwards. As of the end of 2018 Q3, the index registered 100.63, decreasing by 0.06% year on year (Chart 2.37).

In the second half of 2018, the Sinyi housing price index rose gradually. In 2019 Q1, the index roughly returned to the level of 2015 Q2. Owing to new residential building sales picking up as the housing market gained momentum, the Cathay housing price index increased significantly in 2018 Q4. In 2019 Q1, the index continued to rise (Chart 2.37), mainly driven by a sharp increase in prices of new residential buildings both in Tainan City and Kaohsiung City.

Chart 2.38 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.
3. The latest data are as of 2018 Q2.

Source: Housing Price Affordability Indicator Statistics, Construction and Planning Agency of the MOI.

Mortgage burden stayed high though decreased slightly

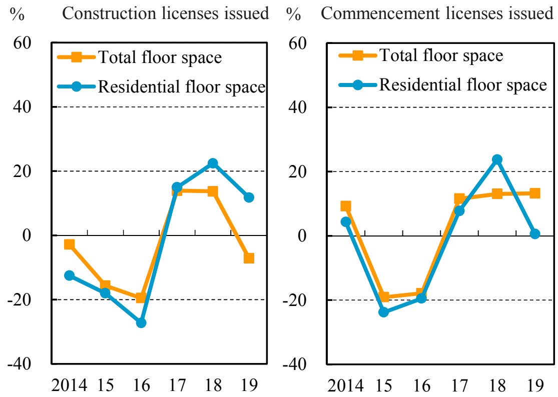
The debt servicing ratio for housing loans decreased gradually from its highest point of 38.90% in 2017 Q2 and then fell to 36.90% in 2018 Q2 (Chart 2.38). Similarly, the house price to income ratio trended up to the highest point of 9.46 in 2017 Q2 before moderately dropping to 9.00 in 2018 Q2 (Chart 2.38). The mortgage burden saw a slight decrease but still stayed at a high level. Among the six metropolitan areas, Tainan City had the lowest burden, while the debt servicing ratio for housing loans and the house price to income ratio in Taipei City registered 61.56% and 15.01, respectively (Chart 2.38), showing the heaviest mortgage burden.

Commencement licenses issued expanded, and pressure from the expansion of unsold new residential properties might increase

In 2018, with the housing market gaining momentum, a rise in properties construction projects, as well as increasing demand from expansion and construction of plants, the total floor space of commencement licenses issued rose by 13.08% year on year, with residential properties increasing by 23.76%. The main reasons were that construction companies' confidence in investing in the real estate market was restored as well as continual commencement of social housing and industrial and commercial buildings construction. In 2019 Q1, the total floor space of commencement licenses issued successively increased by 13.22% year on year, with residential properties increasing by 0.57% (Chart 2.39).

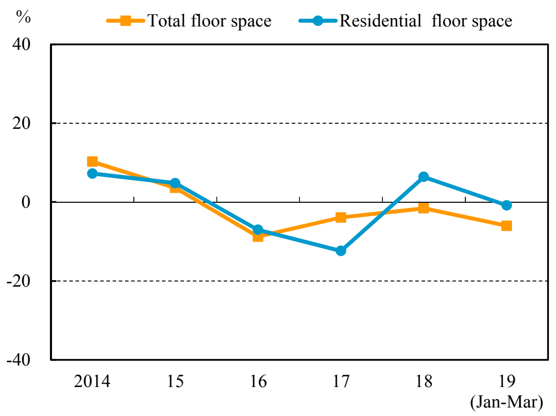
Owing to the gradual completion of residential properties construction projects in recent years, the annual growth rate of the total floor space of usage licenses issued rebounded to -1.57% year on year in 2018, with residential properties turning to a positive 6.40%. In 2019 Q1, the total

Chart 2.39 Annual growth rates of floor space of construction and commencement licenses issued



Source: Monthly Bulletin of Interior Statistics, MOI.

Chart 2.40 Annual growth rates of floor space of usage licenses issued

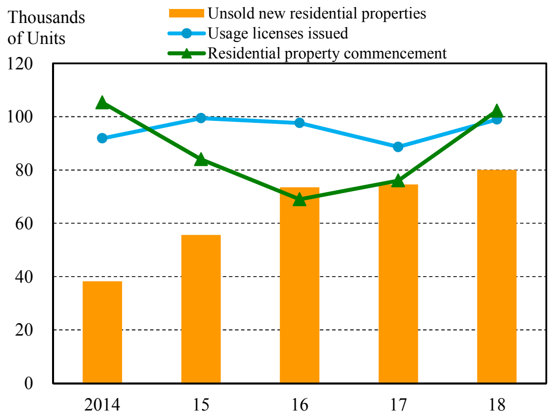


Source: Monthly Bulletin of Interior Statistics, MOI.

floor space decreased at an annual rate of -6.01%, with residential properties also falling to -0.82% year on year (Chart 2.40).

In 2018, usage licenses issued for residential properties amounted to 99 thousand units, an annual increase of 10.3 thousand units, and registered 21.8 thousand units in 2019 Q1. Meanwhile, new residential buildings commencement reached 102.2 thousand units, an annual increase of 26.2 thousand units in 2018 (Chart 2.41); the figure recorded 22.2 thousand units in 2019 Q1. However, given that prices of new residential buildings remained high and demand for house purchases for self-use did not expand significantly, the expansion of unsold new residential properties remained a concern.

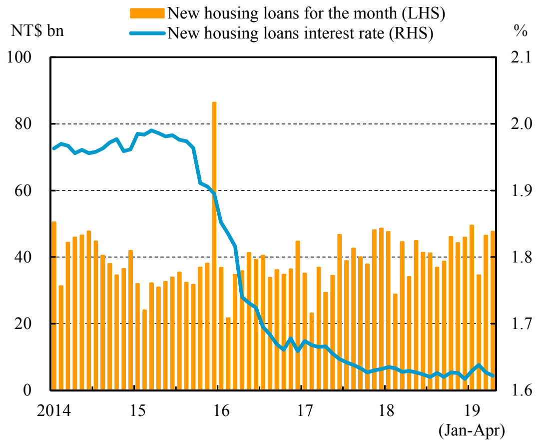
Chart 2.41 Unsold new residential properties, usage licenses issued and commencement for residential properties



Note: Unsold new residential properties includes residential properties built within the last five years, still maintaining the first registration and having the possibility of being for sale. The data are currently published to 2018 Q2.
Source: Monthly Bulletin of Interior Statistics, Real estate information platform, MOI.

Real estate loans grew as mortgage interest rates continued at a lower level

Chart 2.42 New housing loans – amount and interest rate



Source: CBC.

With transactions in the housing market expanding, the total new housing loans granted by the top five banks registered NT$494.1 billion in 2018, increasing by 7.09% year on year. In the first four months of 2019, the figure increased by 14.92% year on year. In 2018, the interest rate for new housing loans remained at a lower level, and dropped to the lowest point of 1.617% in December. Afterwards, the interest rate rebounded slightly and registered 1.622% in April 2019 (Chart 2.42).

From 2018 onwards, mortgage loans were mainly for self-use house purchases. The sum of outstanding loans for house purchases and house refurbishments granted by banks[35] maintained steady growth, registering an annual growth rate of 4.65% at of the end of April 2019. Meanwhile, owing to construction companies increasing land purchases and construction projects,

[35] Refers to domestic banks and the local branches of foreign and Mainland China's banks.

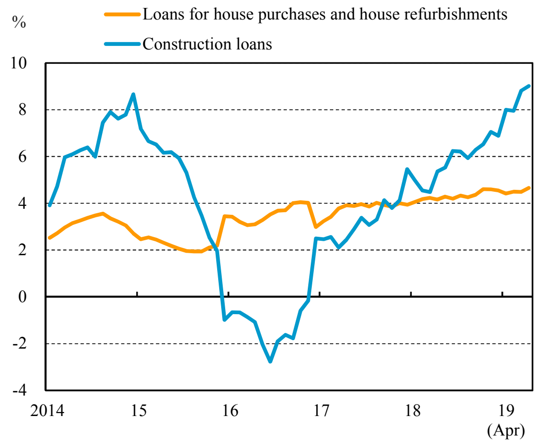
outstanding construction loans continued to expand from April 2018 onwards and reached an annual growth rate of 9.01% at the end of April 2019 (Chart 2.43).

Banks assumed self-discipline on real estate loans and risk management remained satisfactory

The Bank repealed most rules imposed on housing loans and land collateralized loans in March 2016, except for high-value housing loans. At the same time, financial institutions were required to strengthen self-discipline on mortgage-related credit risk. In 2018, the average loan-to-value ratio for new housing loans registered 71.10%, slightly higher than that in 2017. Moreover, the average loan-to-value ratio for high-value housing loans decreased to 57.04% and kept falling to 56.68% in 2019 Q1 (Chart 2.44).

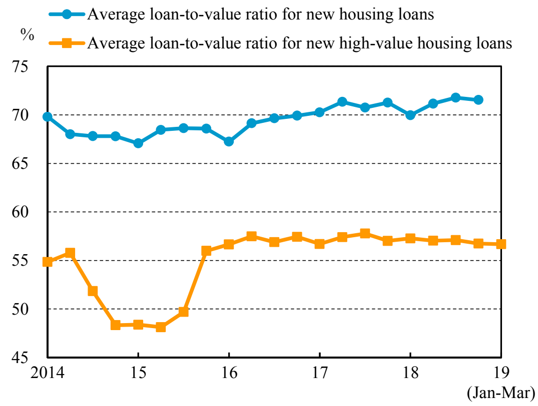
In the second half of 2018, the NPL ratios of housing loans and construction loans decreased moderately. The NPL ratios of those loans registered 0.21% and 0.19%, respectively, at the end of March 2019, both lower than the overall 0.25% NPL ratio of loans granted by domestic banks. Reflecting this, the risk management capability of domestic banks to cope with potential mortgage loan losses remained satisfactory.

Chart 2.43 Annual growth rates of real estate loans



Source: CBC.

Chart 2.44 Average loan-to-value ratios for new housing loans



Notes: 1. Figures are calculated by using the loan-to-value ratios for new housing loans granted by all financial institutions.
2. Figures are calculated by using the loan-to-value ratios for new high-value housing loans granted by all banks.
Sources: JCIC and CBC.

Box 1
The impacts of the US-China trade tensions on Taiwan's economy and finance

Since US President Donald Trump assumed office, the objectives of foreign economic and trade policies in the US have been emphasized as "fair trade" and "America first" through gradual strengthening of trade protection measures aimed at protecting benefits for American citizens. On the other hand, as a beneficiary of globalization and a rising power, Mainland China actively promoted the "Made in China 2025" plan that provoked a heightened sense of alertness among market participants in the US and became the main reason behind the US-China trade dispute.

From March 2018 onwards, following several rounds of trade negotiations, the US and Mainland China successively raised a series of concrete and tough bilateral trade sanctions and retaliations. In early May 2019, however, the two economies still failed to reach an agreement and instead announced tariff hikes on each other's products, further escalating the trade dispute. It is generally believed that even if US-China trade negotiations reach an agreement, the great-power competition between the US and Mainland China is likely to continue because of their inherent conflicts of interest. Considering that the US and Mainland China both are important trading partners of Taiwan, it could undermine Taiwan's economic growth and financial stability if the trade dispute remains unresolved. This box discusses the impacts of the US-China trade conflicts on Taiwan's economic and financial conditions, and introduces the preemptive measures which were launched by the government.

1. The impacts on Taiwan's economic and financial conditions

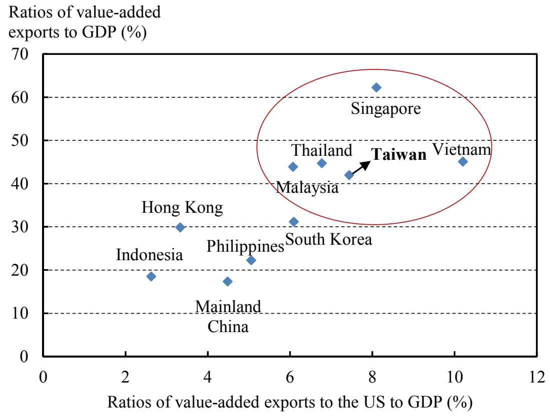
1.1 Economic influences

The US-China trade dispute has a certain degree of impact on Taiwan's economy which are shown below:

1.1.1 Taiwan is highly involved in global value chains and prone to be affected by the trade dispute between the large countries

Taiwan is a small and highly open economy which registered a high engagement of 56.8%[1] in global value chains and a higher

Chart B1.1 Value-added exports of major Asian countries



Note: Calculations are based on the latest published data of 2015.
Sources: IMF and OECD-WTO TiVA.

value-added exports to the US to GDP ratio than other Asian countries such as South Korea and Mainland China[2] (Chart B1.1). Considering that the US and Mainland China are both major export markets of Taiwan,[3] the trade dispute could jeopardize Taiwan's commodity exports and economic growth if protectionist trade policies are implemented by these economies. Moreover, spillover risks induced by a potential economic "hard landing" in Mainland China in the future could lead to a greater impact on Taiwan's economy.

1.1.2 Although conciliation between the US and Mainland China could avoid the intensification of the trade dispute, Taiwan still should prudently manage the potential order-transfer effect and the rearrangement of supply chains

If the US-China trade dispute can reach an agreement as soon as possible, it would be beneficial to global trade and economic growth, and also helpful to Taiwan's exports. However, on account of high uncertainties surrounding the conditions of a US-China trade agreement, if Mainland China promises to purchase more American products in the future, it might lead to a crowding-out effect on the commodities exported from Taiwan to Mainland China. In addition, if the US and Mainland China engage in long-term political wrestling, it could boost the transfer of the global supply chain hub from Mainland China to neighboring countries.

1.2 Financial influences

According to a BIS report[4], when the market showed signs of mounting trade tensions, it not only caused negative impacts on global stock markets, but also induced emerging market currencies, especially the renminbi, to turn to depreciate against the US dollar. However, the impacts on Taiwan's stock and FX markets were relatively mild.

1.2.1 Global stock markets fell in 2018, but Taiwan's stock markets remained relatively stable

In 2018, most Asian economies saw drops in their stock markets. Above all, Mainland China registered the sharpest decrease (-24.59%) owing to the direct impact of the US-China trade dispute. However, the decline in the Taiwan Stock Exchange Weighted Index (-8.60%) was more moderate than those in the stock indices of other Asian economies such as South Korea (-17.28%) and Hong Kong (-13.61%).

1.2.2 The rising trade dispute speeded up international capital movements, yet the impact on Taiwan's FX market remained relatively limited

The escalating US-China trade dispute could cause capital flight to safety, such as US government bonds, gold, and Japanese yen, and in turn, accelerate global capital movements and undermine financial market stability. However, thanks to the strong balance of payments, a sustained current account surplus, ample FX reserves, and sufficient liquidity of the financial system in Taiwan, the capital outflow-bearing capacity remained relatively sound. The NT dollar against the US dollar depreciated by 2.88% in 2018, lower than the 5.15% of the renminbi and the 4.05% of the Korean won, reflecting that the impact of the US-China trade dispute on Taiwan's FX market remained relatively limited.

2. Taiwan's preemptive measures

2.1 Economic and taxation measures

In response to the possible order-transfer effect and the rearrangement of supply chains, the Executive Yuan consecutively implemented several supporting measures, including: (1) strengthening the contribution of research and development in production to promote industrial upgrades; (2) promptly executing domestic demand development plans, such as energy transition and urban renewal, to foster Taiwanese enterprises to invest back in Taiwan; (3) carrying out the "five plus two" innovative industries plan; and (4) actively promoting multilateral economic and trade cooperation plans.[5]

Moreover, in order to guide Taiwanese firms to repatriate their overseas funds into domestic industries and financial markets in Taiwan, the Executive Yuan in April 2019 passed the *Draft Act on the Use and Taxation on the Inward Remittance of Overseas Funds*. This draft act allows individuals' inward remittance of overseas funds as well as the profit-seeking enterprises' allocated investment income which are remitted back from their offshore invested companies to apply for applicable tax preferences according to the regulation.[6] Except for the compliance with the *Money Laundering Prevention Act* and the *Counter-Terrorism Financing Act*, the usages of overseas funds remitted back by Taiwanese enterprises shall be properly managed so as to prevent the negative influences of capital inflows on the capital and financial markets in Taiwan.

2.2 Financial measures

2.2.1 The FSC's preemptive measures

The FSC will continue to pay close attention to the changes in international financial conditions. If there is any significant event affecting Taiwan's economic development or investor confidence, the FSC will adopt necessary preemptive measures to stabilize the domestic stock and futures markets.

The FSC has established a mechanism monitoring the exposures of domestic banks to

Mainland China. At the end of 2018, the exposures of all domestic banks to Mainland China stood at NT$1.78 trillion, or 53% of banks' net worth, lower than the statutory limit of 100% and within a manageable range. Moreover, domestic banks are required to meet the requirement that minimum loan loss provisions and guaranteed reserves shall be at least 1.50% of the outstanding credit to customers in Mainland China so as to reinforce their risk-bearing capacity.

2.2.2 The Bank's preemptive measures

(1) The Bank will closely monitor the new developments of the US-China trade dispute. If the dispute induces rapid movements of international capital, leading 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 and provide markets with sufficient liquidity to support economic activity.

(2) The Bank will continue to monitor the changes in economic and financial conditions in Mainland China, and the exposures of domestic banks to it. Furthermore, the Bank will contact the FSC to deal with any abnormal situation if necessary.

3. Conclusions

If the US-China trade dispute escalates, it could bring about seriously negative impacts on global trade momentum. The trade dispute heightens global economic and financial uncertainty, which not only has protracted impacts on the economies of the US and Mainland China, but also exacerbates volatilities in international financial markets. Nevertheless, on the back of the close attention and preemptive measures undertaken by the relevant governmental agencies, the impact of the trade dispute on Taiwan could be mitigated.

Notes: 1. The figure is calculated by using published data of December 2018 from OECD-WTO TiVA.

2. Based on the latest value-added exports data of 2015 from OECD-WTO TiVA, Taiwan, South Korea and Malaysia not only highly directly exported to the US, but also indirectly exported to the US through Mainland China. Therefore, the impacts of the US-China trade dispute on the above-mentioned countries were higher than those on other emerging countries.

3. Based on the exports data of Taiwan in 2018, Taiwan's exports to the US and Mainland China accounted for 12% and 41%, respectively.

4. BIS (2018), *BIS Quarterly Review,* September.

5. BOFT (2018), *The Development of International Trade in the Republic of China (Taiwan) 2018-2019*, August.

6. Among the inward remittance of overseas funds, 5% of remitted funds can be used freely, but cannot be used for the acquisition of real estate; 25% shall be engaged in financial investments

through trust accounts or securities discretionary accounts. The remaining remitted funds can be used in substantive investments and directly invested in the important policy-focused industries through domestic venture capital investment or private equity funds. Within the first year and the second year from the date of the implementation of this Act, the applicable tax rates of inward remittance of overseas funds will be 8% and 10%, respectively. Furthermore, after the investment is completed within the expiration date, an application for a refund of 50% of the tax amount may be submitted to the tax authorities; in other words, the tax rates will be 4% and 5%, respectively.

III. Financial system assessment

3.1 Financial markets

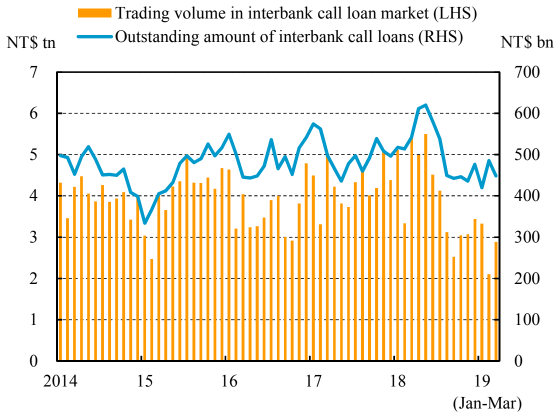
With respect to money and bond markets in 2018, the interbank call loan market and the primary bill market contracted after expanding. The outstanding amount of bond issuance continued escalating, while the turnover rate of outright transactions in the secondary bond market decreased and hit a new low. In the same period, short-term market rates remained at a low level, while long-term rates fluctuated with a downward trend. As for stock markets, stock prices remained high and fluctuated before trending downward; however, they rebounded markedly in 2019 Q1. In the FX market, the NT dollar exchange rate against the US dollar fluctuated with a downward trend, and its volatility remained relatively stable.

3.1.1 Money and bond markets

Interbank call loan market contracted after expanding

In the first half of 2018, the average daily outstanding amount and the trading volume of interbank call loans increased by 12.33% and 17.59% year on year, respectively. The main reason was that the proceeds from net selling of domestic securities by foreign investors weren't remitted outwards promptly and instead those funds were provided as interbank call loans by the custodian banks. Nevertheless, in the second half of 2018, money markets tightened marginally, which decreased banks' willingness to provide call loans. This, together with a decreasing turnover rate of call loans reflecting longer loan tenor, led the trading volume of interbank call loans to decrease markedly by 27.22% year on year. In 2019 Q1, the outstanding amount and the trading volume of interbank call loans continued to stay at a low level (Chart 3.1).

Chart 3.1 Interbank call loan market



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

Outstanding amount of bill issuance increased while the secondary bill market remained on an upward growth path

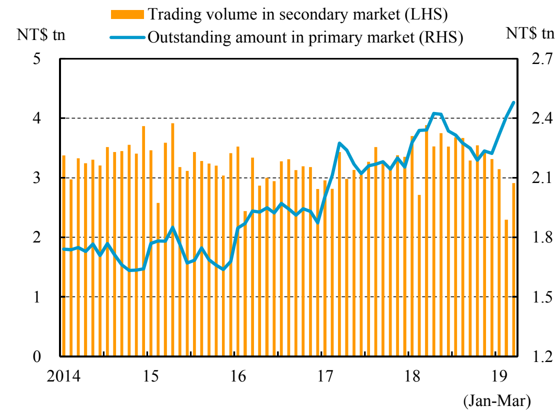
In 2018, although the outstanding amount of bill issuance in the primary market decreased after increasing, it reached NT$2.22 trillion at the end of the year, increasing by 3.18% year on year, owing to the expansion of CP issuance. In 2019 Q1, the outstanding amount of bill issuance rebounded because of increases in CP and treasury bill issuance (Chart 3.2).

Regarding the secondary bill market, the trading volume increased by 9.68% year on year and amounted to NT$42.04 trillion in 2018 owing to the expanded issuance of CP. The trading volume reversed to decrease in 2019 Q1 (Chart 3.2).

Bond issuance expanded continually, but the turnover rates of outright transactions hit a new low

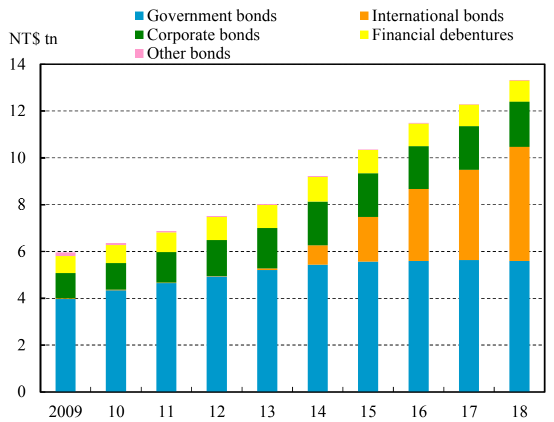
At the end of 2018, the outstanding amount of bond issuance stood at NT$13.33 trillion and increased by 8.41% year on year, mainly driven by significant growth of international bond issuance.[36] However, owing to the fact that the Legislative Yuan passed the amendemnt of *Insurance Act* that authorized FSC to impose a limit on the amount of international bond investments by insurance companies, the momentum of their issuance has cooled down from April 2018 onwards. In addition, the

Chart 3.2 Primary and secondary bill markets



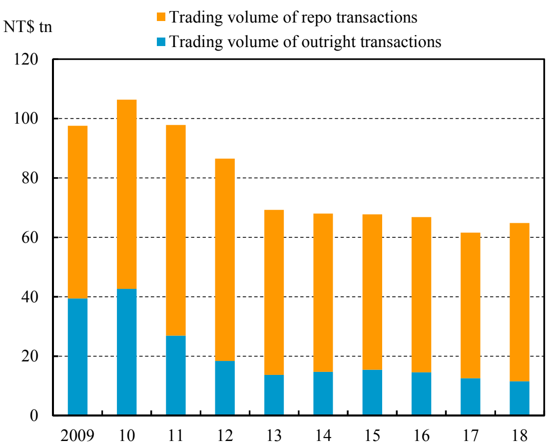
Sources: CBC and FSC.

Chart 3.3 Total amount of bonds outstanding in the primary market



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

Chart 3.4 Outright and repo transactions in the bond market



Source: CBC.

[36] International bonds refer to bonds denominated in foreign currencies and issued in Taiwan by domestic and overseas issuers.

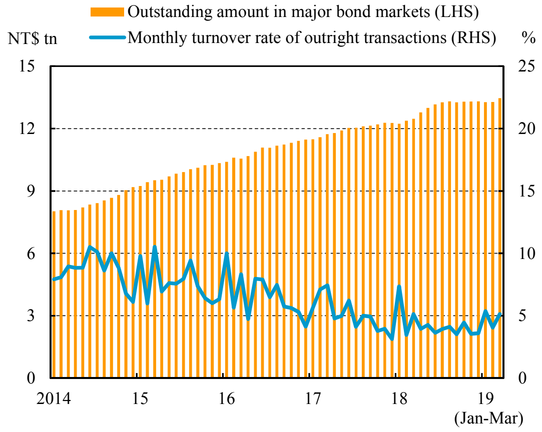
outstanding amount of corporate bond issuance increased by 3.68% year on year because interest rates stabilized at a low level, and this attracted corporates to increase bond issuance for the purpose of fund raising. In the meantime, the outstanding amount of government bond issuance decreased by 0.6% year on year because of the implementation of regular issuance and debt management by the government (Chart 3.3).

In the secondary bond market, trading volume increased by 5.26% year on year to NT$64.82 trillion (Chart 3.4), among which the trading volume of repo transactions increased, while that of outright transactions diminished further. The monthly turnover rate of major bonds in the secondary market also declined in 2018 to a record low of 4.25%, but slightly rebounded in 2019 Q1 (Chart 3.5).

Short-term market rates remained at a low level, while long-term market rates fluctuated with a downward trend

In 2018, owing to sustained ample funds in financial markets, the interbank overnight call loan rate remained at a low level (Chart 3.6). As for long-term market rates, 10-year government bond yields, driven by greater demand for hedging, dipped consecutively from June and reached a two-year low of 0.8115% on August 15 before rebounding marginally. However, from mid-December, the yields followed the downward trend of US government bond yields and fell again (Chart 3.6). Considering that 10-year government bond yields have dropped to a relatively low level recently and the possibility for them to rebound in the future increased, interest rate risks related to bond investments are still high and warrant close attention.

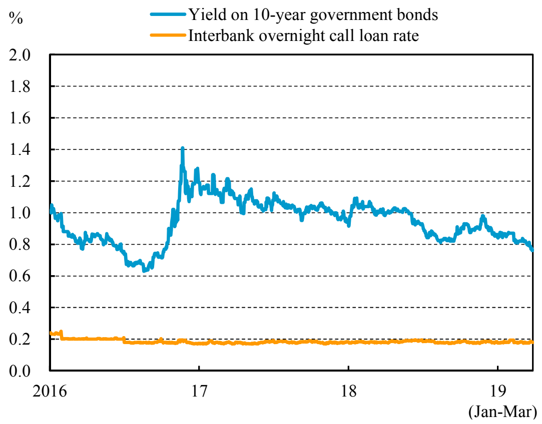
Chart 3.5 Outstanding amount in major bond markets and monthly turnover rate



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.

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



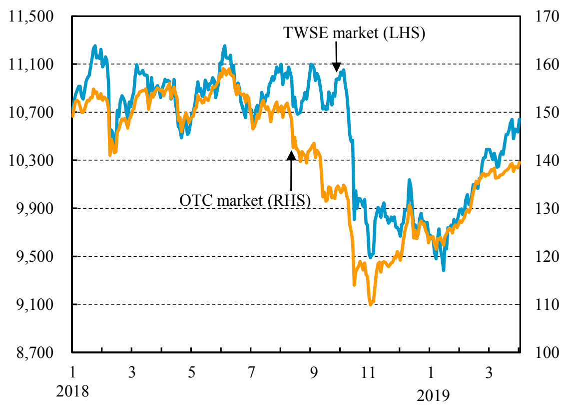
Source: Bloomberg.

3.1.2 Equity markets

Stock indices slumped after experiencing fluctuations at a high level in 2018, but rebounded strongly in 2019 Q1

The TAIEX of the TWSE market fluctuated at a high level around 10,000 in the first three quarters of 2018. However, induced by a slump in international stocks and massive net selling by foreign investors in Asian emerging markets, the TAIEX plunged below 10,000 from October onwards, and registered 9,727 at the end of the year, posting a decrease of 8.60% year on year (Chart 3.7). In 2019 Q1, the stock index rebounded and reached 10,641 at the end of March. Nevertheless, affected by intensified US-China trade tensions, international stock markets tumbled and led to a fall in the TWSE market in early May. The Taipei Exchange Capitalization Weighted Stock Index (TPEx) of the OTC market closely tracked the movements of the TAIEX, but with amplified volatility (Chart 3.7).

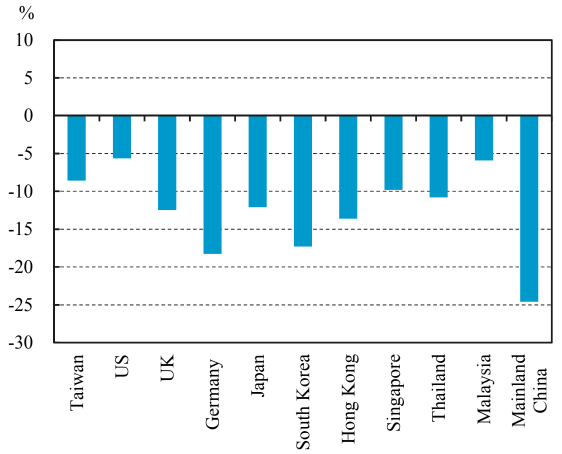
Chart 3.7 Taiwan's stock market indices



Sources: TWSE and TPEx.

As for major stock markets around the world, all of them experienced drops in 2018, with the TAIEX falling slightly more than the major indices in the US and Malaysia (Chart 3.8).

Chart 3.8 Major stock market performance



Notes: 1. Figures are for 2018.
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.

In the first half of 2018, volatility in the TWSE and the OTC markets rose sharply and then dropped. However, affected by the significant fall in international stock markets in October, volatility of the two markets surged and registered 21.29% and 27.05%, respectively, at the end of 2018. In 2019 Q1, the TWSE and the OTC markets stabilized and their volatility decreased to 12.21% and 10.12%, respectively, at the end of March (Chart 3.9).

Annual turnover rates increased

Trading volumes in both the TWSE and the OTC markets were boosted in 2018, induced by the day trading transaction tax being cut by half. The annual turnover rates in terms of trading value in both markets rose to 92.55% and 250.78%, respectively (Chart 3.10). However, the annual turnover rates in the TWSE and the OTC markets declined to 67.52% and 220.18%, respectively, in 2019 Q1, owing to less trading days.

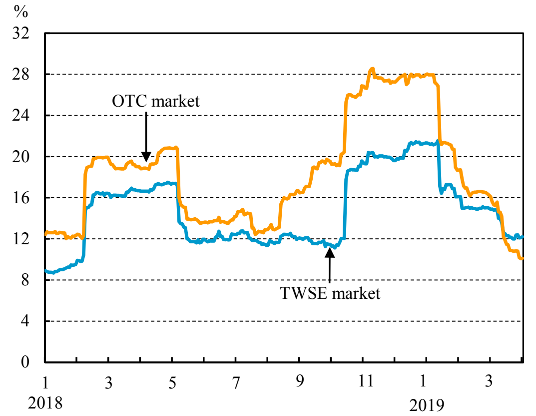
Compared to major stock markets around the world, the annual turnover rate of the TWSE market was still higher than those in the UK, Hong Kong, Singapore, and Malaysia (Chart 3.11).

3.1.3 FX market

The NT dollar exchange rate oscillated along a depreciating path, while the trading volume of the FX market increased

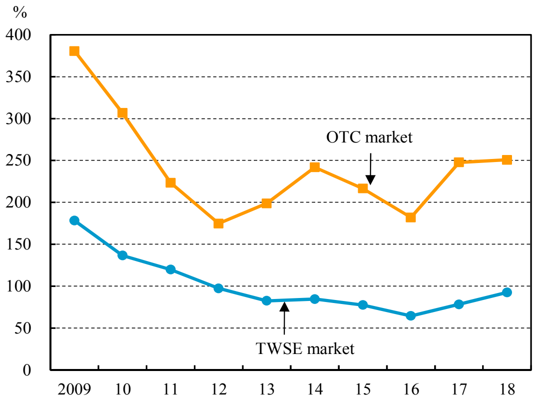
In 2018 Q1, the NT dollar exchange rate appreciated against the US dollar and later on fluctuated within a narrow range. From April onwards, owing to the US-China trade dispute and interest rate hikes by the Fed, the NT dollar exchange rate reversed to depreciate and stood at 30.733 at the end of

Chart 3.9 Stock price volatility in Taiwan's markets



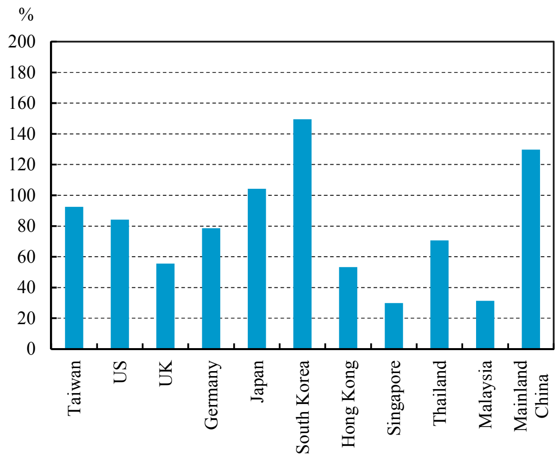
Note: Volatility refers to the annualized standard deviation of 60-day daily index returns.
Sources: TWSE, TPEx and CBC.

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 2018.
Source: TWSE.

2018, an annual depreciation of 2.88%. In the beginning of 2019, owing to market expectations of the Fed suspending interest rate rises, the NT dollar exchange rate was relatively stable against the US dollar and stood at 30.825 at the end of March (Chart 3.12). However, intensified US-China trade tensions in early May led to the depreciation of most emerging Asian currencies including the NT dollar, which turned to depreciate against the US dollar and weakened through 31.

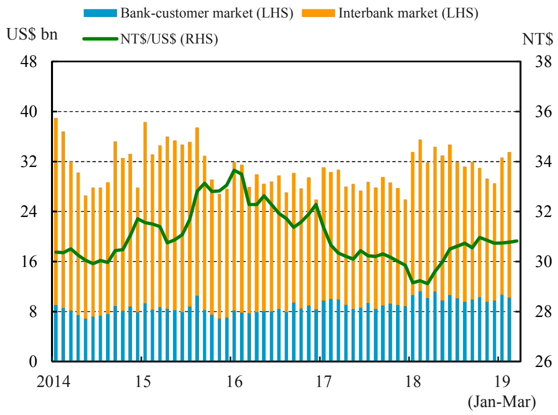
The NT dollar against the US dollar depreciated by 2.88% in 2018, lower than the renminbi and the Korean won, and continued to depreciate by 0.30% in 2019 Q1 (Chart 3.13). However, it still appreciated by 3.36%, 1.34%, and 1.22% against the British pound, the euro, and the Korean won, respectively, but depreciated by 4.83% against the Japanese yen in 2018 (Chart 3.14).

In 2018, the average daily trading volume in Taiwan's FX market rose by 12.37% to US$32.2 billion, compared to US$28.7 billion a year earlier, primarily because of an increase in the interbank market (Chart 3.12).

NT dollar exchange rate volatility remained relatively stable

Volatility in the NT dollar exchange rate against the US dollar shifted between 1.43% and 4.97% and registered an annual average of 3.16% in 2018, before moving

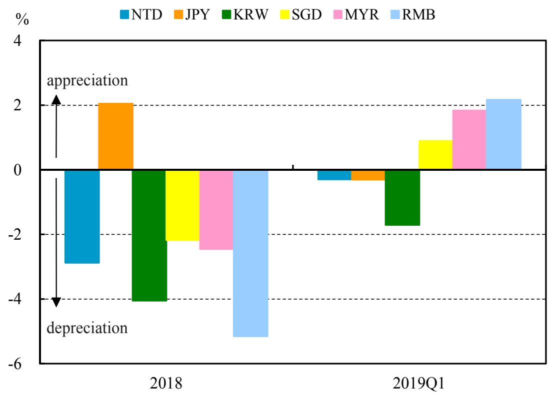
Chart 3.12 NTD/USD exchange rate and FX market trading volume



Notes: 1. Trading volume is the monthly average of daily data, while exchange rate is end-of-period data.
2. The latest data for trading volume are as of February 2019.

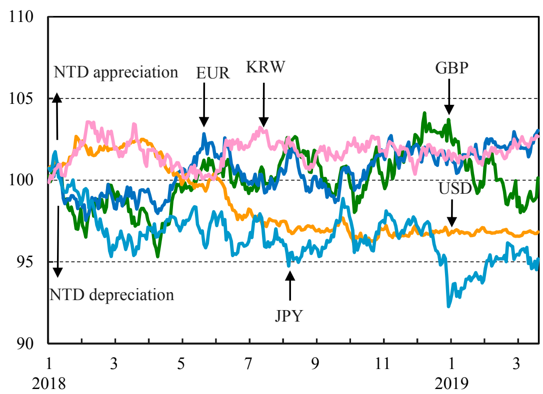
Source: CBC.

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



Source: CBC.

Chart 3.14 Movements of NT dollar exchange rate against key international currencies

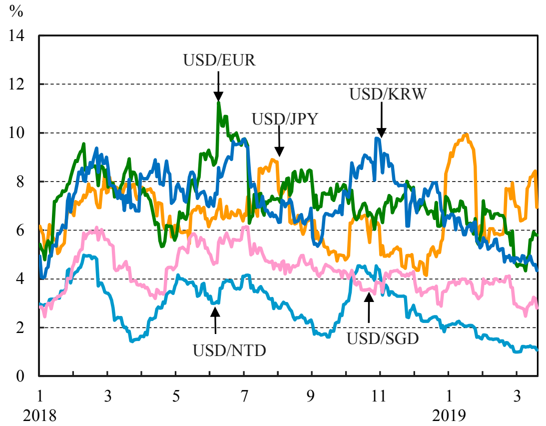


Note: December 29, 2017 = 100.

Source: CBC.

between 0.99% and 2.26% during 2019 Q1. Compared to major currencies such as the Japanese yen, the euro, the Korean won, and the Singapore dollar, the NT dollar exchange rate has been relatively stable against the US dollar (Chart 3.15).

Chart 3.15 Exchange rate volatility of various currencies versus the US dollar



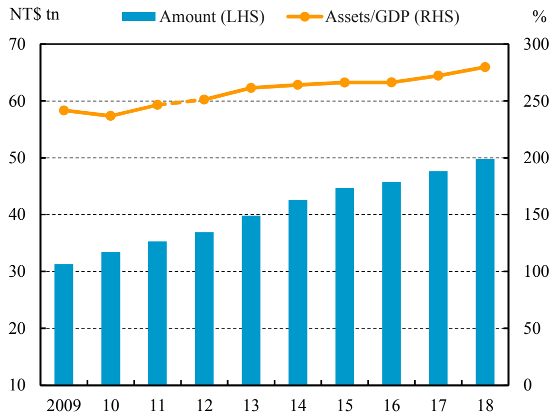
Note: Volatility refers to the annualized standard deviation of 20-day daily returns.
Source: CBC.

3.2 Financial institutions

3.2.1 Domestic banks

The total assets of Taiwan's 38 domestic banks[37] continually expanded in 2018, owing to growth in loans. Asset quality improved, and concentration in corporate loans as well as credit exposures to real estate loans slightly decreased. However, considering the conservative outlook for the real estate market, banks should prudently monitor and control related credit risks. Moreover, the estimated value at risk (VaR) of market risk exposures ascended, but liquidity risk remained moderate thanks to ample funds in the banking system. While domestic banks posted considerably higher profits in 2018 than the previous year, the average capital adequacy ratio remained the same and revealed satisfactory capacity to bear losses.

Chart 3.16 Total assets of domestic banks



Note: Figures from 2012 forward are on the TIFRSs basis, while those of prior years are on the ROC GAAP basis.
Sources: CBC and DGBAS.

Total assets kept growing

The total assets of domestic banks kept growing and reached NT$49.79 trillion at the end of 2018, equivalent to 279.84% of annual GDP (Chart 3.16). The annual growth rate of the total assets also rose to 4.50% due to the substantial increase in loans. Broken down by sector, the asset growth rates of domestic banking units (DBUs), offshore banking units (OBUs), and overseas branches all showed rising trends, with the growth

37 Includes Agricultural Bank of Taiwan.

rate of OBUs exhibiting a remarkable rebound (Chart 3.17).

Credit risk

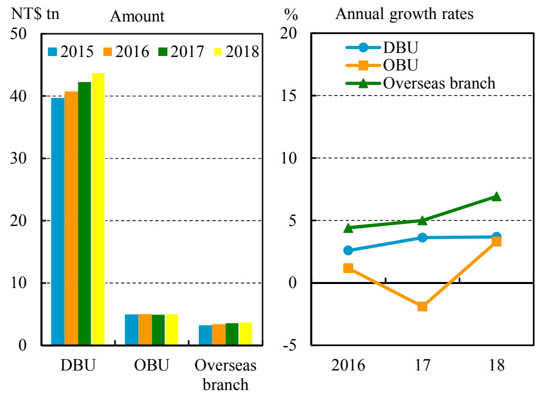
Customer loans kept on rising

Customer loans granted by the DBUs of domestic banks stood at NT$24.40 trillion at the end of 2018, accounting for 49.01% of total assets, with the annual growth rate increasing to 5.10% (Chart 3.18). Among them, the annual growth rate of household borrowing slightly rose to 5.58% owing to steady growth in mortgage loan demand. The growth rate of corporate loans also expanded to 5.51%. However, government loans showed a negative growth rate of -1.86% mainly because of less financing demand from the government as a result of increased tax revenues.

Credit concentration and the share of real estate-secured credit both slightly descended

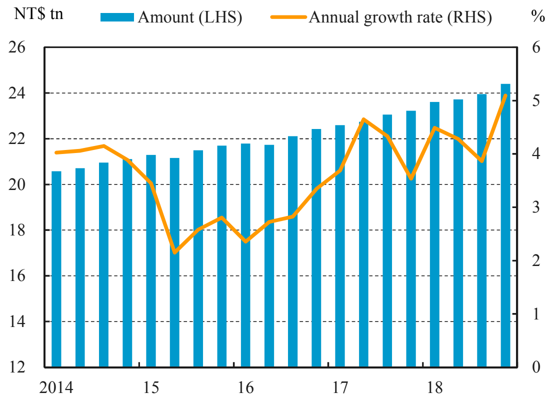
At the end of 2018, real estate loans granted by the DBUs of domestic banks amounted to NT$8.91 trillion and accounted for a share of 36.51% of total loans, which was a little lower than that of the previous year. It reflected marginally decreasing concentration in credit exposure to real estate loans. Moreover, real estate-secured credit granted by domestic banks aggregated NT$16.71 trillion, accounting for 55.46% of total credit,[38] slightly less than that of the previous year (Chart 3.19). Since

Chart 3.17 Total assets of domestic banks by sectors



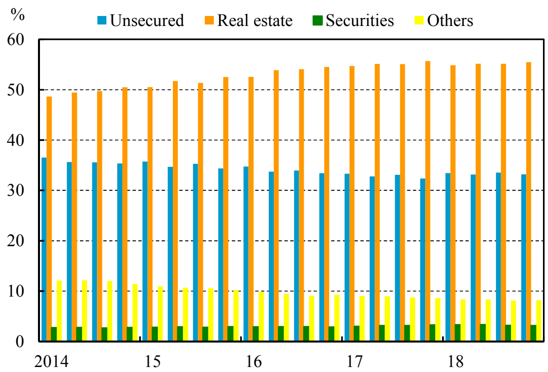
Note: Figures for total assets are inclusive of interbranch transactions.
Source: CBC.

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.

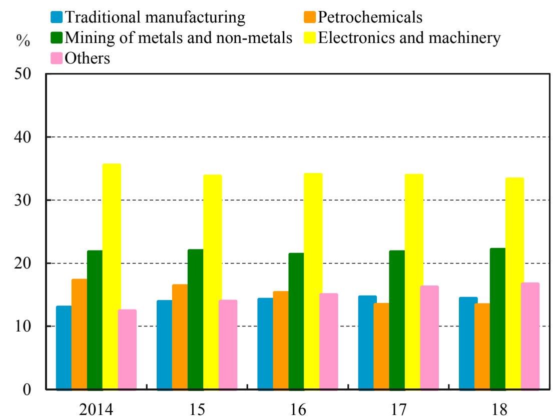
38 The term "credit" herein includes loans, guarantee payments receivable, and acceptances receivable.

domestic housing prices stayed high and unsold new residential properties might put more pressure on the market, the outlook for the real estate market remained conservative. Banks should continue to pay close attention to real estate related credit risks.

Credit concentration in corporate loans slightly diminished

For the DBUs of domestic banks, corporate loans stood at NT$10.69 trillion at the end of 2018, of which loans to the manufacturing sector registered NT$4.21 trillion and accounted for the largest share of 39.39%. Within the manufacturing sector,[39] loans to the electronics industry contributed 33.31%, the largest, but decreasing, share of the total, reflecting that credit concentration to the electronics sector had mildly diminished (Chart 3.20).

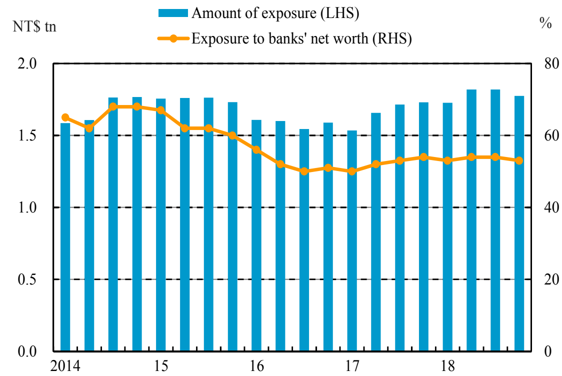
Chart 3.20 Exposure to the manufacturing sector by domestic banks



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.

Chart 3.21 Exposures to Mainland China by domestic banks



Source: FSC.

Exposures to Mainland China increased, but the ratio of the exposures to banks' net worth slightly decreased

At the end of 2018, the exposures of domestic banks to Mainland China increased by 2.55% year on year and stood at NT$1.78 trillion. However, the ratio of the exposures to banks' net worth slightly decreased to 53% (Chart 3.21), much lower than the highest point of 69% in 2014.

Considering that spillover risks stemming from a looming hard landing in Mainland China could possibly pose a greater impact on Taiwan's economic and financial conditions, domestic banks should closely monitor changes in Mainland China's economic and financial

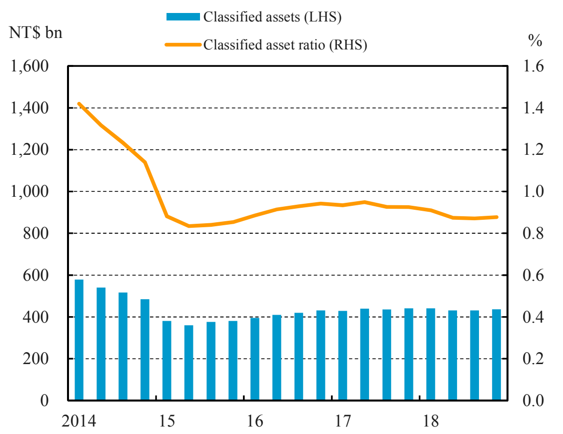
[39] Loans to the manufacturing sector are divided into five categories by industry, including: (1) electronics, (2) mining of metals and non-metals, (3) petrochemicals, (4) traditional manufacturing, and (5) others.

conditions and prudently manage the risk of such exposures.

Asset quality improved

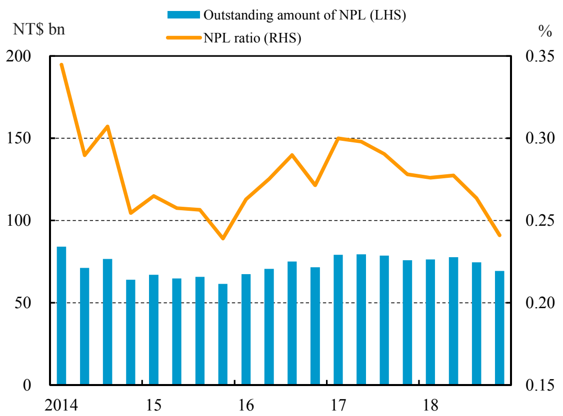
Outstanding classified assets [40] of domestic banks stood at NT$437 billion at the end of 2018, decreasing by 0.91% from a year earlier. The average classified asset ratio also saw a decline to 0.88% (Chart 3.22). Both revealed that the asset quality of domestic banks improved. Although the expected losses of classified assets [41] slightly increased to NT$57.7 billion, it only accounted for 13.11% of loss provisions, indicating that domestic banks had sufficient provisions to cover expected losses.

Chart 3.22 Classified assets of domestic banks



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

Chart 3.23 NPL of domestic banks



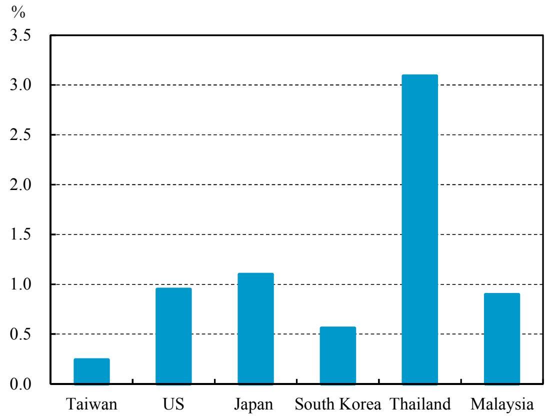
Note: Excludes interbank loans.
Source: CBC.

Furthermore, the outstanding NPLs of domestic banks registered NT$69.4 billion at the end of 2018, decreasing by 8.52% from the previous year. Correspondingly, the average NPL ratio decreased to a recent low of 0.24% (Chart 3.23), and was much lower than those in the US and neighboring Asian countries (Chart 3.24). Among 38 domestic banks, almost all had NPL ratios less than 0.5%, except for one with a slightly higher ratio. In terms of borrowers, the NPL ratio for individual loans marginally decreased to 0.24%, while that for corporate loans continued to decline to 0.26%.

[40] 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.
[41] Loss herein refers to the losses from loans, acceptances, guarantees, credit cards, and factoring without recourse.

At the end of 2018, owing to the continual increase in provisions and the decrease in NPLs, the loan coverage ratio and the NPL coverage ratio rose to 1.38% and 573.67%, respectively (Chart 3.25). The capability of domestic banks to cope with potential loan losses improved.

Chart 3.24 NPL ratios of banks in selected countries



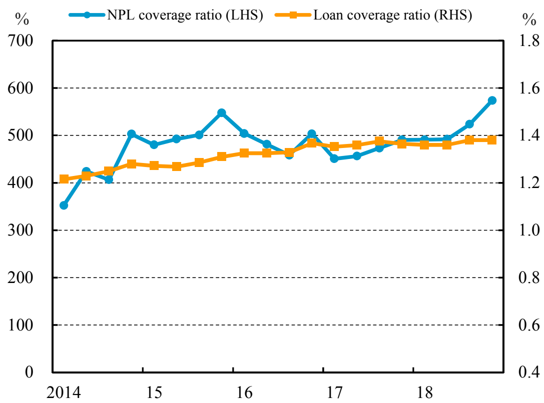
Note: Figure for Japan is end-September 2018 data, while the others are end-December 2018 data.
Sources: CBC, FDIC, FSA, FSS, BOT and BNM.

Market risk

Estimated value-at-risk for market risk exposures increased

At the end of 2018, the net position of debt securities accounted for the largest share of total market risk exposures of domestic banks, followed by the net positions of FX and of equity securities. Based on the Bank's VaR model,[42] the estimated total VaR for market risk exposures of domestic banks stood at NT$119.4 billion at the end of 2018, down by NT$8.8 billion or 7.96% compared to a year earlier (Table 3.1). Among them, the interest rate VaR increased by 10.67%. The main reason was that the US government bond yields oscillated, triggering higher volatility in Taiwan government bond yields. On the other hand, the FX and equities VaR exposures decreased by 14.29% and 3.1%, respectively, owing to reductions in their net positions (Table 3.1).

Chart 3.25 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.

However, the US-China trade negotiation uncertainty, an accelerated economic slowdown in Mainland China and the Brexit deadlock may spur global financial market volatility, which could pose higher market risk to domestic banks and thus warrants close attention.

[42] For more details about the Bank's VaR model, please see CBC (2016), *Financial Stability Report*, Box 2, May. In 2018, the Bank calibrated the VaR model for evaluating market risk VaR, and retrospectively adjusted the data at the end of 2017.

Table 3.1 Market risks in domestic banks

Unit: NT$ bn

Types of risk	Items	End-Dec. 2017	End-Dec. 2018	Changes	
				Amount	PP;%
Foreign exchange	Net position	223.5	195.5	-28.0	-12.53
	VaR	4.9	4.2	-0.7	-14.29
	VaR/net position (%)	2.19	2.15		-0.04
Interest rate	Net position	1,799.0	1,796.0	-3.0	-0.17
	VaR	92.8	102.7	9.9	10.67
	VaR/net position (%)	5.16	5.72		0.56
Equities	Net position	59.8	50.5	-9.3	-15.55
	VaR	12.9	12.5	-0.4	-3.10
	VaR/net position (%)	21.57	24.75		3.18
Total VaR		110.6	119.4	8.8	7.96

Note: PP = percentage point.
Source: CBC.

The impacts of market risk on capital adequacy ratios were slight

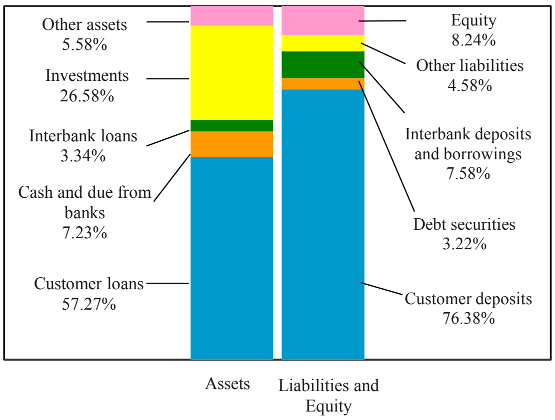
According to the estimation mentioned above, the total VaR would lead to a decrease of 0.22 percentage points in the average capital adequacy ratio of domestic banks and cause the ratio to drop from the current 13.99% to 13.77%. Nevertheless, it would still be higher than the statutory minimum of 9.875% in 2018.

Liquidity risk

Liquidity in the banking system remained ample

The assets and liabilities structure of domestic banks remained roughly unchanged in 2018. For the sources of funds, relatively stable customer deposits still made up the largest share of 76.38% of the total, while for the uses of funds, customer loans accounted for the biggest share of 57.27% (Chart 3.26). The average deposit-to-loan ratio of domestic banks declined to 135.75%, and the funding

Chart 3.26 Asset/liability structure of domestic banks



Notes: 1. Figures are as of end-December 2018.
2. Equity includes loss provisions. Interbank deposits include deposits with the CBC.
Source: CBC.

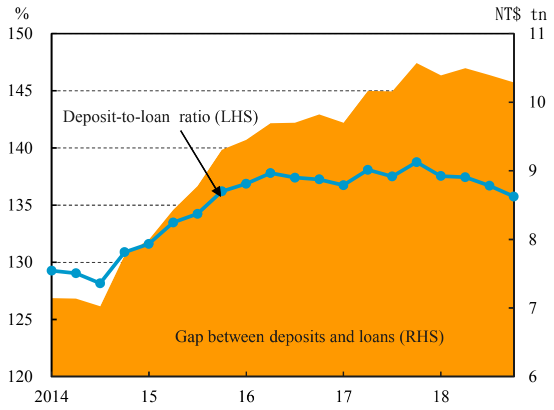
surplus (i.e., deposits exceeding loans) also reduced to NT$10.29 trillion. However, the overall liquidity of domestic banks remained abundant (Chart 3.27).

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 2018 and stood at 32.63% in December (Chart 3.28). Looking at the components of liquid reserves in December 2018, Tier 1 liquid reserves, mainly consisting of certificates of deposit issued by the Bank, accounted for 83.88% of the total. The quality of liquid assets held by domestic banks remained satisfactory.

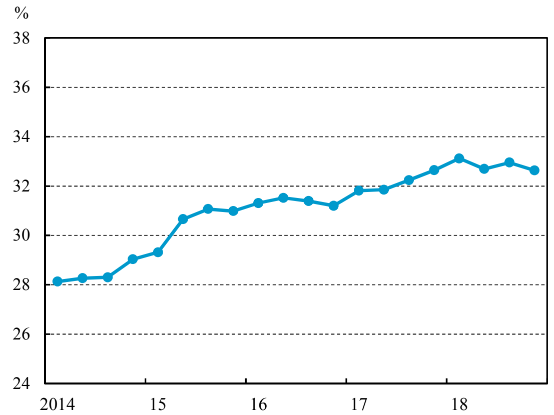
Moreover, the average liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) of domestic banks were 134% and 132%, respectively, at the end of 2018, and all banks met the minimum LCR and NSFR requirements in 2018.[43] Therefore, the overall liquidity risk of domestic banks was relatively low.

Chart 3.27 Deposit-to-loan ratio of domestic banks



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

Chart 3.28 Liquid reserve ratio of domestic banks



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

[43] The minimum LCR requirement for domestic banks was 90% in 2018, except for O-Bank with a minimum requirement of 60%; the minimum NSFR requirement for domestic banks was 100% in 2018. Banks that receive FSC approval after the FSC has consulted with the Central Bank are not subject to either of the requirements.

Profitability

Profitability increased significantly

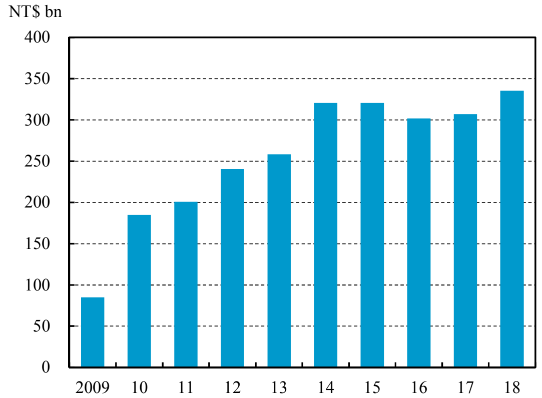
In 2018, the net income before tax of domestic banks rose to NT$335.4 billion, significantly increasing by 9.26% year on year and reaching a 10 year high (Chart 3.29). The rise was mainly caused by growth in net interest revenues. The average ROE and ROA of domestic banks increased to 9.34% and 0.68% (Chart 3.30). Compared to selected Asia-Pacific economies, the average ROE of domestic banks was higher than those of Thailand and South Korea; however, the average ROA still lagged behind those of most other countries (Chart 3.31).

All domestic banks were profitable in 2018. Among them, 12 banks achieved a profitable ROE of 10% or more and four banks had ROAs above the international standard of 1% (Chart 3.32). Most domestic banks performed better than that of the previous year.

Factors that might affect future profitability

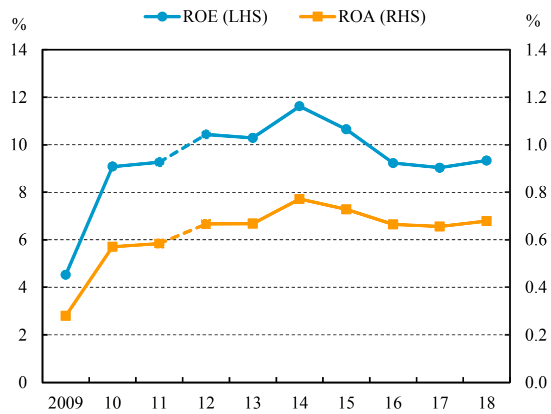
Profitability of domestic banks increased in 2018. In addition, the interest rate spread between deposits and loans of domestic banks rebounded to 1.35 percentage points in 2018 Q4 (Chart 3.33), helping to support future net interest revenues of domestic banks. Nevertheless, the challenges facing future profitability included: (1) decreasing capital expenditures of corporates caused by uncertainties surrounding US-China trade

Chart 3.29 Net income before tax of domestic banks



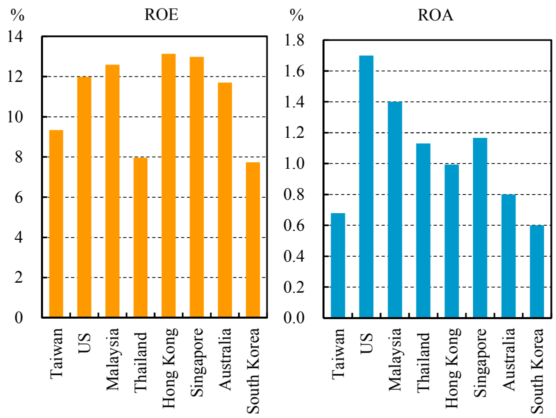
Note: Figures from 2012 forward are on the TIFRSs basis. Figures of prior years are on the ROC GAAP basis (same as all charts in this section).
Source: CBC.

Chart 3.30 ROE & ROA of domestic banks



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

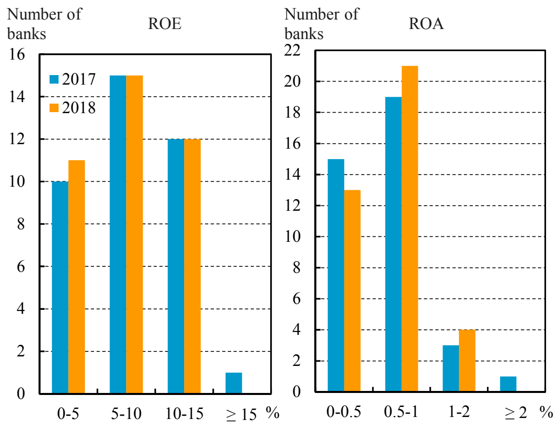
Chart 3.31 ROEs and ROAs of banks in selected economies



Note: Figures are 2018 data.
Sources: CBC, FDIC, BNM, BOT, APRA, FSS and IMF.

tensions leading to lower funding demand; (2) rising economic and financial risks of Mainland China affecting exposures of domestic banks, boosting loan loss provisions; (3) compliance costs of domestic banks remaining high as a result of banks reinforcing their AML/CFT regulatory compliance programs. Though the implementaion of RegTech might help to contain compliance costs, related risks still need to be appropriately managed (Box 2).

Chart 3.32 Domestic banks classified by ROE and ROA

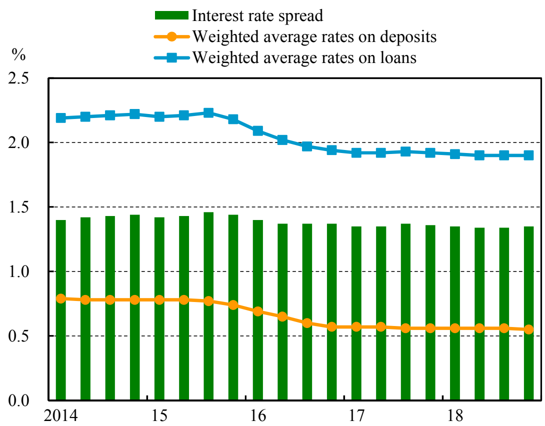


Source: CBC.

Capital adequacy

Capital ratios leveled off

Chart 3.33 Interest rate spread of domestic banks



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

Source: CBC.

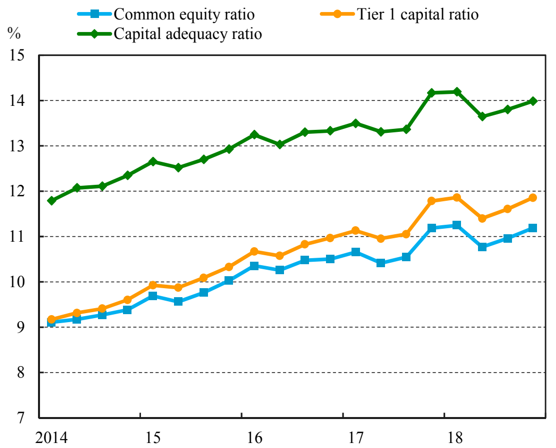
The average capital ratios of domestic banks declined slightly in 2018 Q2 owing to seasonal factors such as cash dividends declared and paid. Afterwards, with capital injection, accumulated earnings, and issuance of eligible capital instruments, all capital ratios rebounded. The average common equity ratio, Tier 1 capital ratio, and capital adequacy ratio of domestic banks registered 11.19%, 11.86%, and 13.99%, respectively, at the end of 2018 (Chart 3.34), almost equivalent to those ratios a year before. However, compared to some Asia-Pacific economies, Taiwan’s banking industry had relatively lower capital levels (Chart 3.35).

Further broken down by components of regulatory capital, common equity Tier 1 capital, which features the best loss-bearing capacity, accounted for 79.98% of eligible capital. This showed that the capital quality of domestic banks was satisfactory.

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

At the end of 2018, the common equity ratios, Tier 1 capital ratios, and capital adequacy ratios for all domestic banks remained above the statutory minimum requirements[44] for 2018 (Chart 3.36). The average leverage ratio of domestic banks at the end of 2018 stood at 6.56%, higher than a year before and well above the international standard of 3%. It indicated domestic banks maintained sound financial leverage.

Chart 3.34 Capital ratios of domestic banks

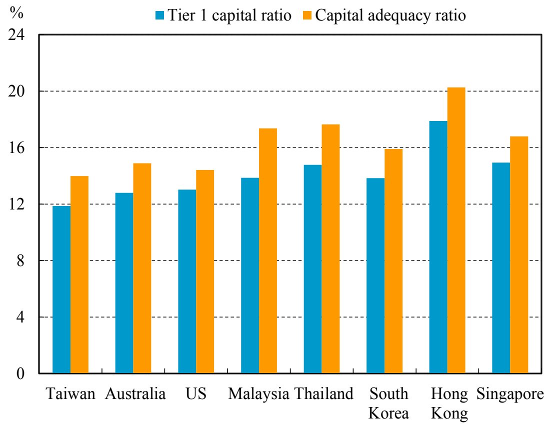


Notes: 1. Common equity ratio = common equity Tier 1 capital/risk-weighted assets.
2. Tier 1 capital ratio = Tier 1 capital/risk-weighted assets.
3. Capital adequacy ratio = eligible capital/risk-weighted assets.
Source: CBC.

Credit ratings

BICRA remained steady but BSI/MPI slightly decreased

Chart 3.35 Capital ratios of banking industry in selected economies



Note: Figures are as of the end of 2018.
Sources: CBC, APRA, FDIC, BNM, BOT, FSS, HKMA and IMF.

Standard & Poor's kept Taiwan's Banking Industry Country Risk Assessment (BICRA)[45] unchanged at Group 4 with moderate risk. Compared to other Asian economies, the 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 assessment of Taiwan's banking system by Fitch Ratings' Banking System Indicator/Macro-Prudential Indicator (BSI/MPI)[46] was downgraded from bbb/1 to bbb/2

[44] The statutory minimum capital requirements of domestic banks for 2018 and 2019 onwards are as follows:

Ratios	2018	2019 onwards
Common equity ratio (%)	6.375	7.0
Tier 1 capital ratio (%)	7.875	8.5
Capital adequacy ratio (%)	9.875	10.5

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

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

because the credit to GDP ratio increased by more than 5 percentage points for two consecutive years[47] (Table 3.2).

All domestic banks received ratings by credit rating agencies at the end of 2018. The weighted average credit rating index[48] went up slightly compared to the previous year owing to the upgrading of two banks (Chart 3.37).

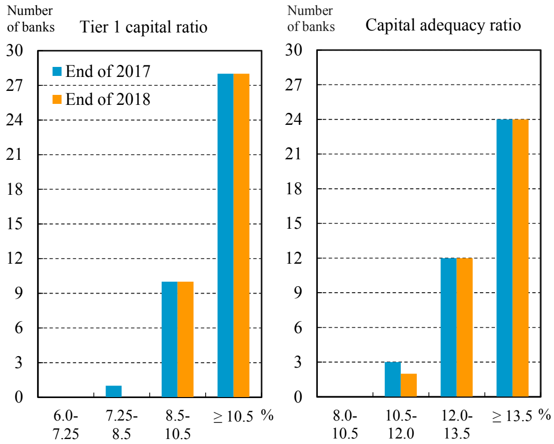
Rating outlooks for almost all domestic banks remained stable or positive

Almost all 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 2018 (Chart 3.38). Only two banks received negative rating outlooks, while rating outlooks for the other 36 banks remained stable or positive.

3.2.2 Life insurance companies

In 2018, total assets of life insurance companies continued their rapid growth, and overall credit ratings held stable. However, their average RBC ratio descended, pretax income declined year on year due to an increase in hedging costs, and the industry still faced higher equity risk.

Chart 3.36 Domestic banks classified by capital ratios



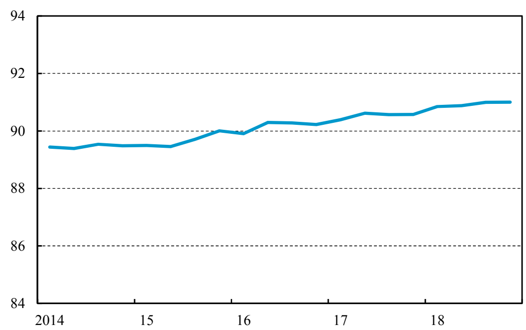
Note: At the end of 2018, the number of domestic banks decreased from 39 a year before to 38.
Source: CBC.

Table 3.2 Systemic risk indicators for the banking system

Banking System	Standard & Poor's		Fitch	
	BICRA		BSI/MPI	
	2018/2	2019/2	2018/3	2019/4
Hong Kong	2	2	a/3	a/3
Singapore	2	2	aa/2	aa/2
Japan	2	2	a/1	a/2
South Korea	3	3	a/1	a/1
Taiwan	**4**	**4**	**bbb/1**	**bbb/2**
Malaysia	4	4	bbb/1	bbb/1
Mainland China	6	6	bb/1	bb/1
Thailand	6	6	bbb/1	bbb/1
Philippines	7	6	bb/1	bb/1
Indonesia	7	7	bb/1	bb/1

Sources: Standard & Poor's and Fitch Ratings.

Chart 3.37 Credit rating index of domestic banks



Sources: Taiwan Ratings Corporation, Fitch Ratings and CBC.

47 Banks' credit to GDP ratio increased by 7.8 and 5.6 percentage points relative to prior year in 2017 and 2018, respectively, while the growth rate has slowed down in 2018.

48 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.

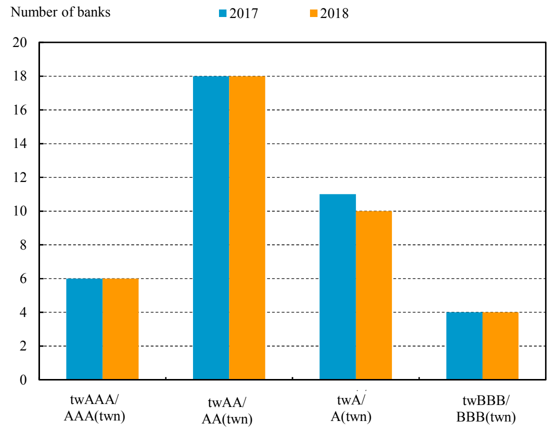
Assets maintained fast growth

The total assets of life insurance companies continued growing and reached NT$26.32 trillion at the end of 2018, equivalent to 147.92% of annual GDP (Chart 3.39). The annual growth rate of total assets decreased to 7.58%, which was still at a high level. The top three companies in terms of assets made up a combined market share of 55.49%. The market structure of the life insurance industry remained roughly unchanged in 2018.

Foreign portfolio investments remained the primary usage of funds

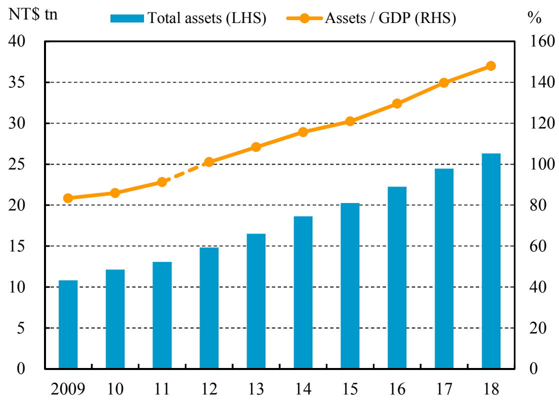
In terms of the usage of funds of life insurance companies, foreign portfolios accounted for 62.31% at the end of 2018, the largest share of total assets, whereas the share of domestic securities investments continued to drop to 16.81%. As for their sources of funds, insurance liabilities accounted for 86.22%, the primary share of total liabilities and equity, while the share of equity decreased markedly to 4.14% owing to strongly expanding unrealized investment losses (Chart 3.40). Overall, financial leverage of life insurance companies rose significantly.

Chart 3.38 Number of domestic banks classified by credit ratings



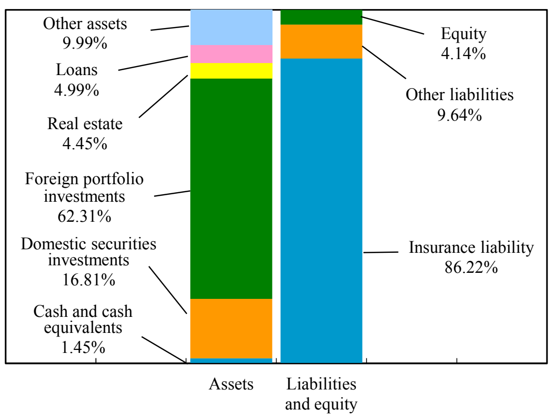
Notes: 1. End-of-period figures.
2. The number of domestic banks decreased from 39 in 2017 to 38 in 2018.
Sources: Taiwan Ratings Corporation and Fitch Ratings.

Chart 3.39 Total assets of life insurance companies



Note: Figures from 2012 forward are on the TIFRSs basis. Figures of prior years are on the ROC GAAP basis.
Sources: FSC and DGBAS.

Chart 3.40 Asset/liability structure of life insurance companies



Note: Figures are as of the end of 2018.
Source: FSC.

Pretax income declined sharply

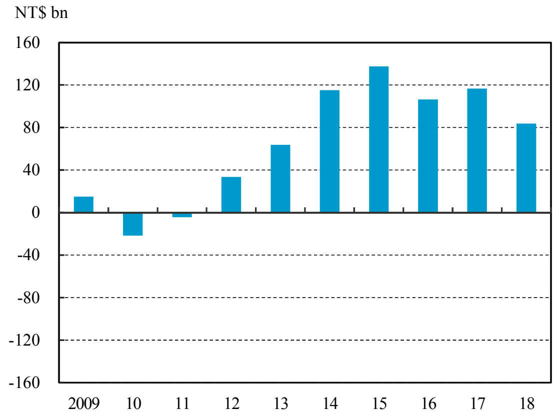
Life insurance companies reported net income before tax of NT$83.7 billion in 2018, decreasing dramatically by 28.22% year on year (Chart 3.41). This was chiefly driven by growth in hedging costs and an increase in non-operating losses on disposal of assets. Therefore, the average ROE and ROA dropped to 6.82% and 0.33%, respectively (Chart 3.42), indicating weakened profitability.

In 2018, the comprehensive income of life insurance companies was NT$-500.7 billion, mainly owing to the substantial increase in unrealized losses on financial assets. However, it has greatly improved on the back of improving global financial markets in 2019 Q1. In addition, the International Financial Reporting Standard 17 (IFRS 17) *Insurance Contracts* is expected to be introduced into Taiwan for implementation in 2025 at the earliest. Life insurance companies could, therefore, face severe financial impairments and capital raising pressures. In response, the FSC has required life insurance companies to strengthen their financial health in order to relieve the impact of the introduction of the IFRS 17.

Average RBC ratio decreased

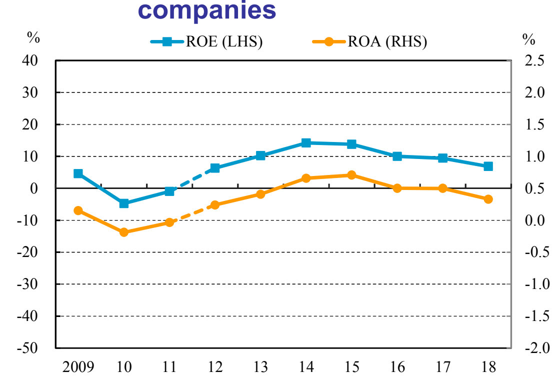
In 2018, capital levels of life insurance companies declined because of a greater decrease in equity. As a result, the average RBC ratio dropped to 268.43% at the end of the year (Chart 3.43). By individual company,

Chart 3.41 Net income before tax of life insurance companies



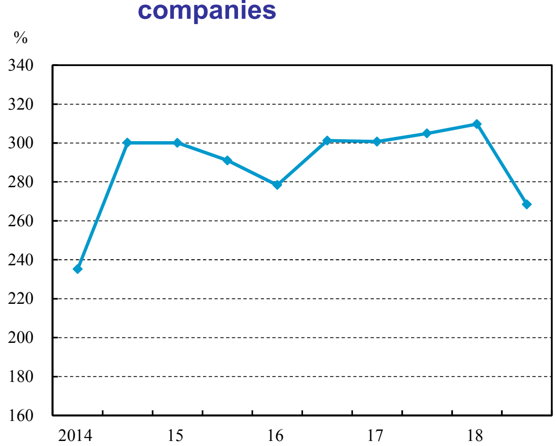
Note: Figures from 2012 forward are on the TIFRSs basis. Figures of prior years are on the ROC GAAP basis.
Source: FSC.

Chart 3.42 ROE & ROA of life insurance companies



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

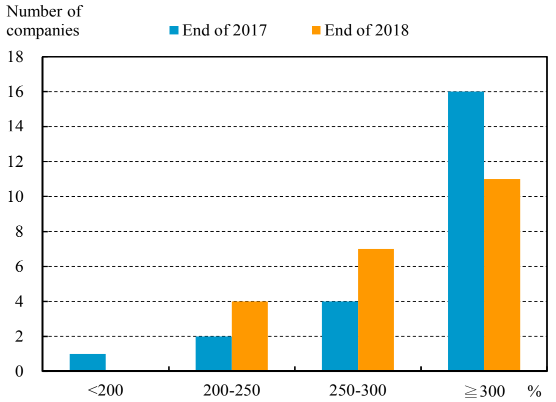
Chart 3.43 RBC ratio of life insurance companies



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

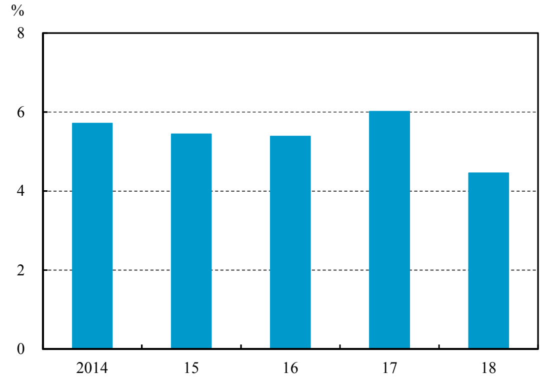
there were 11 companies with RBC ratios over 300%. No company had an RBC ratio below the statutory minimum of 200% (Chart 3.44). Furthermore, the equity to asset ratio decreased markedly to 4.46% at the end of 2018 (Chart 3.45) but rebounded significantly in 2019 Q1.

Chart 3.44 Life insurance companies classified by RBC ratios



Note: The number of life insurance companies decreased to 22 as of the end of 2018 from 23 registered at the end of the previous year.
Source: FSC.

Chart 3.45 Equity/Asset ratios of life insurance companies



Note: Assets are exclusive of separated account products assets.
Source: FSC.

Overall credit ratings remained stable[49]

In 2018, credit ratings among the 11 life insurance companies remained stable. As of the end of the year, all rated life insurance companies maintained credit ratings above twA or its equivalent, while the rating of the top three companies in terms of assets held at twAA+. Moreover, most companies received positive or stable credit outlooks.

Foreign portfolio positions expanded with increasing FX hedging cost and higher equity risk

Foreign portfolio positions of life insurance companies grew continually and reached NT$16.40 trillion in 2018. Life insurance companies also actively used derivative financial instruments to mitigate the impact of FX rate fluctuations. However, FX hedging costs substantially increased owing to consecutive interest rate hikes by the Fed. In January 2019, the FSC amended the applicable regulations and raised the required ratio of FX valuation reserves,[50] which could help life insurance companies manage FX risk flexibly and lower hedging costs. Nonetheless, life insurance companies should monitor the changes in global as well as domestic financial conditions and review their FX hedging strategies in a timely manner so as to alleviate the impacts of rising hedging costs on their profits.

[49] The majority of rated life insurance companies received issuer ratings from Taiwan Ratings; therefore, this section is based primarily on the Taiwan Ratings' rating (tw~), and secondarily on other ratings.
[50] See Section 4.2 "Measures undertaken by the FSC to maintain financial stability."

Furthermore, because the FSC imposed a limit[51] on the amount of international bond investments by insurance companies, such investments slowed down. On the other hand, NTD-denominated bond ETF investments of life insurance companies, excluded from the amounts subject to the overseas investment ceiling, grew rapidly and exceeded NT$500 billion at the end of March 2019. Nevertheless, considering that the net asset value of ETFs is affected by the FX volatility of underlying overseas investment targets, FX risk is still embedded within NTD-denominated bond ETF investments[52] and warrants close attention.

Regarding interest rate risk, US government bond yields moved downward significantly in 2019 Q1, which would help increase the value of bond investments. However, considering that recent volatility in global stock markets exacerbated and the US-China trade dispute heated up, equity risk remained high. Therefore, life insurance companies should prudently control related risks.

3.2.3 Bills finance companies

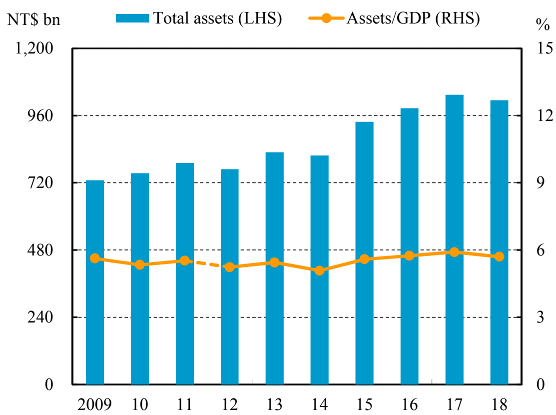
The total assets of bills finance companies contracted marginally in 2018, while the guarantee business expanded and credit asset quality remained sound. However, their profitability weakened and the average capital adequacy ratio declined slightly, while liquidity risk rose.

Total assets contracted marginally

In 2018, mainly owing to the decrease in negotiable certificates of deposit investments, the total assets of bills finance companies decreased by 1.92% and stood at NT$1,014 billion at the end of the year, equivalent to 5.70% of annual GDP (Chart 3.46).

With respect to the asset and liability structure of bills finance companies, bill and bond investments constituted the largest share of 94.45% of total assets as of the end of 2018, the same as the figure recorded a year earlier.

Chart 3.46 Total assets of bills finance companies



Note: Figures from 2012 forward are on the TIFRSs basis. Figures of prior years are on the ROC GAAP basis.
Sources: CBC and DGBAS.

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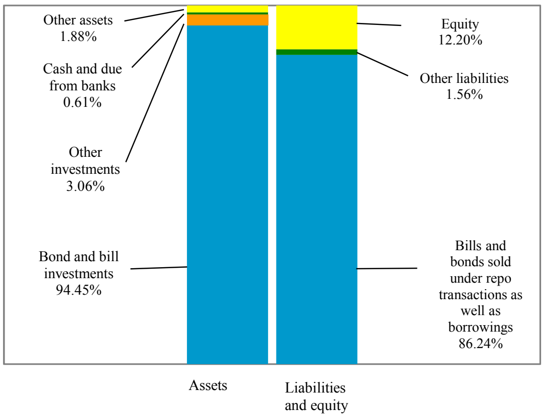
51 See Section 4.2 "Measures undertaken by the FSC to maintain financial stability."
52 Life insurance companies invested in NTD-denominated bond ETFs, which could face FX risk, interest rate risk and insufficient liquidity when such investments were made by a single or minority of life insurance companies. The FSC already planned to revise RBC calculations about FX risk of bond ETFs so as to reasonably reflect the capital charge. In addition, the FSC required securities investment trust companies to develop investor diversification mechanisms when issuing bond ETFs in order to ensure sound market development.

On the liability side, bills and bonds sold under repo transactions as well as borrowings accounted for the primary share of 86.24% of total assets, less than the figure recorded in the previous year. Meanwhile, equity only accounted for 12.2% (Chart 3.47). The asset and liability structure remained roughly unchanged.

Chart 3.47 Asset/liability structure of bills finance companies



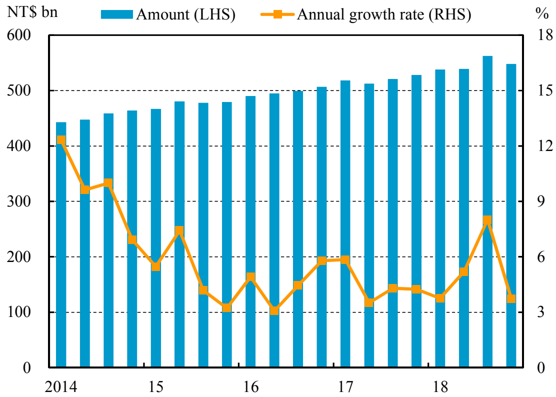
Note: Figures are as of the end of 2018.
Sources: CBC and FSC.

Credit risk increased moderately

Guarantee liabilities expanded and the share of credit secured by real estate trended up

Owing to rising funding demand of corporates in money markets spurred by low short-term market rates, CP guaranteed by bills finance companies registered NT$547.5 billion at the end of 2018, increasing by 3.73% year on year (Chart 3.48). Meanwhile, the average multiple of guarantee liabilities to equity slightly decreased to 4.78 times because of a greater increase in equity. In addition, such multiple of each company was still below the regulatory ceiling of 5 or 5.5 times.

Chart 3.48 Outstanding CP guaranteed by bills finance companies



Source: CBC.

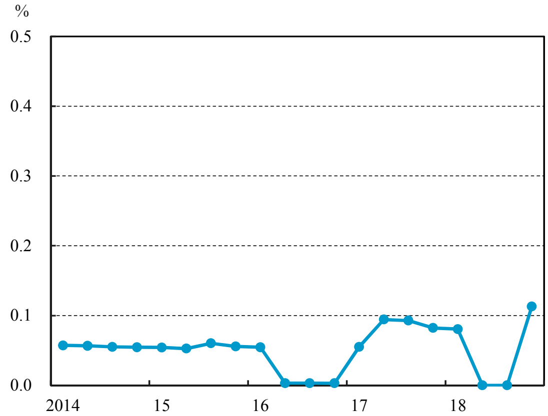
At the end of 2018, guarantees granted to the real estate and construction industries and credit secured by real estate increased to 30.32% and 38.71%, respectively, of total credit of bills finance companies. Both ratios remained at high levels. As the outlook for the domestic housing market remains conservative, bills finance companies should closely monitor the impacts of housing market trends on the quality of related credit and reinforce their capacity to cope with the changes in the real estate cycle.[53]

[53] To strengthen credit risk bearing capacity, the FSC raised the minimum credit loss reserve ratio of guarantees granted to the real estate industry by bills finance companies to 1.5% in March 2019. The bills finance companies should meet this minimum requirement from the end of 2021 onwards.

Credit quality remained sound

The credit quality of bills finance companies remained sound in 2018, as the non-performing credit ratio rose marginally to a still-low level of 0.11% at the end of the year (Chart 3.49). Moreover, the credit loss reserves to non-performing credit ratio stood at 12.08 times, reflecting sufficient reserves to cover potential credit losses.

Chart 3.49 Non-performing credit ratio of bills finance companies

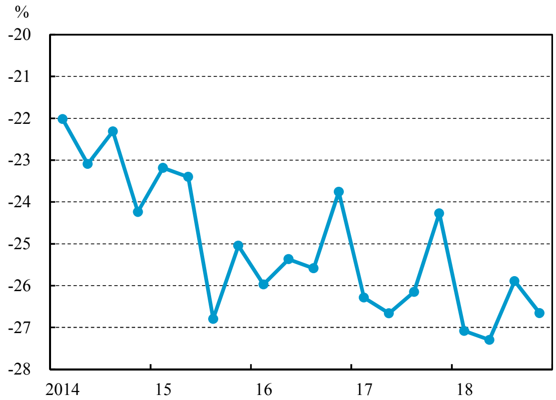


Note: Non-performing credit ratio = non-performing credit/(overdue guarantee advances + guarantees).
Source: CBC.

Liquidity risk rose

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, 43.77% of which were long-term bonds. In addition, more than 80% of their liabilities were from short-term interbank call loans and repo transactions. In addition, the 0-30 day maturity gap to total assets denominated in NTD worsened to -26.66%, reflecting a higher liquidity risk in bills finance companies[54] (Chart 3.50).

Chart 3.50 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.

The major liabilities[55] to equity ratio decreased to 7.64 times at the end of 2018, and the multiple of each company remained below the regulatory ceilings of ten or twelve times, indicating an improvement in financial leverage.

[54] To strengthen liquidity risk management of bills finance company, the Bills Finance Association introduced a self-disciplinary rule in February 2019, prescribing that bills finance companies should establish a mechanism to control the 0-30 day maturity gap of NTD cash flow and develop an emergency plan.
[55] Major liabilities include call loans, repo transactions as well as issuance of corporate bonds and CP.

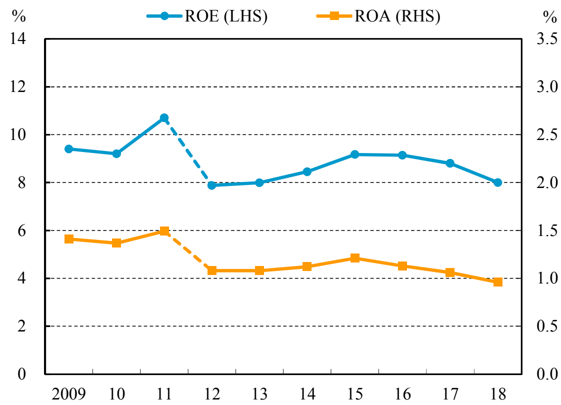
Profitability weakened

Bills finance companies posted a net income before tax of NT$9.7 billion in 2018, a decrease of 7% year on year. The decline was mainly driven by an increase in the yielding costs of bond investments and a higher base period resulting from a substantial amount of lawsuit settlement income in the previous year. The average ROE and ROA fell to 8% and 0.96%, respectively, reflecting weakening profitability (Chart 3.51).

Average capital adequacy ratio slightly declined

Owing to a greater increase in risk assets, the average Tier 1 capital ratio and the capital adequacy ratio of bills finance companies slightly descended to 13.47% and 13.63%, respectively, at the end of 2018 (Chart 3.52). However, the capital adequacy ratio for each company remained well above the statutory minimum of 8%.

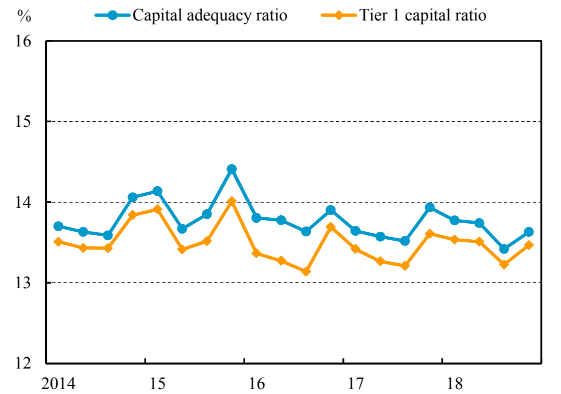
Chart 3.51 ROE & ROA of bills finance companies



Notes: 1. Figures from 2012 forward are on the TIFRSs basis. Figures of prior years are on the ROC GAAP basis.
2. ROE = net income before tax/average equity.
3. ROA = net income before tax/average assets.

Source: CBC.

Chart 3.52 Average capital adequacy ratios of bills finance companies



Source: CBC.

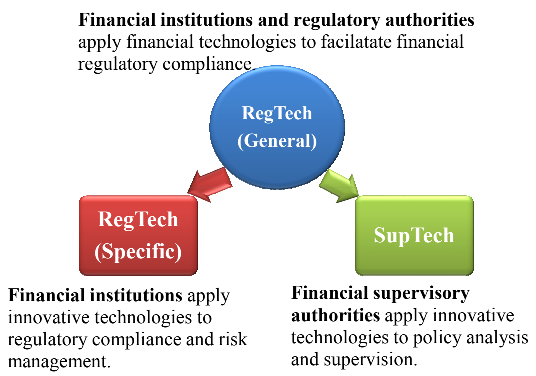
Box 2
RegTech development and applications by domestic banks

After the 2008 global financial crisis, increasingly stringent and radically changing financial regulations in most countries have led to increases in the number of financial institutions having enormous fines imposed on them for breaking regulations. Moreover, the surging cost of regulatory compliance and risk management have imposed a heavy burden on financial institutions' operations.[1] Recently, with the rise of RegTech, a growing number of financial institutions have applied new technologies to enhance compliance efficiency. This box first explores current development and application of RegTech by domestic banks and then analyzes the potential risks arising from the application of RegTech and caveats that warrant attention.

1. Definition of RegTech

"RegTech" is the combination of "regulatory" and "technology". Generally, the Institute of International Finance (IIF) defines RegTech as "the use of new technologies to solve regulatory and compliance requirements more effectively and efficiently."[2] Specifically, RegTech and SupTech refer to the application of innovative technologies by financial institutions and supervisory authorities for regulatory compliance and risk management as well as policy analysis and supervision, respectively (Chart B2.1).[3]

Chart B2.1 Differences between RegTech and SupTech



Source: CBC.

In Taiwan, the Financial Supervisory Commission defines RegTech as follows: Financial institutions use information technologies to broadly collect information regarding various countries' financial regulatory systems and regulatory requirements and to provide analysis and management tools, so as to help the automated compliance processes to lower operational risk.[4]

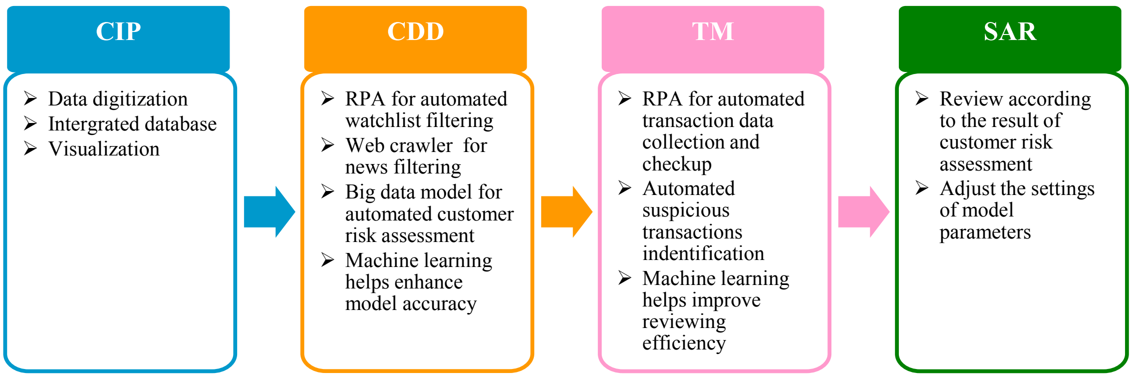
2. RegTech development and applications by domestic banks

Many financial institutions around the world have broadly applied information technologies, such as artificial intelligence, big data, blockchain and machine learning, to regulatory compliance, risk management, transaction monitoring and customer identification programs (CIPs). Regarding technological development for RegTech, domestic banks focus primarily on database applications, such as the construction of process automation and big data models. The application of RegTech mainly includes AML/CFT, regulatory compliance, internal audit/control and risk management. Among them, AML/CFT are more well-developed by domestic banks. RegTech development and applications by domestic banks are summarized as follows.

2.1 AML/CFT

In view of increasingly stricter AML/CFT requirements by regulatory authorities and the fact that the manual examination process in know your customer (KYC) and transaction monitoring is costly and prone to omission, the application of robotic process automation (RPA) and big data models could help enhance AML/CFT efficiency. Accordingly, domestic banks actively apply RegTech to AML/CFT processes (Chart B2.2).

Chart B2.2 RegTech applications on AML/CFT processes



Source: CBC.

(1) CIP: Customer information digitization can enhance CIP efficiency and effectiveness by building up a complete KYC database and visualizing manually unrecognizable data, such as customer relationships and cash flow networks.

(2) Customer due diligence (CDD): RPA system can import sanction lists into the database for automated comparison. Also, a web crawler can automatically collect and analyze public information to enhance the efficiency of the CDD process. By combining the internal and external KYC information mentioned above, banks can assess customer risk level through models, and then apply corresponding customer reviewing and monitoring processes accordingly.

(3) Transactions monitoring (TM): An RPA system gathers historical transaction data of customers and their counterparties to identify suspicious transactions by means of data comparison so as to support the transaction review.

(4) Suspicious activity reporting (SAR): The parameters for the types of risks will be determined according to the assessment of the degree of customers' risks. With these parameters, automated transaction monitoring processes can help achieve consistency of reviewing procedures and increase the accuracy of SAR.

2.2 Other applications

(1) Compliance management platform: The platform provides a database that integrates the internal rules and external regulations to instantly update information for consultation. In addition, the platform can automatically track the follow-up work of the relevant business units in response to regulation changes and enhance the efficiency of compliance management.

(2) Automated examinations for regulatory reports: The system can automatically perform cross-table and intertemporal examinations and identify related items within regulatory reports through formula exploration.

(3) Computer-aided audit tools: Auditors can screen high-risk or abnormal behavior cases through the system prior to conducting on-site audits so as to enhance audit efficiency; meanwhile, the complete audit trails will be kept in the system.

(4) Credit risk models: The models would integrate different aspects of customer information, such as personal profile, payment behavior, and debt burden, and then use statistical analytical methods to measure customers' default risk as a reference benchmark for credit evaluation and loan approval.

3. Risks and caveats of RegTech applications

The potential risks arising from the application of RegTech and caveats that warrant attention are shown as follows:

(1) Software bugs in the system: Before the system goes online, system design and parameter settings should be carefully tested. Continuous monitoring and problem analysis for instant debugging are essential to prevent wrong trading trend or behavior type.

(2) Over-reliance on the system may result in misjudgment: Professional judgment and high awareness are needed to avoid over-reliance on the system, which may result in misjudgment.

(3) Incomplete database and poor data quality: Embedded self-examination mechanism is required to lower the possibilities of error or meaningless data input, which may lead

to a failure or "garbage in, garbage out" result.

(4) Cyber security and personal information leakage: Popularity of cloud technology and change of data access type may increase the risks of cyber security and personal information leakage. Therefore, cyber security management and personal information protection should be reinforced with software and hardware tools.

*4. **Conclusions***

An international trend is visible in developing the application of RegTech, and a growing number of domestic banks have been promoting its development. To evaluate the costs and benefits of RegTech, banks should properly respond to the risks arising from the application of RegTech to avoid missteps or violation of regulations.

Moreover, the application of RegTech can reduce certain manpower needs, which could change the content and type of work for existing staff. To effectively utilize human resources, banks should strengthen capacity building programs to train their staff, shift the streamlined human resources towards improving the interaction between banks and customers, and conduct activities and services which could create higher value.

Notes: 1. According to IIF (2015), JPMorgan Chase added 13,000 employees from 2012-14 to support regulatory compliance and control, at a cost of US$2 billion. In 2014, JPMorgan Chase spent a combined US$600 million on regulatory and control technology. In the same year, Deutsche Bank and UBS spent an additional €1.3 billion and US$900 million on new regulatory requirements, respectively (Institute of International Finance (2015), "REGTECH: Exploring Solutions for Regulatory Challenges," October).

2. Institute of International Finance (2016), "RegTech in Financial Services: Technology Solutions for Compliance and Reporting," March.

3. UK Government Office for Science (2015), "FinTech Futures: the UK as a World Leader in Financial Technologies," March; Toronto Centre (2017), "FinTech, RegTech and SupTech: What They Mean for Financial Supervision," August; BIS (2018), "Innovative Technology in Financial Supervision (SupTech) – the Experience of Early Users," *FSI Insights on Policy Implementation* No 9, July.

4. Financial Supervisory Commission (2016), "FinTech Development Strategy White Paper," May.

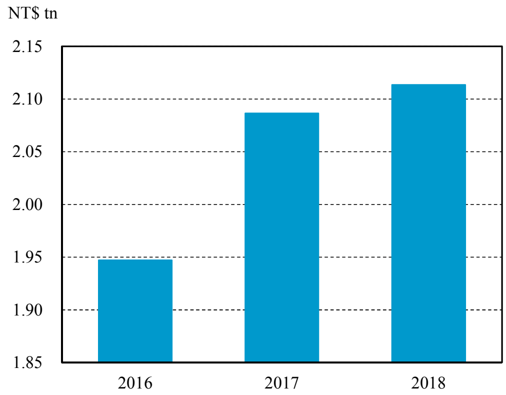
3.3 Financial infrastructure

3.3.1 Payment and settlement systems

Overview of the CIFS's operation

The CIFS serves as the hub of Taiwan's interbank funds transfer and settlement system. The CIFS deals with large-value interbank funds transfers, interbank funding, and funds settlements in financial markets. Moreover, it also provides interbank final settlement services to each clearing institution, such as domestic securities, bills, bonds and retail payments. In 2018, the daily average amount of funds transferred via the CIFS was about NT$2.11 trillion (Chart 3.53).

Chart 3.53 Daily average amount of funds transferred via the CIFS



Source: CBC.

Payment transactions related to daily life are mainly conducted through the retail payment systems of the FISC, the National Credit Card Center (NCCC), and the Taiwan Clearing House (TCH). The trading value of these major systems in 2018 registered NT$212.89 trillion in the FISC, NT$18.99 trillion in the TCH and NT$2.96 trillion in the NCCC. Among them, the amount of funds processed by the FISC's Interbank Financial Information System (FIS) was the largest.

The fast retail payment[56] system in Taiwan was developed very early. Since 1987, financial institutions have conducted real-time settlement through the Bank's Interbank Funds Transfer Guarantee Special Account (Guarantee Account[57]). By linking the FIS with the Guarantee Account, all financial institutions (including community financial institutions) constitute a connected framework to provide the general public 24-hour real-time interbank withdrawal and transfer services (Chart 3.54). Some advanced economies, such as Japan, Hong Kong and Canada, have just

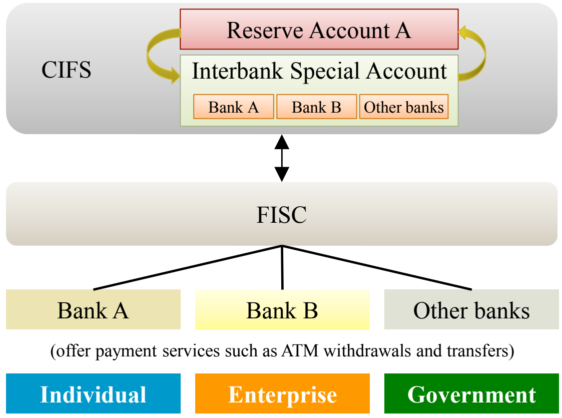
[56] According to the BIS, "fast payment" is defined as a payment in which the transmission of the payment message and the availability of "final" funds to the payee occur in real time or near-real time on as near to a 24-hour and seven-day basis as possible.

[57] The Guarantee Account is a pool account opened by financial institutions in the Central Bank. The account stores the settlement funds required for banks to conduct interbank transactions. When people make interbank withdrawals or transfers, the Interbank Financial Information System of FISC immediately uses the funds in the Guarantee Account to handle the account settlement of interbank fund transfers.

begun developing fast retail payment systems in recent years.

In terms of transaction security, the FISC, entrusted by the FSC, is responsible for the operation of the Financial Information Sharing and Analysis Center (F-ISAC), with the objective to maintain the security of financial transactions via the establishment of a joint financial defense system for InfoSec with financial institutions.

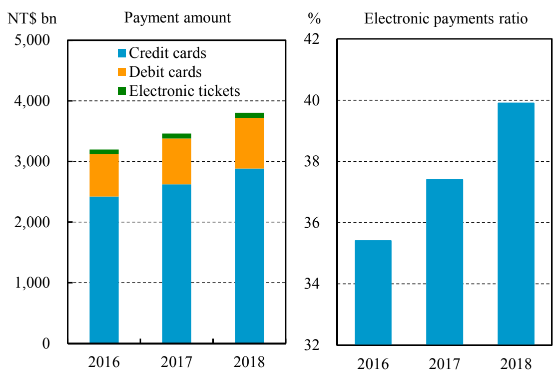
Chart 3.54 Operating framework of domestic fast retail payment system



Source: CBC.

Overview of electronic retail payment transactions

Chart 3.55 Growth of electronic payments



Note: Electronic payment ratio refers to the ratio of the trading value of card-based payment to private consumption expenditure.
Sources: CBC, FSC, FISC and DGBAS.

Over the years, domestic banks and non-bank payment companies have been dedicated to providing diverse and convenient electronic payment instruments for the public to carry out interbank remittances, transfers, bill/tax payments, retail payments and other payments. In terms of consumption expenditure, the public mostly use card-based payments. Among them, the payment amount by credit cards accounts for the largest share, followed by debit cards and electronic stored value cards. The total trading value registered NT$3.80 trillion in 2018, which accounted for 39.95% of total private consumption expenditure (Chart 3.55).

In view of the potential development in mobile payments, since 2017 the National Development Council (NDC) has initiated a cross-ministerial mobile payment mechanism with three themes for promotion, namely building a sound mobile payment environment, expanding the mobile payment coverage, and increasing consumer mobile payment experience, to boost growth of the mobile payment industry and achieve a 90% mobile payment penetration rate[58] by 2025. According to the data collected by the Bank

[58] The penetration rate of mobile payments refers to the ratio of mobile payment users to mobile device users.

from twenty domestic banks, the trading value of mobile payments has grown rapidly since 2017 Q4, registering 120% growth[59] year on year.

As for QR code payment, standardized QR codes, promoted by the FISC and state-owned banks, have allowed consumers to transfer or pay bills/taxes with debit cards or credit cards by scanning QR codes. Currently, the FISC is actively expanding the use of QR codes in versatile types/sites of applications, which integrate more than 4,000 kinds of bills/taxes that can be paid by scanning those codes. Furthermore, it cooperates with large chain stores to provide more convenient payment services, which is expected to bolster trading momentum in the future.

Continue to strengthen the infrastructure of retail payments

In order to help financial institutions keep sufficient interbank settlement funds, the Bank raised the ceiling on the amount of financial institutions' end-of-day balances in the Guarantee Account to be counted as part of the required reserves in January 2019, to promote the smooth operation of overall retail payment infrastructure. The Bank also continues to pay attention to international development trends and urges the FISC to improve its infrastructure, such as lowering processing fees for small-value ATM interbank funds transfers and establishing an inter-agency sharing platform for electronic payments and electronic stored value cards. Moreover, the tiered preferential measures for ATM interbank transfer processing fees were implemented in April 2019 so as to provide the public with a safe, efficient, convenient and low-cost service and to deepen financial inclusion (Box 3).

3.3.2 Providing incentives for financial institution mergers

To provide a friendly legal environment for M&As and strengthen the competitiveness of local financial institutions, in November 2018, the FSC amended regulations relating to the merger of financial holding companies and banks with the aim of encouraging mergers of financial institutions. This policy is applicable to all domestic financial holding companies or banks (applicants). Nevertheless, when it comes to hostile takeovers, only financial institutions without government shareholding management under the MOF can be the applicants or investees. The key points of this policy are as follows:

- The required shareholding ratio of initial investment was revised to be over 10%. However, the applicants have to ensure the merger will be completed within a specified

[59] The mobile payments in this survey included mobile credit cards, mobile debit cards and NFC/QR Code payments. The transaction value in 2018 Q4 was approximately NT$16.77 billion.

period of time (no longer than three years) and submit a follow-up plan for the sale of the purchased shares, which will be executed if the merger fails to be concluded on time.

- If the invested target financial institutions are public companies, the applicants should make enough initial investment through public tender offer within three months after being permitted by the FSC. If the applicants fail to complete the public tender offer as scheduled in the investment plan, they are not allowed to employ another public tender offer of the same invested financial institutions within one year.
- The applicant should obtain one of the following documents in the case of friendly takeover: (1) the board resolution of the invested financial institution showing no objection to the merger; (2) a signed agreement or contract with the insiders or related parties of the invested financial institution to acquire more than 25% of the shares. Those who meet certain criteria[60] are allowed to conduct hostile takeovers without submitting the aforementioned documents. Furthermore, these applicants are allowed to adopt a more flexible approach for capital charge during the merger process.

3.3.3 Paving way for the establishment of internet-only banks

In response to digitized business opportunities and with the aim of encouraging financial innovation and deepening financial inclusion, the FSC proposed a new policy for internet-only banks in April 2018, and subsequently amended relevant regulations to formulate qualification standards of applicants. The main standards include minimum paid-in-capital, scope of business, qualification of founders and directors, fit and proper requirements for major shareholders, supervision standards and physical presence, etc. The FSC has started to accept applications for setting up internet-only banks from November 16, 2018, to February 15, 2019, with a plan of issuing two licenses. As of the time of writing, the FSC received three applications and set up a panel including independent experts and scholars to review applications in a manner of fairness and justice. It is expected that the approval list will be announced by the end of July 2019.

In the future, internet-only banks are expected to draw support from their major shareholders' massive customer bases and technological advantages in e-commerce, telecommunications, or communication software, and to rapidly expand their businesses and make profits. However, owing to overbanking and the highly competitive environment in Taiwan, internet-only banks still will face some challenges in the future. In addition, internet-only

[60] According to the relevant regulations, the applicant should have four prerequisites in place, including adequate capital level, strong operational expertise, robust global expansion capability and sound corporate social responsibility.

banks will be exposed to various risks which are similar, but of a different nature, to those of traditional banks. Therefore, the competent authorities should ensure they comply with financial regulations and strengthen risk management so as to fulfill both goals of financial innovation and financial stability (Box 4).

3.3.4 Financial Technology Development in Taiwan

For the purposes of providing a friendly environment for financial technology development and encouraging the use of technology to develop innovative financial products and services, in July 2018, the FSC promulgated supporting measures pursuant to the *Financial Technology Development and Innovative Experimentation Act* in order to provide financial technology enterprises with necessary assistance, guidance, and counseling services. Recent highlights of related activities promoted by the FSC and other competent authorities are as follows:

Approving an innovative experimentation application

The FSC approved the first application case for FinTech innovative experiment on September 18, 2018. This innovative experiment, involving cross-industry cooperation between a domestic bank and a local telecom company, plans to conduct online lending and credit card businesses for new customers. Moreover, the second batch of application, approved on January 31, 2019, aimed to provide cross-border wire transfers for migrant workers.

Establishing the FinTechSpace

The FinTechSpace, established by the FSC and the TFSR, was inaugurated on September 18, 2018. It aims to create a FinTech ecosystem, cultivate FinTech talents and new ventures, and foster innovation in the domestic financial industry.

Organizing FinTech Taipei 2018

The TFSR, together with the Taiwan Academy of Banking and Finance, organized FinTech Taipei 2018 in December 2018. The expo provided a FinTech exchange platform, deepened financial cross-field collaborations, and was aimed at building FinTech Taipei as a brand through holding this iconic international FinTech conference.

3.3.5 Taiwan prepared for mutual evaluations by the APG

Taiwan has been complying with the international requirements governing AML/CFT set out by the Financial Action Task Force (FATF). However, the FATF successively amended regulations such as the 40 Recommendations and assessment methodology in recent years, which makes it more difficult and challenging for those undergoing national AML/CFT compliance.

To prepare for the third-round of APG mutual evaluations, recently Taiwan has actively implemented corresponding measures aimed at getting higher ratings in the aforementioned evaluations. Those measures included: establishing the "Anti-Money Laundering Office" to be fully in charge of reinforcing national-wide coordination of AML/CFT; amending regulations governing AML/CFT; and organizing assessment and evaluation meetings (Box 5).

3.3.6 FX regulation amendments

Relaxing FX regulations for banks

In order to promote development of the financial services industry in the context of financial globalization and liberalization, the Bank successively relaxed FX regulations for banks as follows:

- In order to conform with the amendments to the *Company Act* that eliminate the recognition system for foreign companies, in November 2018, the Bank revised the *Directions Governing Banking Enterprises for Operating Foreign Exchange Business*, relaxing the qualification criteria for trustors for NTD non-discretionary money trusts.

- In order to conform with the policy that the FSC opened the door for establishing the internet-only banks in February 2019, the Bank revised the *Regulations Governing Foreign Exchange Business of Banking Enterprises*, adding provisions relevant to the qualification criteria for internet-only banks to apply for approval to become authorized FX banks.

- In line with the amendments to the aforementioned regulations, the Bank concurrently revised directions related to application procedures for banks engaging in FX business with customers through electronic and communications equipment.

Relaxing FX regulations for bills finance companies

In response to deregulating foreign currency-denominated interest rate derivative business for bills finance companies, in November 2018, the Bank stipulated application procedures and matters of compliance for the headquarters of bills finance companies conducting the business of FX derivatives involving interest rates as a business entity.

Box 3
Continuously improving the retail payment infrastructure to deepen financial inclusion

Financial inclusion[1] has far-reaching effects on financial development and economic growth. Moreover, it contributes to not only the transmission of the central banks' monetary policy but also financial stability.[2] For quite some time, many countries have regarded it as an important objective of public policy. In recent years, technological innovation has changed the face of retail payment services, which has become a new focus for countries to promote financial inclusion.

1. Countries across the world have successively established fast retail payment systems, which has helped achieving the goal of financial inclusion

Technological innovation expands the depth and breadth of retail payment services, which contributes to achieving financial inclusion. Recently, countries across the globe have successively established fast retail payment systems featuring low cost, easy-to-use interfaces, safe transaction and rapid access to funds. The systems are expected to provide better payment services so that more individuals can be involved in the financial system. (Table B3.1).

Table B3.1 Features of development in international fast retail payment

Features of development	Measures taken
Low cost	• Replacing ATM with online or mobile banking services to reduce setup and maintenance costs • Non-bank payment service providers to join the payment market, providing convenient and low-cost payment services through mobile applications
Easy-to-use interface; safe transaction	• Developing standardized QR Codes • Transferring with mobile phone numbers or email addresses in place of bank account numbers • Intergrating more trading information to provide additional value-added services (such as tracing cash flows)
Rapid access to funds	Adopting pre-funding to provide settlement funds, which is expected to help achieve 24-hour real time gross settlement and allow customers to instantly obtain and employ funds

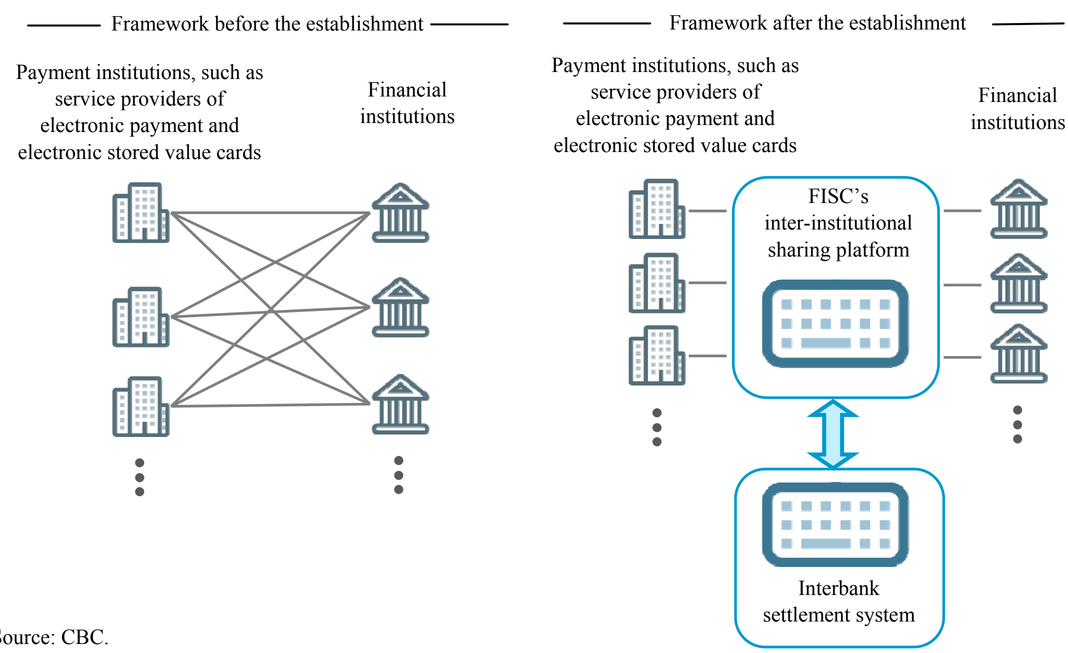
Source: CBC.

2. Continuing to improve the retail payment infrastructure and deepen financial inclusion

With the advent of the mobile payment era, banks are actively promoting various mobile banking services. Meanwhile, non-bank electronic payment institutions (EPIs) are also actively providing consumers with multiple payment options through mobile applications. The Bank continues to urge the Financial Information Service Co., Ltd. (FISC) to improve the retail payment infrastructure to deepen financial inclusion. For example, tiered preferential measures for ATM interbank transfer fees were introduced in April 2019.

In addition, under the current direct network connection model, EPIs connect directly with one or more banks, while their customers are connected to different banks' accounts to settle online payments through the electronic payment platforms. With an increase in EPIs, the above-mentioned operation could become more sophisticated and fuel concern over security of data and transaction processing. In response, the FISC has developed standardized QR Codes and integrated the front-end trading interface. Furthermore, the exchange of post-transaction messages can be conducted immediately through the inter-institutional sharing platform established by the FISC (Chart B3.1). Those procedures, coupled with the transactions through the existing CBC Interbank Funds Transfer System (CFIS) at the back end, demonstrate the benefits of exchanging

Chart B3.1 The inter-institutional sharing platform



Source: CBC.

real-time transaction data at the front end and rapid fund settlement at the back end. Moreover, the inter-institutional sharing platform can solve the current problem of incompatibility between different EPIs. As a result, vendors could receive various types of payment from consumers by signing contracts with even just one acquiring institution.

3. The Bank raised the ceiling on the amount of financial institutions' end-of-day balances in the Interbank Funds Transfer Guarantee Special Account (Guarantee Account) to be counted as part of the required reserves so as to facilitate smooth operation of the payment infrastructure

As the volume of e-commerce and online transactions continues to expand, the average end-of-day balances in the Guarantee Account of the Bank have increased from approximately NT$20 billion in the early period to NT$50 billion or so in 2018, meeting the needs of interbank transactions during non-business hours such as night time and holidays. In order to allow financial institutions to deposit sufficient settlement funds and facilitate smooth operation of the overall retail payment infrastructure, the Bank has raised the ceiling on the amount of financial institutions' end-of-day balances in the Guarantee Account to be counted as part of the required reserves from 4% to 8 %, which became effective from January 4, 2019 onwards. Financial institutions are permitted to retain more funds in the Guarantee Account so as to provide a wider range of payment services.

Notes: 1. According to the definition of the World Bank, financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way.

2. Mehrotra, Aaron and James Yetman (2015), "Financial Inclusion – Issues for Central Banks," *BIS Quarterly Review*, March; Irving Fisher Committee (2016), "Measures of Financial Inclusion – A Central Bank Perspective," *IFC Report*, June.

Box 4
The development of internet-only banks in Taiwan

Responding to digitized business opportunities, as well as aiming to encourage financial innovation and deepening financial inclusion, the FSC announced the policy to open the door for the establishment of internet-only banks in April 2018 and subsequently amended relevant regulations. As internet-only banks have different business models from traditional banks, they may give rise to distinct risks and supervision issues, and their impacts on the domestic financial system and financial consumer rights merit further attention.

1. International trends of internet-only banks

Internet-only banks usually refer to banks without physical branches which provide all financial services through internet or mobile channels, but the definitions are slightly different in various countries. In recent years, the significantly rising penetration rates of online banking provided a good opportunity for the development of internet-only banks. After the Security First Network Bank, the world's first internet-only bank, was established in the United States in 1995, a number of internet-only banks were set up around the world.

In general, there are two business models adopted by internet-only banks. One is providing financial services at preferential prices and enhancing customer experience by using new technology so as to attract customers. Many internet-only banks in European countries and America adopted this model. The other is taking the advantages of solid business networks and massive customer bases from major shareholders of e-commerce, telecommunications, communication software, retail corporations or financial holding companies, to establish a complete ecosystem by integrating product, financial, and information flows from various industries. This model can be represented by internet-only banks in Asian countries.

The same as traditional banks, internet-only banks also face strategic, credit, market, operational, liquidity, and reputational risks. However, since internet-only banks purely rely on internet or mobile channels to provide financial services, the features of the risks they face are somewhat different from those faced by traditional banks.[1] In particular, they should enhance the management of liquidity risk, operational risk (including customer data protection), and reputational risk. Moreover, potential risks of internet-only banks related to money laundering, consumer protection, and using non-traditional data (such as social networking data) for credit review should also be closely monitored.

In the countries with internet-only banks among other kinds of banks, there is no significant difference in supervion standards between internet-only banks and traditional commercial banks. Usually, supervisors in these countries do not formulate special supervisory regulations for internet-only banks but mainly follow the *Core Principles for Effective Banking Supervision*[2] and apply the same supervisory rules as for traditional commercial banks.

2. The development of internet-only banks in Taiwan

2.1 The FSC planned to accept the establishment of two internet-only banks

In April 2018, the FSC proposed a new policy for internet-only bank establishment and accordingly amended relevant regulations governing commercial bank establishment to stipulate the application requirements of internet-only bank establishment. The key requirements include minimum paid-in-capital, scope of business, qualification requirements of founders and directors, fit and proper requirement for major shareholders, supervision standards, and physical presence, etc. (Table B4.1). The FSC planned to issue only two licenses for internet-only banks to properly mitigate competitive pressures in the banking sector.[3]

The FSC also set up four categories of evaluation criteria for the applications, including financial capabilities (10%), fit and proper qualities of founders with shareholdings over 10% and of major senior managers (20%), business model feasibility (40%), and management mechanism appropriateness (30%). Among them, business model feasibility has the highest weighting.

Table B4.1 Main requirements for internet-only bank establishment in Taiwan

Items	Main requirements
Minimum paid-in-capital	• NT$10 billion (the same as required for setting up a commercial bank).
Scope of business	• Same business scope as a commercial bank. • Allowed to apply for money trust, credit card and electronic payment businesses upon application.
Qualification requirements of founders	• More than 40% of paid-in-capital should be subscribed for by the founders of financial institutions (financial holding companies, banks, insurance companies or securities firms), and at least one of the founders should be a bank or a financial holding company whose shareholding should exceed 25%. • A foreign financial institution can be the founder. • Non-financial founders who have the financial technology, e-commerce or telecommunication capabilities and are capable of offering a successful business model may subscribe for more than 10% of the

	paid-in capital.
Qualification requirements of board directors	• More than half of the directors should meet professional requirements in banking, financial technology, e-commerce or telecommunication businesses. • At least one of the board directors should meet professional requirements in financial technology, e-commerce or telecommunication businesses.
Fit and proper requirements for major shareholders	• Major shareholders should meet the requirements of integrity, honesty, and no regulation violation, and can reasonably explain the interested relationships with the banks. • Major shareholders should not have disqualifying conditions for persons in charge of banks.
Supervisory standards	• Subject to the same regulations and supervisory requirements governing incumbent commercial banks; required to join the government deposit insurance scheme.
Branch locations	• The absence of physical branches, except for the head office and the customer service center.

Source: FSC.

2.2 Three groups applied for the licenses of internet-only banks

Currently, three groups with different competitive advantages applied for the licenses of internet-only banks, including Line Commercial Bank, Next Commercial Bank, and Rakuten International Commercial Bank. A look at the background of the founders showed that all applicants employ similar business models to that of Japan, South Korea and Mainland China, seek to expand their customer bases and businesses as fast as possible with the help of their major shareholders that possess massive customer bases in the fields of e-commerce, telecommunications, and communication software.

In order to evaluate applications in a manner of fairness and justice, the FSC stipulated a piece of regulation in February 2019 to set up an evaluation panel comprising external experts and scholars and representatives from the FSC. It was expected that the approval list would be announced by the end of July 2019.

2.3 Taiwan is in a good position to accommodate internet-only banking businesses, but still faces some challenges

High internet and smartphone penetration rates put Taiwan in a good position to develop online banking services. The implementation of a financial regulatory sandbox also provides internet-only banks good opportunities to employ new technology to provide financial services. In addition, massive customer bases of all applicants also are conductive to rapidly expanding business after the internet-only banks are established.

However, owing to high financial inclusion, overbanking and the highly competitive environment in Taiwan, internet-only banks are still confronted with some challenges regarding attracting customers and making profits. Furthermore, difficulty in recruiting suitable senior managers and collecting the necessary big data, as well as making enough profits to cover the high costs of information system development and database maintenance in the short term, also pose challenges to their future operations.

3. Conclusion

Drawing from the business models of internationally renowned internet-only banks, the authorities found that security, efficiency, innovation, and optimized customer experience were important factors to attract customers and earn their trust. In the future, in order to effectively improve profitability, Taiwan's internet-only banks can take advantage of internet and financial technology innovation and cooperate with their major shareholders or strategic partners to produce synergies. Meanwhile, they should strengthen risk management, especially risk controls over liquidity, information security and regulatory compliance, to facilitate sound operation.

In order to fulfill both goals of financial innovation and financial stability, the competent authorities should ensure regulatory compliance of internet-only banks and strengthen risk monitoring of their operations. The authorities should also formulate relevant rules for internet-only banks based on supervisory standards and international experience. In addition, the Bank will prudently assess the impacts of internet-only banks on monetary, credit and foreign exchange policies, as well as financial stability, and take appropriate actions to address potential liquidity risks.

Notes: 1. BCBS (2018), "Sound Practices: Implications of Fintech Developments for Banks and Bank Supervisors," February.
2. BCBS (2012), "Core Principles for Effective Banking Supervision," September. Core principle 4 stipulates that a bank which is licensed and subjected to supervision can accept deposits.
3. The FSC had initially planned to issue two new licenses for the three applicants. However, considering that they all had different business models and target customers, the FSC eventually announced in July 2019 that all three companies were granted approval to set up internet-only banks.

Box 5
Taiwan's preparations for mutual evaluations by the Asia/Pacific Group on Money Laundering (APG)

APG mutual evaluations mainly involve two interrelated components for technical compliance (framework of laws) and effectiveness (outcomes achieved). The evaluations require not only the implementation of comprehensive regulations governing anti-money laundering and combating the financing of terrorism (AML/CFT), but also the delivery of the achievements of the program. If the assessment outcomes fail to meet the standard, national reputation and international financial business could be affected. Therefore, so as to prepare for the third-round APG mutual evaluations in 2018, ministries and departments under Taiwan's cabinet actively implemented the following measures.

1. Establishing an institution fully in charge of reinforcing the national coordination of AML/CFT

In March 2017, the Executive Yuan (Taiwan's cabinet) established the "Anti-Money Laundering Office." Its main missions are to coordinate and execute duties relevant to AML/CFT policies and guidelines within Taiwan, and to promote the preparatory tasks for national AML/CFT risk assessment and the aforementioned mutual evaluations.

2. Amending related regulations

To achieve compliance with the requirements set out in the 40 Recommendations of the Financial Action Task Force (FATF), Taiwan has continued to amend relevant regulations governing AML/CFT. Accordingly, financial supervisory authorities have also conducted several amendments to meet the requirements. The main amendments are shown as follows.

2.1 Laws

(1) Amending the Money Laundering Control Act

For the purpose of complying with international standards, bolstering anti-money laundering systems, increasing transparency in money flows and constructing a suspicious transactions reporting mechanism, the *Money Laundering Control Act* was substantially revised in December 2016 and enacted in June 2017. The *Act* was revised again in November 2018 to avoid disputes and to be more in line with international regulations.

(2) Enacting the *Counter-Terrorism Financing Act*

Following the United Nation's international convention in connection with the prevention of terrorist financing (TF) and FATF's 40 Recommendations, the *Counter-Terrorism Financing Act* was enacted in July 2016. The *Act* was amended in November 2018 to ensure that targeted financial sanctions are fully implemented.

2.2 Regulations applied to the financial sector

(1) Promulgation of the Regulations Governing Anti-Money Laundering of Financial Institutions

Authorized by Articles 7 to 10 of the *Money Laundering Control Act*, the FSC enacted and amended the *Regulations Governing Anti-Money Laundering of Financial Institutions* in June 2017 and November 2018, respectively. The *Act* primarily required that financial institutions comply with the related provisions in undertaking customer (including beneficial owners) due diligence, record keeping, and reporting of large amount cash transactions, as well as suspicious money laundering or TF transactions

(2) Introducing regulations governing financial institutions' AML/CFT internal control and auditing systems

According to Article 6 of the *Money Laundering Control Act*, the FSC changed the directions governing internal control systems into regulations on the banking sector's internal audit and internal control system of AML/CFT in November 2018. Moreover, the FSC enacted regulations governing AML/CFT of the securities, futures, and insurance industries. Additionally, with the aim of urging financial institutions to comply with AML/CFT regulations, the FSC has been promoting public awareness and conducted risk-based targeted examinations.[1]

2.3 Others

The Bureau of Agricultural Finance, Council of Agriculture, also promulgated regulations governing AML/CFT of agricultural financial institutions. The Bank enabled further improvements of the AML/CFT rules by amending regulations governing foreign exchange business handled by foreign currency exchange counters and banks. Furthermore, the Bank conducted risk-based on-site reviews targeting foreign currency exchange counters, along with information integrity reviews of foreign currency remitters and beneficiaries.

3. Organizing a series of assessment or evaluation meetings

Taiwan's AML Office fully cooperated with the public and private sectors to complete a *Technical Compliance Report* and an *Effectiveness Compliance Report* in May and July 2018, respectively. The reports were submitted to the APG for mutual evaluations. In addition, the AML Office has actively organized the following assessment or evaluation meetings.

3.1 National Money Laundering/Terrorist Financing (ML/TF) Risk Assessment Procedure Meetings

From June 2017 onwards, the AML Office successively held four large-scale National ML/TF Risk Assessment Procedure Meetings and published the first *National Money Laundering and Terrorist Financing Risk Assessment Report* in May 2018. The report not only met the requirements specified in the FATF's 40 Recommendations but also helped the development of more effective AML/CFT policies in Taiwan.

3.2 Mock mutual evaluation meetings

The AML Office conducted mock mutual evaluation meetings in December 2017 and April 2018, in which foreign consultants were appointed as mock assessors to simulate possible situations faced when answering questions. These meetings were aimed not only at promoting the related participants of assessed sectors to become familiar with on-site evaluations but also helping the Office identify potential deficiencies or weaknesses of the relevant regulations and measures.

3.3 APG on-site evaluation meetings

Three APG on-site evaluation meetings have been held and are summarized in Table B5.1.

Table B5.1 Summary of the APG on-site evaluation meetings

Date	Title	Summary
August 28-31, 2018	Preparatory meeting	The meeting included two-way communication discussions about three reports (such as *Technical Compliance Report*) proposed by the AML Office, as well as the procedure and administrative details of the on-site evaluation meeting to be held in November 2018.
November 5-16, 2018	On-site evaluation meeting	Thanks to great support and investment by the government, the preliminary results of a mutual evaluation highly attested to the significant progress in Taiwan's AML/CFT.
March 18-21, 2019	Face-to-face meeting	All the participants from different authorities were able to actively explain and reply to the deficiencies proposed by the assessment team so as to mitigate the deficiencies.

Source: CBC.

4. Taiwan actively strives to achieve a higher evaluation rating in the 2019 APG annual meeting

In accordance with the APG mutual evaluation description, Taiwan's mutual evaluation report, revised after the face-to-face meeting, will be submitted to the APG annual meeting in 2019. After further discussion and confirmation, the aforementioned report will be concluded. Against this backdrop, the foremost task of Taiwan's delegation is to plan and formulate measures to achieve higher ratings of some evaluation items so as to receive better evaluation results. Nevertheless, since countries such as the US, Canada, Australia and New Zealand are known for carrying out rigorous assessments in the annual meeting of the international FSRB (FATF-style regional body), Taiwan is likely to face demanding challenges, which warrants preemptive measures.

Note: 1. The content includes evaluating financial institutions' risk profiles, conducting more frequent and detailed examinations according to risk ratings, and carrying out diverse targeted examinations, etc.

IV. Measures to promote financial stability

In 2018, against a backdrop of slowing economic growth at home and abroad and mild domestic inflation, Taiwan's financial markets and financial infrastructure maintained smooth operations and sound development. Profitability of financial institutions remained satisfactory, while asset quality stayed at an appropriate level and capital levels remained sound. As a whole, Taiwan's financial system remained stable.

Facing the changes in global and domestic economic and financial conditions, especially prolonged US-China trade tensions, monetary policy normalization by major economies moving on an unclear path, Brexit uncertainties, and slowdown in economic growth in Mainland China, possible negative impacts on the global economy and increasing financial market risks persist. Therefore, the Bank will continue to closely monitor the influences on the domestic economy and financial system and adopt appropriate monetary, credit, and FX policies as warranted. Meanwhile, the FSC also continues to amend financial laws and regulations and undertakes measures to strengthen financial supervision, aiming to foster the soundness of financial institutions and improve financial stability.

4.1 Measures taken by the Bank to promote financial stability

In view of a slowdown in domestic economic growth and mild inflation, the Bank held policy rates unchanged in 2018. Moreover, the Bank persistently implemented restrictions on high-value housing loans on concerns about their higher price volatility. The Bank also continued to adopt flexible FX rate policies and maintained dynamic stability of the NT dollar exchange rate, as well as timely amending relevant FX regulations.

4.1.1 Adopting appropriate monetary policies in response to domestic and global economic and financial conditions

The Bank kept policy rates unchanged

On account of an uncertain international economic and financial outlook, as well as slower domestic economic growth, coupled with the actual output level remaining below potential output, mild future inflation pressures, and domestic nominal and real interest rates ranking in the middle compared to major economies, the Bank kept policy rates unchanged in 2018. The discount rate, the rate on accommodations with collateral, and the rate on accommodations without collateral remained at 1.375%, 1.75%, and 3.625%, respectively.

Reserve money growth remained moderate

The Bank conducted open market operations to keep market liquidity at an appropriate level. In 2018, the excess reserves in all financial institutions remained at a higher level. The total loans and investments in the banking industry grew by 5.26%, while the monetary aggregate M2 increased by 3.52% year on year. Both rates were higher than the GDP growth rate of 2.63%, indicating that market liquidity was sufficient to support economic activity.

The Bank will continue to implement appropriate monetary policies

The Bank will continue to closely monitor price conditions, the output gap, as well as changes in global and domestic economic and financial conditions, and undertake appropriate monetary policies to maintain price and financial stability, as well as fostering economic growth.

4.1.2 The Bank promoted smooth interbank clearing

With instant interbank clearing significantly increasing year by year, the Bank raised the ceiling on the amount of financial institutions' end-of-day balances in the Guarantee Account to be counted as part of the required reserves from 4% to 8%, effective from January 2019. This adjustment aimed to ensure that financial institutions had an adequate supply of funds and that retail payment systems operated smoothly at all times.

4.1.3 The Bank continued to implement targeted prudential measures on high-value housing loans

In March 2016, the Bank repealed most of the targeted prudential measures imposed on real estate loans, except for high-value housing loans because of higher risks faced by banks resulting from greater volatility in high-value housing prices, and urged banks to exercise self-discipline on mortgage-related credit risk management. In the future, the Bank will continue to monitor financial institutions' credit risk management on real estate loans and the developments in the real estate market and undertake appropriate policy actions in a timely manner as needed to ensure financial stability.

4.1.4 Safeguarding the dynamic stability of the NT dollar exchange rate

Adopting flexible FX rate policies

Considering that Taiwan's economy has a relatively small scale and is heavily dependent on international trade, the Bank adopts a managed float exchange rate regime to contain sharp fluctuations of exchange rate. 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 the event of excessive exchange rate volatility caused by movements of large international short-term capital flows, the Bank would conduct "leaning against the wind" operations to stave off adverse implications for economic and financial stability and to enhance FX market efficiency. The Bank continues to maintain the dynamic stability of the NT dollar exchange rate to foster the long-term development of domestic economic growth.

Maintaining an orderly FX market and promoting its sound development

In 2018, the Bank continued to undertake appropriate management measures to safeguard FX market order and promote its sound development. These measures mainly included: (1) continuing to implement the Real-Time Reporting System for Large-Amount Foreign Exchange Transactions to record the updated transaction information in the FX market; (2) reinforcing examination efforts which were made to ensure that forward transactions were based only on actual transactions; (3) urging authorized banks to enhance their exchange rate risk management in order to reduce FX exposure of individual banks and systemic risk in the FX market; and (4) continuing to strengthen targeted examinations on foreign exchange business in order to maintain the order of the FX market.

4.1.5 Strengthening the AML/CFT mechanism in FX business

In accordance with the recommendations of the FATF to strengthen the AML/CFT regulations, the Bank continued to revise foreign exchange regulations as follows:

1. The Bank revised *the Regulations Governing the Establishment and Administration of Foreign Currency Exchange Counters* in June 2018. These revisions mainly included: requiring the applicant to provide the responsible persons' police criminal record certificates showing no conviction record in Taiwan when applying for the establishment of foreign currency exchange counters or change of its responsible person; requiring compliance with standard operating procedures of AML/CFT; requesting to reject suspicious money laundering or terrorist financing (ML/TF) transactions; and amending terrorist financing reporting procedures.

2. In view of Recommendation 16 and assessment methodology of the FATF, the Bank amended *Directions Governing Banking Enterprises for Operating Foreign Exchange Business* in November 2018, such that upon receiving a request from the competent authorities, banks must provide the originator and beneficiary information available within three business days.

4.2 Measures undertaken by the FSC to maintain financial stability

From 2018 onwards, the FSC has continued promoting green financing and FinTech development, as well as paving the way for setting up internet-only banking and amending regulations relating to incentive measures for mergers of financial institutions. Additionally, the FSC has strengthened AML/CFT measures and regulatory compliance programs of financial institutions, as well as enhancing risk management and compliance effectiveness of financial institutions so as to maintain financial stability.

4.2.1 Strengthening Taiwan's AML/CFT measures

In response to the mutual evaluations of the APG and to fully align with the 40 Recommendations of the FATF, the FSC has introduced amendments to the related regulations:

1. In November 2018, the FSC amended the *Regulations Governing Anti-Money Laundering of Financial Institutions.* With regard to the regulation on customer due diligence for occasional transactions, the existing requirement applicable to cash transactions exceeding certain amounts has been amended to be not limited to cash transactions only. Moreover, suspected ML/TF transactions shall be filed promptly after approval by the responsible chief compliance officer at the institution, and the report shall be filed within two business days after the approval.

2. The FSC promulgated three regulations in November 2018, through amendments that made the “directions” governing AML/CFT internal control systems of financial institutions into “regulations”. The main contents of the regulations cover internal control and auditing systems for AML/CFT, ML/TF risk assessment, appointment of dedicated chief compliance officers and unit establishment.

4.2.2 Enhancing risk management, corporate governance and legal compliance of the financial industry

1. In October 2018, the FSC amended related regulations governing qualification requirements, concurrent serving restrictions and matters for compliance by the responsible persons of banks, as well as founders or responsible persons of financial holding companies. The amendments added the provisions for implementing non-compete clauses and raised the required proportion of professional natural person directors on the board of directors of financial institutions. Moreover, the FSC urged each industry’s association to revise corporate governance best-practice principles, and stipulated term limits for independent board directors of financial institutions.
2. The FSC required 36 domestic banks to conduct stress tests in 2018, applying the methodology adopted by advanced economies and including two-year period stress tests for the first time. The results of the overall stress tests revealed that in both mild and relatively serious scenarios, capital adequacy related ratios of domestic banks were all higher than the minimum requirements, showing that banks still have strong capacity to bear risks.
3. In April 2019, the FSC amended the *Banking Act* and the *Securities and Exchange Act* in order to strengthen regulatory compliance of the financial industry. The amendments raised the maximum fine for violating regulations and posing a hindrance to financial examinations, as well as adding regulations governing prohibition of conflicts of interest for responsible persons of banks.

4.2.3 Continually reinforcing the insurance industry’s risk management

1. In November 2018, to strengthen insurance companies’ management of FX-related risk associated with their overseas investments, the FSC amended the relevant requirements that the total amount of investments in international bonds plus foreign investments of insurance companies shall not exceed 145% of its approved foreign investment.

2. In order to further strengthen the mechanisms for FX valuation reserves held by life insurance companies, the FSC introduced the amendments to related directives in January 2019. The amendments required life insurance companies to raise the monthly fixed setting ratio of reserves set aside from 0.05% to 0.06%, and to raise both the monthly additional reserve setting ratio and the monthly additional offsetting ratio from 50% to 60% when the hedging cost in the foreign exchange market reaches 2% or more.

4.2.4 Strengthening mechanism for whistleblower and InfoSec of financial industry

1. In March and May 2018, the FSC amended the related rules governing internal control and auditing systems of financial holding companies, as well as banking, insurance, and securities and futures industries. The amendments required those financial institutions to establish an internal whistleblower mechanism and designate an independent unit to take charge of review and investigation of reported cases.
2. The FSC urged each industry's association to review and establish self-disciplinary regulations of InfoSec and required financial institutions to establish an InfoSec unit and appoint a chief officer to take charge of InfoSec activities. Moreover, the FSC set up the F-ISAC with the aim of building a joint financial defense system for InfoSec in Taiwan.

4.2.5 Promoting risk-based internal audit system

To urge internal auditors of financial institutions to focus on primary risks and conduct audits in depth, the FSC has approved the adoption of risk-based internal audit systems at 10 domestic banks. Additionally, the FSC encouraged large domestic banks to actively adopt this system, with a step-by-step plan divided into two stages according to asset scale.

Appendix: Financial soundness indicators[61]

Table 1: Domestic Banks

Unit: %

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
Earnings and profitability						
Return on assets (ROA)	0.67	0.77	0.73	0.66	0.66	0.68
Return on equity (ROE)	10.29	11.62	10.65	9.23	9.03	9.34
Net interest income to gross income	60.97	59.34	60.85	60.04	60.03	59.33
Non-interest expenses to gross income	52.81	50.15	52.62	52.01	52.74	51.55
Gains and losses on financial instruments to gross income	14.63	14.11	9.60	11.37	R 14.85	11.23
Employee benefits expenses to non-interest expenses	59.32	57.50	55.90	56.29	56.75	57.15
Spread between lending and deposit rates (basis points)	1.42	1.42	1.44	1.38	1.36	1.35
Asset quality						
Non-performing loans to total loans	0.39	0.25	0.24	0.27	0.28	0.24
Provision coverage ratio	311.65	502.87	547.66	503.45	490.59	573.67
Capital adequacy						
Regulatory capital to risk-weighted assets	11.83	12.35	12.93	13.33	14.17	13.99
Tier 1 capital to risk-weighted assets	9.14	9.60	10.33	10.97	11.78	11.86
Common equity Tier 1 capital to risk-weighted assets	9.06	9.38	10.03	10.50	11.19	11.19
Capital to total assets	6.60	6.85	7.12	7.37	7.35	7.50
Non-performing loans net of provisions to capital	-3.24	-3.86	-3.03	-2.49	-2.18	-1.86
Leverage ratio	-	-	5.90	6.29	6.42	6.56
Liquidity						
Customer deposits to total loans	130.06	130.89	136.21	137.25	138.76	135.75
Liquid assets to total assets	13.40	13.17	12.18	10.55	9.75	9.46
Liquid assets to short-term liabilities	18.42	18.32	16.85	14.98	13.37	13.36
Liquidity coverage ratio	-	-	125.13	125.81	134.76	133.89
Net stable funding ratio	-	-	-	-	-	132.44

[61] For more details, please refer to CBC (2017), "Explanatory notes: Compilation of financial soundness indicators," *Financial Stability Report*, May.

Table 1: Domestic Banks (cont.)

Unit: %

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
Credit risk concentration						
Household loans to total loans	47.73	48.67	49.79	50.10	50.93	51.16
Corporate loans to total loans	44.65	44.32	43.74	43.79	43.63	43.80
Large exposures to capital	52.40	42.21	36.97	34.74	31.88	28.95
Gross asset positions in financial derivatives to capital	6.79	15.61	16.62	12.33	6.29	6.92
Gross liability positions in financial derivatives to capital	8.09	15.53	17.35	12.67	7.76	9.36
Sensitivity to market risk						
Net open position in foreign exchange to capital	3.04	2.69	2.91	4.21	3.95	3.78
Foreign-currency-denominated loans to total loans	19.90	21.22	21.55	20.80	20.35	20.14
Net open position in equities to capital	22.71	24.33	22.52	21.73	21.42	22.51
Foreign-currency-denominated liabilities to total liabilities	27.01	29.01	30.58	29.49	26.31	29.21

Notes: 1. Figures for “Return on assets”and “Return on equity” from 2013 are based on the daily average assets and daily average equity.
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. Figures for “Capital adequacy” from 2013 are on the Basel III basis.
4. Figures for “Leverage ratio” and “Liquidity coverage ratio” are published from 2015, while figures for “Net stable funding ratio” are publishe 2018.
5. Figures for “Large exposures” are revised to the total amount of credit to the first 20 private enterprises at domestic banks after integration.
6. Figures with “R” are revised data.

Table 2: Non-financial Corporate Sector

Units: %, times

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
Total liabilities to equity						
TWSE-listed companies	105.35	101.77	94.29	98.33	100.07	99.48
OTC-listed companies	81.22	76.76	76.26	82.52	82.73	82.36
Return on equity						
TWSE-listed companies	14.06	14.78	13.73	14.38	15.81	14.92
OTC-listed companies	9.92	12.21	10.36	10.39	10.44	13.02
Net income before interest and tax / interest expenses (times)						
TWSE-listed companies	13.11	13.38	13.45	13.18	13.60	11.18
OTC-listed companies	11.12	14.50	12.75	12.59	12.88	16.23

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

Table 3: Household Sector

Unit: %

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
Household borrowing to GDP	82.46	82.66	R 82.92	R 83.37	R 85.72	87.89
Borrowing service and principal payments to gross disposable income	42.14	43.74	46.28	47.16	R 47.78	48.15

Notes: 1. Figures for "gross disposable income" are the sum of household disposable income, rent expense and interest expense.
2. Figure of "gross disposable income" for 2018 is a CBC estimate.
3. Figures with "R" are revised data.

Table 4: Real Estate Market

Unit: index, %

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
Land price index	105.79	115.07	119.28	118.91	117.24	100.22
Residential real estate loans to total loans	27.91	28.04	28.96	29.35	29.82	29.73
Commercial real estate loans to total loans	14.26	14.70	15.87	16.60	17.54	17.78

Notes: The land price index is published semiannually, and the reference dates are the end of March and September, respectively, while these figures are based on end-September data every year (March 2013 = 100).

Table 5: Market Liquidity

Unit: %

Items \ Year (end of year)	2013	2014	2015	2016	2017	2018
The turnover ratio of trading value in stock market	82.64	84.63	77.54	64.60	78.40	92.55
The monthly average turnover ratio in bond market	8.59	8.64	7.67	6.62	5.10	4.25

Notes: 1. The turnover ratio in terms of trading value in stock market is the cumulative figure of the period.
2. The monthly average turnover ratio in bond market is the average figure of the period.

Abbreviations

ABS	Australian Bureau of Statistics
AML	Anti-Money Laundering
APG	Asia/Pacific Group on Money Laundering
APP	Asset purchase program
APRA	Australian Prudential Regulation Authority
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
BSI	Banking System Indicator
CBC	Central Bank of the Republic of China (Taiwan)
CDD	Customer due diligence
CDOs	Collateralized debt obligations
CFT	Countering the financing of terrorism
CIFS	CBC Interbank Funds Transfer System
CIPs	Customer identification programs
CP	Commercial paper
CPI	Consumer price index
CLOs	Collateralized loan obligations
DBUs	Domestic banking units
DGBAS	Directorate-General of Budget, Accounting and Statistics of the Executive Yuan
ECB	European Central Bank
EPIs	Electronic payment institutions
ETF	Exchange-traded fund

EU	European Union
EUR	Euro
FATF	Financial Action Task Force
FDIC	Federal Deposit Insurance Corporation
Fed	Federal Reserve System
FinTech	Financial technology
FIS	Financial information system
FISC	Financial Information Service Co., Ltd
F-ISAC	Financial Information Sharing and Analysis Center
FSA	Financial Services Agency, Japan
FSC	Financial Supervisory Commission
FSIs	Financial soundness indicators
FSS	Financial Supervisory Service, South Korea
FX	Foreign exchange
GAAP	Generally accepted accounting principles
GBP	British Pound
GDP	Gross domestic product
G-SIBs	Global systemically important banks
HKMA	Hong Kong Monetary Authority
IFRSs	International Financial Reporting Standards
IIF	Institute of International Finance
IMF	International Monetary Fund
InfoSec	Information security
JCIC	Joint Credit Information Center
JPY	Japanese Yen
KRW	Korean Won
KYC	Know your customer
LCR	Liquidity coverage ratio
ML	Money laundering
MLF	Medium-term lending facility
MOF	Ministry of Finance
MOI	Ministry of Interior
MPI	Macro-prudential indicator

M&As	Mergers and acquisitions
NCCC	National Credit Card Center
NDC	National Development Council
NPL	Non-performing loan
NSFR	Net stable funding ratio
NTD	New Taiwan dollar
OBUs	Offshore banking units
OECD	Organization for Economic Co-operation and Development
OTC	Over-the-counter
PBC	People's Bank of China
PP	Percentage Point
PSL	Pledged supplementary lending
QR code	Quick response code
RBC	Risk-based capital
RegTech	Regulatory technology
repo	Repurchase agreement
RMB	Renminbi
ROA	Return on assets
ROC	Republic of China
ROE	Return on equity
RPA	Robotic process automation
SAR	Suspicious activity reporting
Sifma	Securities industry and financial markets association
SOEs	State-owned enterprises
SSE	Shanghai Stock Exchange
SupTech	Technology in financial supervision
TAIEX	Taiwan Stock Exchange Weighted Index
TCH	Taiwan Clearing House
TEJ	Taiwan Economic Journal Co., Ltd
TF	Terrorist financing
TFSR	Taiwan Financial Services Roundtable
TIFRSs	Taiwan-IFRSs
TiVA	Trade in value-added

TLTRO	Targeted longer-term refinancing operations
TM	Transactions monitoring
TPEx	Taipei Exchange Capitalization Weighted Stock Index
TWSE	Taiwan Stock Exchange
USD	US dollar
VaR	Value at risk
WPI	Wholesale price index

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