Central Bank of the Republic of China (Taiwan)

Financial Stability Report

May 2016 | Issue No. 10

Table of contents

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), the CBC, 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 CBC 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 CBC focuses primarily on the risks that could affect the stability of the overall financial system. Nevertheless, the CBC 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 is current as of 30 April 2016.

Abstract

In 2015, the global economy experienced a slow recovery and financial stability risks increased. While the growth momentum of Taiwan's economy moderated, financial markets continued evolving and financial institutions stayed healthy. These circumstances, coupled with smoothly operating payment systems, underpinned a stable financial system. Meanwhile, the CBC revised targeted prudential measures for real estate loans given that financial institutions have strengthened associated credit risk management. The Financial Supervisory Commission (FSC) reinforced banks' risk management on complex financial derivatives business to promote the soundness of banking operations.

The dynamics of economic performance across the world's major economies were uneven in 2015. The US grew steadily, while euro area growth remained sluggish and economic recovery in Japan was worse than expected. For emerging economies, growth momentum waned. The recovery in advanced economies is expected to proceed at a moderate pace in 2016, as predicted by IHS Global Insight, while growth momentum in emerging economies will remain subdued. Meanwhile, owing to uncertainties in the global economic outlook, plunging oil and commodity prices, and economic slowdown in Mainland China, financial stability risk elevated and volatility in major stock and foreign exchange markets heightened. Moreover, banking sectors in some economies were still exposed to particular negative shocks, such as deteriorating asset quality of banks in the euro area as well as mounting debt burdens and weakening debt servicing capacities of corporate sectors in emerging economies.

In 2015, owing to a substantial decline in exports amid subdued global demand and the threat from industrial supply chain localization in Mainland China, Taiwan's economy saw slower growth momentum along with stable inflation. On account of the continuous balance of payments surplus, the amount of foreign exchange reserves climbed to US$433.2 billion at end-April 2016 and the scale of external debt contracted, suggesting an enhanced external debt servicing capacity. Fiscal deficits shrank; nevertheless, the government's debt level mounted. The *Fiscal Health Plan* was carried out continuously to enhance fiscal soundness. With regard to the non-financial sector, the profitability of listed companies dropped; however, their financial leverage ratio declined, short-term debt-servicing capacity enhanced, and the credit quality of corporate loans stayed healthy. Household borrowing increased

marginally, yet the ratio of household borrowing to disposable income decreased and the credit quality remained satisfactory. Real estate market trading volume contracted while house prices declined gradually. However, the mortgage burden remained heavy.

The financial system in Taiwan remained stable in 2015 amid heightened international and domestic economic and financial volatility. As for financial markets, bond issuance in the primary market expanded, but the turnover of transactions in the secondary market remained at a low level. Meanwhile, volatility in stock markets reversed to fall after rising up and foreign exchange markets remained dynamically stable. With respect to financial institutions, the profitability of domestic banks declined slightly in 2015; however, their sound asset quality, sufficient provisions, adequate capital levels, and ample liquidity persisted. Life insurance companies and bills finance companies both reinforced business performance and their financial conditions exhibited sound fundamentals. With regard to financial infrastructure, the major payment systems operated smoothly during 2015. While the foreign currency clearing platform planned by the CBC has been broadly completed, the CBC is attentively facilitating the development of a mobile payment platform in Taiwan.

To pursue the operating objective of promoting financial stability, the CBC successively adopted appropriate monetary, credit, and foreign exchange policy measures in 2015 in response to the uncertainties surrounding the evolution of global and domestic economic and financial conditions. The underlying measures included lowering policy rates three times, maintaining the growth of broad monetary aggregates at appropriate levels, and implementing a flexible managed float foreign exchange rate regime. Moreover, the CBC also revised targeted prudential measures for real estate loans given that banks have strengthened associated credit risk management.

I. Overview

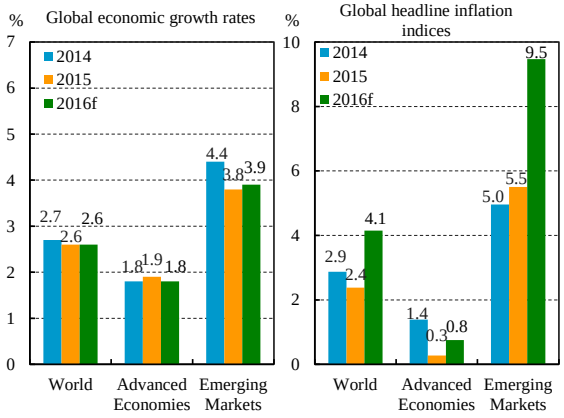
Macro environmental factors potentially affecting financial sector

Global economy saw a sluggish recovery, while international financial markets faced increased risks

Global recovery proceeded at a slow pace, and inflationary pressures receded

In 2015, the recovery of the global economy was sluggish and advanced economies took divergent growth paths. In the US, the economy grew steadily. However, euro area growth remained weak. Moreover, economic growth in Japan was lower than expected. Affected by several unfavorable factors, growth momentum in emerging economies waned. From 2016 onwards, growth in the US may be less than expected owing to a strong dollar, which has caused a drop in exports. In the euro area and Japan, although they have continued applying monetary easing policies, growth momentum has still not gained traction. Meanwhile, growth in Mainland China and other emerging economies continued decelerating. In this setting, IHS Global Insight predicts[1] world real GDP growth to remain at 2.6% in 2016, the same as in 2015. Real GDP in advanced economies is projected to decrease slightly to 1.8%. The average growth rate in emerging economies is forecast to increase modestly to 3.9% (Chart 1.1).

Chart 1.1 Global economic growth rates and headline inflation indices

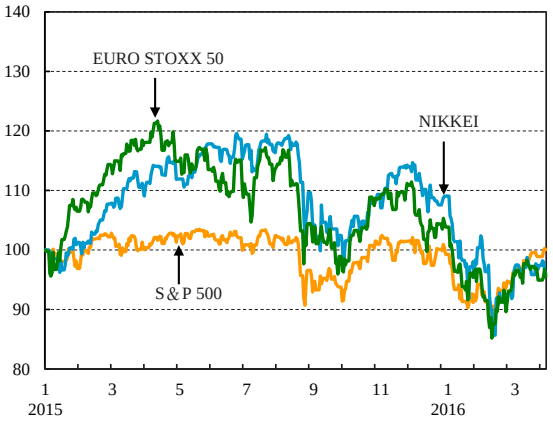


Note: Figures for 2016 are IHS Global Insight estimates.
Source: IHS Global Insight (2016/4/15).

[1] IHS Global Insight estimate on 15 April 2016.

Regarding consumer prices, owing to a fall in the international prices of crude oil and cereals, the global consumer price index (CPI) inflation rate dropped to 2.4% in 2015, lower than the 2.9% recorded a year earlier. CPI inflation rates in advanced economies fell markedly and were lower than their targets, whereas the rates in emerging economies increased. IHS Global Insight predicts the headline inflation rate in advanced economies will merely increase to 0.8% and the global headline inflation rate will rise to 4.1%[2] in 2016 (Chart 1.1).

Chart 1.2 Performance of equity indices of US, Euro area and Japan



Notes: 1. January 2015 = 100.
2. The EURO STOXX 50 Index is derived from 50 stock indices in 12 major economic bodies in the euro area.

Source: Bloomberg.

Global financial stability risks elevated

In 2015, as uncertainties concerning the global economic outlook rose, coupled with a fall in crude oil prices as well as the slowdown of Mainland China's economy, financial stability risks elevated. Financial risks in some advanced economies have not fully receded. Though US banks had better performance, European banks faced poor asset quality, business model transformation, as well as the erosion of banks' profits as a result of negative interest rate policies (NIRPs). In the meantime, Japanese banks increased their foreign investments to improve investment returns. However, such operations might increase credit risks, and NIRPs could further erode banks' profits. In the third quarter of 2015, stock prices in the US, the euro area and Japan fluctuated dramatically. Although they rebounded in the fourth quarter, stock prices tumbled again in the first quarter of 2016 (Chart 1.2). Meanwhile, the US dollar was strong in 2015, while the euro depreciated and the Japanese yen continuously stayed at a low level. However, in the first quarter of 2016, the Japanese yen appreciated markedly after it temporarily depreciated.

Financial risks in emerging markets mounted. The debt burdens of the corporate sectors in many emerging economies surged, and the debt servicing ability weakened. In addition, the default rates of energy-related enterprises ascended, affected by tumbling oil prices, posing severe challenges to the asset quality, profitability and capital levels of the banking industries of affected countries. Moreover, as US monetary policy normalized gradually, there were

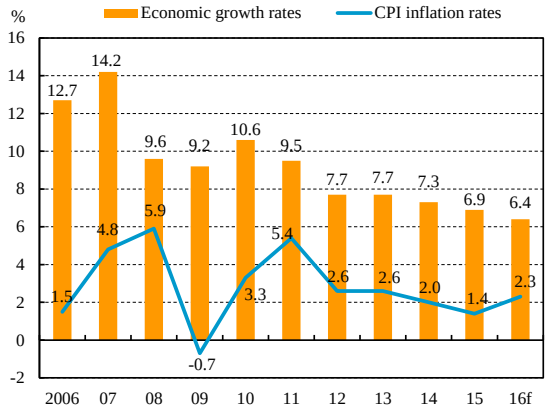
[2] The global headline inflation rate is predicted to increase in 2016. The main reason is that inflation in Venezuela is relatively high, and the inflation rate is expected to reach 502.8%, leading to a jump in inflation to 9.5% in emerging economies.

massive capital outflows from emerging economies, leading to a drop in most stock markets in emerging economies and considerable depreciation of local currencies, triggering turmoil in the financial markets.

Mainland China's economic growth momentum waned, while housing prices and the stock and foreign exchange markets sharply fluctuated

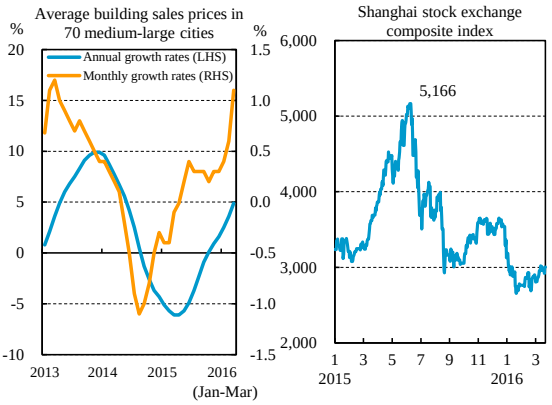
Mainland China's economic growth rate dipped to 6.9% throughout 2015 from 7.3% a year before, lower than its official growth target of 7%. In 2016, in an effort to promote supply-side structural reforms by Mainland China's government, IHS Global Insight projects the economic growth rate to continue falling to 6.4%. Meanwhile, the CPI inflation rate of Mainland China stood at 1.4% in 2015, lower than the official goal of 3.0%. IHS Global Insight projects the annual CPI inflation rate of 2016 to increase to 2.3% (Chart 1.3).

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



Note: Figures for 2016 are IHS Global Insight projections.
Sources: National Bureau of Statistics of China and IHS Global Insight (2016/4/15).

Chart 1.4 Mainland China's building sales prices in 70 medium-large cities and Shanghai stock exchange composite index



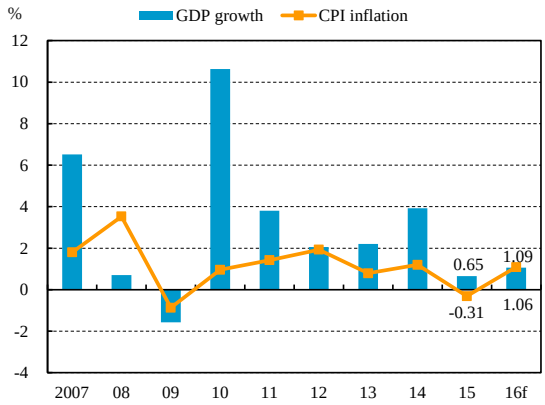
Sources: Thomson Reuters and Blooomberg.

The annual growth rate of housing prices reversed to rise after declining. Furthermore, in early 2016, first- and specific second-tier cities' housing prices markedly rose, while there was divergence in the property market with third- and fourth-tier cities facing the challenge of stock clearance. The stock and foreign exchange markets fluctuated significantly. In the first half of 2015, stock prices sharply rose. However, the detachment from fundamentals led to a dramatic fall in the market afterwards (Chart 1.4). The renminbi exchange rate continued to drop in 2015, on account of the implementation of reform of the mid-price of the renminbi against the US dollar.

Meanwhile, the annual growth rate of aggregate financing to the real economy in 2015 decreased to 12.4% from 14.3% a year earlier, mainly resulting from a decline in off-balance

sheet financing caused by Mainland China's financial institutions deleveraging and the government strengthening supervision on shadow banking. Moreover, credit risks surged as the NPL ratio edged up to 1.67% at the end of 2015. With local government debts coming due, various measures were successively launched.

Chart 1.5 Economic growth rates and CPI inflation rates of Taiwan



Note: Figures for 2016 are DGBAS projections on 27 May 2016.
Source: DGBAS.

Domestic economic growth slowed, while consumer prices rose mildly

Owing to sluggish momentum in foreign trade, the annual economic growth rate was merely 0.65% for 2015, significantly lower than the 3.92% of the previous year. Meanwhile, the average CPI inflation rate registered -0.31%, whereas the core CPI inflation rate rose moderately and reached 0.79%. It is expected that in 2016, external demand will remain weak, accompanied by mild internal demand. As a result, the DGBAS forecasts[3] Taiwan's economic growth rate to increase slightly to 1.06% for the whole year and projects the annual CPI inflation rate to increase to 1.09% (Chart 1.5).

Taiwan's external debt shrank to US$159 billion at the end of 2015 while foreign exchange reserves remained at a sufficient level of US$426 billion, implying that the capacity to service external debt remained robust. Fiscal deficits fell, decreasing to 0.67%[4] of annual GDP in 2015. The outstanding public debt at all levels of government in 2015 expanded, and the ratio of outstanding public debt to annual GDP registered 37.11%.[5] The Ministry of Finance kept implementing the *Fiscal Health Plan* to improve the structures of fiscal revenue and expenditure, and control the scale of public debt.

[3] The figures are based on a DGBAS press release on 27 May 2016.
[4] As a comparison, fiscal deficits in EU member nations are not allowed to exceed 3% of GDP, according to the *Maastricht Treaty* and the subsequent *Stability and Growth Pact*.
[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*.

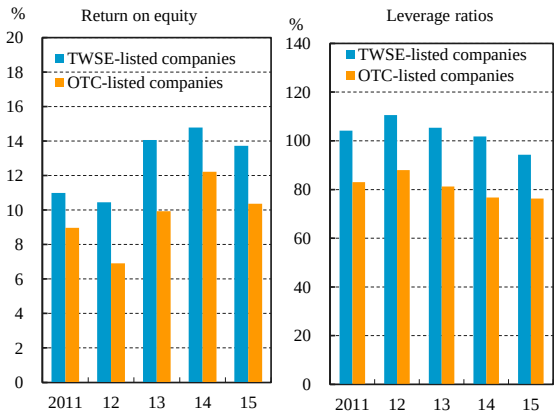
Non-financial sectors

Corporate sector

In 2015, resulting from the slowdown of recovery in the global economy and declining exports in Taiwan, the profitability of Taiwan Stock Exchange (TWSE) listed and over-the-counter (OTC) listed companies slightly fell. However, their leverage ratios declined somewhat (Chart 1.6), and short-term debt servicing capacity enhanced.

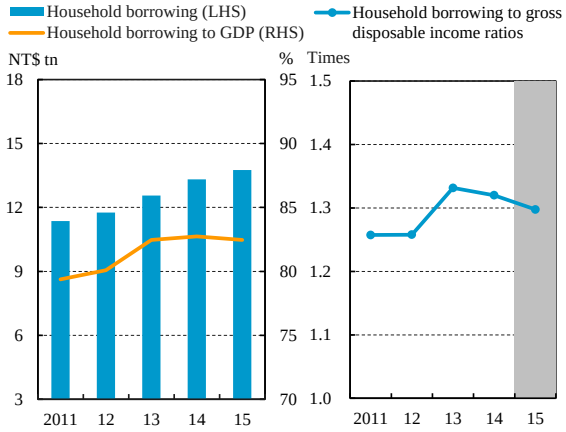
The NPL ratio of corporate borrowing continued to decline to 0.33% at the end of 2015, the lowest level on record, reflecting sound credit quality for the corporate sector. As a result of a slowdown in global economic growth and the crowding-out effect caused by industrial supply chain localization in Mainland China, the corporate sector's profit outlook faces challenges.

Chart 1.6 Return on equity and leverage ratios in corporate sector



Notes: 1. Figures are from consolidated financial statements, and those from 2012 forward are on the TIFRSs basis, while those of prior years are on the ROC GAAP basis.
2. Return on equity = net income before interest and tax / average equity.
3. 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.

Household sector

At the end of 2015, total household borrowing saw a slight expansion and reached NT$13.76 trillion, equivalent to 82.46% of annual GDP. As total disposable income grew at a faster pace in 2015, the ratio of household borrowing to total disposable income shrank to 1.30 at the end of the year, reflecting a lessening of the household debt burden (Chart 1.7).

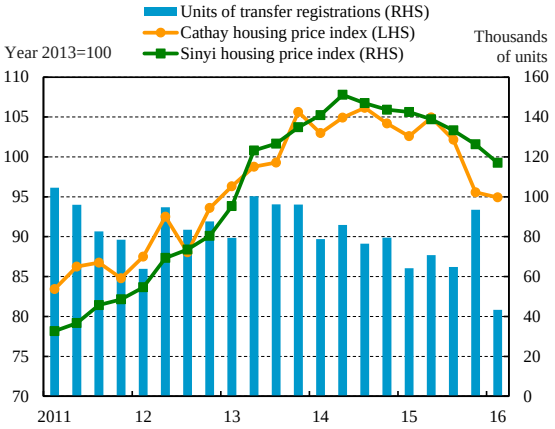
The NPL ratio of household borrowing stabilized at 0.23% at the end of 2015, remaining at a 16-year low, indicating that household credit quality remained satisfactory. Moreover, the decreasing domestic unemployment rate and steady growth of regular earnings should help improve the debt servicing capacity of households.

Real estate market

At the end of 2015, the total number of building ownership transfers for transaction declined by -8.53% compared to that of the previous year, showing that the trading volume in the real estate market kept contracting. This was caused by a heavier tax burden on real estate owners, and the uncertainty surrounding property tax reforms. With subdued housing market transactions, the Sinyi housing price index (for existing buildings) and Cathay housing price index (for new constructions) declined in 2015 (Chart 1.8).

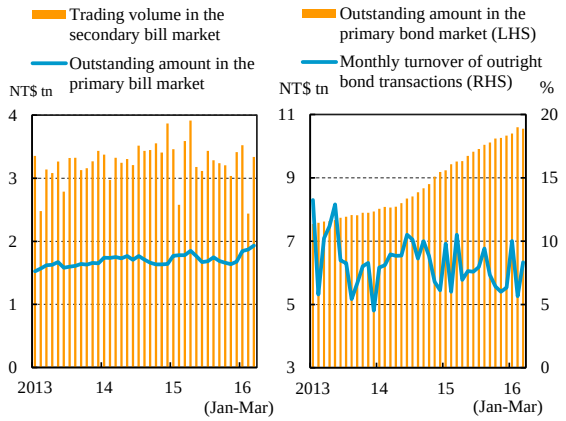
In 2015, since mortgage interest rates decreased slightly, the mortgage burden ratio for Taiwan was 35.81% in Q4. The house price to income ratio during the same period was 8.51. Among all areas, the mortgage burden and house price to income ratios in Taipei City were the highest, reaching 66.26% and 15.75, respectively, implying a still-heavy debt burden.

Chart 1.8 Building ownership registrations and real estate price indices



Note: For comparison purposes, the two indices use the same base year of 2013.
Sources: MOI, Cathay Real Estate and Sinyi Real Estate Inc.

Chart 1.9 Primary and secondary bill and bond markets



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

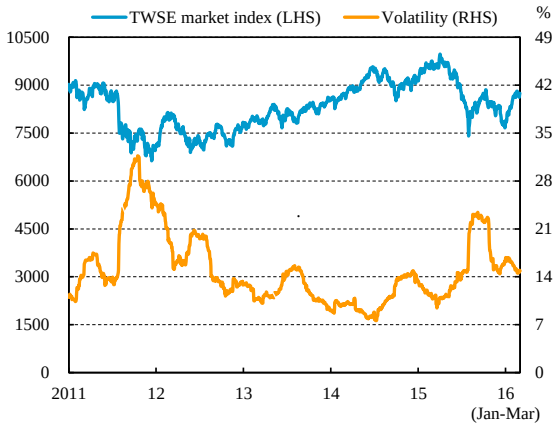
Assessment of the financial sector

Financial markets

Bill and bond issuance in the primary market expanded, but trading volume in the secondary market fell

The outstanding amount of bill issuance in the primary market at the end of 2015 slightly increased by 2.22%. However, trading volume in the secondary market decreased by 2.97% owing to a contraction of bills finance companies replacing repurchase (RP) transactions with call loans. Meanwhile, the outstanding amount of bond issuance at the end of 2015 ascended by 12.30% year on year. The reason was mainly that the outstanding amount of foreign currency-denominated international bonds grew sharply. However, liquidity in the secondary bond market was insufficient, owing to an amplified concentration of bonds held by life insurance companies and banks. The monthly turnover ratio of outright transactions of the main bonds[6] in the secondary market remained roughly flat (Chart 1.9).

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.

As for market rates, the secondary market rates of short-term commercial paper sharply dropped in 2015, affected by the CBC cutting policy rates twice, in September and December 2015. The yield on Taiwan's long-term 10-year government bonds also tumbled and diverged from the rising trend of US government bond yields. With a weakening domestic economy and major advanced countries implementing monetary easing policies, Taiwan government bond yields will have a tendency to fall and are unlikely to rise in the near future.

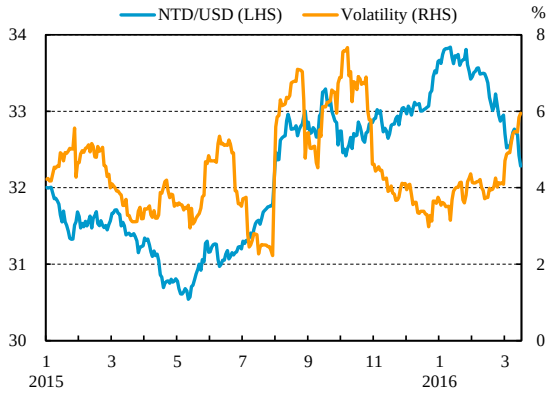
Stock indices descended after hitting a historical high, while volatility reversed to fall after rising up

The Taiwan Stock Exchange Weighted Index (TAIEX) of the TWSE market experienced a decline after trending up gradually and closed at a fifteen-year high in late April. The TAIEX registered 8,338 at the end of 2015, posting a decrease of 10.41% year on year. In early 2016, international stock markets deteriorated and the TWSE market also slumped. Afterwards, thanks to stabilization measures implemented by Taiwan's government, as well as the gradual rally in European and US stock markets, the TAIEX turned to trend up (Chart 1.10).

[6] It includes government bonds, international bonds, corporate bonds, and financial debentures.

In 2015, volatility in the TWSE market amplified. Later, it turned to drop to 14.48% at the end of December. In 2016, volatility stood at 14.85% at the end of March (Chart 1.10).

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.

The NT dollar exchange rate reversed from appreciation to depreciation, but volatility remained relatively stable compared to other currencies

In early 2015, owing to inflows of international hedge funds into Asian emerging countries, the NT dollar exchange rate appreciated upwards against the US dollar, reaching a yearly high of 30.541 on 22 May. Thereafter, the Fed signaled an interest rate hike and the PBC adjusted downwards the mid-price of the renminbi against the US dollar, leading to the depreciation of Asian currencies, including the NT dollar, against the US dollar. At the end of 2015, the NT dollar exchange rate stood at 33.066, with annual depreciation of 4.08%. In early 2016, the sharp depreciation of the renminbi leading to greater fluctuations in the exchange rates of other Asian currencies, coupled with the divergence of monetary policies in major advanced economies and heightened geopolitical tensions, affected market stabilization. Reflecting this, the NT dollar exchange rate continually depreciated against the US dollar in January, yet later resumed appreciation (Chart 1.11).

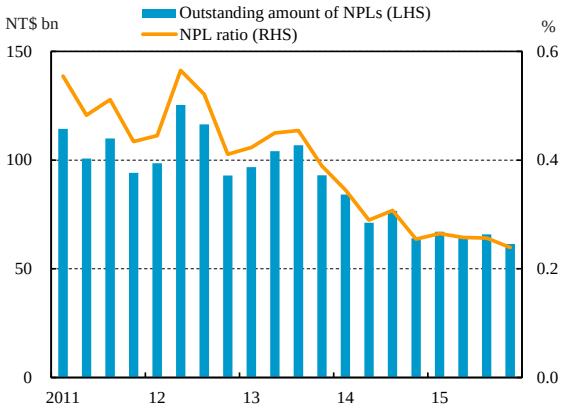
Volatility in the NT dollar exchange rate against the US dollar fluctuated between 2.22% and 7.67% in 2015, and registered an annual average of 4.54%. In the first quarter of 2016, volatility fluctuated between 3.13% and 5.95% (Chart 1.11). However, the NT dollar exchange rate was relatively stable compared to volatility in the exchange rates of major currencies such as the Japanese yen, euro, Korean won and Singapore dollar against the US dollar.

Financial institutions

Domestic banks

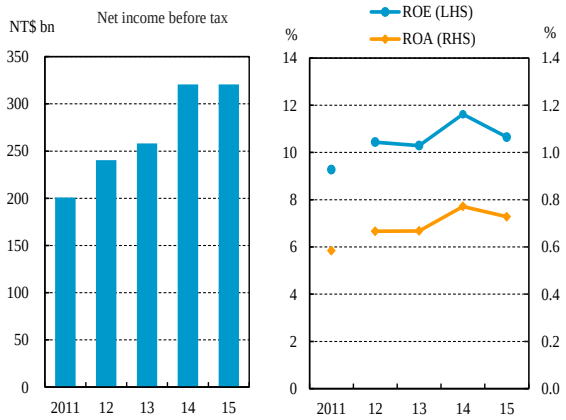
In 2015, the NPL ratio of domestic banks touched a new low of 0.24%, implying satisfactory asset quality (Chart 1.12), along with ample loan loss reserves. The credit concentration of corporate loans continually declined, while the concentration of credit exposure in real estate loans has also been addressed. The aggregate amount of exposure to Mainland China descended. At the end of 2015, the ratio of the aggregate amount of such exposure to banks' net worth decreased to 60%, within the statutory limit and with no domestic bank exceeding the limit.

Chart 1.12 NPL ratio of domestic banks



Note: Excludes interbank loans.
Source: CBC.

Chart 1.13 Profitability of domestic banks



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

The aggregate net income before tax of domestic banks was NT$320.6 billion in 2015, decreasing slightly by 0.03% year on year. The average return on equity (ROE) and return on assets (ROA) also fell to 10.65% and 0.73%, respectively, representing a decline in profitability (Chart 1.13). Meanwhile, as a result of capital injection and accumulated earnings of banks, the average capital adequacy ratio continuously rose to 12.93% at the end of 2015. The rise in the ratio was in favor of reinforcing domestic banks' loss absorbing capacity. The estimated Value at Risk (VaR) for market risk exposures of domestic banks rose, but had limited influence on capital adequacy.

Life insurance companies

Life insurance companies reported a net income before tax of NT$137.6 billion in 2015, hugely increasing by 19.35% over the previous year (Chart 1.14). This was chiefly driven by incremental expansion of interest income spurred by continuous growth in foreign bond and

international bond investments, as well as cash dividends deriving from investment portfolios.

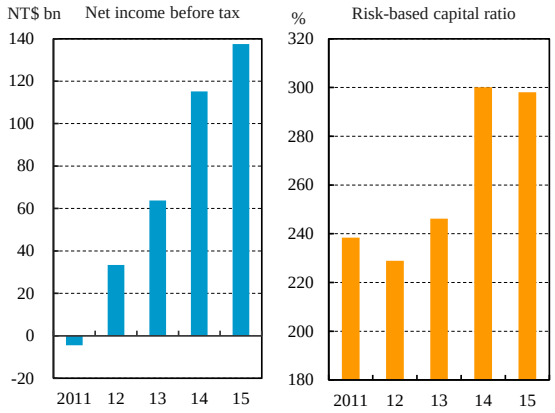
The average risk-based capital (RBC) ratio declined slightly to 298.03% at year-end 2015, but remained at a high level (Chart 1.14). The funds of life insurance companies are mainly invested in securities and the proportion of foreign portfolio investments increased. In response, life insurance companies should reinforce market risk management continuously.

Bills finance companies

The outstanding guarantees business undertaken by bills finance companies increased moderately at the end of 2015, while credit quality remained satisfactory. The liquidity risk of bills finance companies remained high as a maturity mismatch between assets and liabilities still persisted.

Nonetheless, bills finance companies posted a combined net income before tax of NT$10.3 billion in 2015, with an increase of 11.79% year on year. The average capital adequacy ratio increased to 14.41% (Chart 1.15), while the individual ratio for each bills finance company was higher than 13%.

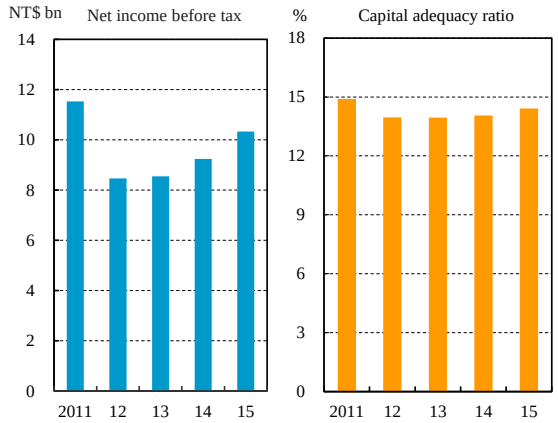
Chart 1.14 Net income before tax and risk-based capital ratios of life insurance companies



Notes: 1. Figures for net income before tax from 2012 forward are on the TIFRSs basis, while those of prior years are on the ROC GAAP basis.
2. Kuo Hua Life Insurance Company, which was taken into receivership by the Taiwan Insurance Guaranty Fund in August 2009 and merged into TransGlobe Life Insurance Company in March 2013, is excluded. Figures from 2014 onwards are exclusive of Singfor and Global Life Insurance companies, which were taken into receivership on 12 August 2014 and merged into Cathay Life Insurance Company on 1 July 2015.

Source: FSC.

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



Note: Figures for net income before tax from 2012 forward are on the TIFRSs basis, while those of prior years are on the ROC GAAP basis.

Source: CBC.

Financial infrastructure

The foreign currency clearing platform has been broadly completed and has helped promote the development of electronic payment services to ensure transaction security

In 2015, all three systemically important payment systems (SIPSs)[7] in Taiwan were functioning smoothly. The foreign currency clearing platform, which was promoted and established by the CBC, has been broadly completed, currently providing US dollar, renminbi, Japanese yen and euro remittance services, as well as incorporating real-time gross settlement (RTGS), payment versus payment (PVP) and delivery versus payment (DVP) mechanisms for settlement services. Furthermore, the platform links with Euroclear, Clearstream and the settlements systems in Mainland China, Japan and euro area.

In order to promote the sound development of domestic mobile payments, the Financial Information Service Co., Ltd. (FISC), the Taiwan Clearing House (TCH) and financial industry jointly established a payment service provider trusted service manager (PSP TSM) platform. Moreover, following the trend of cloud computing developments, the PSP TSM platform extended its function to include host card emulation (HCE)[8] and established the tokenization[9] authentication mechanism in 2015 to ensure transaction security. To effectively respond to cyber-attacks, following the requirements of the Bank for International Settlements (BIS), the CBC and related authorities have assessed the conformity of several important payment systems including the CBC Interbank Funds Transfer System (CIFS) with the *Principles for Financial Market Infrastructures.* The CBC's assessment confirmed that the CIFS has complied with the principles.

Other financial regulatory reforms

The FSC has implemented four waves of supervisory reinforcements because banks engaging in complex high-risk derivatives had numerous disputes with investors. Mechanisms handling customer disputes have been established and these measures will promote customer protection and the healthy development of financial markets. Furthermore, the *Financial*

[7] The three SIPSs include the CBC Interbank Funds-Transfer System (CIFS), the Interbank Remittance System (IRS) and the Check Clearing House System (CCHS).

[8] With HCE, customers are allowed to store their card account details in the merchants' secure cloud servers. HCE enables mobile applications to offer payments by providing virtual representation of account identities.

[9] Tokenization is a process to tokenize data by using the tokenization system. The service provides protection for customers by replacing the actual card account numbers with token numbers at the merchants with proximity sensors for online commerce. Because information transmitted is replaced with tokens, merchants will not know the real card account numbers, and data will not be exposed during transmission. It will effectively lower the risk of card account numbers being retrieved by others or the risk of fraud.

Institutions Merger Act was amended in December 2015 to simplify the merger procedures and provide tax preference to enhance the merger incentives for financial institutions. To promote development of the financial service industry, the CBC continued to relax foreign exchange regulations of financial institutions in 2015.

Taiwan's financial system remained stable

In 2015, global and domestic economic growth slowed, while the volatility of international financial markets amplified. Against this backdrop, domestic financial markets operated smoothly and the profitability of financial institutions remained satisfactory with sound asset quality. Meanwhile, the capital adequacy ratio of domestic financial institutions increased continuously and the loss absorbing capacity was adequate. The three major payment systems functioned along an orderly trajectory. By and large, the financial system in Taiwan remained stable.

The upcoming events emanating from the evolution of domestic and international economic and financial conditions that may have impacts on Taiwan's real economy and financial system necessitate increased vigilance. Above all, the spillovers from the divergence in the monetary policies of advanced economies, the rise in financial risks of emerging economies, and subdued economic growth of Mainland China deserve special attention. In response, the CBC will pay close attention and formulate adequate monetary, credit and foreign exchange policies to mitigate these impacts. Meanwhile, in the hope of facilitating the soundness of financial institutions and promoting financial stability, the FSC will persist in revamping financial regulations and enhancing financial supervisory measures, including: (1) continually reinforcing banks' risk management for conducting complex financial derivatives business; (2) establishing an off-site monitoring mechanism for detecting material risks of financial institutions; (3) strengthening risk management and increasing the risk-bearing capability of the insurance industry; and (4) increasing financial institution and securities market transparency.

II. Macro environmental factors potentially affecting financial sector

2.1 International economic and financial conditions

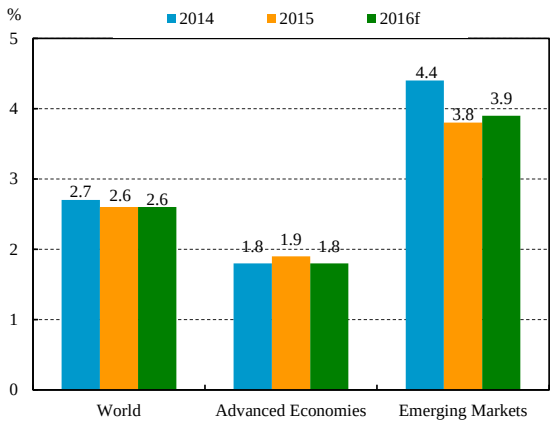
2.1.1 International economic conditions

Global economic growth softened and prospects remained uncertain

In 2015, global economic recovery was less sustained than expected. The International Monetary Fund (IMF) and IHS Global Insight both downgraded their forecasts for economic growth several times as economic performance across the world's major economies was uneven. The US economy grew steadily because of improved employment, strong domestic demand and increased disposable income. However, euro area growth remained weak even though Greece temporarily averted a default crisis. Meanwhile, despite sticking to an easier monetary policy stance, growth was worse than expected in Japan because of feeble consumption and stagnant wages. For the emerging economies, although they were still responsible for more than around 70% of global economic growth, the growth rate has decreased continuously over the last five years due to weaker domestic currencies, low commodity and oil prices, higher US interest rates and slowing Mainland China's growth, showing that their recovery momentum has waned.

From 2016 onwards, despite signs of an improving labor market, growth in the US may be weaker than expected owing to a strong dollar, which has caused a drop in exports. In the euro area and Japan, although they have continued applying monetary easing policies, growth momentum has still not gained traction. Among the emerging economies, Mainland China is undergoing structural reforms, which have further lowered its growth and could affect other emerging economies. Furthermore, Brazil is

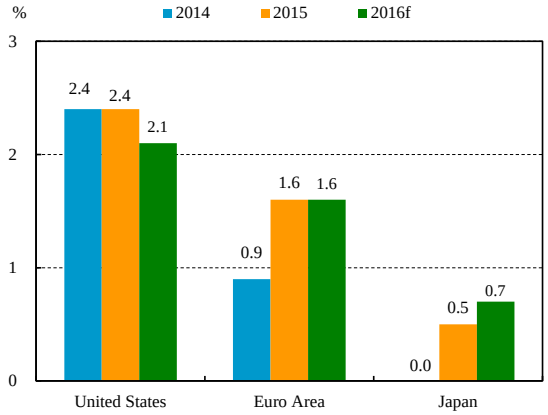
Chart 2.1 Global economic growth rates



Note: Figures for 2016 are IHS Global Insight estimates.
Source: IHS Global Insight (2016/4/15).

confronting a serious fiscal crisis. In sum, economic growth in emerging economies appears less favorable than anticipated. IHS Global Insight predicts[10] world real GDP growth to be 2.6% in 2016, the same figure as in 2015. Real GDP in advanced economies is projected to slightly decrease to 1.8%. The average growth rate in emerging economies is forecast to increase modestly to 3.9% (Chart 2.1).

Chart 2.2 Economic growth rates in US, Euro area and Japan



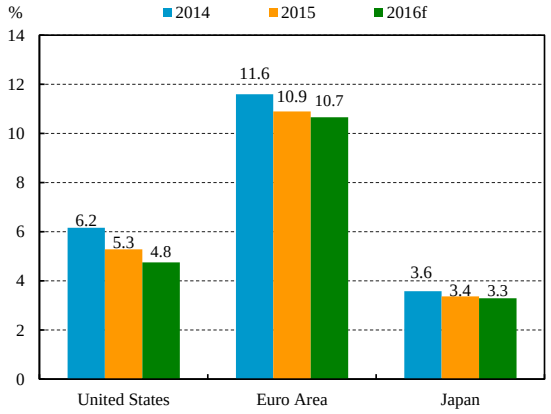
Note: Figures for 2016 are IHS Global Insight estimates.
Sources: Official websites of the selected economies and IHS Global Insight (2016/4/15).

Advanced economies took divergent growth paths

The US economy grew steadily, its labor and housing markets improved continuously

In 2015 Q1, the growth rate in the US was below expectations owing to abnormal weather conditions and a strong dollar. Recovery gained momentum later because of the increase in private consumption when the severe effect of weather conditions faded, along with improvements in employment, consumer expenditure and the property market. The annual economic growth rate was 2.4%, the same as in 2014. Although the Fed raised interest rates in December 2015, showing its confidence in the recovery in the job market and the economy, IHS Global Insight predicts US economic growth to slow to 2.1% in 2016 because of the cloudy prospects of investments in the energy sector and exports (Chart 2.2).

Chart 2.3 Unemployment rates in US, Euro area and Japan



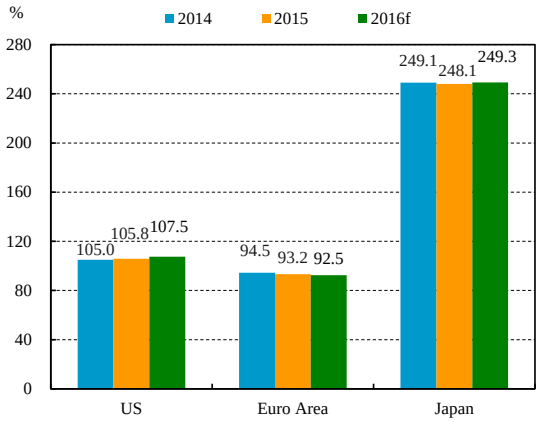
Note: Figures for 2016 are IHS Global Insight estimates.
Sources: Official websites of the selected economies and IHS Global Insight (2016/4/15).

The labor market in the US kept improving in 2015 with the unemployment rate dropping to an eight-year low of 5.3% from 6.2% in 2014. Robust gains in employment increased private consumption, which supported economic growth. Since the labor market outlook remained

[10] See Note 1.

bright, IHS Global Insight anticipates the unemployment rate will fall to an annual rate of 4.8% in 2016 (Chart 2.3).

Chart 2.4 Government debt-to-GDP ratios in US, Euro area and Japan



Note: Figures for 2016 are IMF projections.
Source: IMF (2016), *Fiscal Monitor*, April.

In fiscal year 2015, the pickup in wage growth boosted individual income taxes, reducing the US deficit to US$438.9 billion. Although the fiscal condition stayed positive, the IMF forecasts the US government debt burden to worsen further because of higher borrowing costs after the lifting of the interest rate as well as increasing medical and social expenditures. The ratio of outstanding government debt relative to annual GDP will continue elevating to an estimated 107.5%[11] in 2016 (Chart 2.4).

The euro area economy has gradually gained momentum

Thanks to the ECB's expansion of QE, and the diminishing of the threat of Greece exiting the euro area (Grexit), resulting from Greece's debt crisis, the economic growth rate in the euro area rose to 1.6% in 2015. Nonetheless, the high unemployment rate of 10.9% and soft oil prices challenged efforts to achieve their inflation target. In 2016, despite the prolonged refugee problem and the UK's possible withdrawal from the European Union, IHS Global Insight expects the euro area economic growth rate to stay at the same level of 1.6%, and the unemployment rate to decrease further to 10.7%, owing to the ECB's expansion of monetary easing measures and negative interest rate policy (NIRP) (Chart 2.2, 2.3).

Regarding government finance, the euro area countries made an effort to shrink their fiscal deficits, causing the fiscal deficit to GDP ratio to drop to an eight-year low of 2% in 2015. Moreover, the outstanding government debt-to-GDP ratio continued declining to 93.2%. As economic activity in the euro area gradually gains momentum, the IMF forecasts the ratio to fall slightly to 92.5% in 2016 (Chart 2.4).

[11] IMF (2016), *Fiscal Monitor*, April.

Economic growth in Japan was lower than expected, the inflation target hard-to-achieve, leading to the BoJ introducing an NIRP

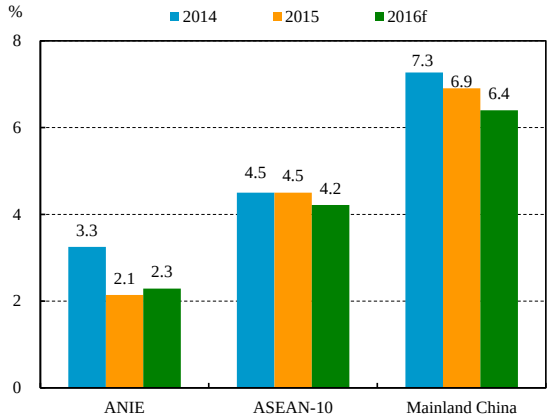
In 2015 Q1, Japanese economic growth increased steadily as exports accelerated. However, the global economy remained sluggish and the effect of Japan's monetary stimulus was below expectations, leading to a mere 0.5% annual growth rate. In order to revive economic growth and achieve the targeted 2% inflation rate, the BoJ adopted an NIRP for the first time in February 2016, introducing a rate of -0.1% on the incremental increase in financial institutions' excess reserves. Additionally, the Japanese government announced that the corporate tax rate would be cut to 29.97%, effective from April 2016, as well as postponing the second sales tax hike until 2017, to underpin corporate profitability and investment. IHS Global Insight estimates Japanese economic growth to increase slightly to 0.7% in 2016, and the unemployment rate to decrease marginally to 3.3% (Chart 2.2, 2.3), while the IMF predicts the outstanding government debt-to-GDP ratio to increase to 249.3% in 2016 because of ballooning social welfare costs of a fast-aging population (Chart 2.4).

Economic growth of Asian emerging economies slowed down

In 2015, Mainland China's economic slowdown resulted in lower commodity imports, leading to a significant decline in economic growth of Asian emerging economies. GDP growth in most Asian newly industrialized economies (ANIEs) experienced substantial downturns. With regard to the sharp drop in global trade, economic growth in export-oriented ANIEs contracted from 3.2% in 2014 to 2.1%. Among member countries in the Association of South East Asian Nations (ASEAN-10), the economic growth rate in Indonesia decreased owing to weak export performance and plunging international commodity prices. In contrast, Thailand benefited from a relatively stable political environment, and economic activity in Vietnam, buoyed by the expanding manufacturing sector and low wages, sustained its upward trajectory. As a result, the overall growth rate of the ASEAN-10 was 4.5%, the same as in 2014. In Mainland China, structural reforms, excess manufacturing capacity, weakening property markets and soft global demand lowered economic growth further to 6.9% in 2015, the lowest level in 25 years.

IHS Global Insight anticipates that the economic growth rate in the ANIEs will improve moderately to 2.3% in 2016, while the growth rate in the ASEAN-10 countries, affected by declining economic growth in Mainland China and low commodity prices, will fall to 4.2%. Meanwhile, the continued digestion of excess capacity in the industrial sector, a glut of housing inventory, and a government debt bubble will further pressure Mainland China's economy, lowering the annual growth rate to 6.4% in 2016 (Chart 2.5). In addition, the unemployment rate in the ANIEs and the ASEAN-10 is expected to decline slightly to 3.4% and 4.3%. In contrast, the unemployment rate in Mainland China is projected to rise slightly to 4.2% from 4.1% in 2015 (Chart 2.6).

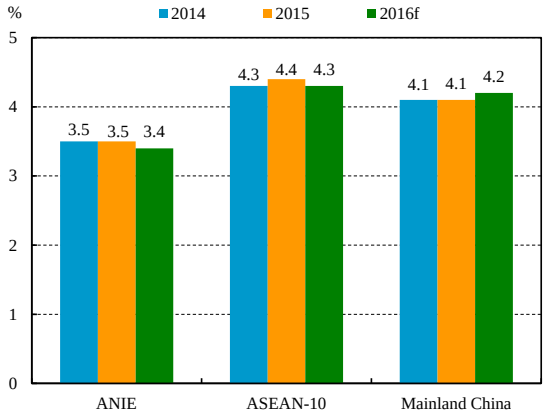
Chart 2.5 Economic growth rates in Asian emerging economies



Notes: 1. Figures for 2016 are IHS Global Insight projections.
2. ANIE refers to Asian Newly Industrialized Economies, including Taiwan, Hong Kong, Singapore and South Korea.
3. ASEAN-10 refers to the 10 member countries of the Association of South East Asian Nations, including Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

Sources: Official websites of the selected economies and IHS Global Insight (2016/4/15).

Chart 2.6 Unemployment rates in Asian emerging economies



Notes: 1. Figures for 2016 are IHS Global Insight projections.
2. For ANIE and ASEAN-10, see Notes 2 & 3 in Chart 2.5.

Sources: Official websites of the selected economies and IHS Global Insight (2016/4/15).

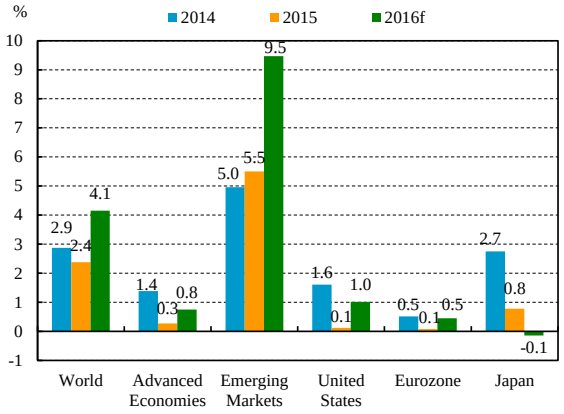
Global inflation remained subdued

In 2015, the price of crude oil fell substantially as emerging economies, such as Mainland China, underwent sluggish growth, resulting in a sharp deceleration in oil demand growth. Moreover, the technique for mining oil shale made progress in the US, allowing production to reach a historically high level, and the US government abolished 40-year-old constraints on crude oil exports, further pressuring oil prices.[12] In the meantime, the international price of cereal continued its downward trend in 2015 as a result of slowing global export demand, excess food supply and the strengthening of the US dollar. Prices of vegetable oil, dairy and meat also fell. Since commodity and oil prices plunged dramatically, the

[12] Brent crude oil plunged from a high of US$110.95 per barrel in June 2014 to a low of US$36.43 at the end of 2015.

oil-exporting nations (such as Saudi Arabia, Venezuela and Russia, etc.) experienced fiscal difficulties and economic slowdown. In addition, low commodity and oil prices led inflation to drop well below the targets of many developed nations (such as the US and Japan, etc.) and affected their monetary policies. Under the influence of low oil and food prices, the global headline inflation rate declined from the 2.9% registered in 2014 to 2.4%. Headline inflation rates in advanced economies also fell markedly from 1.4% to 0.3%, and core inflation rates remained at 1.6%, which were lower than their targets.[13] Still, headline inflation rates increased from 5% to 5.5% in emerging economies as Brazil experienced its crisis of mounting deficits and high inflation (Chart 2.7).

Chart 2.7 Global headline inflation indices



Note: Figures for 2016 are IHS Global Insight estimates.
Sources: Official websites of the selected economies and IHS Global Insight (2016/4/15).

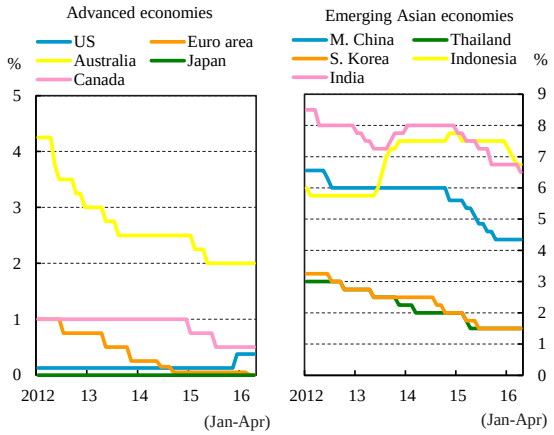
From 2016 onwards, the members of the Organization of the Petroleum Exporting Countries (OPEC) eventually failed to reach an agreement to freeze output. However, global prices of crude oil fluctuated with an upward trend on account of a slump in the US oil rig count and geopolitical conflicts in Iraq and Nigeria. With regard to international cereals, since projected global supply is sufficient and world stocks are higher than the figures registered last year, cereal prices are expected to drop steadily. IHS Global Insight predicts that the headline inflation rate in advanced economies will merely increase to 0.8% and the global headline inflation rate will rise to 4.1%[14] (Chart 2.7).

[13] IMF (2016), *World Economic Outlook*, April.
[14] See Note 2.

The US started raising interest rates, while most economies continued to adopt easy monetary policy stances

In 2015, advanced economies adopted divergent monetary policies. In December 2015, the Fed raised its target band for the federal funds rate by 25 basis points, to 0.25-0.5%, since US economic activity and labor market indicators continued to strengthen. Nonetheless, the Fed did not hike the rate further in March 2016 as it flagged risks from global financial and economic developments. Meanwhile, although the euro area economy has recovered mildly, most indicators of inflation remained muted. Therefore, the ECB announced an expanded asset purchase program in January 2015. In December of the same year, the ECB pledged to extend easing and lowered its overnight deposit rate. In March 2016, the ECB cut the rate further. Likewise, apart from implementing a quantitative easing policy, Japan cut interest rates into negative territory in February 2016 to stimulate the economy. Canada and Australia also lowered policy rates to boost economic growth. As for emerging Asian economies, to mitigate the impact of weak global demand on their domestic economies, most of them kept easing monetary policies. Among these countries, Mainland China has cut the reserve requirement ratio as well as the interest rate on deposits and loans several times (Chart 2.8).

Chart 2.8 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 Australia, cash rate target; for Japan, uncollateralized overnight call rate; for Canada, the target for the overnight rate.
2. Emerging Asia: figure for Mainland China is based on financial institution one-year lending base rate; for Thailand, 1-day repurchase rate; for South Korea, base rate; for Indonesia, Bank Indonesia rate; for India, repurchase rate.
3. Figures are as of 15 April 2016.

Sources: Central banks' websites.

From 2015 onwards, the US hiked interest rates, while the euro area, Japan and Mainland China continued adopting accommodative monetary policies. The divergence of monetary policies could trigger a surge in both global financial market disruption and international capital flow volatility. In addition, the divergence could pressure the debt servicing ability of those emerging economies, affecting global financial stability. Furthermore, as quantitative easing in Japan and the euro area has gradually become less effective, the BOJ and ECB anticipated boosting economic growth and inflation expectations by introducing NIRPs. However, unexpected effects of the NIRPs, coupled with market concerns about adverse impacts caused by the NIRPs, have increased global financial market uncertainty and risks.

2.1.2 International financial conditions

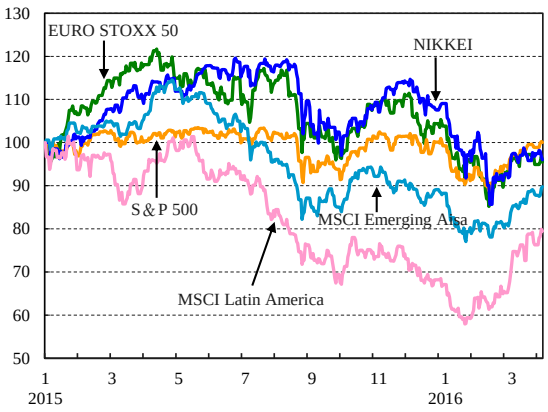
Global financial stability risks elevated

In the first half of 2015, global financial stability broadly improved as economic conditions recovered across advanced economies. However, from the second half of 2015 onwards, uncertainties concerning the global economic outlook and Mainland China's economic transition rose. These, coupled with a fall in crude oil and commodity prices as well as a drop of investor confidence regarding government policy actions, triggered turmoil in global financial markets and elevated financial stability risks.

Financial risks in some advanced economies have yet to fully recede

In recent years, the capital and liquidity levels of the banking industry have risen as advanced economies launched several financial regulatory reforms. However, the NPL ratios of banks in numerous economies ascended dramatically during the global financial crisis and are yet to recede fully. Moreover, sluggish adjustment of banks' business models[15] has continuously affected banks' profitability and loss-bearing capacity. Among different countries, US banks recovered at a faster pace and their exposure to emerging markets and the energy industry remained low. In addition, the overall risk of US banks was manageable on account of their high profitability and low NPL ratios. On the other hand, European banks failed to reduce non-performing assets generated during the financial crisis; at the same time, business model transformation as well as a large amount of litigation compensation affected their profitability and capability to raise capital. Furthermore, many European banks failed to increase their capital levels to meet new regulatory requirements and they remained at challenging levels. In the meantime, in response to declining domestic bond yields, Japanese banks reduced their

Chart 2.9 Performance of key international equity indices



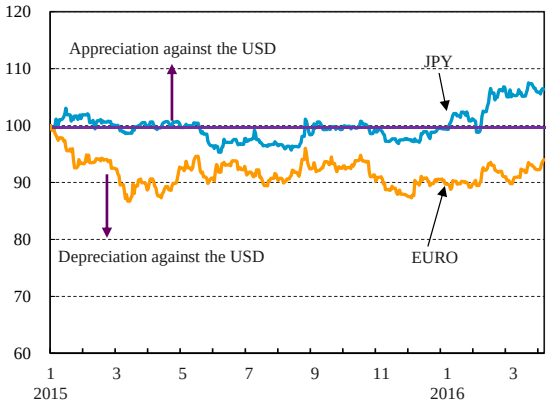
Notes: 1. 1 January 2015 = 100.
2. The Euro STOXX 50 refers to a stock index of the euro area consisting of the largest 50 stocks in the 12 major economies.

Source: Bloomberg.

[15] Before the global financial crisis, the banking industry undertook securitization and various innovations through complex, high-risk financial derivatives operations to earn high profits. After the crisis, regulations turned stricter and imposed restrictions on the scope and type of bank businesses. For example, the Volcker Rule in the US prohibited commercial banks from engaging in proprietary trading and the ring-fencing rule in the UK was designed to separate retail banks from wholesale banks.

holdings of yen bonds at the same times as increasing their foreign investments to improve investment returns. Nevertheless, such operations, along with a rising concern that NIRPs would further affect banks' profits, increased credit risks and led to tumbling stock prices.

Chart 2.10 Movements of various currencies against the US dollar



Note: 1 January 2015 = 100.
Source: Bloomberg.

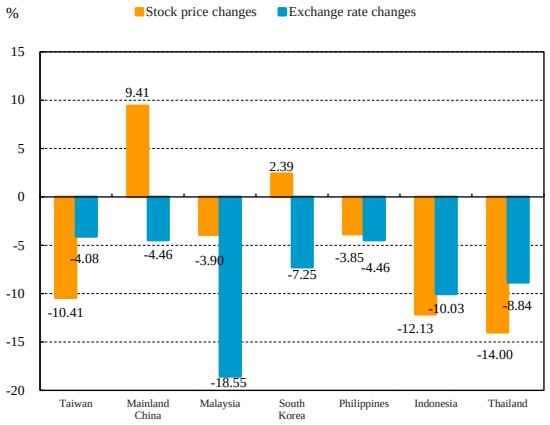
In 2015, the stock and foreign exchange markets in advanced economies fluctuated dramatically. Among them, stock markets in advanced economies trended upward in the first half of 2015 thanks to economic recovery. The stock indices of Japan and the euro area particularly outperformed others. In the third quarter, stock prices in the US, the euro area and Japan tumbled simultaneously owing to unfavorable market sentiment such as slowing economic growth in Mainland China and rising expectation of a Fed interest rate hike. Although stock prices slightly rebounded in the fourth quarter, the volatility in stock markets amplified again in the first quarter of 2016 (Chart 2.9). With regard to foreign exchange markets, expectations of a Fed interest rate hike led to a stronger US dollar, while the euro depreciated against the US dollar owing to quantitative easing and the NIRP of the ECB. The Japanese yen against the US dollar continuously stayed at a low level in the face of qualitative and quantitative monetary easing policies by the BOJ. The Japanese yen temporarily depreciated against the US dollar as the BOJ announced its NIRP in January 2016; afterwards, the Japanese yen appreciated markedly because of massive hedging capital inflows caused by international financial market fluctuations (Chart 2.10).

Financial risks in some emerging markets mounted

Financial systems in emerging economies faced challenges owing to several adverse impacts such as a slack global economy, the plunging prices of crude oil and raw materials, as well as substantial adjustment of assets prices. In recent years, the measures of financial leverage for corporate sectors in many emerging economies surged owing to over-indebtedness. The weakening profitability and debt servicing ability, caused by a slowdown in economic growth, had an adverse impact on their refinancing ability. Added to this, the strengthening US dollar lifted dollar-denominated debt burdens of such corporates and pushed up the default risks. In addition, oil-producing and raw material-exporting countries, such as Russia, Brazil and

Venezuela, faced high fiscal deficits and foreign debt triggered by tumbling oil and raw material prices. The default risks of energy corporates in those countries ascended as well. Although banking industries in most emerging economies remained profitable and adequately capitalized, rapid credit growth and increasing borrower default may cast a shadow over credit markets, as well as eroding banks' profits and capital levels.

Chart 2.11 Changes in equity indices and exchange rates among Asian emerging economies



Notes: 1. The comparison is based on the difference between the figures at end-2014 and end-2015.
2. Taiwan uses TWSE Weighted Index; Mainland China uses SSE Composite Index; Malaysia uses Kuala Lumpur Composite Index; South Korea uses KOSPI Index; Philippines uses PSEI Index; Indonesia uses Jakarta Composite Index; Thailand uses SET Index.

Sources: Datastream and Bloomberg.

In the first half of 2015, benefiting from QE policies in the euro area and Japan, stock prices of Asian emerging economies trended upward. Nevertheless, in the second half of 2015, the economic slowdown in Mainland China jeopardized exports. This, coupled with capital outflows driven by market expectations of rising interest rates in the US, led to a drop in most Asian stock markets. In 2015, Asian emerging economies' currencies mostly depreciated. Among them, the Malaysian ringgit against US dollar depreciated considerably, registering a decline of 18.55% as falling international crude oil prices adversely affected its exports (Chart 2.11).

The IMF indicated that rising downside risks of the global economy posed several challenges for emerging economies,[16] including: (1) the increasing debt burden and default risks of big companies in Mainland China and other emerging economies[17] may have negative spillover effects on other economies and thus adversely affect the global financial system; (2) the default rate on foreign currency-denominated corporate debts ascended because of currency depreciation, and corporate cash flow deteriorated, affected by declining raw material prices; (3) some banks' balance sheets have yet to reflect late-cycle asset quality deterioration and NPL ratios in some economies' banking sectors are set to rise as corporate earnings and asset quality deteriorate; (4) rapid credit growth underlies a significant increase in banks' loan-to-deposit ratios and funding positions in some economies' banking sectors are now approaching statutory ceilings, which could potentially become a further constraint on banks'

[16] IMF (2015), *Global Financial Stability Report*, October; IMF (2016), *Global Financial Stability Report*, April.
[17] According to the IMF's estimation, loans potentially at risk in Mainland China's corporate sector reached US$1.3 trillion, or 15.5% of total commercial bank loans. Considering estimates of bank loans potentially at risk and assuming a 60 percent loss ratio suggests that potential bank losses on these loans could amount to US$756 billion, or 7% of GDP. Alternatively, assuming a lower loss ratio of 45 percent yields potential bank losses of US$567 billion, or 5% of GDP. See IMF (2016), *Global Financial Stability Report*, April.

ability to underwrite credit.

International organizations called on national authorities to take measures to promote global financial stability

According to the IMF's assessment,[18] further bouts of market turmoil or disorderly balance sheet deleveraging could erode global economic output by 3.9% compared to baseline level without proper policy frameworks. In order to lessen the risks from global financial instability, international organizations such as the IMF[19] and the OECD[20] provided the policy suggestions as follows:

- With the divergence in the monetary policies of advanced economies, national authorities should make concerted policy efforts to reduce the possibility that episodes of financial market volatility could disrupt the current economic expansion. In addition, national authorities should reevaluate trading restrictions on derivatives to address problems when liquidity is tightening.

- In the euro area, the authority should strengthen bank supervision and reform the insolvency framework. Injections of public money to recapitalize banks or an orderly wind-down of insolvent institutions is needed when necessary to speed up the recognition of bank losses and lower NPLs.

- Emerging economies should enhance supervision on banks' credit risks, including higher capital requirements for foreign currency exposures as well as caps on the share of such exposures. Furthermore, structural reforms are also required, such as relaxing regulations and raising the proportion of foreign direct investment to replace volatile short-term capital by providing tax incentives.

- Emerging and developing economies should adopt flexible foreign exchange policies to abate the impacts arising from deteriorating terms of trade. Implementation of expansionary fiscal policies is another measure to respond to negative impacts if necessary.

- The corporate sector in Mainland China should be appropriately deleveraged to smooth credit channels. Supervisory authorities should promote interest rate liberalization, reinforce market discipline, increase banks' loss-absorbing buffers and strengthen

[18] IMF (2016), Global Financial Stability Report, April.
[19] See Note 16.
[20] OECD (2015), *Economic Outlook*, NO. 98 November.

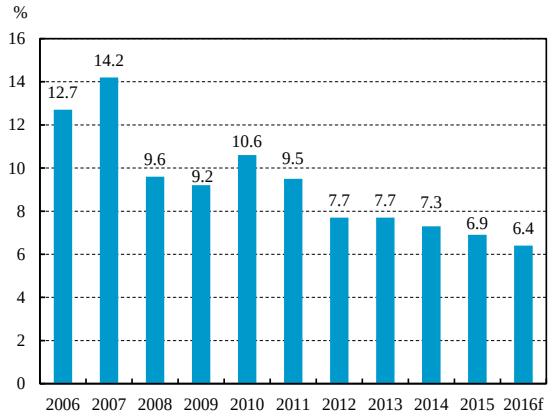
regulations to avoid the risk of excessive competition.

2.1.3 Mainland China's economic and financial conditions

Economic growth momentum continuously waned

In 2015, under increasing pressure stemming from the slow pace of the global economic recovery, excess capacity, and mounting local government debts, Mainland China's economic growth rate fell to 6.9% from 7.3% in 2014, lower than its official growth target of 7% and the lowest level of GDP growth recorded since 1990 (Chart 2.12).

Chart 2.12 Economic growth rates of Mainland China



Note: Figure for 2016 is an IHS projection.
Sources: National Bureau of Statistics of China and IHS (2016/4/15).

Taking a glance into 2016, in an effort to promote supply-side structural reforms,[21] Mainland China's National People's Congress (NPC) and Chinese People's Political Consultative Conference (CPPCC) in March targeted an economic growth rate of 6.5% to 7% for 2016, the first time that the goal was reported as a range rather than a specific number, giving greater flexibility in policy making. However, IHS Global Insight projects the economic growth rate to continue falling to 6.4% in 2016 on account of weakening property markets and excess capacity in manufacturing (Chart 2.12).

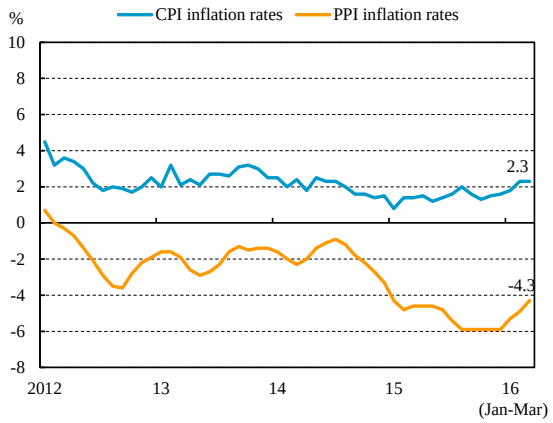
Prices remained stable and housing prices turned to increase

Owing to sluggish domestic demand and falling international oil prices, the CPI inflation rate of Mainland China was 1.4% in 2015, lower than the official goal of 3.0%. In the beginning of 2016, affected by cold weather and the seasonal factor of the Lunar New Year holidays, food prices surged and the CPI inflation rate rebounded to 2.3% in March. IHS Global Insight projects the annual CPI inflation rate of 2016 to increase to 2.3%. In contrast, the producer price index (PPI) inflation rate registered -5.2% in 2015 owing to industrial overcapacity and falling raw material prices. Moreover, the PPI inflation rate contracted to -4.3% in March 2016 (Chart 2.13).

[21] The term "supply-side structural reforms" aims at readjusting the economic structure to optimize the allocation of supply-side elements, thus improving economic growth.

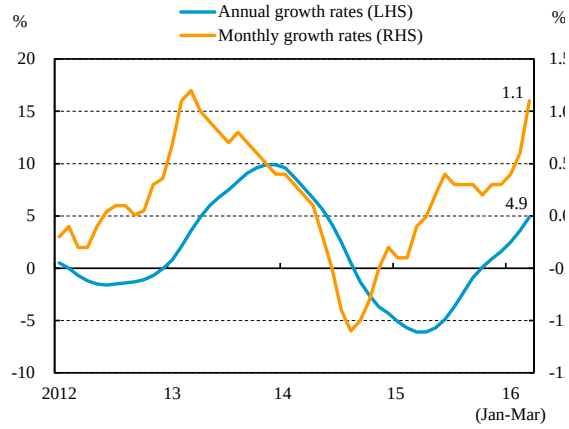
The annual growth rate of housing sales prices in 70 medium-large cities continued to decline in 2015 Q1. However, owing to a series of deregulation measures [22] in the housing market from May, housing prices turned to rise after declining, and the annual growth rate reached a yearly high of 1.6% at the end of the year (Chart 2.14). Furthermore, in early 2016, massive cash inflows into the housing market led to a marked rise in the first- and specific second-tier cities' housing prices while the third- and fourth-tier cities faced the challenge of stock clearance. Therefore, the divergence in the property market has induced two separate sets of housing policies from Mainland China's government, including strengthening supervision on first- and second-tier cities to stabilize housing prices as well as continually implementing easing monetary policies with respect to third- and fourth-tier cities in an effort to accelerate destocking.

Chart 2.13 Inflation rates of Mainland China



Source: National Bureau of Statistics of China.

Chart 2.14 Average growth rates of building sales prices in 70 medium-large cities of Mainland China



Source: Thomson Reuters.

The PBC continued to implement an easing monetary policy to maintain balance between stabilizing growth and restructuring the economy

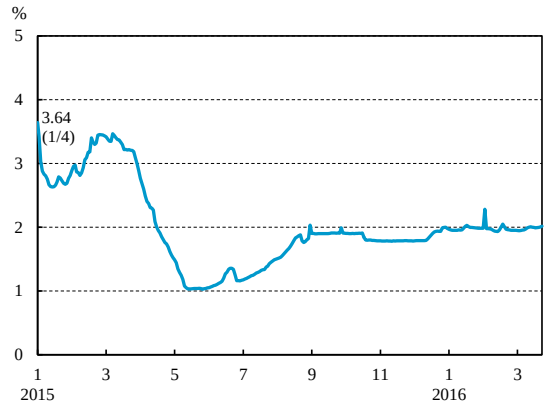
In an effort to reduce financing costs with the aim of sustaining economic growth, the People's Bank of China (PBC) continued to take a series of monetary easing measures in 2015, such as successively cutting the reserve requirement rate (RRR) for targeted agricultural and micro enterprises. Subsequently, the PBC took alternative targeted monetary easing measures that injected funds into markets through different policy tools, including cutting repurchase rates several times, and launching the medium-term lending facility (MLF), pledged supplementary lending (PSL) and short-term liquidity operations (SLOs). Besides

[22] The measures include cutting the down payment ratio for second house buyers and shortening the owning period to exempt sellers from business taxes when individuals sell an ordinary house in March 2015, and cutting the down payment ratio for first house buyers from 30% to 25% in September.

these, the PBC lowered the benchmark deposit and lending rates to 1.5% and 4.35%, respectively, which was the fifth interest rate cut since July 2012. Furthermore, the PBC removed the deposit interest rate ceiling in October 2015 to achieve its interest rate liberalization target.[23]

Later, owing to the slowdown in economic growth and massive capital outflows from Mainland China, the PBC cut the RRRs for all banks by 50bps in March 2016 to maintain ample liquidity in the financial system. In the face of easy monetary policy, the Shanghai Interbank Offered Rate (SHIBOR) fluctuated mildly except for a temporary rise during the Chinese New Year holidays because of seasonal demand (Chart 2.15).

Chart 2.15 Shanghai Interbank Offered Rates



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

Chart 2.16 Shanghai stock exchange composite index

Source: Bloomberg.

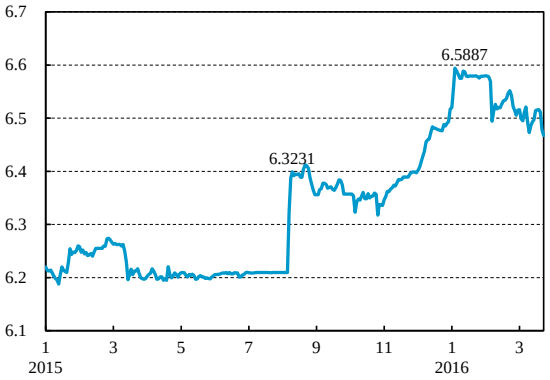
The stock and foreign exchange markets sharply fluctuated

In early 2015, thanks to interest rate and RRR cuts by the PBC, the One Belt One Road and MSCI inclusion of Mainland China's shares, the Shanghai stock exchange composite (SSE) index sharply rose and registered 5,166 in mid-June, increasing by 60% from the end of 2014 (Chart 2.16). However, detachment from fundamentals, strengthened deleveraging by the government and negative international factors all led to a panic sell-off and dramatic fall in the market. Afterwards, the SSE composite index gradually stabilized in Q4, and reached 3,539 at the end of December, with an annual rise of 9.4%. In the beginning of 2016, a circuit breaker mechanism was triggered resulting in a panic sell-off again and the SSE composite index plummeted to 2,655. At the end of March, the SSE composite index slightly rebounded to 3,004.

[23] The PBC expanded the ceiling on deposit interest rates from 1.2 times the benchmark rate to 1.3 and 1.5 times, respectively, in March and May 2015. In August, the PBC removed the ceiling on long-term (excluding within one year) banks' certificate of deposit interest rates. In October, the PBC removed the ceiling on all banks' deposit interest rates.

Regarding the foreign exchange market, the renminbi exchange rate turned to stabilize after depreciating against the US dollar in 2015 Q1. However, the renminbi sharply dropped to 6.3231, driven by the implementation of reform of the mid-price of the renminbi against the US dollar on 11 August. Later, the IMF included the renminbi into the special drawing right (SDR) currency basket in November. Therefore, market participants expected that the momentum of stabilization of the renminbi exchange rate by the PBC would decline and that depreciation of the renminbi would follow. At the end of December, the renminbi exchange rate stood at 6.4936 against the US dollar, an annual depreciation of 4.5%. In the beginning of 2016, the renminbi exchange rate has rapidly depreciated through the combined effect of capital outflows and expected depreciation of the renminbi. Afterwards, the PBC intervened to greatly drive up the Hong Kong Interbank Offered Rate (HIBOR) to boost the cost of shorting the renminbi offshore, resulting in the stabilization of the renminbi (Chart 2.17).

Chart 2.17 RMB/USD exchange rate



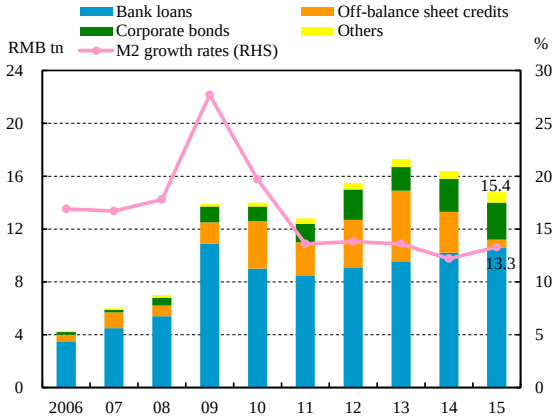
Source: CBC.

Furthermore, Mainland China's government gradually opened the capital account and took a series of measures for the onshore foreign exchange market from 2015 onwards to promote the internationalization of the renminbi, including: (1) implementing reform of the mid-price of the renminbi against the US dollar; (2) opening its interbank foreign exchange market to foreign central banks and similar institutions; (3) allowing qualified foreign institutional investors to participate in the foreign exchange market; (4) publishing the renminbi exchange rate composite index provided by the China Foreign Exchange Trade System (CFETS). As a result, the effects of these measures on Mainland China's economy and the global financial market should be cautiously monitored in the future.

The increment in aggregate financing to the real economy slightly decreased, but NPL ratios of banks continually trended up

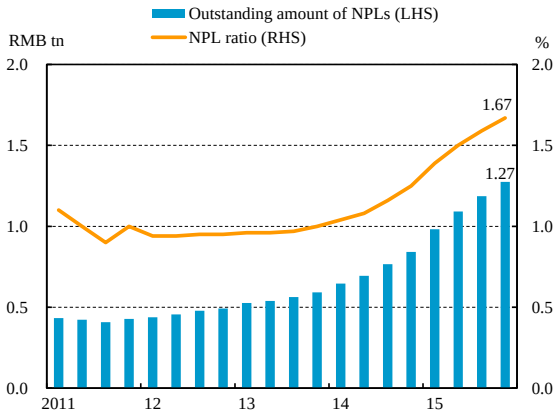
With a view to the PBC's reinforcement of the financial sector to support the real economy, the annual growth rate of broad money supply M2 increased to 13.3% at the end of 2015, higher than the official annual target of 12%. Meanwhile, aggregate financing to the real economy rose by RMB15.4 trillion at the end of 2015; however, the annual growth rate decreased to 12.4% from 14.3% a year earlier, mainly resulting from a decline in off-balance sheet financing as Mainland China strengthened financial institution deleveraging and supervision on shadow banking (Chart 2.18).

Chart 2.18 Aggregate financing to the real economy and annual growth rates of M2 in Mainland China



Source: PBC.

Chart 2.19 NPL ratios of Mainland China's commercial banks



Source: China Banking Regulatory Commission.

Despite a sustained rise in bank loans in the most recent four years, the NPL ratio edged up to 1.67% at the end of 2015 from the 1.25% recorded a year earlier as a result of moderate economic growth (Chart 2.19). Because Mainland China's government continually cut excessive industrial capacity and cleaned up indebted corporates, the NPL ratio may continue to increase.

With local government debts coming due, various measures were successively launched

On account of local governments facing enormous debts due from 2015 onwards,[24] alongside increasing pressure to service their debts owing to ongoing economic slowdown and address

[24] The National Audit Office of the People's Republic of China published the audit findings of public debts at all levels of government in December 2013. Based on the report, about RMB2.78 trillion of the total local government debts fell due in 2015, and about RMB1.52 trillion will fall due in 2016.

the sources of financial stability pressure, Mainland China's government consented to launch a RMB3.2 trillion local government debt-swap program so as to enable local governments to tackle their debt due problems. Furthermore, the State Council determined to raise the limit the National Social Security Fund is allowed to invest in local government bonds and adopted a local government debt ceiling in order to reduce default risk of local government debts.

2.2 Domestic economic conditions

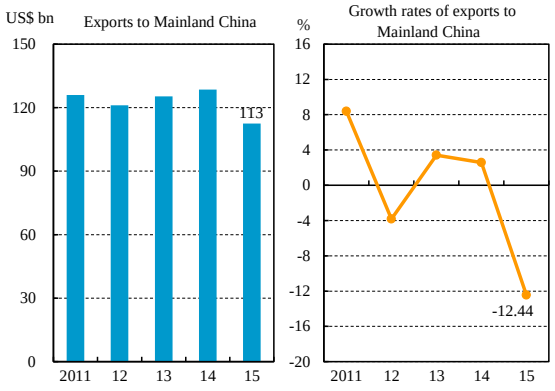
In 2015, because of a substantial decline in exports and sluggish momentum in investment, the domestic economy grew slowly along with stable inflation. Short-term external debt servicing ability remained strong on the back of a sustained surplus in the balance of payments and ample foreign exchange reserves. Meanwhile, the scale of external debt shrank and external debt servicing capacity improved. Although the government's fiscal deficits fell, the total government debt level slightly mounted; furthermore, the government kept implementing the *Fiscal Health Plan* to enhance a sound fiscal system.

2.2.1 Exports declined sharply and domestic economic growth slowed

As a result of the continuous slump in international crude oil prices, global demand moderation and increasing threat from industrial supply chain localization in Mainland China, Taiwan's exports to major markets all declined in 2015, with an annual decrease of 10.90%, reaching the lowest level since 2009. Moreover, other major exporting countries in Asia also faced the same challenges.[25]

Because Taiwan's exports are highly concentrated on Mainland China's market, and greatly affected by the industrial supply chain localization and their slowdown in economic growth, the growth rate of exports to Mainland China (including Hong Kong) sharply shrank to -12.44% in 2015 (Chart 2.20). Broken down by industry, exports of optical instruments registered the greatest decline in both amount and growth rate. In

Chart 2.20 Exports and growth rates of exports to Mainland China

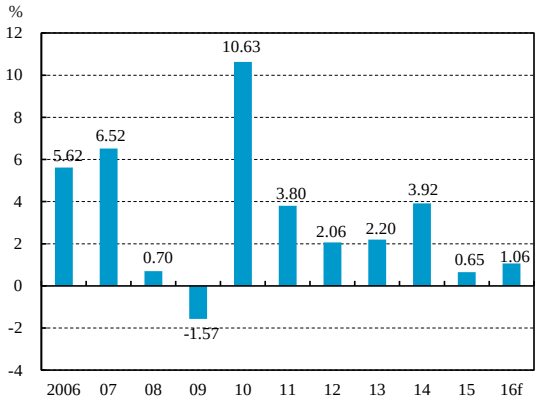


Source: MOF.

[25] Affected by global business cyclical factors, the annual export growth rates in major Asian countries dropped substantially, e.g., Singapore (-19.8%), Hong Kong (-15.3%), Malaysia (-14.6%), Japan (-9.5%), South Korea (-8.0%), Thailand (-5.8%) and Mainland China (-2.5%).

the short run, the emergence of the industrial supply chain in Mainland China will directly influence exports of intermediate goods from Taiwan. Meanwhile, the gradual completion of Mainland China's supply chain and the *Go Global* strategy promoted by Mainland China's government will jeopardize the importance of the role played by Taiwan's industries in the international specialization over the longer run.

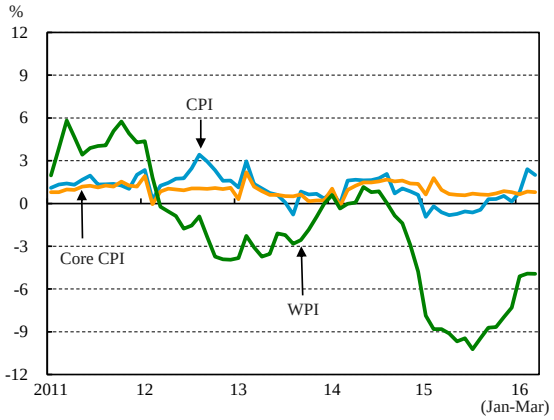
Chart 2.21 Economic growth rates in Taiwan



Note: Figure for 2016 is forecast by DGBAS.
Source: DGBAS.

The slump in exports, uncertainty over market prospects and a shortage of domestic investment led the economic growth rate to significantly decline in Q2 2015. Moreover, growth rates dropped to -0.80% in Q3 and -0.89% in Q4. Overall, the annual economic growth rate stood at only 0.65% in 2015, much lower than the 3.92% of the previous year (Chart 2.21).

Chart 2.22 Consumer and wholesale price inflation rates



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

Taking a glance into 2016, the growth rate of exports is likely to continue to drop alongside sluggish momentum in private investment and insufficient growth in consumption. As a result, the DGBAS preliminarily estimates Taiwan's economic growth rate to reach -0.68% in Q1 and forecasts the annual economic growth rate to stand at 1.06%[26] in 2016 (Chart 2.21).

2.2.2 Domestic prices remained stable

In 2015, dragged down by the decrease in the international prices of raw materials, such as crude oil, the wholesale price index (WPI) inflation rate showed a downward trend, which continuously magnified from January and turned to narrow after registering -10.23% in July. Afterwards, the WPI inflation rate reached -7.30% in December (Chart 2.22). The annual WPI inflation rate stood at -8.84% in 2015, lower than the -0.57% in the previous year, and

[26] See Note 3.

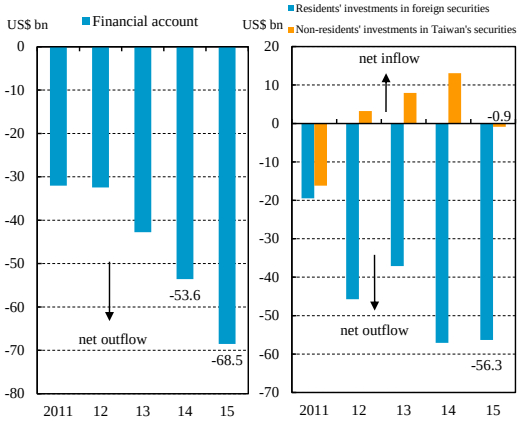
reached the lowest level on record. The DGBAS projects the annual WPI inflation rate to remain in negative territory at -2.88% in 2016.[27]

Attributed to a prolonged weakness in international crude oil prices and the plunges in prices of gasoline, electricity and gas, the CPI inflation rates were negative from January to August in 2015. However, domestic prices of vegetables and fruits rose considerably owing to the influence of typhoons and torrential rain, and the CPI inflation rate turned positive from September, whereas the core CPI inflation rates all kept positive during the whole year (Chart 2.22). Eventually the annual CPI inflation rate registered -0.31% in 2015, lower than the 1.20% of the previous year, while the core CPI inflation rate rose moderately and reached 0.79%, lower than the 1.26% recorded a year earlier. With global economic recovery remaining slow and the international prices of crude oil and cereals continuing at low levels, the DGBAS forecasts the annual CPI inflation rate to ascend to 1.09%[28] in 2016.

2.2.3 Current account surplus persisted and foreign exchange reserves stayed abundant

In 2015, despite both merchandise exports and imports decreasing compared to the previous year, the trade surplus rose as exports decreased less than imports, causing the annual current account surplus to reach US$75.5 billion, or 14.44%[29] of annual GDP, with an increase of US$13.0 billion or 20.83% compared to 2014.

Chart 2.23 Financial account and net inflow/outflow of securities investments



Source: CBC.

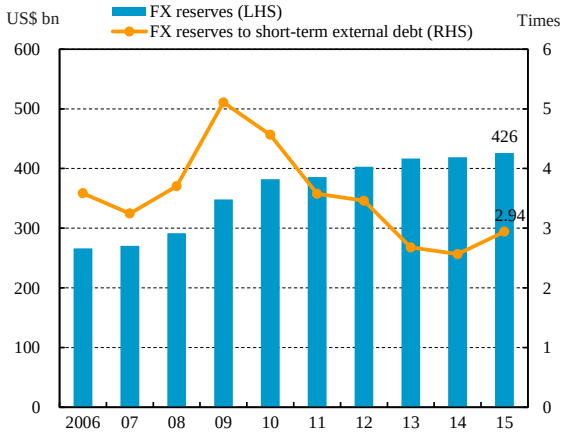
The annual balance of outflows expanded to a record high of US$68.5 billion in 2015. Focusing on the components of the financial account, residents' investments in foreign securities in 2015 held at a high level primarily resulting from the continuously increasing foreign bond investments by insurance companies. Meanwhile, non-residents' investments in Taiwan's securities shrank, owing to the reduced investments by foreign institutional

[27] See Note 3.
[28] See Note 3.
[29] 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 at relatively high risk.

investors in the domestic stock and bond markets (Chart 2.23). With rising outflows on the financial account but a greater increase in the current account surplus, the balance of payments surplus climbed to US$15 billion in 2015, increasing by 15.34% from a year earlier.

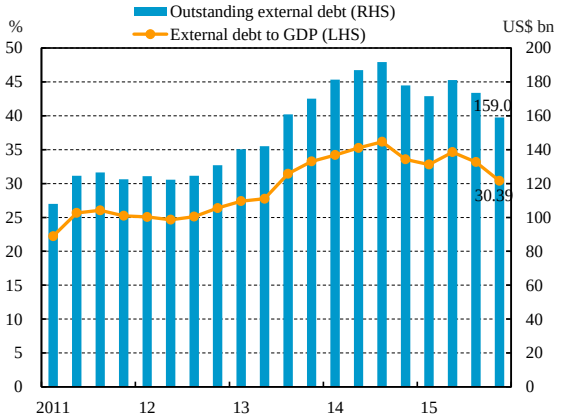
On account of the continuous balance of payments surplus, the accumulation of investment earnings from foreign exchange reserve assets and the appreciation of major currencies, such as the euro, against the US dollar, the foreign exchange reserves climbed to US$426 billion at the end of December 2015, a slight increase of 1.68% from the previous year. At the end of April 2016, the amount of foreign exchange reserves continued to increase to US$433.2 billion. Furthermore, at the end of 2015, the ratio of foreign exchange reserves to short-term external debt turned to rise to 2.94 times owing to an increase in foreign exchange reserves and a decrease in short-term external debt. Consequently, it was higher than internationally recognized minimum levels,[30] implying that Taiwan's foreign exchange reserves have a robust capacity to meet payment obligations (Chart 2.24).

Chart 2.24 Short-term external debt servicing capacity



Note: FX reserves and external debt are end-of-period figures.
Source: CBC.

Chart 2.25 External debt servicing capacity



Notes: 1. External debts are end-of-period figures.
2. GDP is annual figures.
Sources: CBC and DGBAS.

[30] The general international consensus is that a ratio of foreign exchange reserves to short-term external debt higher than 100% indicates relatively low risk.

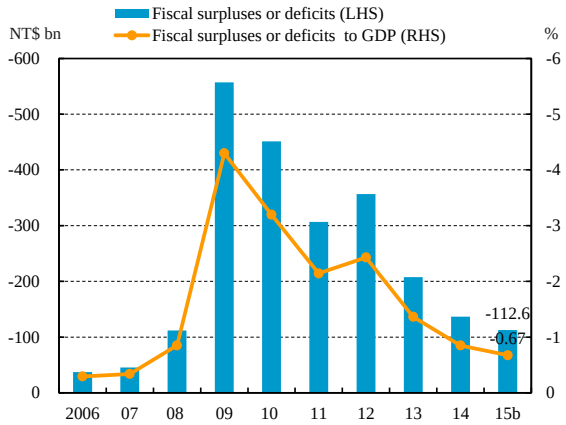
2.2.4 Scale of external debt shrank and debt-servicing capacity improved

Taiwan's external debt[31] slightly rose in the first half of 2015 owing to the increases of offshore banking units' due from foreign banks and foreign deposits. Domestic banks repaid foreign loans with abundant capital from Q3, causing external debt to fall to US$159 billion, or 30.39% of annual GDP, at the end of the year, suggesting that the capacity to service external debt improved[32] (Chart 2.25).

2.2.5 Fiscal deficits fell but government debt slightly rose

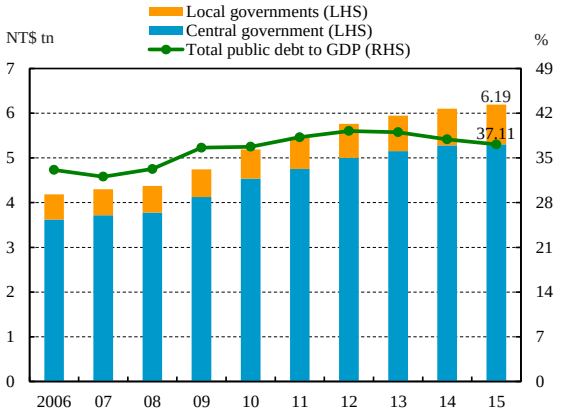
To promote economic growth in 2015, the government appropriately increased expenditures and boosted spending on public infrastructure construction investment and technology development. However, the excess of central government tax revenues and surplus of debt expenditures[33] caused fiscal deficits to decline to NT$112.6 billion alongside a fall in the ratio of fiscal deficits to annual GDP to 0.67%[34] in 2015 (Chart 2.26).

Chart 2.26 Fiscal deficits position



Notes: 1. Fiscal position data include those of central and local governments.
2. Data of fiscal deficits are annual figures. Figures for 2015 are final accounts and budgets for the central government and local governments, respectively.
Sources: MOF and DGBAS.

Chart 2.27 Public debts



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 2015 are preliminary final accounts and budgets for the central government and local governments, respectively.
Sources: MOF and DGBAS.

As fiscal deficits stayed high and both central government and local governments relied on

[31] The CBC defines external debt as 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 (starting from December 2004, figures for public external debt include outstanding foreign debt arising from repo transactions between the CBC and international financial institutions). The term "private external debt" refers to private-sector foreign debt not guaranteed by the public sector.

[32] The general international consensus is that a country with a ratio of external debt to GDP lower than 50% is deemed to be at relatively low risk.

[33] The figures are based on a DGBAS press release on 21 April 2016.

[34] See Note 4.

bond issuance to finance debt servicing expenditures, outstanding public debt at all levels of government[35] in 2015 expanded to NT$6.19 trillion,[36] or 37.11% of annual GDP,[37] from the NT$6.10 trillion registered in the previous year (Chart 2.27).

In order to promote fiscal health, the Ministry of Finance continued to implement the *Fiscal Health Plan* and *Central Government Debt Improvement Plan* that seek to enhance a sound fiscal system through the following approaches: implementing all the measures of increasing income and reducing expenses; improving the structures of revenue and expenditure; controlling the scale of debt; coordinating all resources; diversifying sources of finance; and timely modifying taxation.[38]

2.3 Non-financial sectors

2.3.1 Corporate sector[39]

The profitability of listed companies dropped in 2015. However, their financial leverage ratio declined and short-term debt servicing capacity enhanced. The credit quality of corporate loans stayed sound, as NPL ratios were at their lowest recorded level. Nevertheless, it is noteworthy that the deceleration in corporate investment growth could affect their long-term profitability.

[35] 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. As of April 2016, the outstanding one-year-or-longer non-self-liquidating public debts are NT$5.40 trillion, NT$0.59 trillion, NT$0.16 trillion, and NT$0.6 billion for central government, municipalities, counties, and townships, respectively. The figures account for 33.73%, 3.69%, 1.00%, and 0.004% of the average GDP for the preceding three fiscal years, which are below the ceilings of 40.6%, 7.65%, 1.63%, and 0.12% for central government, municipalities, counties, and townships, separately, set out in the *Public Debt Act*.

[36] Outstanding non-self-liquidating debt at all levels of government with a maturity of one year or longer stood at NT$6.15 trillion as of the end of April 2016.

[37] See Note 5.

[38] It includes the restoration of the business tax on financial services to 5 percent and the implementation of the integrated housing and land tax system since January 1, 2016.

[39] Corporate sector only includes the data of TWSE-listed companies and OTC-listed companies. Throughout this section, figures for listed companies are consolidated financial data; prior to 2011 are under ROC GAAP, while from 2012 are under the TIFRSs. In light of changes in accounting treatment and presentation, readers should interpret these figures prudently when comparing statistics before and after IFRSs adoption.

Profitability of listed companies dropped in 2015

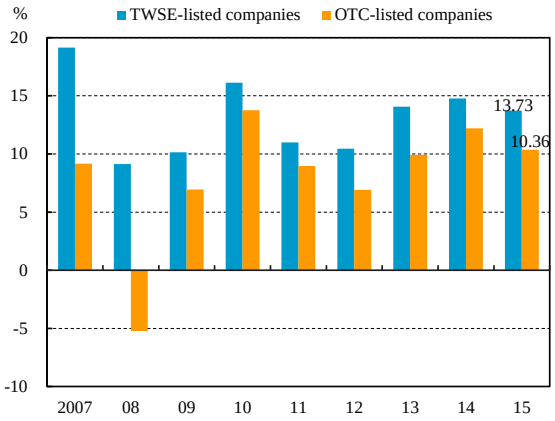
In 2015, resulting from the slowdown of the recovery in the global economy and declining exports of Taiwanese companies, the average ROEs of TWSE-listed and OTC-listed companies dropped to 13.73% and 10.36%, respectively, from 14.78% and 12.21% in 2014 (Chart 2.28). Profitability fell, mainly driven by the decrease in market demand and the rise of the red supply chain in Mainland China, sluggish stock clearance in electronic products, as well as intense price competition among peers, bringing about profit downturns in the semiconductor, computers & peripheral equipment, and optoelectronic industries.

Except for the plastics industry, all major industries for TWSE-listed companies reported decreasing ROEs in 2015, especially the iron & steel and the building material & construction industries. For OTC-listed companies, except for slightly increased profitability in the electric machinery industry, all other industries experienced descended performance (Chart 2.29).

Leverage ratio decreased for listed companies

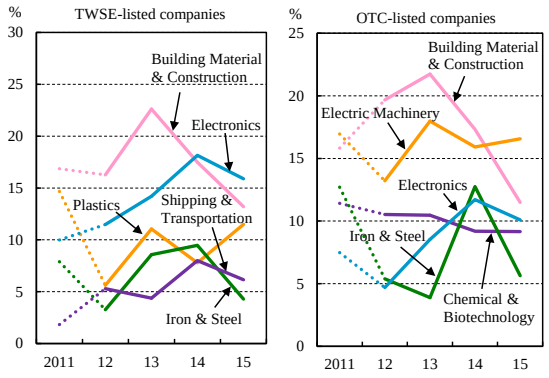
At the end of 2015, the average leverage ratio for TWSE-listed companies fell to 94.29% from 101.77% at the end of the previous year. Similarly, the average

Chart 2.28 Return on equity in corporate sector



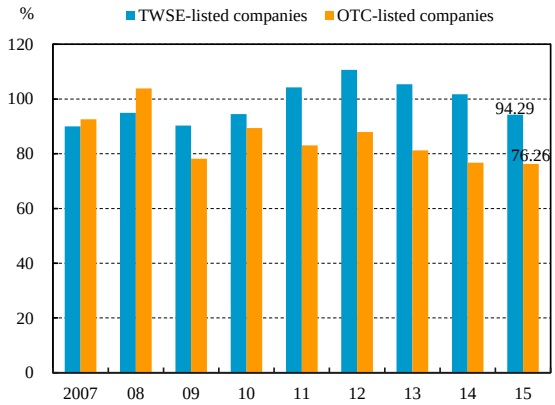
Note: Return on equity = net income before interest and tax / average equity.
Source: TEJ.

Chart 2.29 Return on equity of TWSE-listed and OTC-listed companies by major industries



Source: TEJ.

Chart 2.30 Leverage ratios in corporate sector



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

leverage ratio for OTC-listed companies also slightly decreased to 76.26% from 76.76% a year earlier (Chart 2.30). In 2015, listed companies achieved operating surpluses and arranged capital injections to reinforce capital adequacy, resulting in the run-up of total equity and a decline in leverage ratios.

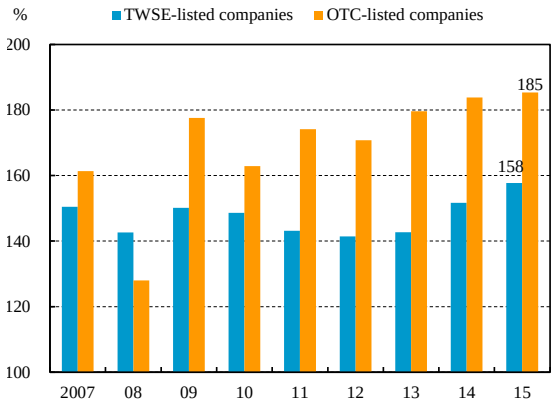
Short-term debt servicing capacity for listed companies continued to enhance

Owing to a greater decrease in current liabilities, the current ratio for TWSE-listed companies increased to 158% at the end of 2015, while the interest coverage ratio slightly rose to 13.45. In addition, the current ratio for OTC-listed companies continued to increase to 185%. However, their interest coverage ratio fell to 12.75, but still held at a relatively high level in recent years (Chart 2.31 and 2.32). For listed companies as a whole, short-term debt servicing capacity generally enhanced.

Credit quality of corporate[40] loans remained sound

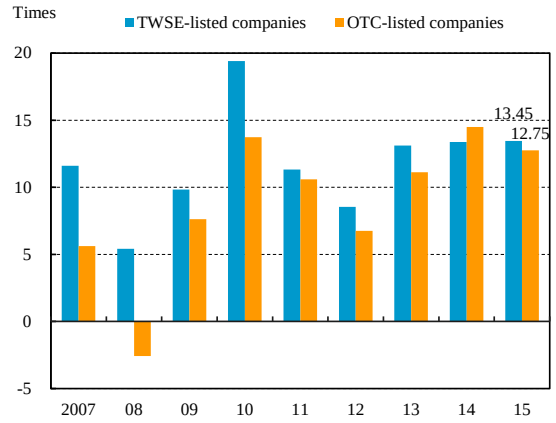
In 2015, the NPL ratio for corporate loans granted by financial institutions continued to decline as a result of massive write-offs of NPLs by large corporations, such as ProMOS Technologies and TPSi. The ratio declined to only 0.33% at the end of the year, reflecting sound credit quality for the corporate sector

Chart 2.31 Current ratios in corporate sector



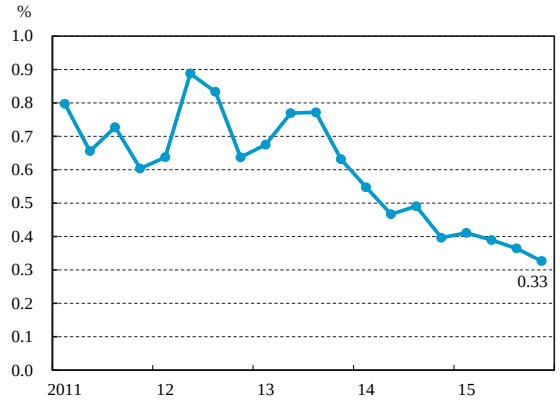
Note: Current ratio = current assets / current liabilities.
Source: TEJ.

Chart 2.32 Interest coverage ratios in corporate sector



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

Chart 2.33 NPL ratios of corporate loans



Note: End-of-period figures.
Source: JCIC.

[40] The data for the corporate sector herein are on the basis of listed and unlisted corporations provided by the JCIC.

(Chart 2.33).

Deceleration in corporate investment growth could affect long-term profit

As a result of lackluster recovery momentum in the global economy and the crowding-out effect by industrial supply chain localization in Mainland China, the corporate sector's profit outlook faces challenges, even affecting firms' willingness to invest. The growth rate of domestic private real investment (Chart 2.34) was only 2.75% in 2015, while the DGBAS predicts it will continue to decline to 1.09% for 2016. It is advisable for banks to pay close attention to the impact of the downturn in corporate investment growth on their long-term profit.

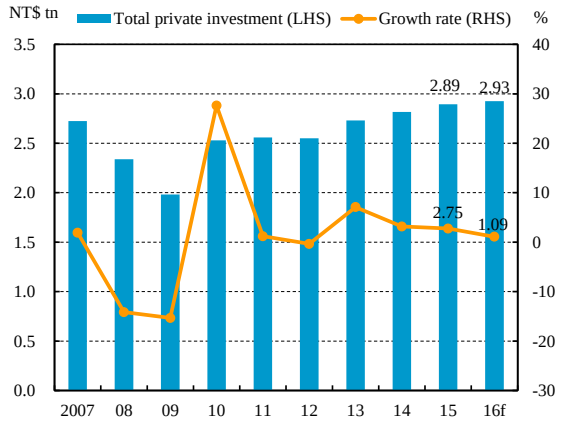
2.3.2 Household sector

The household debt burden relieved slightly as the balance of total household borrowing expanded more slowly than that of disposable income. The overall credit quality of household borrowing remained satisfactory; furthermore, combined with the falling unemployment rate and steadily growing regular earnings, this should help underpin the debt servicing capacity of households.

Household borrowing increased slightly

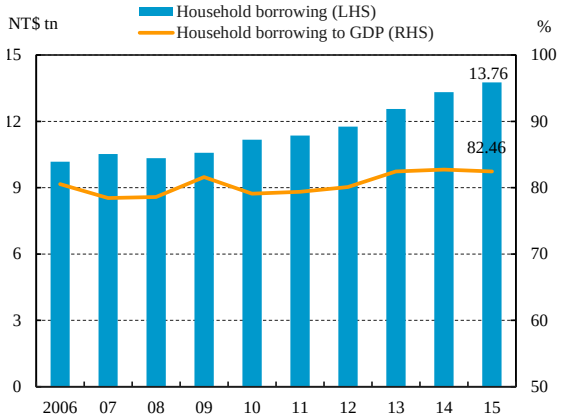
At the end of 2015, total household borrowing saw a slight expansion and reached NT$13.76

Chart 2.34 Private real investment



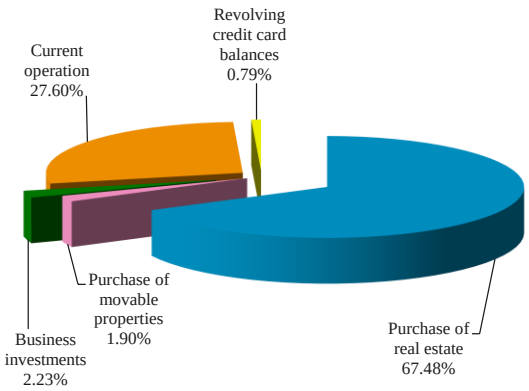
Source: DGBAS.

Chart 2.35 Household borrowing to GDP



Sources: CBC, JCIC and DGBAS.

Chart 2.36 Household borrowing by purpose

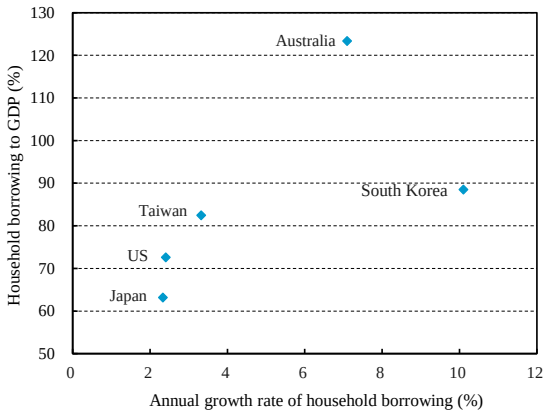


Note: Figures are as of the end of 2015.
Sources: CBC and JCIC.

trillion, equivalent to 82.46% of annual GDP (Chart 2.35). The largest share of household borrowing went for the purchase of real estate (67.48%), followed by current operation loans[41] (27.60%). The rest of the household borrowing categories took only minor percentages, including loans to purchase movable properties, largely consisting of vehicle loans, business investment loans, and revolving balances on credit cards (Chart 2.36).

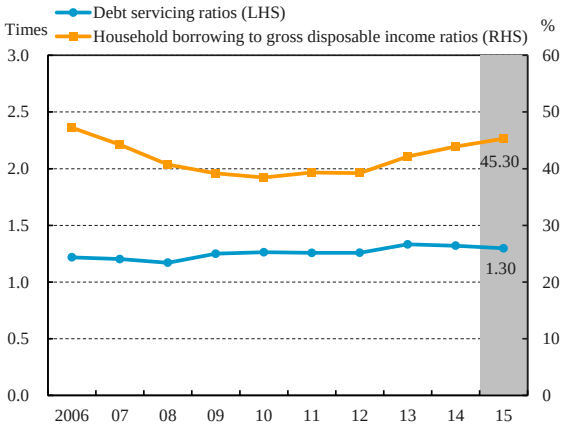
At the end of 2015, the increment of total household borrowing was mainly from an increase in loans for the purchase of real estate and current operation loans, and the annual growth rate of total household borrowing (in Taiwan) reduced to 3.32% at the end of 2015 from 6.04% a year earlier. Compared to other countries, the growth of total household borrowing in Taiwan was lower than that in South Korea and Australia, but higher than that in Japan and the US. In addition, as a percentage of GDP, household borrowing in Taiwan was much lower than that in Australia, equivalent to that in South Korea, but higher than that in the US and Japan (Chart 2.37).

Chart 2.37 Household indebtedness in selected countries



Note: Figures are as of the end of 2015.
Sources: Fed, BOJ, BOK, ABS, IMF, DGBAS, CBC and JCIC.

Chart 2.38 Household indebtedness and debt servicing ratios



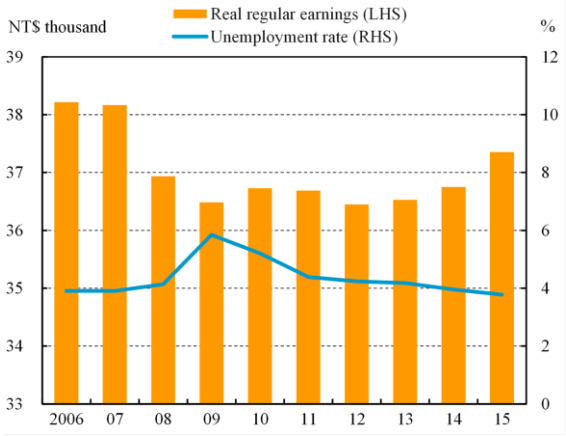
Note: Gross disposable income in shaded area is CBC estimate.
Sources: CBC, JCIC and DGBAS.

[41] The term "current operation loans" includes outstanding cash card loans.

The ratio of household borrowing to disposable income declined

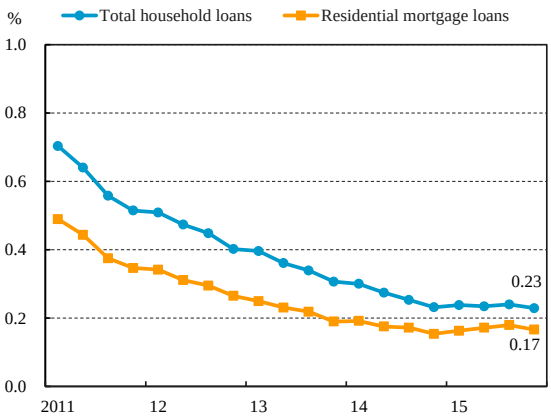
As total household borrowing grew at a slower pace than disposable income in 2015, the ratio of household borrowing to total disposable income[42] shrank to 1.30 at the end of the year, reflecting a lessening of the household debt burden. However, owing to the increase in loans for the purchase of movable properties and current operations, the debt servicing ratio uplifted to 45.30% in 2015 from 43.91% a year earlier (Chart 2.38). Nevertheless, the decreasing domestic unemployment rate, still low interest rates on loans and steady growth of real regular earnings should help improve the debt servicing capacity of households (Chart 2.39).

Chart 2.39 Unemployment rate and regular earnings



Sources: DGBAS and Ministry of Labor.

Chart 2.40 NPL ratios of household borrowing



Note: Figures are as of the end of each quarter.
Source: JCIC.

NPL ratio of household borrowing remained low

The NPL ratio of household borrowing stabilized at 0.23% at the end of 2015, remaining at a 5-year low. This indicated that household credit quality remained satisfactory (Chart 2.40).

2.3.3 Real estate market

From 2015 onwards, trading volume in the real estate market contracted. House prices declined gradually but remained high. In addition, real estate loans grew slowly as mortgage interest rates fell moderately. With banks improving risk control of housing loans, the CBC gradually revised targeted prudential measures. In addition, the government has implemented

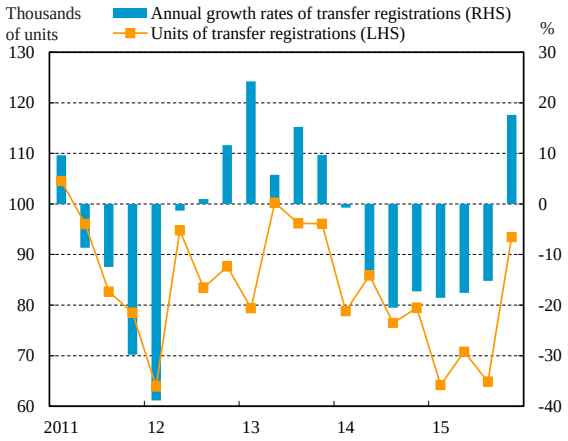
[42] Total disposable income = disposable income + rental expenses + interest expenses.

some measures, including levying a consolidated housing and land income tax since 2016, combined with continuously expanding social housing. All the above-mentioned measures helped promote sound development of the real estate market.

Trading volume in the real estate market contracted

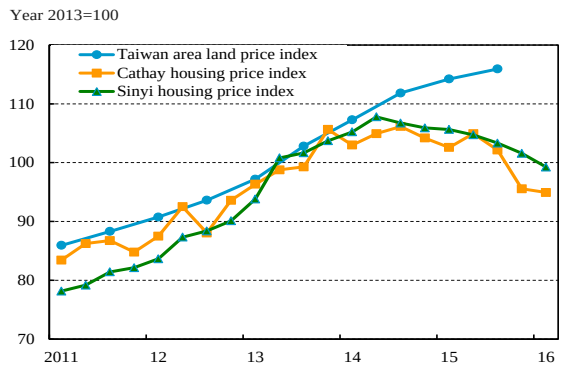
In the first three quarters of 2015, the total number of building ownership transfers for transaction further declined and showed double-digit negative growth as a result of slowing domestic economic growth, a heavier tax burden on real estate owners, and the uncertainty surrounding property tax reform. In Q4, trading volume in the real estate market increased significantly, with the annual growth rate rebounding to 17.59%, owing to the release of a large number of new existing buildings, transfers before the levying of a consolidated housing and land income tax[43] as well as the rising current land value, along with the CBC revising some regulatory measures on real estate loans (Chart 2.41). Therefore, the accumulated number of building ownership transfers for transaction was 290 thousand units in 2015, which was the lowest level since 2002, with an annual growth rate of -8.53%.

Chart 2.41 Building ownership registrations for transaction



Source: Monthly Bulletin of Interior Statistics, MOI.

Chart 2.42 Land and house price indices



Notes: 1. Taiwan area land price index is released semiannually. Figures are as of the end of March and September.
2. For comparison purposes, all three indices use the same base year of 2013 (2013 average=100).

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

In 2016 Q1, the annual growth rate of the total number of building ownership transfers for transaction was -32.56%. From January to April, the total annual growth rate of the six metropolitan areas was -28.29%.

[43] Amendments of certain provisions in *the Income Tax Act* and Amendments of Article 6-1 in *The Specifically Selected Goods and Services Tax Act* were promulgated on June 24, 2015, and came into force from January 1, 2016.

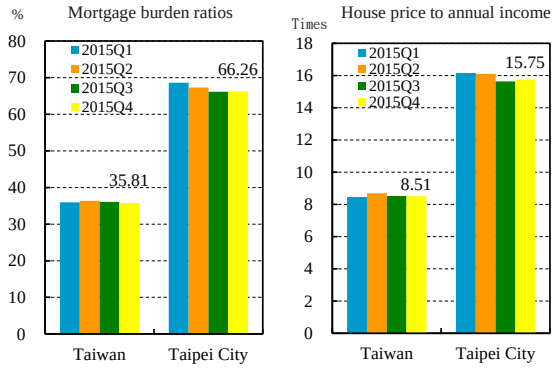
Real estate prices declined slightly

In 2015, driven by a contracted housing market, housing prices fell moderately. Over the same period, land prices trended up continuously, though at a slower pace, as the annual growth rate of the land price index declined to 3.66% as of the end of September 2015 (Chart 2.42). The housing price index reached its highest point in 2015 Q1 and then reversed to trend downwards. As of the end of 2015 Q4, the annual growth rate declined to 0.53%. Currently the index has declined by 1.16%[44] from its highest point.

The Cathay housing price index (for new constructions) has fallen since 2015 Q3 (Chart 2.42), while the annual growth rate fell at a faster pace and was -7.47% as of 2016 Q1. The current index has dropped by 10.57% from its highest point in 2014 Q3.

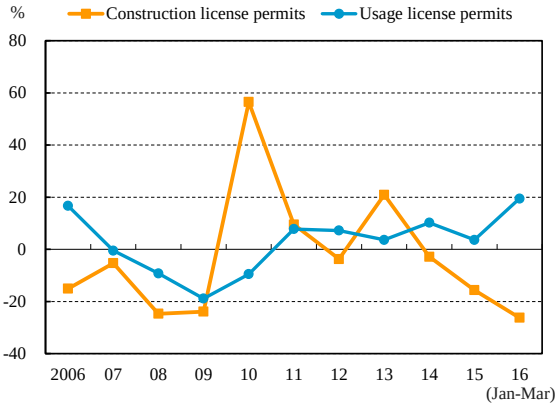
The Sinyi housing price index (for existing buildings) has turned to negative growth since 2015 Q2, while the annual growth rate continuously fell at a faster pace, registering -6.04% as of 2016 Q1. The current index has fallen by 7.92% from its highest point in 2014 Q2.

Chart 2.43 Mortgage burden ratios and house price to income ratios



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

Chart 2.44 Annual growth rates of floor space of construction license permits and usage license permits



Note: The annual growth rate of January to March 2016 is the currently accumulated number compared to the same time last year.
Source: Monthly Bulletin of Interior Statistics, MOI.

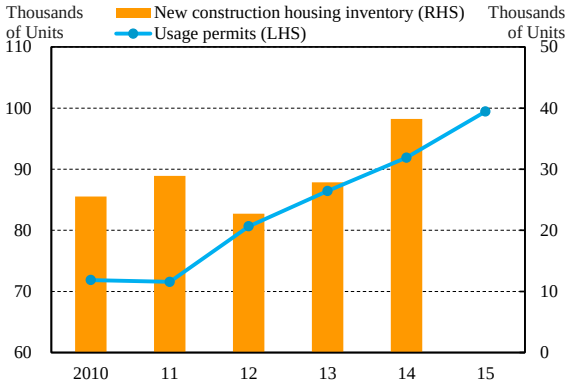
Mortgage burden stayed high

In 2015, housing prices declined gradually and mortgage interest rates fell slightly. While the growth of household disposable income continued to slow, the mortgage burden ratio

[44] The land price index was 119.28 as the Ministry of Interior re-designated 31 March 2013 as the base period (index=100). The housing price index is comprised of the transacted housing prices data from the real estate market transaction price inquiry system of the Ministry of Interior.

registered 35.81% in 2015 Q4, only declining by 0.29 percentage points quarter by quarter from Q3, but increasing by 0.19 percentage points year on year. The house price to income ratio during the same period was 8.51, falling by 0.01 quarter by quarter, but rising by 0.1 year on year (Chart 2.43). Compared to other cities in Taiwan, the mortgage burden and house price to income ratios in Taipei City were the highest, reaching 66.26% and 15.75, respectively.

Chart 2.45 Units of new residential properties construction and usage permits



Note: New residential properties construction (for sale) uses data from land registration, house tax registration and Taiwan Power Company, filtering the residential properties built within the last 5 years, still maintaining the first registration and having the possibility of being for sale. The data began in 2010 Q2 and is currently published to 2014 Q4.
Source: Monthly Bulletin of Interior Statistics, MOI; Real estate information platform.

Construction license permits contracted, while new residential properties construction expanded

In 2015, with sluggish economic growth, a decrease in new residential properties construction projects, as well as enterprises decreasing their demand for floor space to launch new stores, the total floor space of construction license permits decreased by 15.63% (Chart 2.44) year on year, with residential properties decreasing by 17.98%. From January to March 2016, the annual growth rate of the total floor space of construction license permits decreased continuously to -26.23%, with residential properties decreasing to -27.36%.

Owing to gradually completed construction projects being introduced to the market in recent years, the total floor space of usage permits increased continuously in 2015 (Chart 2.44), with an annual growth rate of 3.63%, mainly driven by the fact that residential properties increased by 4.82%. With the release of new buildings, the annual growth rate of the total floor space of usage permits registered 19.47% from January to March 2016, with the growth rate of residential properties reaching 17.08%.

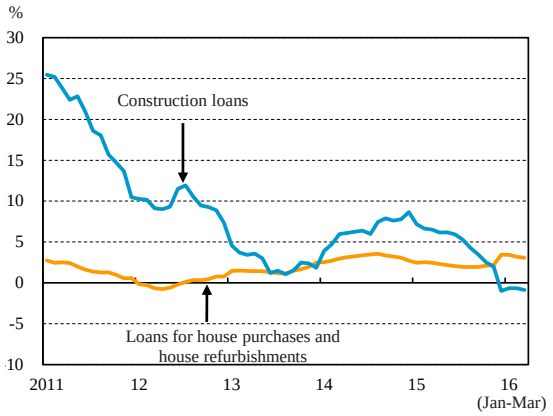
According to the Ministry of Interior, new residential properties construction (for sale) registered 38 thousand units at the end of 2014, increasing by around 10 thousand units or 37.37% year on year. In 2015, 99 thousand usage permits were released, showing that new residential properties increasing by 8 thousand units or 8.2% year on year (Chart 2.45). From January to March 2016, 24 thousand units were continuously released with an annual growth rate of 27.39%. Reflecting this, new construction housing inventory (for sale) will

continuously increase.

Real estate loans grew modestly as mortgage interest rates slightly decreased

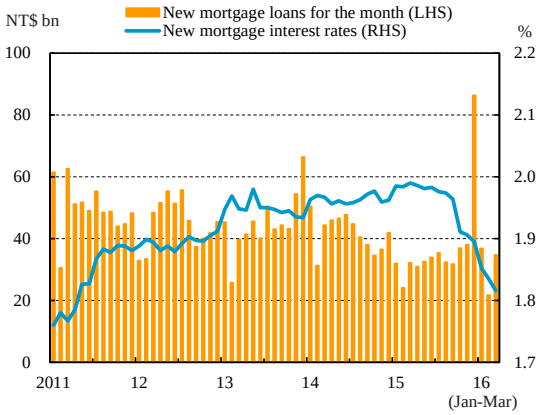
In 2015, housing loans grew slowly, owing to the CBC and the FSC continuously urging financial institutions to control their risk relating to real estate loans. At the end of September 2015, the annual growth rate of the outstanding loans for house purchases and house refurbishments granted by banks[45] decreased to 1.94%. Subsequently, owing to an increase of transactions in the real estate market in 2015 Q4, the annual growth rate rebounded marginally and then registered 3.06% as of the end of March 2016 (Chart 2.46). Meanwhile, outstanding construction loans turned to negative growth at the end of 2015 and the annual growth rate registered -0.86% as of the end of March 2016 (Chart 2.46).

Chart 2.46 Annual growth rates of real estate loans



Source: CBC.

Chart 2.47 New mortgages – amounts and interest rates



Source: CBC.

In 2015 Q4, the new loans for house purchases granted by the top five banks[46] increased significantly, owing to transactions in the real estate market returning to an upward trend. Meanwhile, the accumulated number decreased by 11.14% year on year to NT$446.4 billion in 2015. From January to March 2016, the figure increased by 5.72% year on year. The interest rate for new mortgages gradually decreased and then dropped to 1.816% in March 2016 (Chart 2.47).

The CBC moderately revised targeted prudential measures

From 2015 onwards, the CBC continuously deployed measures to enhance risk management

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

regarding the real estate loans of financial institutions, and moderately revised related measures according to banks' real estate lending and developments in the housing market. In August, the CBC revised several measures related to house-purchase loans, including removing six districts from the scope of the designated Specific Areas, raising the loan-to-value (LTV) ratio ceiling to 60% on housing loans taken out for high-value housing and those taken out by corporate legal entities or third (or more) home purchases by natural persons.

In March 2016, the CBC repealed most rules imposed on home mortgage loans and land loans, except for high-value housing loans. In the CBC's assessment, targeted macro-prudential measures on the real estate sector have proved effective, and financial institutions have continued to strengthen self-discipline on mortgage-related credit risk. In addition, as the government rolled out several taxation schemes to promote sound development of the housing market, speculative demand has tapered off. However, a large portion of newly extended mortgage loans remains concentrated on high-value home purchases; therefore, relevant regulations should be continuously put in place. In the future, the CBC will continue to keep watch on banks' real estate lending and developments in the housing market. Appropriate measures will be adopted in a timely manner to sustain financial stability (Box 1).

Box 1
The CBC adjusted targeted prudential measures on real estate lending

With a view to controlling the credit risk incurred by financial institutions' real estate lending, the CBC has successively adopted various targeted prudential measures governing real estate-related loans since June 2010. These measures have gradually come into effect. The financial institutions have prudently managed real estate-related credit risk, and speculative demand in the real estate market has abated while property transactions have moderated. Moreover, the government has continued with the advancement of its residential policy, helping to sustain the sound development of the housing market. Taking these developments into account, since August 2015 the CBC has adjusted the prudential measures on real estate lending twice so as to promote financial stability.

1. The CBC revised the contents of its targeted prudential measures twice

Given that the effects of several targeted prudential measures emerged progressively, the CBC adjusted some of the measures from 14 August 2015 onwards, including reduction of the scope of Specific Areas and increases in the caps on loan-to-value (LTV) ratios. The CBC further slashed most of the targeted prudential measures on 25 March 2016 and merely retained regulations pertinent to high-value housing (Table B1.1).

Table B1.1 Key amendments to targeted prudential measures on real estate lending

Items	Previous regulation	Key amendments on 14 August 2015	Key amendments on 25 March 2016
1. Mortgage loans for house purchases in Specific Areas	1. LTV ratio capped at 60% 2. Scope of Specific Areas: (1) All districts in Taipei City (2) 17 districts in New Taipei City (3) 4 districts in Taoyuan City	Repealed the following Specific Areas: 1. Bali and Yingge districts in New Taipei City 2. All 4 districts in Taoyuan City	Repealed
2. LTV ratio cap on loans for a natural person's third (or more) mortgage house(s)	LTV ratio capped at 50%	LTV ratio capped at 60%	Repealed
3. LTV ratio cap on mortgage loans for corporate legal entities	LTV ratio capped at 50%	LTV ratio capped at 60%	Repealed
4. Land collateralized loans	1. LTV ratio capped at 65% 2. Disbursement of 10% of	Unchanged	Repealed

	the approved loan amount to be withheld until construction commences 3. Concrete and detailed plans for construction projects required upon loan application		
5. Mortgage loans for high-value housing	1. LTV ratio capped at 50% 2. Definition of high-value housing: (1) Properties in Taipei City valued at NT$70 million and above (2) Properties in New Taipei City valued at NT$60 million and above (3) Properties located elsewhere in Taiwan, valued at NT$40 million and above	LTV ratio capped at 60%	Unchanged

Note: The 17 districts in New Taipei City include Banqiao, Sanchong, Zhonghe, Yonghe, Xinzhuang, Xindian, Tucheng, Luzhou, Shulin, Xizhi, Sanxia, Linkou, Tamsui, Wugu, Taishan, Bali, and Yingge. The four districts in Taoyuan City include Taoyuan, Luzhu, Zhongli, and Guishan.

Source: CBC.

2. Major considerations of the CBC's adjustments

2.1 The effects of the prudential measures came into view

The concentration of banks' loans on real estate alleviated as the ratio of outstanding real estate loans to total loans dropped to 35.00% in February 2016 from 37.59% in June 2010. The concentration of housing loans in Specific Areas also descended, while the ratio of new housing loans in Specific Areas to total new housing loans decreased to 40.27% in February 2016 from 64.99% in June 2010. Moreover, compared to the condition before implementation of the prudential measures, the LTV ratios of various regulated loans all showed a downward trend, whereas their mortgage rates rose gently (Table B1.2).

2.2 Housing market transactions moderated and house prices fell gradually

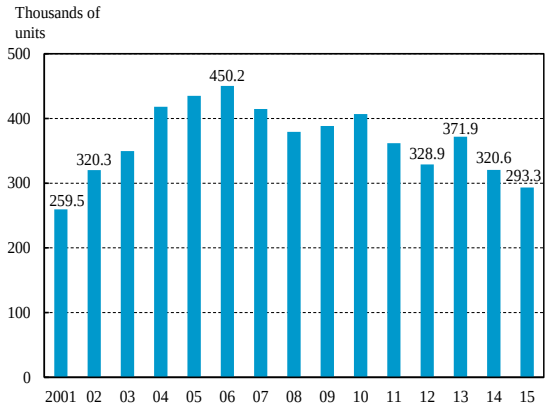
The number of buildings traded nationwide diminished markedly in 2015, setting a new record low from 2002 (Chart B1.1). Moreover, the price indices of existing houses and new houses at the end of 2015 also dropped by 5.8% and 10%, respectively, from the peak recorded in 2014 (Chart B1.2).

Table B1.2 LTV ratios and mortgage rates of regulated loans

Items	LTV ratios		Mortgage rates	
	Base period	February 2016	Base period	February 2016
Mortgage loans for house purchases in Specific Areas	63.91% (July 2010)	57.21%	1.97% (July 2010)	2.07%
Mortgage loans for high-value housing	80-99% (June 2012)	56.48%	1.84% (June 2012)	1.94%
Mortgage loans for a natural person's third (or more) mortgage home(s)	58-72% (June 2014)	58.05%	1.97% (June 2014)	2.13%
Land collateralized loans	68.36% (December 2010)	62.36%	2.08% (December 2010)	2.71%

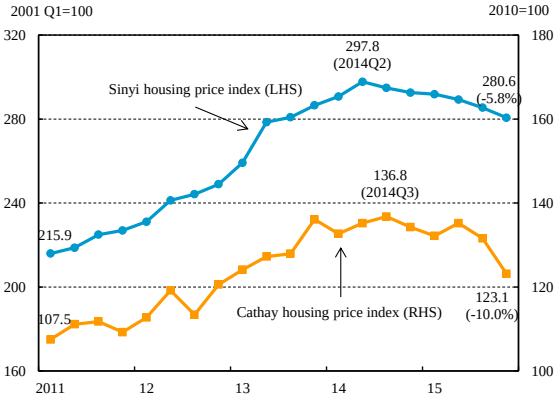
Source: CBC.

Chart B1.1 Buildings traded nationwide



Source: Monthly Bulletin of Interior Statistics, MOI.

Chart B1.2 2011-2015 House Price Indices



Note: Sinyi housing price is for existing houses, and Cathay housing price is for new houses.

Sources: Sinyi Real Estate Review and Cathay Real Estate Indicators Quarterly Bulletin.

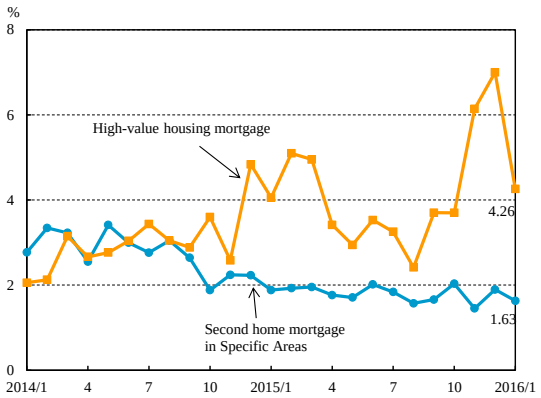
2.3 Concentration of high-value housing loans remained elevated

The ratio of high-value housing loans to total new housing loans undertaken by banks stood on the high side (Chart B1.3), indicating that banks' excessive concentration on high-value housing loans still existed. Meanwhile, volatile high-value housing prices will raise related credit risks borne by banks. Accordingly, these loans still need to be kept under regulation.

3. The CBC will persistently monitor the risk management of financial institutions on real estate lending

In the future, the CBC will continue to pay close attention to financial institutions' risk management of real estate-related credit and developments in the property market, and will undertake appropriate policy actions in a timely manner as warranted so as to sustain financial stability.

Chart B1.3 Proportion of banks' new mortgage loans for housing



Source: CBC.

III. Financial sector assessment

3.1 Financial markets

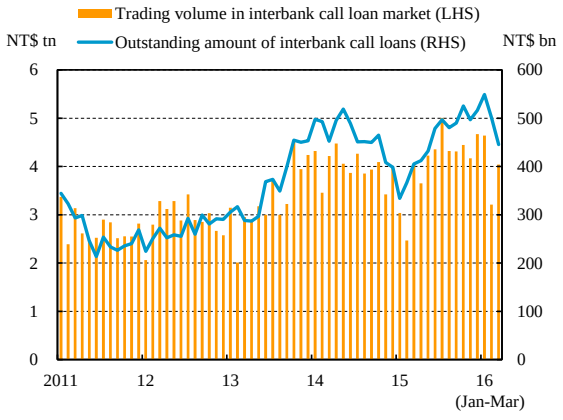
With respect to money and bond markets in 2015, the trading volume of interbank call loans roughly remained unchanged. The trading volume of bills in the secondary market fell, although the outstanding amount in the primary market increased. In the bond market, the turnover of outright transactions in the secondary market remained at a lower level, whereas the outstanding amount in the primary market expanded noticeably. Short-term market rates remained low, while long-term market rates fell. With regard to the stock markets, stock indices hit a fifteen-year high, while volatility reversed to fall after rising. In the foreign exchange market, the NT dollar exchange rate against the US dollar turned to depreciation after appreciating, but remained relatively stable.

3.1.1 Money and bond markets

Trading volume of interbank call loans roughly remained unchanged

In the first half of 2015, the average daily outstanding amount and the trading volume of interbank call loans both contracted year on year. However, in the second half of the year, the figures turned to increase, driven by the fact that bills finance companies expanded their borrowings from the interbank call loan market for yielding operations amid falling call loan rates. As a result, the annual outstanding amount and the trading volume of interbank call loans for the year as a whole were similar to the figures a year earlier. In 2016 Q1, affected by some financial institutions adjusting their funding strategies and the seasonal factor of the Lunar New Year, the trading volume of interbank call loans

Chart 3.1 Interbank call loan market



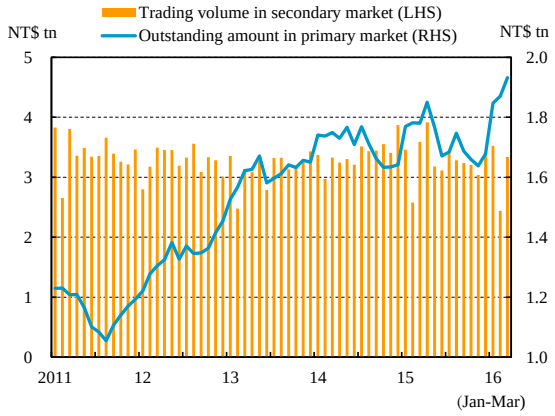
Note: Outstanding amount is the monthly average of daily data.
Source: CBC.

turned to diminish (Chart 3.1).

Bill issuance in the primary market increased, but trading volume in the secondary market fell

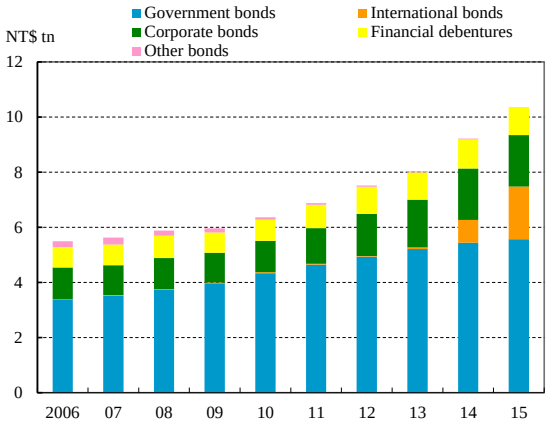
At the end of 2015, the outstanding amount of bill issuance increased by NT$36.5 billion or 2.22% year on year. Owing to domestic economic recovery and an increase in enterprises' current operation funding demand in early 2015, the outstanding amount of commercial paper,[47] which accounted for the largest share of total bill issuance, gradually increased. However, the outstanding amount of commercial paper gradually decreased from May onwards due to a weakening domestic economy. At the end of the year, the outstanding amount of commercial paper rebounded by NT$39.8 billion or 3.04% compared to the previous year, fueled by stronger demand from enterprises for funding and a drop in the short-term market rate. Moreover, the outstanding amount of negotiable certificates of deposit (NCDs) also increased by NT$37.4 billion or 18.70%. On the contrary, the outstanding amount of treasury bills contracted by NT$40.0 billion or 30.77%.[48] In 2016 Q1, the outstanding amount of bill issuance in the primary market continued to trend upwards as commercial paper issuance increased (Chart 3.2).

Chart 3.2 Primary and secondary bill markets



Sources: CBC and FSC.

Chart 3.3 Outstanding amount of bond issuance in the primary market



Note: Other bonds include beneficiary securities and foreign bonds.

Source: FSC.

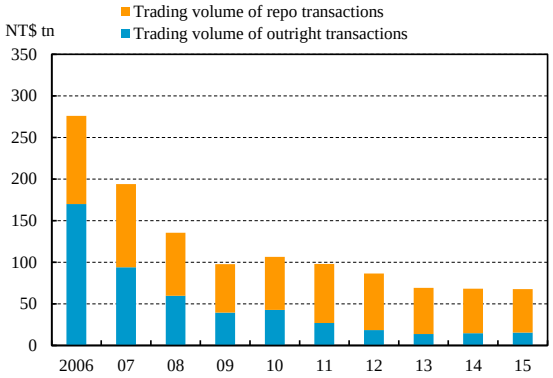
In 2015, the outstanding amount of bill issuance in the primary market saw an increase. On the other hand, the bill trading volume in the secondary market over the same period

[47] The proportion of commercial paper to the total issuance in the primary bill market is over 80%. As a result, it has considerable influence on changes in the outstanding amount.

[48] With consideration to transactions, bills finance companies actively purchased NCDs to expand the source of bills. On the other hand, the Ministry of Finance, after having achieved annual tax budget goals ahead of schedule, redeemed more treasury bills to reduce the interest burden.

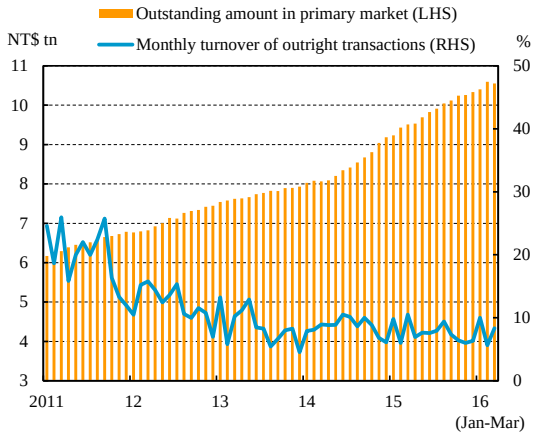
decreased by NT$1.2 trillion or 2.97% year on year. The main reasons behind this were that bills finance companies replaced RP transactions with call loans as their major source of funding for yielding operations, taking advantage of falling interest rates in the interbank call loan market, and that banks had actively purchased commercial paper, most of which was held to maturity. In 2016 Q1, the trading volume roughly remained steady (Chart 3.2).

Chart 3.4 Outright and repo transactions in the bond market



Source: CBC.

Chart 3.5 Outstanding amount and turnover in primary bond market



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

Source: FSC.

Bond issuance in the primary market expanded, but the turnover of outright transactions in the secondary market remained at a lower level

At the end of 2015, the outstanding amount of bond issuance increased by NT$1.13 trillion or 12.30% year on year. The reason was mainly that insurers built up their investment in International Bonds[49] as the FSC simplified steps for issuing International Bonds and relaxed the related regulations, as well as the yields of International Bonds being much higher than those of local government bonds with the same maturity. As a result, the outstanding amount of foreign currency-denominated international bonds sharply grew by 1.32 times to NT$1.91 trillion,[50] exceeding corporate bonds and financial debentures, and was second only to local government bonds. As for corporate bonds, enterprises become less willing to issue corporate bonds as their investment strategy turned more conservative. The outstanding amount of corporate bonds in 2015 decreased

[49] Bonds denominated in foreign currencies offered and issued in Taiwan by domestic and overseas issuers are called "International Bonds." Bonds denominated in renminbi (RMB) are specifically called "Formosa Bonds."

[50] Insurers, mainly life insurance companies, are the major investors in international bonds. In 2015, the auction ratio and hold ratio of government bonds were 9.57% and 21.58%, dropping by 3.36 percentage points and 3.19 percentage points, respectively, compared to a year earlier.

by 0.37% or NT$6.99 billion over the previous year. Moreover, the outstanding amount of financial debentures also decreased by 5.94% or NT$62.44 billion year on year as some financial holding companies replaced bond issuance with capital injections to boost their bank subsidiaries' capital adequacy and merger momentum (Chart 3.3).

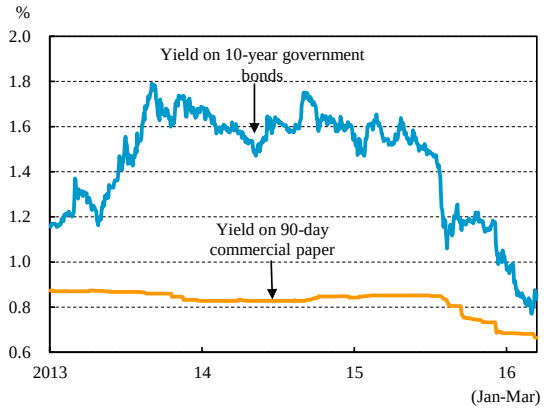
Bond issuance in the primary market markedly expanded in 2015, while the trading volume in the secondary bond market slightly fell by 0.45% year on year (Chart 3.4). The main reason was that liquidity in the secondary bond market was insufficient, driven by the fact that life insurance companies mainly invested in international bonds by adopting buy-and-hold strategies, as well as an amplified concentration of bonds held in the market owing to rising bond holdings by banks. Therefore, in 2016 Q1, the monthly turnover ratio in the primary bond market[51] roughly remained flat after descending to a lower level of 7.67% in December 2015 (Chart 3.5).

Short-term market rates remained low, while long-term market rates fell

As for short-term market rates, affected by sluggish domestic economic growth and weak funding demand of enterprises, coupled with the CBC's two rate cuts by 12.5 bps in each of the September and December meetings in 2015, the secondary market rates of 90-day commercial paper sharply dropped. In 2016 Q1, short-term market rates remained at a low level, reflecting the fact that the CBC slashed policy rates by 12.5 bps in March (Chart 3.6).

With regard to long-term bond interest rates, the yield on Taiwan's 10-year government bond initially tumbled following the impact of falling international oil prices in the first half of 2015. Afterwards, the yield fluctuated within a narrow range, affected by the movement of key US economic indicators and US government bond yields. In the second half of 2015, plummeting domestic and foreign stock markets caused massive capital flows into the bond market for hedging. This, together with two consecutive policy rate-cuts of 12.5 bps each by the CBC, led the policy rates to keep falling and to diverge from the upward trend of US government bond yields. Furthermore, in early 2016, fueled by the global financial market

Chart 3.6 Yield spread



Source: Bloomberg.

[51] See Note 6.

turmoil and the CBC lowering policy rates again by 12.5 bps in March, more funds flowed into the bond market for safety. As a result, the yield on Taiwan's 10-year government bond fell to a historical low of 0.77% on 21 March 2016 (Chart 3.6).

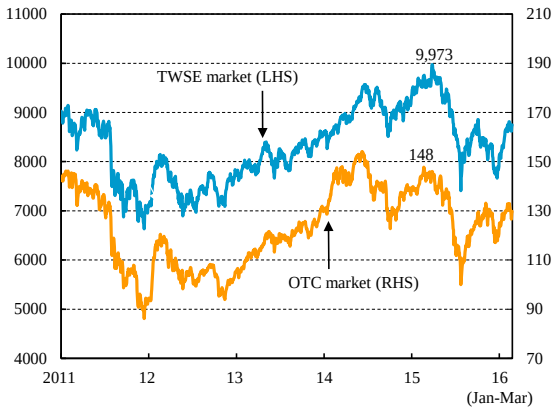
With a weakening global economy and major advanced countries successively implementing monetary easing policies, Taiwanese government bond yields seem more likely to fall than to rise in the short term. However, since the yield on Taiwan's government bonds mostly fluctuate along with those of US government bonds, the corresponding yields will likely trend upwards in the future if affected by US monetary policy normalization. Related interest risk warrants close attention.

3.1.2 Equity markets

Stock indices descended gradually after hitting a fifteen-year high, while volatility reversed to fall after rising

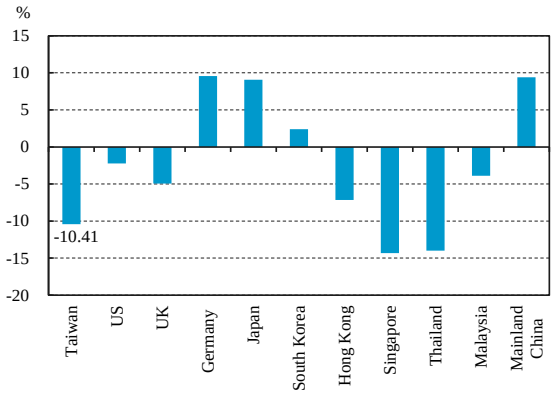
In early 2015, the FSC announced a program to boost securities markets in Taiwan. In addition, the ECB continued to adopt quantitative easing monetary policies and major countries successively cut interest rates, leading to the run-up in major international stock markets. Reflecting these factors, the TAIEX of the TWSE market proceeded on a notable rise to hit the 10,000 intraday mark and close at a fifteen-year high of 9,973 on 27 April. However, in the second half of 2015, subdued by the slump in global stock markets and the slowdown in domestic economic recovery, the TAIEX experienced a sharp decline and dipped to 7,410 on 24 August. Afterwards, owing to the rally in international stock markets and the interest rate cut by the CBC, the TAIEX rebounded and registered 8,338 at the end of 2015, posting a decrease

Chart 3.7 Taiwan's stock market indices



Sources: TWSE and TPEx.

Chart 3.8 Comparison of major stock market performances

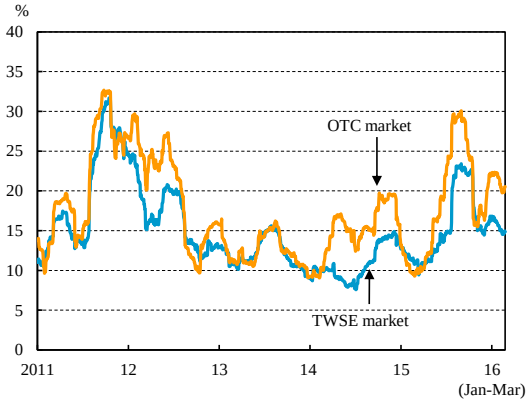


Notes: 1. Figures are for 2015.
2. Taiwan's data is for the TWSE market.
Source: TWSE.

of 10.41% year on year (Chart 3.7). Broken down by sector, the indices for the oil, gas and electricity, food manufacturing, biotechnology and medical, textile and fiber, and plastics industries reported positive returns, while the indices for the other sectors all fell.

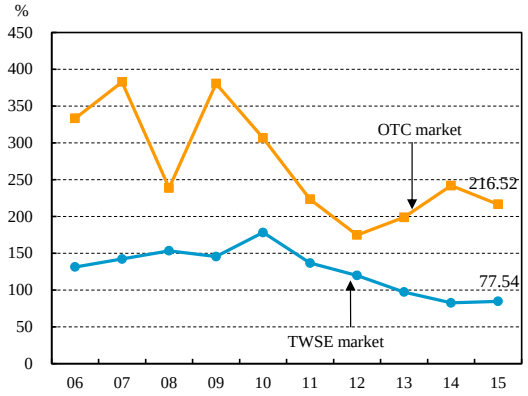
In early 2016, international stock markets deteriorated owing to the deepened concern over the downturn in the global economy, falling oil prices, implementation of the "circuit breaker" mechanism in Mainland China and depreciation of the renminbi. As a result, the TWSE market also slumped over the same period. Afterwards, thanks to the support from the National Financial Stabilization Fund, the measures implemented by Taiwan's government to maintain market stability, as well as the gradual rally in European and US stock markets, the TAIEX turned to trend up and reached 8,744 at end-March 2016, increasing by 4.88% from the end of 2015 (Chart 3.7).

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 ratios in Taiwan's stock markets



Sources: TWSE and TPEx.

Taiwan's Taipei Exchange Capitalization Weighted Stock Index, namely the OTC market index, closely tracked the movements of the TAIEX, trending downwards after hitting an annual high of 148 in March 2015, and later rebounded before falling gradually to close at 129 at end-December, for an annual decrease of 8.07%. The index rallied after declining in early 2016 and reached 130 at the end of March (Chart 3.7).

In contrast to major stock markets around the world, the TAIEX and most markets in Asia showed negative performances in 2015. In other regions of the world, the stock indices of Germany, Japan, and Mainland China performed better and increased by 9.56%, 9.07% and 9.41%, respectively (Chart 3.8).

In 2015, volatility in the TWSE and the OTC markets amplified and broadly rose to its

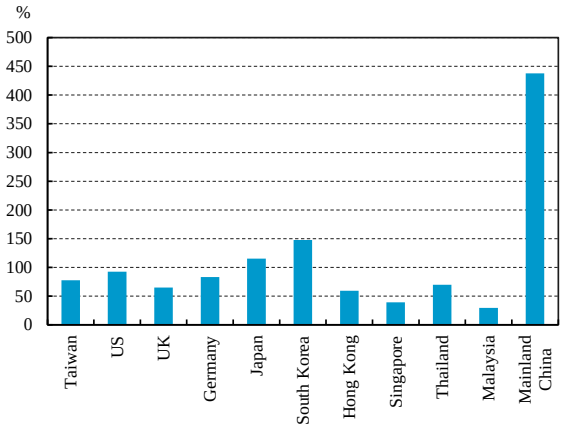
highest levels in Q3, reaching 23.42% and 30.07%, respectively. Subsequently, volatility in those two markets turned to drop to 14.48% and 16.30%, respectively, at the end of December. At the beginning of 2016, volatility of local stock indices amplified again and stood at 14.85% and 20.55%, respectively, at the end of March (Chart 3.9).

Annual turnover ratio declined

The TWSE and the OTC markets both experienced reductions in trading in 2015. The average monthly trading value in the TWSE market registered NT$1.68 trillion, a decrease of 7.80% year on year, while the annual turnover ratio in terms of trading value declined to 77.54%. In the OTC market, the trading situation was similar to the TWSE market. The average monthly trading value posted NT$474.1 billion in 2015, a decline of 10.49% year on year, while the annual turnover ratio fell to 216.52% (Chart 3.10).

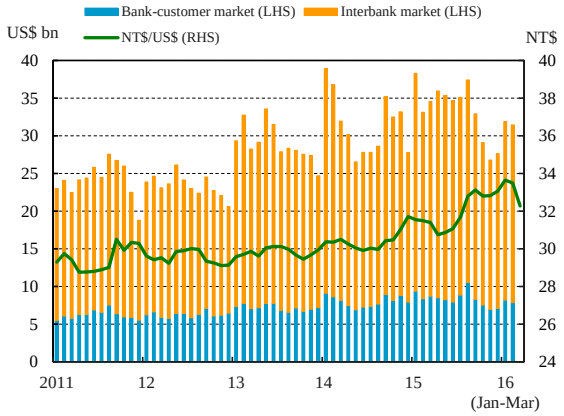
Comparing major stock markets around the world, the annual turnover ratio in Mainland China ranked among the highest in 2015, while that in the stock market in Taiwan was approximately equal to that in Germany, but higher than those in the UK, Hong Kong, Singapore, Thailand, and Malaysia (Chart 3.11).

Chart 3.11 Comparison of turnover ratios in major stock markets



Notes: 1. Figures refer to accumulated turnover ratios in 2015.
2. Taiwan's data is for the TWSE market.
Source: TWSE.

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



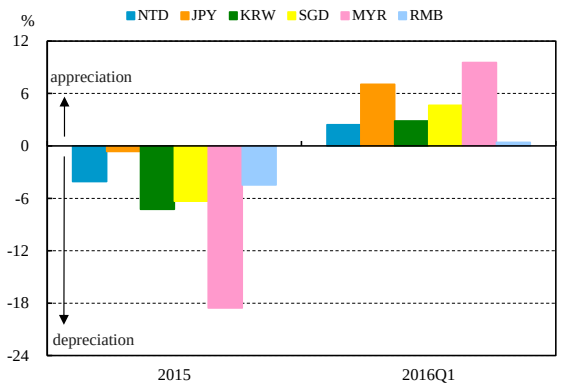
Notes: 1. Trading volume is the monthly average of daily data, while exchange rate is end-of-period data.
2. The latest data for trading volume is as of February 2016.
Source: CBC.

3.1.3 Foreign exchange market

The NT dollar exchange rate reversed from appreciation to depreciation and the trading volume continued to increase

In early 2015, major economies, such as the euro area and Mainland China, adopted monetary easing policies. Moreover, the Swiss National Bank's (SNB's) announcement to abandon the Swiss franc's cap against the euro, coupled with the implementation of negative interest rates in Sweden, induced an international capital flight to safety towards Asian emerging countries. As a result, the NT dollar exchange rate appreciated against the US dollar, reaching a yearly high of 30.541 on 22 May. Thereafter, the Fed signaled an interest rate hike and the PBC adjusted downwards the mid-price of the renminbi against the US dollar, leading to the depreciation of Asian currencies. Meanwhile, the continuous decline of exports from Taiwan and net selling from foreign investors in the domestic stock market brought the NT dollar exchange rate to turn to depreciation against the US dollar, hitting a yearly low of 33.292 on 25 September. At the end of 2015, the NT dollar exchange rate reversed to appreciate marginally and stood at 33.066, with annual depreciation of 4.08%. In early 2016, the sharp depreciation of the renminbi and the resulting greater fluctuations in the exchange rates of other Asian currencies, coupled with the divergence of monetary policies in major advanced economies and lingering geopolitical tensions, roiled the foreign exchange market. Reflecting this, the NT dollar exchange rate continually depreciated against the US dollar, yet later appreciated and rose to 32.282 at the end of March (Chart 3.12).

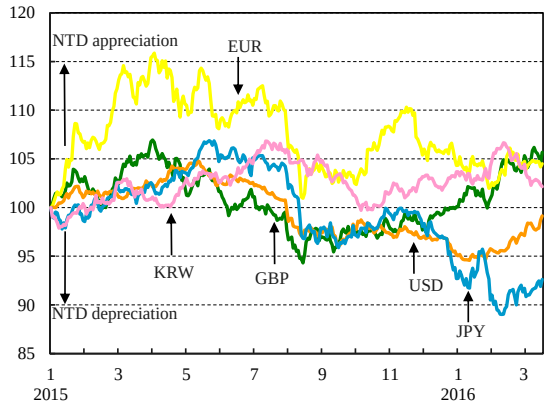
Chart 3.13 Exchange rate changes of major Asian currencies against the US dollar



Source: CBC.

Compared to other major currencies in Asia, the depreciation of the NT dollar against the US dollar at 4.08% was only greater than the Japanese yen's 0.63% in 2015. At the end of March 2016, the NT dollar appreciated by 2.43% compared to the end of the previous year, while other major Asian currencies also displayed appreciating trends (Chart 3.13).

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



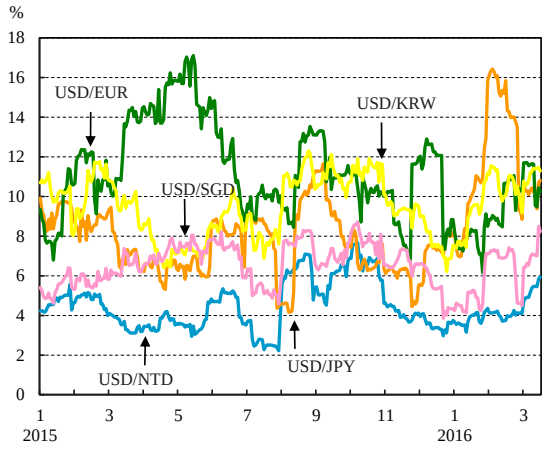
Note: 2 January 2015 = 100.
Source: CBC.

As for the NT dollar against other key international currencies, in 2015 the NT dollar

appreciated by 0.65%, 3.42% and 6.69% against the British pound, the Korean won and the euro, respectively, but depreciated by 3.47% against the Japanese yen over the same period (Chart 3.14).

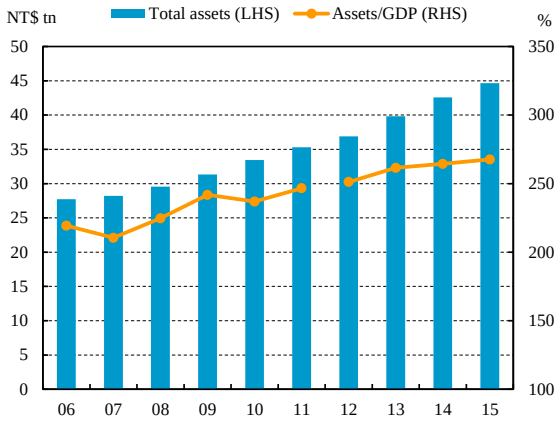
In 2015, domestic and international capital movements continued to increase. The average daily trading volume in Taiwan's foreign exchange market kept rising and reached US$33.4 billion, increasing by 6.25% compared to US$31.5 billion a year earlier, primarily because of an increase in the trading volume of the interbank market (Chart 3.12). A breakdown by counterparty showed that the average daily trading volume in the interbank market accounted for 74.95% of the total in 2015, while the retail bank-customer market made up a 25.05% share. As for types of transactions, spot trading accounted for the largest share of 41.51% of the total, followed by foreign exchange swaps with 40.08%.

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.

Chart 3.16 Total assets of domestic banks



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

NT dollar exchange rate volatility remained relatively stable

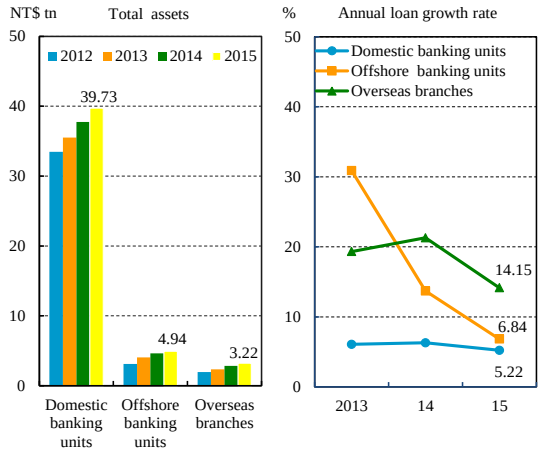
Volatility in the NT dollar exchange rate against the US dollar fluctuated between 2.22% and 7.67% in 2015, and registered an annual average of 4.54%. In early 2016, owing to the fluctuations of the renminbi, the exchange rates of other Asian currencies fluctuated dramatically. Notably, volatility in the NT dollar exchange rate against the US dollar fluctuated between 3.13% and 5.95% during 2016 Q1. Since 2015, the NT dollar exchange rate against the US dollar has been relatively stable compared to the exchange rates of major currencies such as the Japanese yen, the euro, the Korean won and the Singapore dollar (Chart 3.15).

3.2 Financial institutions

3.2.1 Domestic banks

In 2015, the total assets of domestic banks[52] accumulated continuously, though at a slower pace than in the previous year. Asset quality improved and the concentration in corporate loans kept declining while the concentration of credit exposures in real estate loans decreased slightly. Nevertheless, banks should take prudent actions to address related credit risks deriving from contracting trading volume and moderately falling prices of real estate. The estimated VaR of overall market risk exposures of domestic banks rose but had limited influence on their capital adequacy. Moreover, liquidity risk was moderate thanks to ample liquidity in the banking system. The profitability of domestic banks in 2015 declined slightly compared to that of the previous year, while the average capital adequacy ratio also rose. This revealed that the capacity of domestic banks to bear losses was satisfactory.

Chart 3.17 Total assets and annual asset growth rate of domestic banks (DBUs, OBUs and Overseas branches)



Notes:1. Figures for total assets are on the TIFRSs basis.
2. Figures for total assets are inclusive of interbank transactions.

Source: CBC.

Total assets continued to increase at a moderate pace

The total assets of domestic banks kept increasing, albeit at a more moderate pace, and reached NT$44.66 trillion at the end of 2015, equivalent to 267.64% of annual GDP (Chart 3.16). The annual growth rate of total assets decreased to 4.94% from 6.86% a year earlier. Annual growth rates of assets held by domestic banking units, offshore banking units, and overseas branches declined, particularly offshore banking units (Chart 3.17). This was mainly because slowing global and domestic economic growth affected firms' demand for investment and operating funds. As a result, banks' loan policies turned more conservative, leading to a slower growth in domestic and foreign corporate loans.

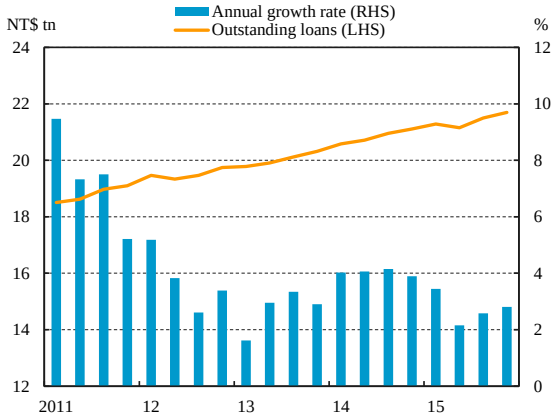
[52] The 40 domestic banks referred to in this section include the Agricultural Bank of Taiwan.

Credit risk

Customer loans growth slowed

In 2015, customer loans[53] were the major source of credit risk for domestic banks. Outstanding loans of their domestic banking units (DBUs) stood at NT$21.70 trillion at the end of 2015, accounting for 48.59% of total assets, with the annual growth rate decreasing to 2.80% from 3.89% a year earlier (Chart 3.18) .

Chart 3.18 Outstanding loans and annual loan growth rate in domestic banks



Source: CBC.

In terms of borrowers of loans, at the end of 2015, the annual growth rate of corporate loans decreased to 1.48% from 3.11% a year earlier as a sluggish global economy affected firms' demand for borrowing. The annual growth rate of individual loans fell to 5.17% from 5.93% at the end of the previous year because of a slowdown in real estate loans growth. The annual growth rate of loans to government agencies was -6.97%, mainly because an increase in government tax revenues caused a decrease in demand for bank borrowing.

Chart 3.19 Credit by type of collateral in domestic banks

Note: End-of-period figures.
Source: CBC.

Concentration of credit exposure in real estate loans descended slightly

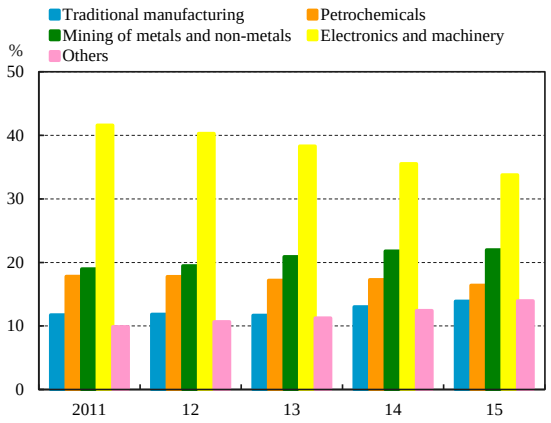
Outstanding real estate loans[54] granted by the DBUs of domestic banks amounted to NT$7.91 trillion, accounting for 36.46% of total loans at the end of 2015. The ratio descended slightly by 0.12 percentage points over the previous year, reflecting a decline in the concentration of credit exposure in real estate loans. However, the total real estate-secured credit granted by domestic banks reached NT$14.07 trillion, accounting for 52.53% of total

[53] The term "customer loans" herein refers to discounts, overdrafts, other loans, and import bills purchased. It excludes export bills purchased, non-accrual loans and interbank loans.
[54] The term "real estate loans" herein refers to house-purchase loans, house-refurbishment loans, and construction loans.

credit, [55] with an increase of 2.05 percentage points over the previous year (Chart 3.19). The ratio of real estate-secured credit remained high.

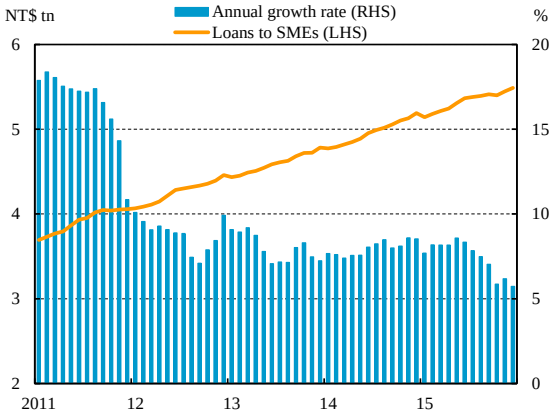
Although the CBC loosened most targeted macro-prudential measures regarding real estate loans except for high-value house-purchase loans, the trading volume of real estate contracted and real estate prices trended downwards owing to the integrated housing and land taxation policy, a rise in the property tax, and a slack domestic economy. Banks should cautiously adjust their loan policies and strengthen risk control mechanisms to address related credit risks.

Chart 3.20 Exposure to the manufacturing sector by domestic banks



Notes: 1. End-of-period figures.
2. Exposure to each sector = loans to each sector / loans to the whole manufacturing sector.
Source: CBC.

Chart 3.21 Loans to SMEs by domestic banks



Source: CBC.

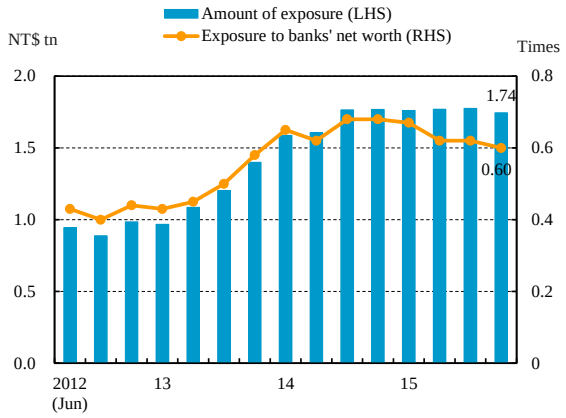
Credit concentration of corporate loans declined gradually

Outstanding corporate loans of the DBUs of domestic banks stood at NT$9.49 trillion at the end of 2015, while loans to the manufacturing sector registered NT$3.72 trillion and accounted for the largest share of 39.17% of the total. Within the manufacturing sector,[56] the largest proportion of loans was for the electronics industry, which stood at NT$1.26 trillion and accounted for 33.76% of the total loans to the whole manufacturing sector. However, the exposures to the electronics industry has gradually decreased in recent years (Chart 3.20), reflecting an improvement in the credit contentration in corporate loans.

[55] The term "credit" herein includes loans, guarantee payments receivable, and acceptances receivable.
[56] 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.

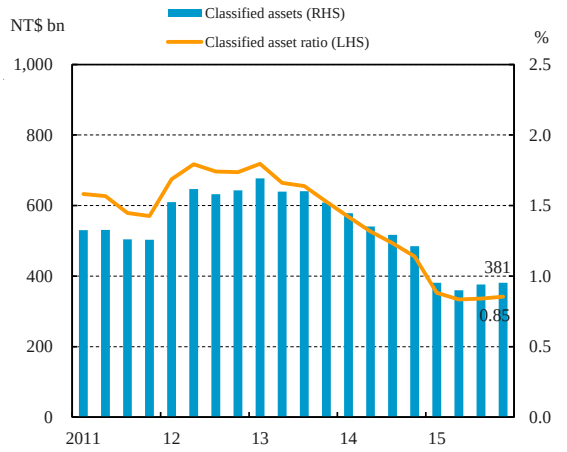
Outstanding corporate loans to small and medium enterprises (SMEs) by domestic banks steadily expanded to NT$5.49 trillion at the end of 2015, increasing by NT$297.0 billion or 5.72% over the previous year, corresponding to a decrease in the annual growth rate of 2.81 percentage points compared to the previous year (Chart 3.21). The ratio of these loans to outstanding corporate loans has kept rising year by year and reached a ten-year high of 57.81% at the end of 2015. This indicates that banks continued to conform with government policy to extend SME loans to meet firms' funding demand, while at the same time taking into consideration proper risk control. The outstanding amount of loan guarantees applied for by SMEs through the Small and Medium Enterprise Credit Guarantee Fund of Taiwan (SMEG) decreased by 5.44% from year-end 2014 to NT$823.1 billion at the end of 2015. This was due to weak corporate funding needs caused by shrinking export orders; yet the figure for the total amount remained at a relatively high level.

Chart 3.22 Exposure to the Mainland China area by domestic banks



Note: The FSC implemented calculation method of statutory exposure in the Mainland China area since April 2012.
Source: CBC.

Chart 3.23 Classified assets of domestic banks



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

The outstanding nominal amount of TRFs and DKOs has decreased, but the default risks should be cautiously monitored

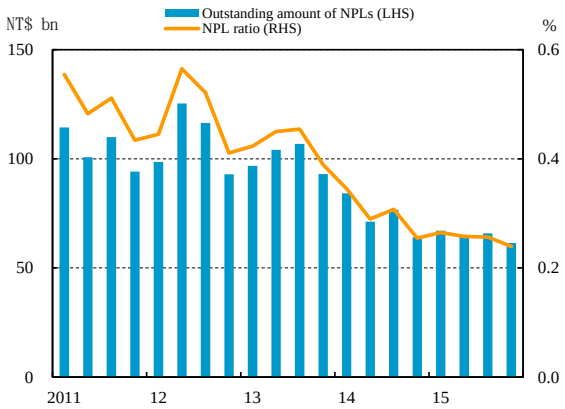
Domestic banks with higher exposures to target redemption forwards (TRFs) and discrete knock-outs (DKOs) faced higher default risk from clients due to a sharp depreciation in the renminbi during 2015. If the renminbi depreciates further, such banks might suffer greater losses. The FSC has introduced four rounds of strengthened regulation directed at complex, high-risk financial derivatives, such as TRFs and DKOs, to help enhance the sound operation of banks and to strengthen consumer protection since April 2014 (see Chapter 3.3). Moreover,

the outstanding nominal amount of such contracts has decreased markedly[57] with existing contracts expiring successively. However, some settlement default cases should be cautiously monitored.

Exposure to Mainland China gradually decreased

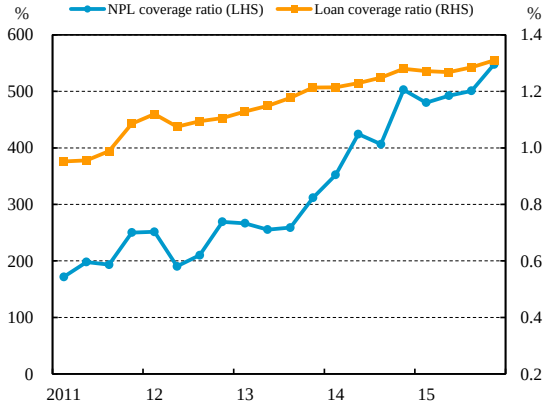
According to Article 12-1 of the *Regulations Governing the Banking Activity and the Establishment and the Investment by Financial Institution Between the Taiwan Area and the Mainland Area*, the aggregate amount of credit, investment, and interbank loans/deposits (hereafter statutory exposure)[58] extended by a domestic bank to customers in the Mainland Area should not exceed 100% of the bank's net worth as of the end of the preceding fiscal year. At the end of 2015, the aggregate amount of such exposure of all domestic banks stood at NT$1.74 trillion, or 60% of banks' net worth, lower than 68% a year earlier (Chart 3.22). The exposure level continued to fall and no domestic bank exceeded the limit.

Chart 3.24 NPL ratio of domestic banks



Note: Excludes interbank loans.
Source: CBC.

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.

In order to reinforce risk control and risk-bearing capacity for credit exposure of domestic banks to customers in the Mainland Area, the FSC implemented four intensified measures[59] in 2015. However, affected by a

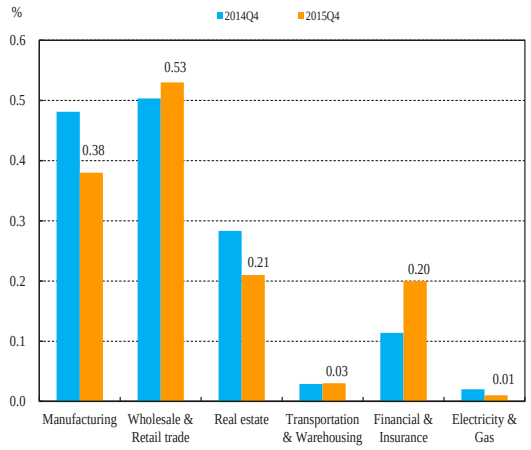
[57] According to the FSC, the nominal amount of TRFs-related contracts of all domestic banks dropped from a peak of NT$97.4 billion in May 2014 to NT$82.0 billion at the end of 2015, and then further down to NT$39.8 billion in February 2016.

[58] Statutory exposure refers to aggregate exposure, but excludes: (1) short-term trade financing within one year; (2) credits and investments backed by guarantees or collateral which are fully secured outside Mainland China. Moreover, specific interbank loans/deposits with remaining maturity less than three months and the underlying counterparty rated at investment-grade are weighted with 20% of the aggregate amount of exposure.

[59] Such measures include: (1) requiring banks to sufficiently verify the authenticity of related documents of short-term trade financing; (2) asking banks' audit departments to conduct internal audits on the authenticity of short-term trade financing, which should otherwise be counted into exposure to Mainland China; (3) including new interbank loans/deposits, of which the maturity is extended to more than 3 months, into the calculation of exposure to Mainland China; and (4) increasing the regulatory loss provision ratio of performing credit assets exposed to Mainland China to at least 1.5% by the end of 2015.

slowdown in economic growth in Mainland China, rising volatility in stock and foreign exchange markets, and heightening NPL ratios of Mainland China's commercial banks, the related exposure of domestic banks still faces higher credit and market risk. Accordingly, domestic banks should cautiously monitor economic and financial conditions in Mainland China, as well as taking preemptive measures when warranted.

Chart 3.26 NPL ratios of domestic banks in selected industries

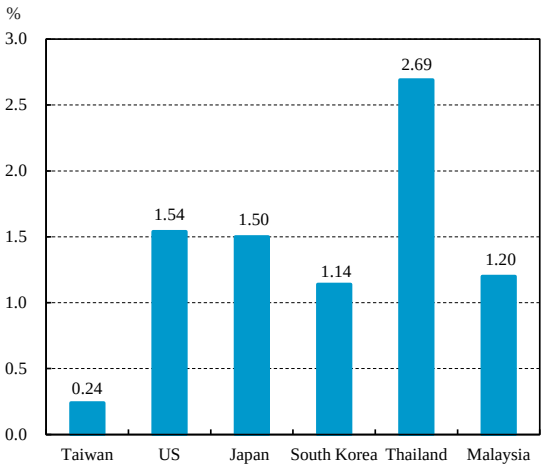


Note: Excludes interbank loans.
Source: JCIC.

Asset quality improved continuously

Outstanding classified assets [60] and the average classified asset ratio of domestic banks stood at NT$381.3 billion and 0.85% at the end of 2015, decreasing by 21.39% and 0.29 percentage points, respectively, over the previous year (Chart 3.23). This revealed that the asset quality kept improving. Meanwhile, expected losses of classified assets [61] also contracted by NT$5.3 billion or 7.29% from a year earlier to NT$48.3 billion, while the ratio of expected losses to loan loss provisions was only 12.47%, indicating sufficient provisions to cover expected losses.

Chart 3.27 NPL ratios of banks in selected countries



Note: Figure for Japan is end-September 2015 data, while the others are end-December 2015 data.
Sources: CBC, FDIC, FSA, FSS, BOT and BNM.

The outstanding NPLs of domestic banks registered NT$61.4 billion at the end of 2015, decreasing by 4.05% year on year, owing to bad debt write-offs and NPL recoveries. The average NPL ratio fell to a record low of 0.24% (Chart 3.24). With the decrease in NPLs and the increase in provisions, the NPL coverage ratio and the loan coverage ratio rose to 547.66% and 1.31%, respectively, at the end of 2015

[60] The *Regulations Governing the Procedures for Banking Institutions to Evaluate Assets and Deal with Non-performing/Non-accrual Loans* break down all assets into five different categories, including: category one – normal credit assets; category two – credit assets requiring special mention; category three – substandard credit assets; category four – doubtful credit assets; and category five – loss assets. The term "classified assets" herein includes all assets classified as categories two to five.

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

(Chart 3.25), showing an improving capability in addressing bad debt losses.

Among 40 domestic banks, all had NPL ratios of less than 1% at the end of 2015. In terms of borrowers, the NPL ratio for individual loans remained at 0.23% and corporate loans declined by 0.05 percentage points to 0.32% compared to the previous year. Among corporate loans, the NPL ratios saw a rise in the wholesale and retail trade industries, together with financial and insurance industries, while the ratio of the manufacturing and real estate industries dropped (Chart 3.26).

Compared to the US and neighboring Asian countries, the average NPL ratio of domestic banks in Taiwan was much lower (Chart 3.27) .

Market risk

Estimated Value-at-Risk for market risk exposures rose

The net position of debt securities accounted for the largest share of total market risk exposures of domestic banks at the end of 2015, followed by the net positions of foreign exchange and of equity securities. Based on the new market risk model constructed by the CBC (Box 2), the estimated total VaR for foreign exchange, interest rate, and equity exposures of domestic banks stood at NT$131.8 billion at the end of 2015, ascending by NT$30.6 billion or 30.24% compared to the figure a year earlier (Table 3.1). The estimated

Table 3.1 Market risks of domestic banks

Unit: NT$ bn

Types of risk	Items	End-Dec. 2014	End-Dec. 2015	Changes	
				Amount	PP ; %
Foreign exchange	Net position	205.1	208.7	3.6	1.76
	VaR	3.9	4.2	0.3	7.69
	VaR / net position (%)	1.90	2.01		0.11
Interest rate	Net position	1,157.9	1,447	289.1	24.97
	VaR	85.6	114	28.4	33.18
	VaR / net position (%)	7.39	7.88		0.49
Equities	Net position	75.8	80.1	4.3	5.67
	VaR	11.7	13.6	1.9	16.24
	VaR / net position (%)	15.44	16.98		1.54
Total VaR		101.2	131.8	30.6	30.24

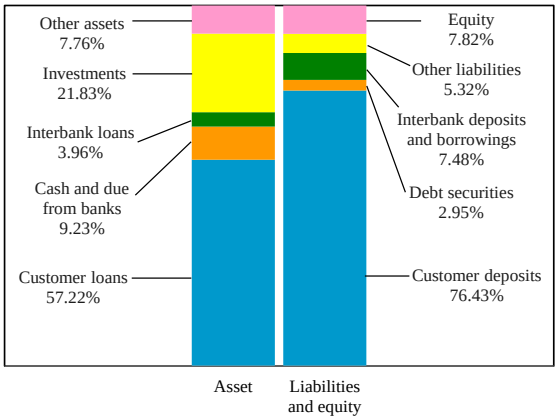
Note: PP = percentage point.
Source: CBC.

VaR for each of those market risk exposures was higher than a year earlier. Among them, the interest rate VaR increased by 33.18%, while the foreign exchange and equity VaRs also increased by 7.69% and 16.24%, respectively (Table 3.1).

The effects of market risk on capital adequacy ratios were slight

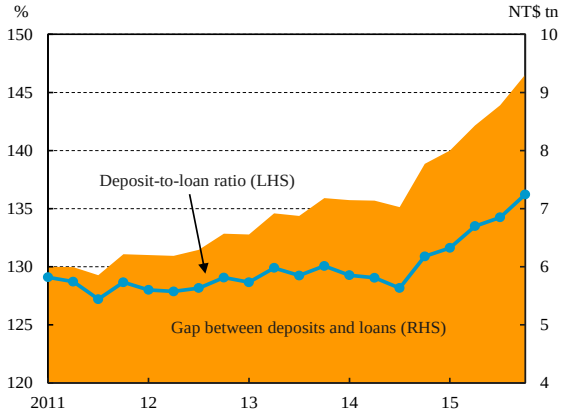
According to the estimated results mentioned above, the total VaR would cause a decrease of 0.34 percentage points in the average capital adequacy ratio of domestic banks and induce the ratio to drop from the current 12.93% to 12.59%. Nevertheless, it would still be higher than the statutory minimum of 8% in 2015.

Chart 3.28 Asset/liability structure of domestic banks



Notes: 1. Figures are as of end-December 2015.
2. Equity includes loss provisions. Interbank deposits include deposits with the CBC.
Source: CBC.

Chart 3.29 Deposit-to-loan ratio of domestic banks



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

Liquidity risk

Liquidity in the banking system remained ample

The structure of assets and liabilities for domestic banks roughly remained unchanged in 2015. As for the sources of funds, relatively stable customer deposits still made up the largest share of 76.43% of the total, followed by equity at 7.82%, while debt securities issues contributed a mere 2.95%. Regarding the uses of funds, customer loans accounted for the biggest share of 57.22%, followed by securities investments at 21.83%, while cash and due from banks accounted for 9.23% (Chart 3.28).

Given that the increase in deposits exceeded that in loans in 2015, the average deposit-to-loan ratio of domestic banks rose to 136.21%. The funding surplus (i.e., deposits exceeding loans) also expanded to NT$9.31 trillion, indicating that the overall liquidity in domestic banks

remained abundant (Chart 3.29).

Overall liquidity risk was moderate

The average NT dollar liquid reserve ratio of domestic banks was well above the statutory minimum of 10% in every month of 2015 and stood at 30.99% in December, an increase of 1.95 percentage points year on year (Chart 3.30), while the ratios of individual banks were each higher than 15%. Looking at the components of liquid reserves in December 2015, Tier 1 liquid reserves, mainly consisting of certificates of deposit issued by the CBC, accounted for 86.60% of the total, while Tier 2 and other reserves accounted for a total of 13.40%. This revealed that the quality of liquid assets held by domestic banks remained satisfactory.

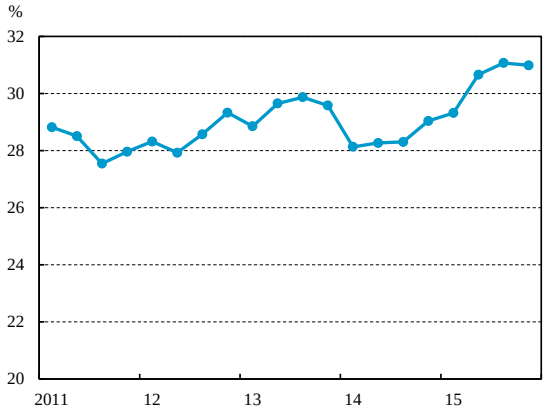
At the end of 2015, the average liquidity coverage ratio (LCR) of all domestic banks was 125%, while the average ratios of state-owned banks and private banks were 117% and 128%, respectively. All banks met the minimum requirement of 60% in 2015. Overall liquidity risk was moderate.

Profitability

Profitability in 2015 decreased slightly

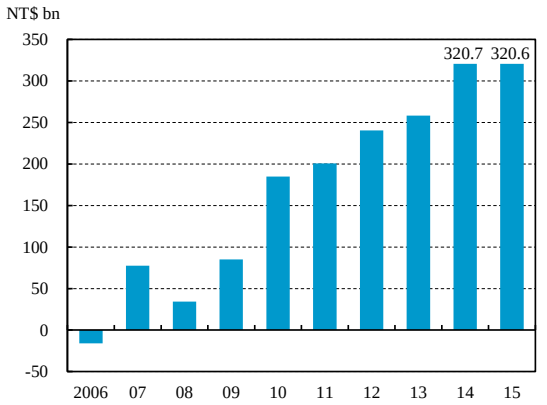
The aggregate net income before tax of domestic banks was NT$320.6 billion in 2015, decreasing slightly by NT$0.1 billion

Chart 3.30 Liquid reserve ratio of domestic banks



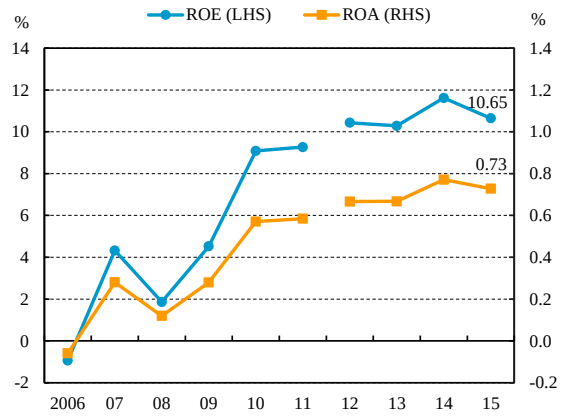
Note: Figures are the average daily data in the last month of each quarter.
Source: CBC.

Chart 3.31 Net income before tax of domestic banks



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

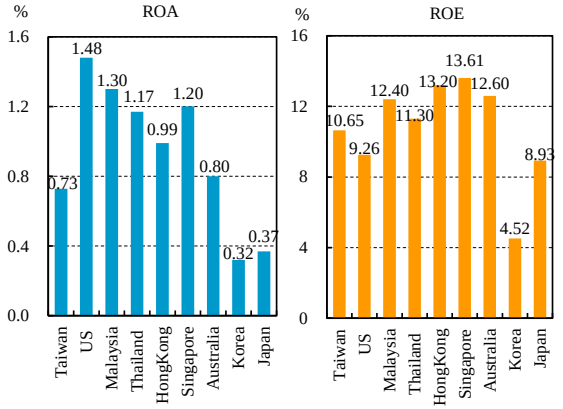
Chart 3.32 ROE & ROA of domestic banks



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

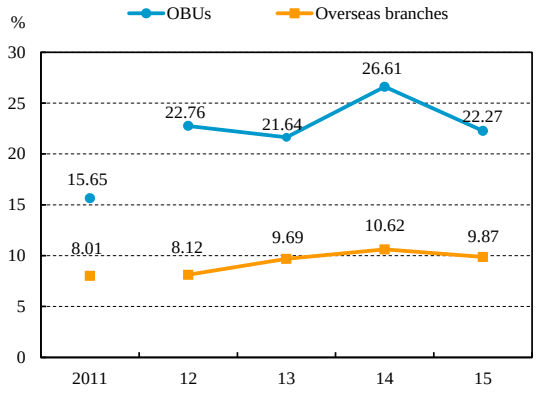
or 0.03% year on year (Chart 3.31). The average ROE and ROA also fell year on year to 10.65% and 0.73% from 11.62% and 0.77%, respectively, due to the continuous increases in equity and assets. Affected by a fall in the trading volume of TRFs owing to the depreciation of the renminbi and the measures taken by the FSC to strenghten the oversight of complex and high-risk products, gains on foreign exchange and valuation gains on financial assets or liabilities shrank. This, together with an increase in provisions related to bad debt expenses for tackling TRF disputes, mainly resulted in profitability turning to decline (Chart 3.32).

Chart 3.33 Comparison of ROAs and ROEs of banks in selected economies



Note: Figure for Japan is as of April 2015 to September 2015, while the others are as of 2015.
Sources: CBC, FDIC, BNM, BOT, APRA, FSS and IMF.

Chart 3.34 Profit contributions of OBUs and overseas branches



Note: Overseas branches include branches in Mainland China.
Source: CBC.

Compared to selected neighboring Asia-Pacific economies, the ROAs of domestic banks still lagged behind their counterparts, only better than South Korea and Japan. The ROEs ranked in the middle, higher than the US, South Korea and Japan (Chart 3.33).

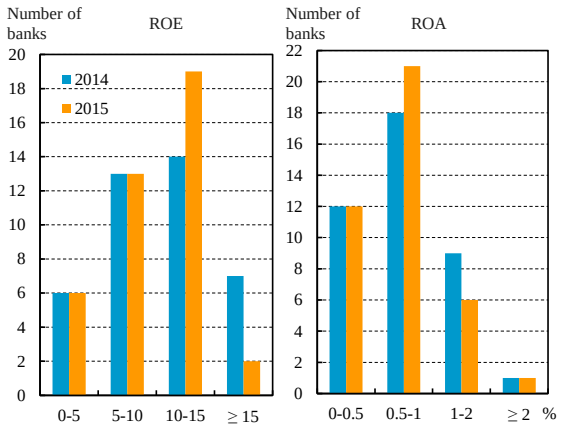
Among the sources of income, offshore banking units (OBUs) and overseas branches' annual net income before tax in 2015 declined for the first time in recent years, dropping by 16.34% and 7.07%, respectively. OBUs contributed 22.27% of total profit, decreasing from 26.61% a year earlier, and the ratio for overseas branches shrank to 9.87% (Chart 3.34).

In 2015, two domestic banks achieved profitable ROEs of 15% or more, decreasing from seven banks in 2014; the number of domestic banks whose ROAs reached the international standard of 1% decreased from ten to seven (Chart 3.35). Nevertheless, the ROEs of 14 banks, and ROAs of 17 banks increased compared to the previous year.

Net operating income grew slowly

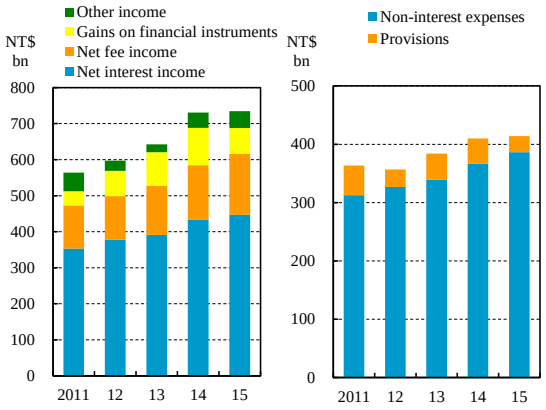
Total net operating income of domestic banks registered NT$734.6 billion in 2015, increasing by NT$3.8 billion or 0.52% year on year, mainly owing to growth in net fee income and interest income. Analyzed by income component, net fee income increased by NT$18.6 billion or 12.29% year on year, supported by growth in the wealth management business related to insurance and credit card business. Net interest income rose by NT$13.4 billion year on year; however, the annual growth rate decreased from 10.73% to 3.08%. Moreover, net gains on financial instruments decreased by NT$32.6 billion or 31.62%, driven by a significant decrease in valuation gains (Chart 3.36).

Chart 3.35 Distribution of ROEs and ROAs of domestic banks



Source: CBC.

Chart 3.36 Composition of income and costs of domestic banks



Source: CBC.

Operating costs increased by a smaller margin

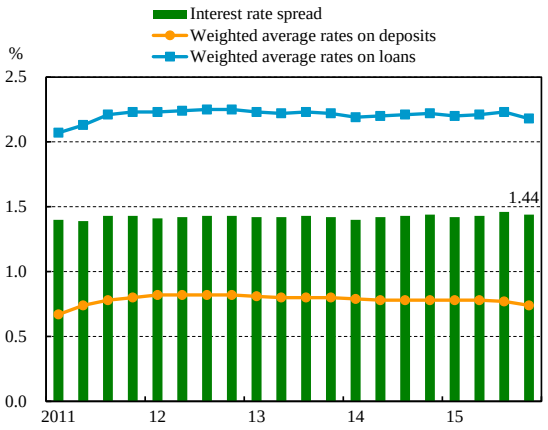
The operating costs of domestic banks registered NT$414 billion in 2015, rising slightly by NT$3.9 billion or 0.94% compared to the previous year. Among them, non-interest expenses [62] increased by NT$20 billion or 5.45% and accounted for an increasing share of 93% of total operating costs, owing to the rise in employee benefits expenses and other operating and management expenses. Meanwhile, provisions for loan losses and guarantee reserves decreased by NT$16.1 billion or 36.99% year on year, mainly because the moderate growth of loans resulted in a decrease in additional provisions (Chart 3.36).

[62] Non-interest expenses include employee benefits expenses, depreciation and amortization expenses, and other operating and management expenses.

Factors that might affect future profitability

In the first three quarters of 2015, the interest rate spre ad between deposits and loans of all domestic banks gradually rose owing to the reduction in low interest loans and the raising of interest rates on long-term loans by some domestic banks. However, the spread reversed and declined to 1.44 percentage points in 2015 Q4 (Chart 3.37), as the CBC cut interest rates and some banks granted new state-owned enterprises loans with low interest rates. In addition, the shrinkage of the trading volume of TRFs and the possible rise of relative default losses could influence banks' future profitability.

Chart 3.37 Interest rate spread between deposits and loans

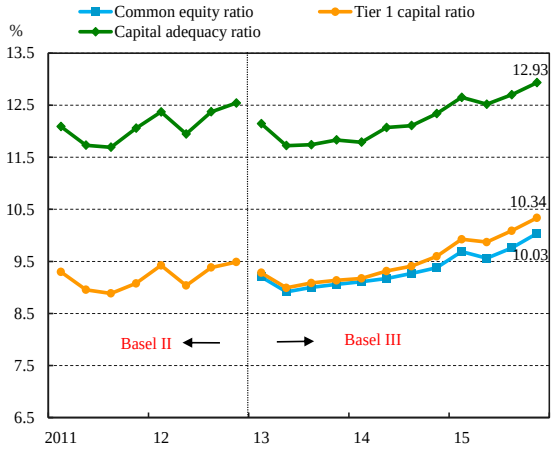


Notes: 1. Interest rate spread = weighted average interest rates on loans - weighted average interest rates on deposits.
2. The weighted average interest rates on deposits and loans exclude preferred deposits of retired government employees and central government loans.

Source: CBC.

In December 2014, the FSC required that domestic banks maintain a provision ratio of at least 1.5% against loans for home purchase, refurbishment, or construction by the end of 2016. Some large private banks had already achieved the 1.5% provision ratio at the end of 2014; however, some small banks with higher ratios of real-estate loans faced difficulties reaching the required provision ratio. Nevertheless, the requirement is estimated to have a limited influence on overall profits.

Chart 3.38 Capital ratios of domestic banks



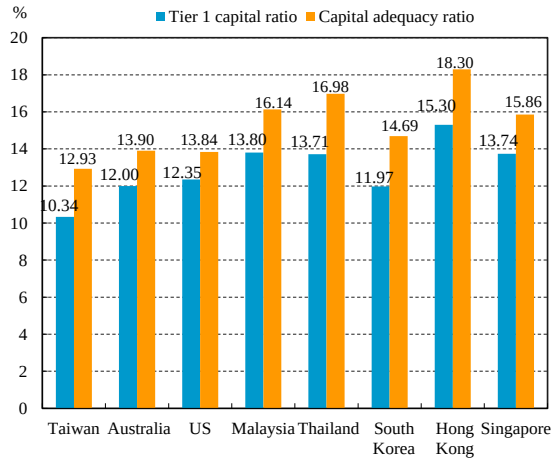
Notes: 1. Figures from 2013 forward are based on Basel Ⅲ, while prior years are based on Basel Ⅱ.
2. Common equity capital ratio = common equity Tier 1 capital / risk-weighted assets
3. Tier 1 capital ratio = Tier 1 capital / risk-weighted assets
4. Capital adequacy ratio = eligible capital / risk-weighted assets

Source: CBC.

Moreover, in response to the trends of global FinTech innovation and the the need to enhance service effectiveness of domestic banks, the FSC implemented the policy of "Building Digital Financial Environment 3.0" in January 2015, set up the Financial Technology Office, permitted banks to invest 100%

in a FinTech company, and established a FinTech development fund. Provided that domestic banks are able to come up with appropriate FinTech innovations in the future, their profitability will be enhanced. Nevertheless, banks will face numerous challenges during the transformational process (Box 3).

Chart 3.39 Comparison of capital ratios in selected economies



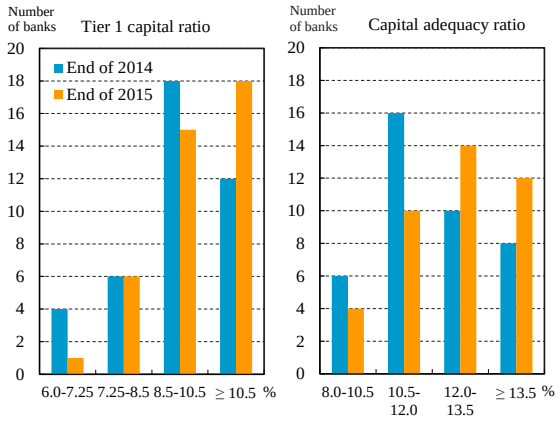
Note: Figures are as of the end of 2015.
Sources: CBC, APRA, FDIC, BNM, BOT, FSS, HKMA, and IMF.

Capital adequacy

Capital ratios trended upward

In the second quarter of 2015, the average capital ratio of domestic banks declined slightly owing to faster growth in risk-weighted assets and seasonal effects such as cash dividends declared and paid. Afterwards, as a result of capital injection and accumulated earnings as well as the issuance of Basel III-compliant capital instruments, the average common equity ratio, Tier 1 capital ratio, and capital adequacy ratio rose and stood at 10.03%, 10.34%, and 12.93%, respectively, at the end of 2015 (Chart 3.38). However, compared to neighboring Asia-Pacific economies, domestic banks in Taiwan had lower capital levels (Chart 3.39).

Chart 3.40 Number of domestic banks classified by capital ratios



Source: CBC.

Further breaking down the components of regulatory capital, common equity Tier 1 capital, which features the best loss-bearing capacity, accounted for 77.58% of eligible capital, while non-common equity Tier 1 capital and Tier 2 capital registered only 2.33% and 20.09%, respectively, at the end of 2015. It showed that the capital quality of domestic banks was satisfactory.

The capital levels of all domestic banks were higher than the 2015 statutory minimum

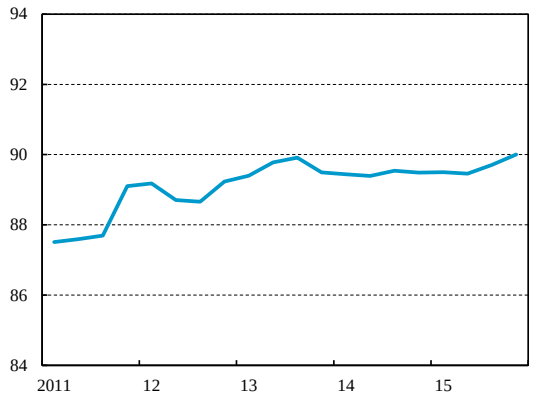
At the end of 2015, the common equity ratios, Tier 1 capital ratios, and capital adequacy ratios for all domestic banks remained above the statutory minimum requirements for 2015 and 2016. [63] Compared to the end of the previous year, the number of banks with Tier 1 capital ratios higher than 10.5% significantly increased, indicating that most banks have been improving their capital quality and levels (Chart 3.40).

Table 3.2 Systemic risk indicators for the banking system

Banking System	Standard & Poor's		Fitch	
	BICRA		BSI/MPI	
	2015/2	2016/2	2015/2	2016/2
Hong Kong	2	2	a/3	a/3
Singapore	2	2	aa/2	aa/2
Japan	2	2	a/1	a/1
South Korea	3	3	bbb/1	bbb/1
Taiwan	**4**	**4**	**bbb/1**	**bbb/1**
Malaysia	4	4	bbb/1	bbb/1
China	5	5	bb/3	bb/3
Thailand	6	6	bbb/1	bbb/1
Indonesia	7	7	bb/2	bb/2
Philippines	7	7	bb/1	bb/1

Sources: Standard & Poor's and Fitch Ratings.

Chart 3.41 Credit rating indices of rated domestic banks



Note: End-of-period figures.
Sources: Taiwan Ratings Corporation, Fitch Ratings, and CBC.

Some banks faced pressure to raise their capital levels

Even though the capital ratios of all banks at the end of 2015 met the minimum standards for 2016, some banks, particularly state-owned and private banks, might not fulfill all minimum capital requirements effective from 2017 onwards and thus face pressure to raise their capital levels. Such banks should actively reinforce their capital adequacy via seasoned equity offerings, accumulating earnings, issuing subordinated debts, and adjusting asset structures to raise their capital ratios gradually.

[63] The minimum capital requirements in the Basel Ⅲ transition periods are as follows:

Items	2013	2014	2015	2016	2017	2018	2019 onwards
Common equity ratio (%)	3.5	4.0	4.5	5.125	5.75	6.375	7.0
Tier 1 capital ratio (%)	4.5	5.5	6.0	6.625	7.25	7.875	8.5
Capital adequacy ratio (%)	8.0	8.0	8.0	8.625	9.25	9.875	10.5

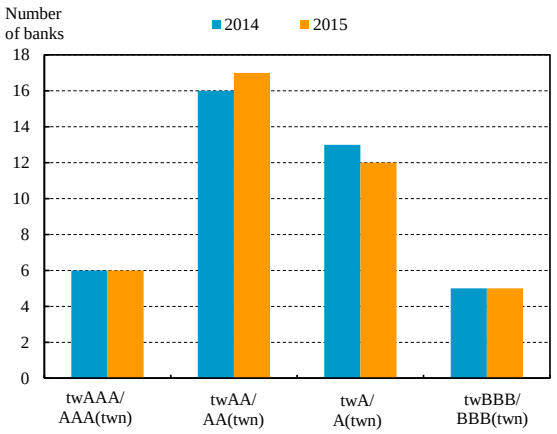
Credit ratings

Average credit rating level enhanced

With respect to the overall risk assessments of Taiwan's banking system made by credit rating agencies, Standard & Poor's Banking Industry Country Risk Assessment (BICRA) [64] maintained Taiwan's BICRA unchanged at Group 4. Compared to other Asian economies, the risk of Taiwan's banking industry was higher than those of Hong Kong, Singapore, Japan, and South Korea, about the same as that of Malaysia, but much lower than those of Mainland China, Thailand, Indonesia and the Philippines. The assessment of Taiwan's banking system evaluated by Fitch Ratings' Banking System Indicator/Macro-Prudential Indicator (BSI/MPI) [65] also remained unchanged at level bbb/1 (Table 3.2).

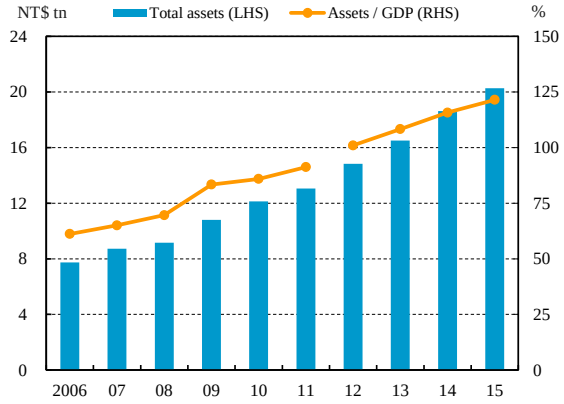
All domestic banks were rated by credit rating agencies for 2015. As for the rating results[66] released by credit rating agencies, the credit rating index[67] of domestic banks went up in 2015 (Chart 3.41), mainly because three banks received rating upgrades.

Chart 3.42 Number of domestic banks classified by credit ratings



Note: End-of-period figures.
Sources: Taiwan Ratings Corporation and Fitch Ratings.

Chart 3.43 Total assets of life insurance companies



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

[64] The analytical dimensions of Standard & Poor's BICRA include economic risk and industry risk. The economic risk of a banking sector is determined by factors including economic resilience, economic imbalances, and credit risk in the economy, while industry risk is determined by institutional framework, competitive dynamics and system-wide funding. The overall assessments of those factors will lead to the classification of a country's banking system into BICRA groups, ranging from group 1 (lowest risk) to group 10 (highest risk), in order to indicate the relative country risk and banking sector credit quality.

[65] Fitch Ratings has devised two complementary measures, the BSI and MPI, to assess banking system vulnerability. The two indicators are brought together in a Systemic Risk Matrix that emphasizes the complementary nature of both indicators. The BSI represents banking system strength on a scale from aa (very strong) to ccc/cc/c (very weak). On the other hand, the MPI indicates the vulnerability to stress on above-trend levels of private sector credit, a bubble in real asset prices, and/or major currency appreciation, measuring the vulnerability of the macro environment on a scale from 1 (low) to 3 (high) in terms of banking system vulnerability.

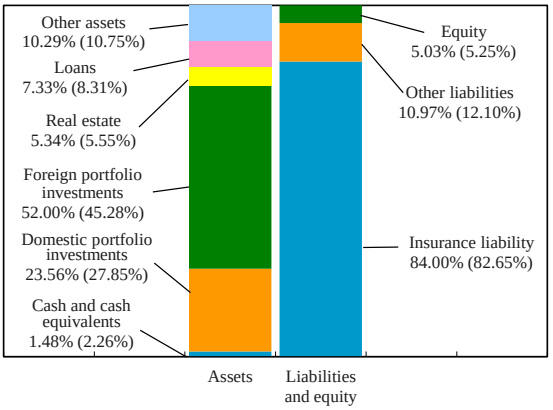
[66] As of the end of 2015, the majority of Taiwan's domestic banks received long-term issuer ratings from Taiwan Ratings, followed by those with national long-term ratings from Fitch Ratings. Therefore, this section is based primarily on the Taiwan Ratings' ratings (tw~), and secondarily on Fitch Ratings' ratings (~twn).

[67] 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.

Rating outlooks for the majority of domestic banks remained stable or positive

Most domestic banks maintained credit ratings of twAA/twA (Taiwan Ratings) or AA(twn)/A(twn) (Fitch Ratings) at the end of 2015, and none had credit ratings lower than twBB/BB(twn) (Chart 3.42). The results were similar to those received the previous year. Regarding rating outlooks, only one bank turned negative in 2015,[68] while the other 39 banks remained stable or positive.

Chart 3.44 Asset/liability structure of life insurance companies

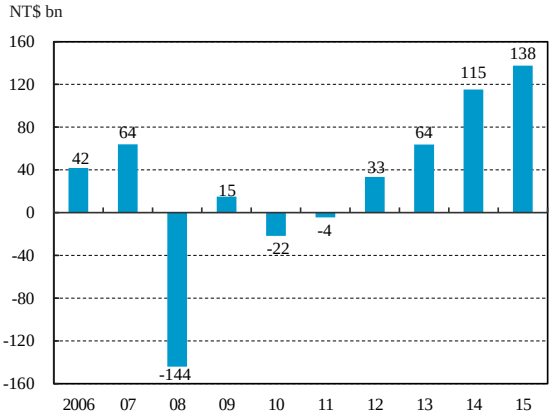


Note: End-December 2015 data; figures in parentheses are as of the end of December 2014.
Source: FSC.

3.2.2 Life insurance companies

In 2015, asset growth in life insurance companies moderated and their profitability enhanced, showing an improvement in operating performance. At the end of 2015, the average RBC ratio of life insurance companies decreased slightly. However, the RBC ratios for all insurance companies were higher than the statutory minimum, except that of Chaoyang Life Insurance Company, which was taken into receivership in early 2016.

Chart 3.45 Net income before tax of life insurance companies



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

Asset growth moderated

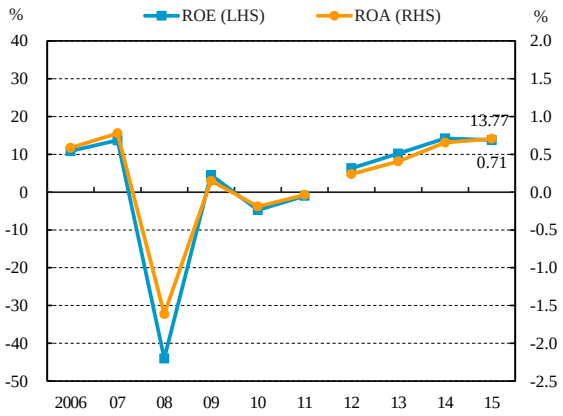
The total assets of life insurance companies grew continually and reached NT$20.28 trillion at the end of 2015, equivalent to 121.50% of annual GDP (Chart 3.43). The annual growth rate of total assets fell to 8.8% at the end of 2015, decelerating from 12.93% a year earlier.

At the end of 2015, 21 domestic life insurance companies[69] held a 98.57% market share by assets, four of which were foreign affiliates holding a 2.77% market share, while four foreign

[68] The reason why this bank received a negative rating outlook was that Taiwan Ratings expected the financial holding company's acquisition of another bank could result in higher leverage and a weaker credit profile for the group.
[69] Foreign affiliates included.

life insurance companies held the remaining 1.43% of total assets. The top three companies in terms of assets held a combined market share of 56.14%, revealing a slight increase of 0.8 percentage points year on year. The market structure of the life insurance industry roughly remained unchanged in 2015.

Chart 3.46 ROE & ROA of life insurance companies



Notes: 1. Figures from 2012 forward are on the TIFRSs basis, while 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.

The share of foreign portfolio investments increased rapidly

The funds of life insurance companies at the end of 2015 were mainly invested in foreign portfolios and domestic securities. The share of foreign portfolio investments rose to 52%, benefiting from the relaxation of related regulations that expand the scope of eligible foreign corporate bond investments[70] and exclude foreign currency-denominated international bonds from the amount subject to the overseas investment ceiling. The share of domestic securities investments continued to drop to 23.56%. As for the sources of funds, insurance liability accounted for the largest share of 84%, and equity decreased to a share of 5.03% because available-for-sale financial assets with unrealized gains turned into that with unrealized losses. As a result, overall financial leverage of life insurance companies increased marginally (Chart 3.44).

Profitability enhanced

Life insurance companies reported net income before tax of NT$137.6 billion in 2015, a year-on-year increase of NT$23 billion or 19.35% (Chart 3.45). This was chiefly driven by incremental expansion of interest income spurred by continuous growth in foreign bond or international bond investments, as well as cash dividends deriving from investment portfolios.

During the same period, average ROE and ROA were 13.77% and 0.71%, respectively (Chart 3.46). While the ROA posted an eight-year high, the ROE was slightly lower than the 14.20% registered in the previous year yet remained at a high level. Among all 25 life insurance

[70] In order to help the insurance industry boost investment returns amid a low interest rate environment, the FSC expanded the scope of eligible foreign corporate bond investments for insurance companies that meet certain risk management requirements.

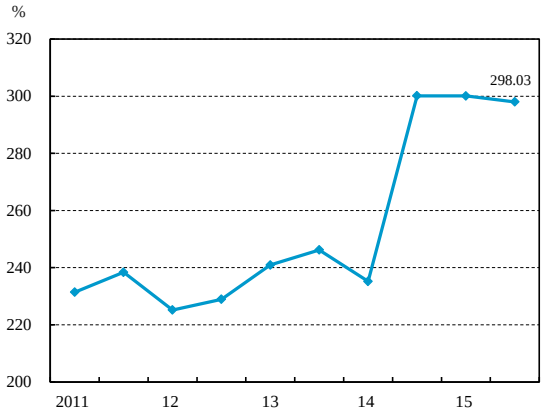
companies, ten companies posted better profits and achieved ROEs of 10% or more, which was one company more than that of the previous year. However, 11 companies still suffered losses, a number same as a year earlier.

There were huge unrealized losses on available-for-sale financial assets[71] at year-end 2015 owing to the slump in major global stock markets in the second half of the year, despite an increase in profitability of life insurance companies. However, such losses started to shrink considerably in 2016 Q1 as stock markets began to recover.

Average RBC ratio decreased slightly

In 2015, operating profits of life insurance companies bolstered the amount of regulatory capital; however, growing investment portfolios and the FSC's measure to raise the coefficient for the interest rate risk capital charge[72] significantly increased the amount of RBC. As a result, the average RBC ratio declined slightly to 298.03% at the end of 2015 from 300.12% a year before, but still remained at a high level (Chart 3.47).

Chart 3.47 RBC ratio of life insurance companies



Notes: 1. RBC ratio = regulatory capital / risk-based capital.
2. Kuo Hua Life Insurance Company, which was taken into receivership by the Taiwan Insurance Guaranty Fund in August 2009 and merged into TransGlobe Life Insurance Company in March 2013, is excluded. Figures from 2014 onwards are exclusive of Singfor and Global Life Insurance companies, which were taken into receivership on 12 August 2014 and merged into Cathay Life Insurance Company on 1 July 2015.

Source: FSC.

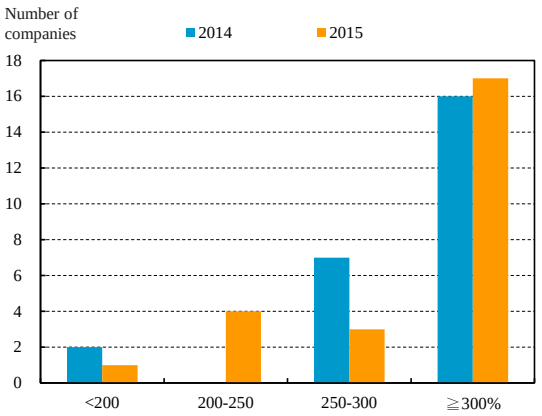
By individual company, there were 17 companies with RBC ratios over 300%, one more than the figure of the previous year. There was only one company, Chaoyang Life Insurance Company, with an RBC ratio below the statutory minimum of 200%, one less than the number a year earlier (Chart 3.48). On 26 January 2016, the FSC took over Chaoyang Life Insurance Company and appointed the Taiwan Insurance Guaranty Fund as the receiver because the company's RBC ratio was seriously inadequate and the company failed to carry out the capital increase plan or the corrective action plan for finance or business within the period required by the FSC.

[71] Unrealized loss on available-for-sale financial assets is not included in net income before tax.
[72] In order to strengthen capital adequacy and reflect interest rate risk of life insurance companies, the FSC raised the coefficient for the capital surcharge of prior-year interest rate risk from 0.1 to 0.3.

Overall credit rating level elevated slightly, with most obtaining stable credit outlooks

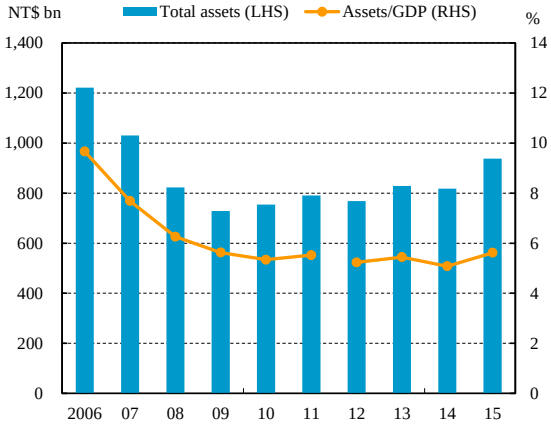
Among 11 life insurance companies rated by Taiwan Ratings or Fitch Ratings, only Taiwan Life Insurance Company received a rating upgrade from twA+ (Taiwan Ratings) to AA+(twn) (Fitch) after being merged into CTBC Financial Holding Company[73] and thus rated by a different credit rating agency. None of the others received credit rating adjustments in 2015. As of the end of December, all rated life insurance companies maintained credit ratings above twA or its equivalent, while the three biggest insurance companies by assets were all rated twAA+, showing strong capability to fulfill all financial commitments. As for the credit outlook, all received stable credit outlooks, except for Taiwan Insurance Company, CTBC Life Insurance Company, and China Life Insurance Company, which received negative credit outlooks.

Chart 3.48 Number of life insurance companies classified by RBC ratios



Notes: 1. End-of-period figures.
2. Figure for 2014 is exclusive of Singfor and Global Life Insurance Companies.
Source: FSC.

Chart 3.49 Total assets of bills finance companies



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

Life insurance companies faced higher market risk

The funds of life insurance companies are mainly invested in securities, part of which is measured at fair value. Recent turbulence in financial markets signaled higher market risk for life insurance companies, particularly an increase in foreign exchange risk with the widened currency mismatches between their assets and liabilities. The main reason behind this was that life insurance companies actively built up foreign portfolio positions but the expansion of their foreign currency policy positions was limited. Meanwhile, although the vast majority of life insurance companies' securities investments were investment grade financial assets, the

[73] Taiwan Insurance Company completed the shares conversion with CTBC Financial Holding Company (CTBC Holding) on 15 October 2015 and became a 100% shareholding subsidiary of CTBC Holding.

pick-up in the share of some insurance company holdings in non-investment grade financial assets warrants close attention.

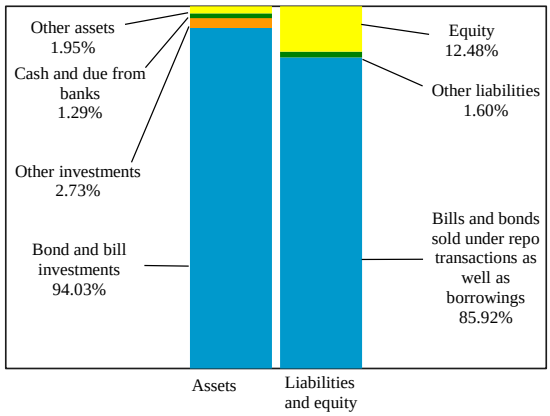
3.2.3 Bills finance companies

The total assets of bills finance companies expanded markedly in 2015, whereas the outstanding balance of guarantees grew slowly. Profitability improved and the average capital adequacy ratio rose, while credit asset quality remained sound. However, liquidity risk in bills finance companies stayed high.

Total assets expanded markedly

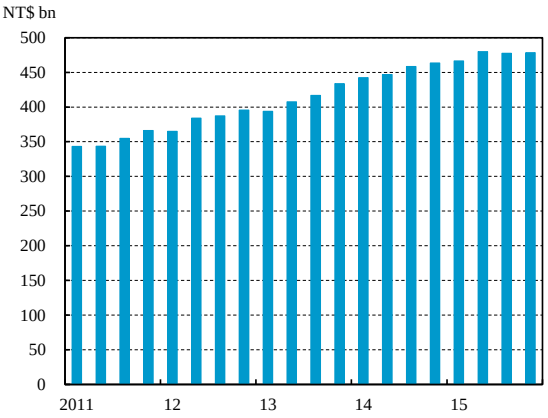
The total assets of bills finance companies stood at NT$937.6 billion at the end of 2015, a figure equivalent to 5.62% of annual GDP, with an annual growth of 14.60%. The magnitude of this expansion of total assets was mostly caused by rising bill and bond holdings as falling market rates were favorable to yielding operations (Chart 3.49).

Chart 3.50 Asset/liability structure of bills finance companies



Note: Figures are end-December 2015 data.
Sources: CBC and FSC.

Chart 3.51 Outstanding commercial paper guarantees of bills finance companies



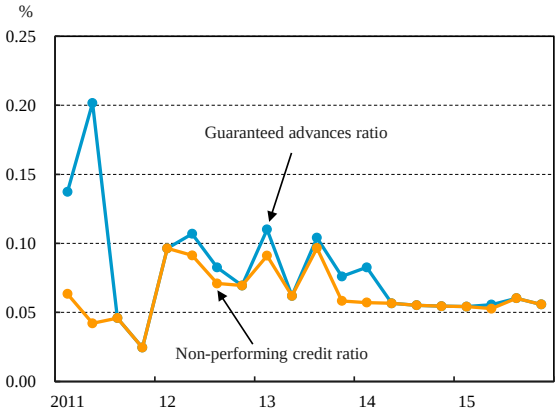
Note: End-of-period figures.
Source: CBC.

In terms of the asset and liability structure at the end of 2015, bond and bill investments constituted 94.03% of total assets, an increase of 0.72 percentage points year on year. On the liability side, bills and bonds sold under repo transactions as well as borrowings accounted for 85.92% of total assets, while equity only accounted for 12.48% (Chart 3.50).

Credit risk

Outstanding balance of guarantees grew slowly while the ratio of real estate-secured credit continued its upward trend

Chart 3.52 Guaranteed advances ratio and non-performing credit ratio of bills finance companies



Notes: 1. Guaranteed advances ratio = overdue guarantee advances / (overdue guarantee advances + guarantees).
2. Non-performing credit ratio = non-performing credit / (overdue guarantee advances + guarantees).
Source: CBC.

The outstanding guarantees business undertaken by bills finance companies registered NT$478.6 billion at the end of 2015, a slower increase of NT$14.9 billion or 3.22% year on year owing to weak funding demand of enterprises in view of sluggish domestic economic growth in the second half of the year (Chart 3.51). Nevertheless, the average multiple of outstanding guarantees to equity of bills finance companies rose to 4.62 times at the end of 2015, compared to 4.58 times a year before. Each bills finance company still conformed to the regulatory ceiling of 5.5 times.[74]

Guarantees granted to the real estate and construction industries and the credits secured by real estate accounted for 28.59% and 33.95%, respectively, of total credits of bills finance companies, continuing an upward trend. Such credit risks might heighten under a backdrop of contracting transaction volume and moderating prices in the housing market. In response, the FSC put a greater emphasis on real estate credit concentration and risk management in their financial examinations of bills finance companies in 2016.[75]

Credit quality remained sound

At the end of 2015, the average guaranteed advances ratio and the non-performing credit ratio of bills finance companies both grew slightly but stayed at a relatively low level of 0.056%, reflecting sound credit quality (Chart 3.52). At the same time, both the ratios of credit loss reserves to total guaranteed advances and those to non-performing credits were 29.38 times, indicating that the reserves set aside were significantly sufficient to cover potential credit losses.

[74] According to the *Ceiling on the Total Amounts of the Short-term Bills Guarantee and Endorsement Conducted by Bills Finance Companies*, the ratio of outstanding commercial paper guaranteed to equity for a bills finance company should not exceed 1, 3, 4, 5 or 5.5 times, respectively, depending on the level of its capital adequacy ratio of below 10%, above 10% but below 11%, above 11% but below 12%, above 12% but below 13%, or above 13%.

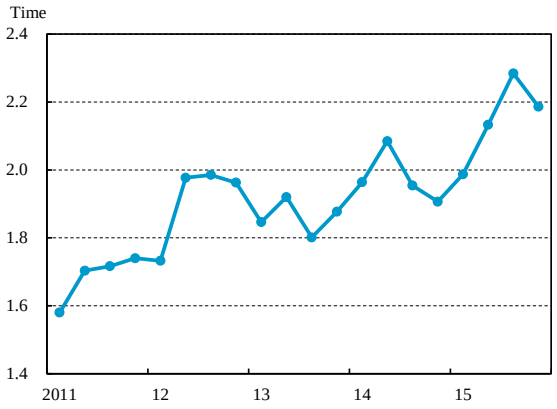
[75] According to the press release of the Financial Examination Bureau of the FSC on 20 January 2016.

Liquidity risk remained high

Over 90% of funds in bills finance companies were invested in bills and bonds, 43.8% of which were long-term bonds, while the sources of funds still heavily relied on short-term interbank call loans and repo transactions. It showed a significant maturity mismatch existing between assets and liabilities. Moreover, the substantial increase of bond investments caused the average multiple of the 0-60 day maturity gap between major assets and liabilities to equity to increase to 2.19 times, compared to 1.91 times a year before. Therefore, the liquidity risk in bills finance companies remained elevated (Chart 3.53).

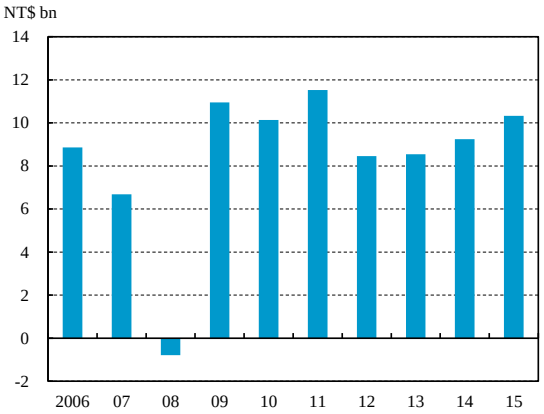
As the total assets expanded, major liabilities in bills finance companies grew by 16.10% in 2015, bringing the average multiple of major liabilities[76] to equity higher to 7.77 times at the end of 2015, compared to 6.85 times a year before. However, the multiple of each bills finance company was below the regulatory ceilings of ten or twelve times.[77]

Chart 3.53 Maturity gap between major assets and liabilities to equity of bills finance companies



Source: CBC.

Chart 3.54 Net income before tax of bills finance companies



Note: Figures from 2012 forward are on the TIFRSs basis, while prior years are on the ROC GAAP basis.
Source: CBC.

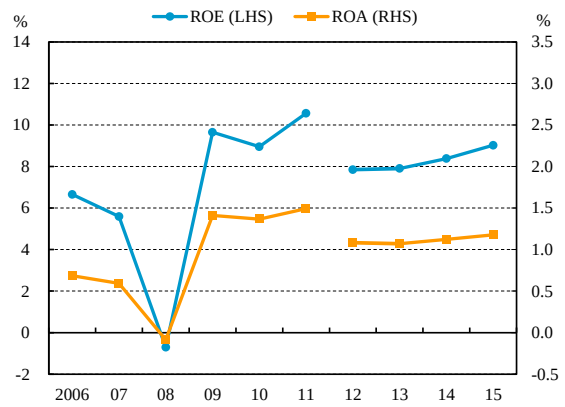
[76] Major liabilities include call loans, repo transactions as well as issuance of corporate bonds and commercial paper.

[77] According to the *Directions for Ceilings on the Total Amounts of the Major Liabilities and Reverse Repo Transactions Conducted by Bills Houses*, which aim to reduce the operating and liquidity risks of bills finance companies, the major liabilities of a bills finance company could not exceed six times, eight times or ten times its equity depending on the level of its capital adequacy ratio of below 10%, above 10% but below 12%, or above 12%. If a bills finance company is a subsidiary of a financial holding company or its bank shareholder meets safe and sound criteria, the ceiling will be raised by an additional two times its equity. As of the end of 2015, the capital adequacy ratio of each bills finance company was above 13%, so the ceilings were capped at ten times or twelve times for each one.

Profitability rose markedly

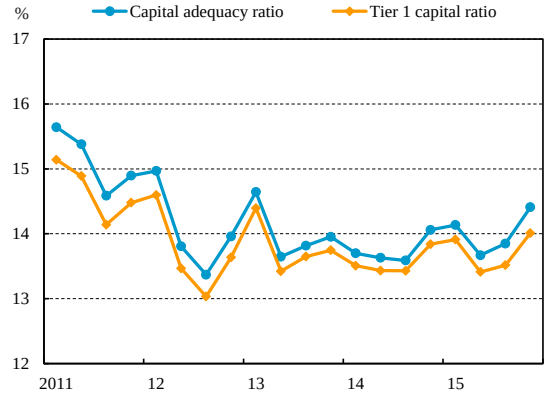
Bills finance companies posted a net income before tax of NT$10.3 billion in 2015, with an increase of NT$1.1 billion or 11.79% year on year (Chart 3.54). Over the same period, average ROE and ROA registered 9.02% and 1.18%, respectively, both higher than the ratios of 8.38% and 1.12% posted in 2014 (Chart 3.55). This rise was mainly driven by the increase in commission fee income as bills finance companies actively undertook the commercial paper guarantees and underwriting businesses and by the growth in bond investments earnings as they greatly expanded bond positions in expectation of lower interest rates.

Chart 3.55 ROE & ROA of bills finance companies



Notes: 1. Figures from 2012 forward are on the TIFRSs basis, while 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 3.56 Capital adequacy ratios of bills finance companies



Source: CBC.

Average capital adequacy ratio rose

Owing to accumulating earnings and the decrease in risk-weighted assets, the average capital adequacy ratio of bills finance companies registered 14.41% at the end of 2015, higher than 14.06% of the previous year, while the Tier 1 capital ratio rebounded to 14.01% from 13.84% a year before.[78] Furthermore, the capital adequacy ratio for each bills finance company was higher than 13%, well above the statutory minimum of 8% (Chart 3.56).

[78] Bills finance companies particularly increased short-term bond holdings with lower risk weights, and reduced non-guarantee commercial paper holdings with higher risk weights.

Box 2
Modification to VaR model for measuring banks' market risks under Basel III

In September 2006, the CBC developed a value-at-risk (VaR) model for measuring market risks of domestic banks and modified it for the first time in 2009. In response to the continual revisions of the method for calculating capital requirements for banks' market risk exposures under the Basel Accord, coupled with the increased volatility in domestic and international financial asset prices in recent years, the CBC modified the VaR model again in 2015 to improve the model's accuracy and robustness and to meet Basel III capital requirements.

1. Key modifications

In the spirit of the value-at-risk model of Jorion (2006), which has been widely used in financial risk management, and the market risk internal model developed by Chung (2015), while taking into account the Basel III capital requirements for market risks, the CBC revised the existing market risk model. The main modifications are shown below and summarized in Table B2.1.

(1) Instead of the current methods for measuring banks' general market risks, a dynamic Nelson-Siegel term structure model and a vector autoregressive VAR(1) model used for multivariate time series are applied to interest rate risks, while a random walk model is used for foreign exchange risks. Meanwhile, an AR(1)-EGARCH(1,1) model is employed in assessing equity risks. The settings of the above-mentioned models, which are straightforward and flexible, are able to be performed under either baseline or stress scenarios.

(2) In addition to general market risks, specific risks calculated under the standardized approach to market risks are incorporated in the estimation of exposures to interest rate risks and equity risks.

(3) In accordance with Basel III, the time to maturity of traded positions related to interest rate risk exposures is precisely constructed in more detail with 13 time-buckets (originally consisted of 4 buckets) based on the maturity and coupon rate of individual instruments, so as to capture the risks deriving from changes in the term structure of interest rates.

(4) In view of a more conservative treatment of the relationship among interest rate risks, foreign exchange risks and equity risks, the calculation of the aggregate VaR of the aforementioned three market risks by a Copula is substituted for an add-up method.

Furthermore, in addition to the current calculation of a VaR-based measure of banks' exposures to market risk under normal market conditions, an estimation of stressed VaR calculating significant losses deriving from market risks under stressed market conditions will be considered.

2. Estimation process

(1) Firstly, the maximum likelihood estimators of the above-mentioned models are measured for 40 domestic banks in terms of their equity, foreign exchange, and interest rate risk exposures.

(2) Secondly, in accordance with the foregoing estimations, the aggregate loss distribution for all banks is estimated using a variance-covariance method and a Monte Carlo simulation. The loss distributions of bank-specific risks subjected to the aggregate loss distribution are, in turn, calculated based on the result of the Monte Carlo simulation.

(3) Finally, all bank and bank-specific VaRs for market risks deriving from the output of the aggregate and bank-specific loss distributions are computed. The resulting capital adequacy ratios of individual banks would be adjusted accordingly, given that their market risk capital charges under the standardized approach are less than their VaR estimates.

Table B2.1 The revised market risk model

Item	Interest rate risk	Foreign exchange risk	Equity risk
Model	• Dynamic Nelson-Siegel Term Structure model • Multivariate Autoregression AR(1) model	Random Walk model	AR(1)-EGARCH(1,1) model
Risk	General risks & specific risks	General risks	General risks & specific risks
Risk Exposure	Interest rate positions in the trading book which are denominated in 9 currencies[1] and mapped to 13 time buckets[2]	Foreign exchange positions denominated in 8 currencies[1]	Equity positions in the trading book traded in 9 major stock exchanges[1]
Market index	Yields on government bonds with different terms in selected economies	Spot exchange rates of foreign currencies against NT dollar	Stock indices in selected economies
Adding a stressed VaR	Yes	Yes	Yes

Notes: 1. Interest rate risks and foreign exchange risks mainly derive from interest rates and foreign exchange positions denominated in NTD, USD, JPY, GBP, HKD, KRW, RMB, AUD and EUR; equity risk mainly results from equity exposures in the stock

markets of Taiwan, US, Japan, UK, Hong Kong, South Korea, Mainland China, Australia, and EU.

2. The 13 time buckets include 1 month, 2 months, 4.5 months, 9 months, 1.5 years, 2.5 years, 3.5 years, 4.5 years, 6 years, 8.5 years, 12.5 years, 17.5 years, and 20 years.

Source: CBC.

Reference: 1. Chung, C.F. (2015), *The development of an internal model for measuring banks' market risks under Basel III*, CBC internal paper, December.

2. Jorion, P. (2006), *Value at Risk: The New Benchmark for Managing Financial Risk*, Third Edition, McGraw-Hill.

Box 3
FinTech developments and their influence on the domestic banking industry

Financial technologies, also known as FinTech, integrate finance and technology in ways that bring disruptive innovation. They dramatically alter financial business models by offering more affordable, efficient, and accessible financial services. In spite of being an ideal tool for achieving financial inclusion, they could have a great impact on the traditional banking industry. In this Box, we collect global FinTech innovation trends, demonstrate current FinTech developments in the domestic banking industry, as well as analyzing the challenges and influences faced by the banking industry under the evolution of FinTech.

1. Global trends of FinTech developments

1.1 Global investment in FinTech has grown significantly in recent years

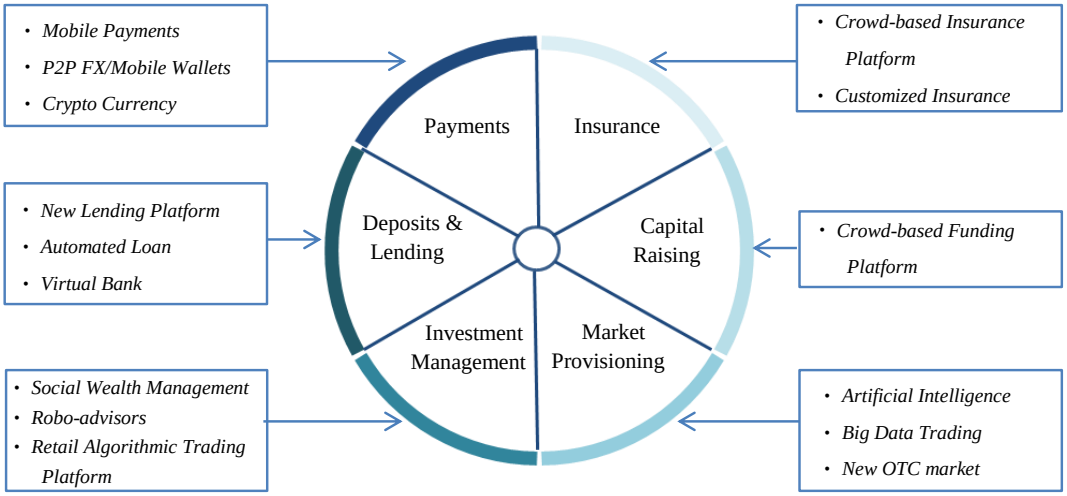
According to Accenture (2015), global investment in FinTech ventures has grown 12 times during 2008-2014. In the first half of 2015, the total amount of investment in FinTech further increased to US$16 billion from US$12.21 billion registered in 2014. Furthermore, as reported by CB Insight (2015), venture capital (VC) investors invested mainly in the payment field during 2007-2014, while the second most invested area was personal finance management. Lending and Bitcoin occupied the third and the fourth places respectively in the same period.

Silicon Valley is the biggest FinTech center in the world, while New York and London rank second and third, respectively. Among them, FinTech investment in Silicon Valley and New York combined accounts for more than 75% of global investment. Even though other emerging FinTech hubs, such as Dublin, Berlin, Tel Aviv, Singapore, Hong Kong, and Sydney, have not reached large enough scales, they are positioning themselves as the leading regional FinTech hubs underpinned by government support and other distinctive advantages.

1.2 Main areas of FinTech innovations

The World Economic Forum (2015) pointed out that FinTech innovations mainly focus on six financial areas: payment, deposit & lending, investment management, market provisioning, capital raising, and insurance. Many innovative services, which overturn traditional financial business models, are promoted in each area[1] (Chart B3.1).

Chart B3.1 Six fields of FinTech and examples of innovative services

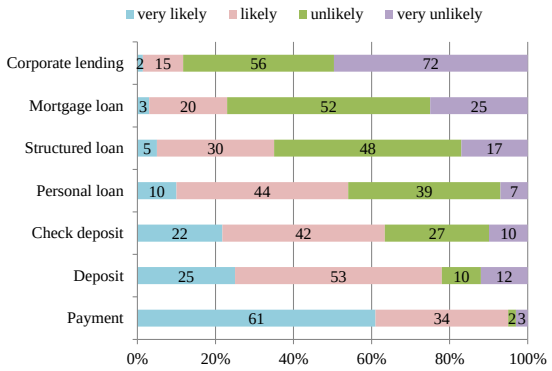


Note: In this chart, the CBC merely reveal a part of the innovative services in each field instead of covering all the services mentioned in the report.
Source: World Economic Forum.

1.3 Impacts on the global banking industry

Roland Berger (2015), who surveyed 60 banks, reported that new competitors will probably disrupt traditional banking businesses, especially payment and deposit, owing to the prevalence of FinTech (Chart B3.2). Additionally, since consumers will be more accustomed to using digitized virtual channels (such as internet and mobile phone), they will tend not to visit bank branches personally, thus lowering the value of those branches. In some countries (such as European countries like Denmark, Netherlands and Germany), the number of bank branches is decreasing.

Chart B3.2 Banking businesses that seem likely to be disrupted in the next three years



Note: The survey sample includes 60 banks across 15 countries.
Source: Roland Berger.

1.4 Strategic actions taken by the global banking industry to cope with FinTech

In order to deal with the impact of FinTech, the global banking industry has generally adopted four strategic actions, including: (1) investing in FinTech-related industries (e.g., Barclays invested in Barclays Accelerator); (2) acquiring FinTech-related companies (e.g., BBVA, a Spanish banking group, acquired Simple, a US company); (3)

strategically allying with FinTech-related companies (e.g., Westpac, an Australian bank, partnered with Moven); (4) selling financial services to FinTech-related companies (e.g., German bank Fidor offered software, such as Fidor OS and Fidor API, to FinTech-related companies with a charge).

2. Current developments of domestic banks concerning FinTech

In view of global FinTech trends and Bank 3.0, the program "Building Digital Environment 3.0" introduced by the FSC was officially launched in January 2015. In addition to permitting 12 types of financial business that could be applied by banks' consumers online, the FSC established the Financial Technology Office in September 2015, together with raising the Financial Technology Development Fund, creating a FinTech incubation center, and forming a database for Big Data application. Moreover, with the deregulations made by the FSC, domestic banks also actively promoted FinTech innovations. Some of them have already established FinTech departments and devoted considerable human resources and funds to improve technology innovations. The FinTech services launched by domestic banks are summarized in Table B3.1.

Table B3.1 FinTech services developed by some banks

Measures	Contents
1. Establishing FinTech departments	In the first half of 2015, some banks established FinTech departments for research and implementation of innovative financial technology, as well as devoting considerable human resources and funds to individual innovative projects.
2. Major innovative financial services	● Currently, banks mainly focus on mobile payment and third-party payment. ● Other innovative services include big data analysis, ATMs using finger vein verification technology, robo-advisors, and interbank deposit ATMs.
3. Investing in FinTech companies	Some banks have already announced FinTech investment projects, while some others are actively assessing potential investments.
4. Branch transformation	● In the future, banks will tend to adopt multiple-channel models, indicating that physical branches will coexist with virtual channels. ● As physical branches still preserve their own value, banks do not plan to shut branches in the near term. Instead, banks will transform the functions of branches into financial product sales and consulting services. In addition, they will train and take their branch employees on the transition journey.

Source: Interviewed banks, CBC.

Despite the fact that domestic banks are vigorously devoted to FinTech, they face many challenges during the development of innovations, such as: (1) the difficulty of knowing the young digital generation's appetite; (2) uneasiness of nurturing talented FinTech

employees; (3) short lifecycle and high R&D cost of digital financial products; (4) intense competition from many non-financial companies.

3. Possible FinTech Impacts on the domestic banking industry

(1) FinTech enterprises offering many banking services are skimming off banking profits.[2] On the other hand, FinTech development can benefit the banking industry by introducing new products and cutting costs. McKinsey & Company (2014) evaluated that if Asian banks could properly respond to these digital trends, they would represent opportunities rather than threats in the future.[3]

(2) To respond to the changes in business models under the digital environment, banks must make substantial adjustments in many aspects, such as organizational structure, operating procedure, sales channels, information systems, and human resources management. Banks will have to confront substantial challenges when trying to transform smoothly.

(3) As customers broadly conduct financial transactions through internet and mobile channels, cyberattacks and personal information theft are likely to be problems. Therefore, inadequate network security and personal information protection will become important sources of risks for banks.

(4) In Taiwan, given the insufficiency of FinTech talents in the banking sector, it is urgent for banks and associated academies to strengthen FinTech-related training and education.

4. Conclusion

Rapidly innovating FinTech exerts tremendous competitive pressure on domestic and foreign financial industry participants, but this also brings them new opportunities. Domestic banks should make the best use of FinTech technologies and innovative business models to increase their competitiveness through smooth business transformation. In the meantime, banks should enhance internet security management so as to lower related risks.

Notes: 1. The World Economic Forum (2015) also listed crucial innovative products/platforms/enterprises in each area. For instance, payment field includes: (1) mobile payment such as Apple Pay and Android Pay; (2) P2P FX/mobile wallets such as TransferWise and M-Pesa; (3) crypto currency such as Bitcoin and Ripple. For more detailed information, please refer to the report.

2. Global bank revenues estimated at US$4.7 trillion and profits at US$470 billion a year could potentially be disrupted by nonfinancial FinTech firms, according to analysts at Goldman Sachs.

See The Economist (2014), Banks Glory Days May Be Over with New Financial Technology, or "Fintech", Companies Taking Aim at Their Services and Profits, special report, 8 May.

3. McKinsey & Company analysis demonstrated that FinTech could be a threat to the Asian banking industry (such as leading to business erosion, profit shrinkage, and higher operation risk), which might decrease banks' net profits by 29-36% of. If banks respond properly to digital trends, FinTech will emerge as opportunities (such as lowering costs, introducing new FinTech products, and capturing market share from other banks), which might increase banks' net profits by 43-48% of. Overall, opportunities would be larger than threats.

Reference: 1. Accenture (2015), The Future of Fintech and Banking: Digitally Disrupted or Reimagined.
2. CB Insight (2015), *Disruption in Financial Services*, Webinar Presentation.
3. McKinsey & Company (2014), Digital Banking in Asia: Winning Approached in a New Generation of Financial services.
4. Roland Berger (2015), Executive Retail Banking Survey: Digital Transformation.
5.World Economic Forum (2015), The Future of Financial Services: How Disruptive Innovations Are Reshaping the Way Financial Services Are Structured, Provisioned and Consumed.

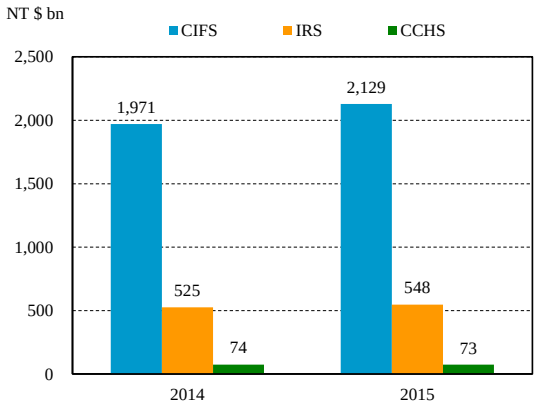
3.3 Financial infrastructure

3.3.1 Payment and settlement systems

Overview of three domestic systemically important payment systems in 2015

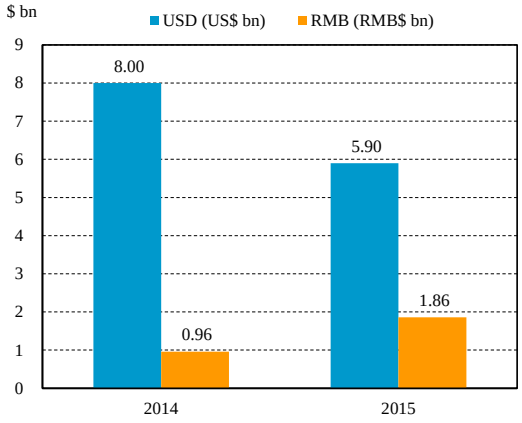
In 2015, the daily average amount of funds transferred via the three SIPSs,[79] which process domestic interbank payments, continued to expand, except for a slight decline of the CCHS. Among them, the CBC's CIFS[80] grew the fastest, mainly owing to the increase in settlements of interbank foreign exchange and securities transactions, and functioned as the most important system with the daily average amount of funds transferred reaching NT$2.13 trillion (Chart 3.57).

Chart 3.57 Daily average amount of funds transferred via the three SIPSs



Source: CBC.

Chart 3.58 Daily average amount of funds transferred via the foreign currency clearing platform



Source: CBC.

Functions of the foreign currency clearing platform have been broadly completed

Since the foreign currency clearing platform planned by the CBC and established by the FISC was launched on 1 March 2013, the trading volume of funds transferred via this platform has grown steadily, mainly in terms of US dollar and renminbi transactions, which recorded 1,850 thousand and 315 thousand, respectively. Meanwhile, the average daily transaction amounts of US dollars and renminbi in 2015 registered US$5.9 billion and RMB1.9 billion, respectively (Chart 3.58).

In 2015, the CBC continued to expand the functions of the foreign currency clearing platform

[79] See Note 7.
[80] The CIFS is a system which handles the final settlement of large-value payments in financial markets and interbank fund transfers.

by providing domestic and cross-border Japanese yen remittances services in January and May 2015, respectively. In addition, the platform connected with the Taiwan Depository & Clearing system to provide a delivery versus payment (DVP)[81] mechanism for foreign currency-denominated bond and bill transactions in July 2015, and included NCDs in bond and bill transactions at the end of August as well.

The foreign currency clearing platform has been broadly completed, currently providing US dollar, renminbi, Japanese yen and euro remittance services, as well as incorporating real-time gross settlement (RTGS),[82] payment versus payment (PVP)[83] and DVP mechanisms for settlement services. Furthermore, the platform links with Euroclear, Clearstream and the settlements systems in Mainland China, Japan, and the euro area. Therefore, it has become a close partner with the international settlement network, not only helping the domestic financial industry to expand their international business but also saving remittance time and fees[84] for financial consumers.

Recent developments of mobile payment platform in Taiwan

Thanks to growing popularity of mobile internet devices, mobile payments are gradually accepted by the public, driving the increase in the global mobile payment utilization rate year by year. In order to satisfy public needs and promote the sound development of domestic mobile payment, the FISC, the Taiwan Clearing House (TCH), and the financial industry jointly established a payment service provider trusted service manager (PSP TSM) platform, which received authentication from Visa and MasterCard and conforms to related international standards. At the end of 2015, 37 banks had joined this platform. Among them, 23 banks have officially launched mobile payment services.

Moreover, following the trend of cloud computing, the PSP TSM platform extended its function to include host card emulation (HCE)[85] and established the tokenization[86] authentication mechanism in 2015 to ensure transaction security. This new development has gotten support from 35 banks through their participation.

[81] DVP is a settlement mechanism which complies with international standards and aims to ensure that the delivery of securities occurs only if the corresponding transfer of funds occurs in order to efficiently prevent settlement risk.
[82] RTGS is a mechanism aiming to reduce settlement risk of large-value transactions settling on a real-time basis only when the banks involved hold sufficient account balances.
[83] PVP refers to a mechanism for payments between two different currencies and is used worldwide to control foreign currency settlement risk. Taking NTD/USD swaps as an example. PVP ensures that a final transfer of USD (or NTD) occurs only if a final transfer of NTD (or USD) takes place.
[84] According to the CBC's estimation, more than NT$1.6 billion of remittance fees have been saved since the platform was launched.
[85] See note 8.
[86] See note 9.

Measures to shield financial market infrastructure from cyber attacks

In recent years, cyber attacks have increased gradually and become more complex. As a result, they are one of the main risks in financial transactions. As financial market infrastructures (FMIs) could not recover immediately once under attack, this might cause the public to lose confidence in FMIs and in turn undermine financial stability. Therefore, supervisory authorities have increasingly paid close attention to management issues regarding cyber attacks.

For effective responses to cyber attacks, the BIS published the *Guidance on Cyber Resilience for Financial Market Infrastructures*. It suggests that FMIs should adopt an integrated recovery program to resume critical operations within two hours, including: (1) using related technical tools to help rapidly identify the breadth of systemic damage; (2) implementing cyber governance to strengthen communication and emergency notification management; and (3) employing measures such as prevention, detection and recovery. It also suggests that FMIs should cooperate and share information with each other. Following the requirements of the BIS (2014), the CBC and related authorities have assessed the conformity of several important payment systems, including the CIFS, with the *Principles for Financial Market Infrastructures.* Especially concerning Principle 17, which suggests that operational risk should include integrated recovery assessment in response to cyber attacks, the CBC's assessment confirmed that the CIFS has complied with the principle. The main assessment conclusions revealed that the CIFS has considered operational reliability and adopted a high level of security design, established a business continuity plan, conducted scenario simulaitons regularly, evaluated the probability of cyber attacks, and adopted adequate defensive measures to ensure the emergency response and recovery ability of the CIFS.

3.3.2 Strengthening the supervisory regulations of complex high-risk derivatives

The renminbi has depreciated significantly since the first quarter of 2014, after appreciating continuously in the previous few years. This has induced numerous disputes between banks and investors over complex high-risk derivatives such as TRF and DKO products over significant losses suffered by customers.

Considering that some banks had failed to properly know their customers and product suitability, as well as not fully disclosing the risks, the FSC announced fines or bans on banks for engaging in such transactions and further implemented four rounds of supervisory

reinforcements. Those measures included tightening the qualification of professional corporate investors, restricting contract terms, setting loss limits and minimum initial margin requirements for customers, establishing the management mechanism for credit limits, and enhancing disclosure of product risks. In addition, the FSC has required banks to conduct scenario analyses to evaluate potential losses and to establish mechanisms handling customer disputes (Table 3.3). These measures will promote customer protection, sound operation of banks, and healthy development of financial markets.

Table 3.3 FSC measures to strengthen the supervision of complex high-risk derivatives

Periods	Major measures
2014/4-2014/6	With growing TRF investment disputes after great depreciation of the renminbi, the FSC launched the following supervisory measures: 1. Taking enforcement actions on ten banks by ordering them to correct deficiencies immediately, levying penalties or banning them from engaging in TRF business. 2. Amending applicable regulations and ask banks to amend self-regulatory rules: • Defining complex high-risk derivatives and confine the scope of investors to those professional customers or customers who transact for hedging purposes. • Requiring banks to establish collateral mechanisms for potential losses of non-hedging transactions. • Requesting the JCIC to establish a query system for customers' derivatives trading limits and outstanding balances.
2015/2-2015/7	While banks turned to sell DKOs instead of TRFs and needed to reinforce their risk control, the FSC further amended applicable regulations and required banks to amend self-regulatory rules. The key amendments include the following: 1. Amending the definition of complex high-risk derivatives as products that have more than three settlement or price fixing periods and contain embedded put options. 2. Limiting the maximum losses for non-hedging complex high-risk derivatives to six or 9.6 times the notional amounts. 3. Requiring banks to disclose possible maximum losses to customers in transaction documents. 4. Asking banks to control the overall credit risks of customers.
2015/10-2016/1	Considering significant price volatility in exchange rate markets might induce higher credit risks of such products to banks, the FSC took further supervisory measures as follows: 1. Ordering nine banks to take corrective measures or to ban them from engaging in such transactions. 2. Amending applicable regulations to strengthen financial supervision on such products with the following major amendments: • Restricting banks from trading complex high-risk products with individuals and non-professional corporates for non-hedging purposes. • Tightening the qualification of professional corporates in terms of total assets from NT$50 million to NT$100 million, which also requires a written application to the bank for the qualification. • Limiting the tenor of complex high-risk exchange rate products to no longer than one year, the price fixing or settlement periods to less than twelve periods, and the maximum losses of individual transaction for non-hedging purposes to less than 3.6 times the notional amounts. • Requiring banks to establish minimum initial margin requirements for complex high-risk derivatives and foreign exchange derivatives containing embedded put options with the term exceeding one year. • Requesting that banks establish credit limits mechanisms such that the maximum

	transaction amount for complex high-risk derivatives should not exceed 2.5 times the verifiable financial resources of a customer. 3. Strengthening the supervision on those banks highly involved in complex high-risk transactions and requesting them to set the total limits for such products, which should be approved by the board of directors and be submitted to the FSC. 4. Requiring banks to reinforce the calculation requirements for credit valuation adjustment (CVA) for over-the-counter derivatives.
2016/3-2016/4	1. Asking banks to conduct scenario analyses to evaluate expected losses of customers, as well as delinquencies and estimated losses of banks, which should be reported to the board of directors and be submitted to the FSC. 2. Requesting the Financial Ombudsman Institution (FOI) to establish a mediation mechanism for complex high-risk derivatives disputes, which was inaugurated on 15 April 2016.

Sources: FSC and CBC.

3.3.3 Amendments to the Financial Institutions Merger Act

To simplify the merger procedures of financial institutions, provide tax preference, enhance the merger incentives for financial institutions, and expand the scale of financial institutions, the *Financial Institutions Merger Act* was amended on 9 December 2015. The key amendments include:

- Clearly stipulating that the *Act* applies to financial holding companies and that credit departments of farmers' and fishermen's associations are excluded.

- Adding the provision that cash and other properties can be used as payments for the merger of financial institutions.

- Adding the provision that a merger of financial institutions can be asserted as a defense against creditors, fund beneficiaries, right holders of insurance contracts, etc., if financial institutions establish a trust for the purpose of paying off debt or demonstrate that the exercise of rights by creditors will not be impeded.

- Based on the principle of tax fairness, revoking the provision that asset management companies are levied at the same business tax rates as banks when dealing with non-performing loans transferred from financial institutions.

- Adding new tax incentives for mergers of financial institutions after taking reference from the *Business Mergers and Acquisitions Act*. These incentives include the exemption from securities transaction taxes for transferred securities due to mergers, the exclusion of goods or labor services transferred from the scope of the imposition of business taxes, the extension of amortization years of goodwill generated due to mergers from within 5 years to within 15 years, and the expansion of the scope of deferred land value increment tax to

include the land owned by the extinguished institution.

These amendments are crucial for the development of Taiwan's financial industry as they can reinforce current regulations governing mergers of financial institutions and facilitate overseas market expansion of domestic financial institutions.

3.3.4 Foreign exchange regulation amendments

Relaxing foreign exchange regulations of banks

In order to promote development of the financial services industry in the context of financial globalization and liberalization, the CBC continued to relax foreign exchange regulations in 2015 as follows:

- In January and July 2015, the CBC revised the *Directions Governing Banking Enterprises for Operating Foreign Exchange Business*, which included: (1) allowing foreign exchange certificates of deposit to be pledged for foreign currency funds; (2) relaxing the qualification criteria for trustors of non-discretionary money trusts; (3) allowing trustors to collateralize their beneficiary rights for foreign currency loans; (4) removing restrictions on issuance of foreign currency negotiable certificates of deposit (NCDs).

- In May 2015, the CBC revised the *Regulations Governing Foreign Exchange Business of Banking Enterprises*, which included: (1) allowing the Agricultural Bank of Taiwan to apply for approval to be an authorized foreign exchange bank; (2) allowing authorized foreign exchange banks to issue foreign currency NCDs; (3) expanding the scope of foreign exchange derivatives; (4) simplifying procedures for authorized foreign exchange banks to apply for certain foreign exchange business.

- To move in line with the deregulation measure that allowed authorized foreign exchange banks to issue foreign currency NCDs, the CBC promulgated the *Directions for Issuance of Foreign Currency-Denominated Negotiable Certificates of Deposit by Banks* in July 2015. It increased flexibility in fund management for NCD holders by allowing foreign currency NCDs to be pledged for foreign currency funds or to be collateralized for foreign currency loans.

Relaxing foreign exchange regulations of insurance companies

In order to meet the funding needs of the insured and to enhance competitiveness of the

insurance industry and to facilitate their foreign currency policy business, the CBC continued to relax measures governing foreign exchange business of insurance companies in 2015 as follows:

- In April 2015, the CBC removed the restriction on insurance companies that a foreign currency loan pledged against a foreign currency policy should not exceed 20% of the amount of the policy value reserve.
- In April 2015, the CBC revised the *Regulations Governing Foreign Exchange Business of Insurance Enterprises*, removing the restriction on insurance companies to extend foreign currency loans pledged against foreign currency policies.
- Effective from August 2015, insurance companies may participate in foreign currency syndicated lending.

Relaxing foreign exchange regulations of securities investment trust and consulting firms

In order to help domestic investment trust firms to grow their foreign mutual funds business, in August 2015, the CBC expanded the scope of foreign currency discretionary investment business conducted by securities investment trust enterprises and securities investment consulting enterprises, allowing these enterprises to invest in multi-currency funds that meet the following criteria: (1) the amount of domestic security investment is not over 30% of their net asset value; (2) currency classes include the NT dollar.

IV. Measures to maintain financial stability

In 2015, against a backdrop of moderate domestic economic growth and steady inflation, Taiwan's financial markets and infrastructure maintained smooth operations and sound development. Profitability of financial institutions stayed healthy, while asset quality and capital positions strengthened further. As a whole, Taiwan's financial system remained stable.

As a result of an uneven economic recovery and the divergence of monetary policies among major economies, international financial markets fluctuated significantly, which, in turn, heightened uncertainties over global economic recovery. Facing changes in global and domestic economic and financial conditions, especially slowing economic growth in Mainland China, expanded quantitative easing monetary policies by the ECB and spillover effects likely induced by US monetary policy normalization in the future, the CBC will continue to closely monitor the influence of these issues on the domestic economy and financial system and adopt appropriate monetary, credit, and foreign exchange policies. Meanwhile, the FSC also continues to amend financial laws and regulations and undertakes measures to strengthen financial supervision, aiming at maintaining the soundness of financial institutions and improving financial stability.

4.1 Measures taken by the CBC to promote financial stability

Since 2015, the CBC has prudently relaxed restrictions on foreign exchange business to foster a more diversified market. Between 2015 Q1 and 2016 Q1, in view of domestic growth deceleration and mild inflation, the CBC cut policy rates three times and conducted open market operations to maintain monetary and credit conditions at an accommodative level. Given that banks have continued strengthening credit risk management on real estate loans, the CBC revised the relevant targeted prudential measures. Moreover, to prevent massive and frequent cross-border capital flows from disrupting the domestic foreign exchange market, the CBC continually followed the managed float regime and stabilized the NT dollar exchange rate.

4.1.1 Adopting appropriate monetary policies to cope with domestic and global economic and financial conditions

The CBC lowered policy rates three times

Owing to a slowdown in global economic growth, worse-than-expected domestic economy, widened negative output gap, and moderate inflation outlook, the CBC lowered policy rates three times by a total of 12.5 bps during the period from September 2015 to March 2016. As a result, the discount rate, the rate on accommodations with collateral, and the rate on accommodations without collateral fell to 1.5%, 1.875%, and 3.75%, respectively.

Reserve money growth remained moderate

The CBC accommodated financial markets with funds to keep liquidity at an appropriate level through open market operations. In 2015, the excess reserves in all financial institutions remained ample. The total loans and investments of all banks grew by 4.61%, while the monetary aggregate M2 grew by 6.34% year on year, both of which were higher than the GDP growth rate of 0.75%. This indicated that market liquidity was sufficient to support economic activity.

The CBC will continue to implement appropriate monetary policies

The CBC 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 policy actions to maintain price and financial stability and, in turn, foster economic growth.

4.1.2 Amending targeted prudential measures for real estate loans

Given that financial institutions have enhanced credit risk management on real estate loans and the government's measures to promote a sound housing market have gradually come into effect, speculative real estate demand decreased and property transactions slowed down. In view of these developments, the CBC made amendments to targeted prudential measures for real estate loans in August 2015, removing six districts from the scope of the designated Specific Areas and raising the loan-to-value ratio ceiling on real estate loans taken out by certain borrowers. In March 2016, the CBC further lifted all relevant measures except those for high-value housing loans. As a sound real estate market is vital to financial stability and

economic growth, the CBC will continue to monitor financial institutions' credit risk management on real estate loans and the enforcement results of targeted prudential measures, so as to undertake appropriate policy actions in a timely manner to ensure financial stability.

4.1.3 Safeguarding stability of the NT dollar exchange rate

Adopting flexible foreign exchange rate policies

Taiwan adopts a flexible managed float exchange rate regime, and the exchange rate of the NT dollar is in principle decided by market forces. Nevertheless, when seasonal or irregular 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 economic and financial stability, the CBC will, in line with its mandate, conduct leaning against the wind operations to maintain market order.

Maintaining an orderly foreign exchange market and promoting its sound development

After the global financial crisis, advanced economies adopted quantitative monetary easing policies, inducing massive and frequent short-term capital movements, which disturbed the domestic foreign exchange market. In order to prevent excessive exchange rate fluctuations and maintain dynamic stability of NT dollar exchange rate, in 2015, the CBC continued to undertake appropriate management measures to safeguard foreign exchange market order and promote its sound development. These measures included:

1. Implementing the Real Time Reporting System for Large-Amount Foreign Exchange Transactions to monitor the latest transaction information in the foreign exchange market.

2. Urging authorized foreign exchange banks to strengthen their foreign exchange rate risk management.

3. Strengthening examinations on forward transactions to ensure that they are undertaken for real demand purposes; undertaking targeted examinations on foreign exchange businesses when necessary.

4. Requiring that, for each authorized foreign exchange bank, its combined position limit for NTD non-delivery forwards (NDFs) and foreign exchange options may not exceed one-fifth of its total position limit.

4.2 Measures undertaken by the FSC to maintain financial stability

From 2015 onwards, in order to facilitate financial innovation and enhance financial competitiveness, the FSC continued to implement several measures of deregulation to promote policies including financial import substitution, building up a stronger Asian presence for Taiwan's banking industry, creating a digital financial environment, and boosting securities markets. Additionally, in order to strengthen financial supervision and risk management of financial institutions, the FSC continuously enhanced domestic banks' risk controls over exposures to Mainland China and implemented prompt corrective actions for the insurance industry,[87] as well as undertaking several measures mentioned as follows to maintain financial stability.

4.2.1 Continually reinforcing banks' risk management for complex financial derivatives business

As complex financial derivatives business conducted by banks, such as TRFs and DKOs, has caused numerous investment disputes, the FSC introduced four sets of supervisory measures from April 2014 to the beginning of 2016 (see Chapter 3.3) to protect investors and promote sound development of financial markets.

4.2.2 Establishing an off-site monitoring mechanism to detect material risks of financial institutions

The FSC issued the *Guidelines for Material Risk Detection for Financial Institutions* in November 2015 to build a mechanism for identifying material risks in a timely manner. The scope of risk detection is comprised of capital adequacy, asset quality, management capability, profitability, and liquidity of financial institutions. In addition, source of profit, foreign risk exposure, investment position, off balance sheet exposures and petition of consumers are included as key detecting factors. The FSC also requested financial institutions to establish internal risk detection guidelines for the purpose of controlling material risks and ensuring sound management.

[87] See CBC (2015), *Financial Stability Report*, Chapter IV, May.

4.2.3 Strengthening risk management and enhancing sound operation for the insurance industry

Increasing the risk-bearing capability of insurance companies with respect to real estate mortgage loans

In order to increase the risk-bearing capability of the insurance industry, the FSC, taking bank practices into consideration, amended related regulations in July 2015, which require insurance companies to raise their allowance for bad debts at a ratio of at least 1.5% against loans for home purchase, refurbishment, or construction by the end of 2016.

Reinforcing public disclosure of RBC ratios

With a view to strengthening supervision of the insurance industry, in addition to the prompt corrective action mechanism established in February 2015, the FSC further required insurance companies to disclose their capital adequacy ratios semiannually from the second half of 2015 onwards to enhance market discipline.[88]

Requiring insurance companies to solicit business with reasonable pricing to avoid inappropriate competition

To strengthen sound operation of insurance companies and avoid inappropriate premium competition, the FSC amended the *Regulations Governing Pre-sale Procedures for Insurance Products* in July 2015, requiring that the premiums of both non-life and life insurance products should reasonably reflect their costs and profits. The aforementioned regulations also prohibited insurance companies from soliciting business with unreasonable pricing. Meanwhile, the FSC amended the *Regulations for Establishment and Administration of Insurance Enterprises*, stipulating that insurance companies should set loan prices in consideration of factors such as market rates, operating costs, and reasonable profits, and should not extend loans at unreasonable prices.

4.2.4 Other supervisory measures

1. To conform with international supervisory standards, the FSC amended regulations with respect to the capital adequacy of banks in April 2015, requiring banks to further disclose

[88] Before the second half of 2015, each insurance company only disclosed its RBC ratio with five tiers: above 300%, above 250% but under 300%, above 200% but under 250%, above 150% but under 200%, and under 150%.

leverage ratios and liquidity coverage ratios.

2. In order to enhance the quality of domestic credit rating services and support sound development of credit rating agencies, the FSC introduced amendments to the *Regulations Governing the Administration of Credit Rating Agencies* in December 2015. The key points of the amendments included: (1) relaxing the establishment criteria and abolishing the requirement that at least one of the founders shall be an internationally recognized credit rating institution; (2) requiring the corporate bylaws to include fee policies and complaint handling mechanisms, etc.; (3) requiring credit rating agencies to comply with international financial reporting standards when preparing financial reports; (4) requiring credit rating agencies to disclose their credit rating procedures, the reasons for the change of the credit rating result, and possible conflicts of interest, etc.; (5) enhancing the credit rating methodologies, models, and key assumptions employed in the rating procedures; (6) adding provisions for preventing conflicts of interest.

3. For the purpose of increasing securities market transparency, additional disclosure was introduced to include simulated transaction and bid/ask information prior to market opening and closing (30 minutes before market opening and 5 minutes before closing when trading orders are accepted), beginning 29 June 2015.

Appendix: Financial soundness indicators

Table 1: Domestic Banks

Unit: %

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
Earnings and profitability						
Return on assets (ROA)	0.57	0.58	0.67	0.67	0.77	0.73
Return on equity (ROE)	9.08	9.27	10.44	10.29	11.62	10.65
Net interest income to gross income	59.52	62.61	63.37	60.97	59.34	60.85
Non-interest expenses to gross income	55.99	55.44	54.71	52.81	50.15	52.62
Gains and losses on financial instruments to gross income	9.93	6.92	11.74	14.63	14.11	9.60
Employee benefits expenses to non-interest expenses	57.67	57.71	59.66	59.32	57.50	55.90
Spread between lending and deposit rates (basis points)	1.36	1.41	1.42	1.42	1.42	1.44
Asset quality						
Non-performing loans to total loans	0.61	0.43	0.41	0.39	0.25	0.24
Provision coverage ratio	157.32	250.08	269.07	311.65	502.87	547.66
Capital adequacy						
Regulatory capital to risk-weighted assets	11.96	12.06	12.54	11.83	12.34	12.93
Tier 1 capital to risk-weighted assets	9.18	9.08	9.49	9.14	9.60	10.34
Common equity Tier 1 capital to risk-weighted assets	-	-	-	9.06	9.38	10.03
Capital to total assets	6.31	6.29	6.59	6.60	6.85	7.12
Non-performing loans net of provisions to capital	2.92	-0.38	-0.82	-3.24	-3.86	-3.03
Liquidity						
Customer deposits to total loans	132.28	128.66	129.06	130.06	130.89	136.21
Liquid assets to total assets	10.46	11.05	9.77	13.40	13.17	12.18
Liquid assets to short-term liabilities	14.65	15.67	14.00	18.42	18.32	16.85

Table 1：Domestic Banks (cont.)

Unit: %

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
Credit risk concentration						
Household loans to total loans	46.67	46.06	46.36	47.73	48.67	49.79
Corporate loans to total loans	43.66	44.91	44.82	44.65	44.32	43.74
Large exposures to capital	66.91	67.57	60.60	52.40	42.21	36.97
Gross asset positions in financial derivatives to capital	8.54	7.57	5.84	6.79	15.61	16.62
Gross liability positions in financial derivatives to capital	10.02	7.05	6.11	8.09	15.53	17.35
Sensitivity to market risk						
Net open position in foreign exchange to capital	2.72	2.71	2.91	3.04	2.69	2.94
Foreign-currency-denominated loans to total loans	16.28	18.14	18.10	19.90	21.22	21.55
Net open position in equities to capital	24.48	24.25	22.13	22.71	24.33	22.52
Foreign-currency-denominated liabilities to total liabilities	20.31	21.65	21.84	27.01	29.01	30.58

Notes: 1. Figures for "Earnings and profitability" from 2012 are on the TIFRSs basis, while prior years are on the ROC GAAP basis.
2. Figures for "return on assets"and "return on equity"from 2013 are on the daily average assets and daily average equity
3. Figures for "Spread between lending and deposit rates" exclude the data of preferred deposits rates of retired government empolyees and central government lending rates.
4. Figures for "Capital adequacy" from 2013 are on the Basel Ⅲ basis.
5. Figures for "Large exposures" are revised to the total amount of credit to the first 20 private enterprises at domestic banks after integration.

Table 2: Non-financial Corporate Sector

Units: %, times

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
Total liabilities to equity						
TWSE-listed companies	94.49	104.22	110.61	105.35	101.77	94.29
OTC-listed companies	89.41	83.03	87.95	81.22	76.76	76.26
Return on equity						
TWSE-listed companies	16.12	10.99	10.45	14.06	14.78	13.73
OTC-listed companies	13.77	8.97	6.91	9.92	12.21	10.36
Net income before interest and tax / interest expenses (times)						
TWSE-listed companies	19.40	11.32	8.55	13.11	13.38	13.45
OTC-listed companies	13.74	10.59	6.75	11.12	14.50	12.75

Notes: 1. Data of TWSE-listed and OTC-listed companies are from TEJ.
2. Figures for listed companies are consolidated financial data; prior to 2011 are under ROC GAAP, while from 2012 are under TIFRSs.

Table 3: Household Sector

Unit: %

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
Household borrowing to GDP	79.11	79.38	80.09	R 82.46	R 82.73	82.46
Borrowing service and principal payments to gross disposable income	38.46	39.34	39.21	R 42.14	R 43.91	45.30

Notes: 1. Figures for "gross disposable income" are net household disposable income before deducting rent and interest expenses.
2. Figure of gross disposable income for 2015 is a CBC estimate.
3. Figures with "R" are revised data.

Table 4: Real Estate Market

Unit: index, %

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
Land price index	85.90	90.86	96.32	R 105.79	R 115.07	119.28
Residential real estate loans to total loans	29.99	28.64	28.21	27.91	R 28.04	28.96
Commercial real estate loans to total loans	13.25	13.70	14.14	14.26	R 14.70	15.87

Notes: 1. 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).
2. Figures with "R" are revised data.

Table 5: Market Liquidity

Unit: %

Items \ Year (end of year)	2010	2011	2012	2013	2014	2015
The turnover ratio of trading value in stock market	136.74	119.87	97.33	82.64	84.63	77.54
The monthly average turnover ratio in bond market	32.95	19.73	12.26	8.59	R 8.64	7.67

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.
3. Figures with "R" are revised data.

Explanatory notes: Compilation of financial soundness indicators

I. General notes

To facilitate international comparison, most items listed in "Appendix: Financial Soundness Indicators" are compiled in accordance with the "Financial Soundness Indicators: Compilation Guide" issued by the IMF. However, a few indicators are not used for analysis in this report due to insufficient time series data.

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

Compilation of Domestic Banks' Indicators

1. The banks in this report as of the end of 2015 include Bank of Taiwan, Land Bank of Taiwan, Taiwan Cooperative Bank, First Commercial Bank, Hua Nan Commercial Bank, Chang Hwa Commercial Bank, The Shanghai Commercial & Savings Bank, Taipei Fubon Commercial Bank, Cathay United Bank, The Export-Import Bank of the Republic of China, Bank of Kaohsiung, Mega International Commercial Bank Co., Agricultural Bank of Taiwan, Citibank Taiwan, ANZ (Taiwan) Bank, China Development Industrial Bank, Industrial Bank of Taiwan, Taiwan Business Bank, Standard Chartered Bank (Taiwan), Taichung Commercial Bank, King's Town Bank, HSBC Bank (Taiwan), Bank of Taipei, Hwatai Bank, Shin Kong Commercial Bank, Sunny Bank, Bank of Panhsin, Cota Commercial Bank, Union Bank of Taiwan, Far Eastern International Bank, Yuanta Commercial Bank, Bank Sinopac, E. Sun Commercial Bank, KGI Bank, DBS Bank (Taiwan) Ltd., Taishin International Bank, Ta Chong Bank, Jih Sun International Bank, EnTie Commercial Bank, and CTBC Bank Co., Ltd., amounting to 40 banks.
2. The domestic banks' related indicators are calculated using unaudited data submitted regularly by domestic banks. The submitted data are different from the data posted on the banks' websites, which are audited and certified by certified public accountants or adjusted by the banks. The statistical basis for these two types of data is different.
3. Domestic banks' related indicators are calculated by aggregating the numerators and denominators of each ratio, and then dividing the total numerator by the total denominator to obtain the peer-group ratios. This methodology differs from the Winsorized mean on the quarterly "Condition and Performance of Domestic Banks" report compiled by the Department of Financial Inspection of the Central Bank of the Republic of China (Taiwan).

II. Explanatory notes on the indicators

1. Domestic banks' indicators

1.1 Earnings and profitability

1.1.1 Return on assets (ROA)

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

- ROA = net income before income tax / average total assets
  - Net income: net income before income tax.
  - Average total assets: the average of total assets at the beginning and the end of the period before 2012, while the daily average of total assets is as of the end of reference date in current year since 2013.

1.1.2 Return on equity (ROE)

This indicator is used to analyze banks' efficiency in using their capital.

- ROE = net income before income tax / average equity
  - Net income: same as 1.1.1.
  - Average equity: the average of equity at the beginning and the end of the period before 2012, while the daily average of equity is as of the end of reference date in current year since 2013.

1.1.3 Net interest income to gross income

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

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

1.1.4 Non-interest expenses to gross income

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

- Non-interest expenses include operating expenses other than interest expenses as follows:
  - Employee benefits expenses.
  - Other expenses related to operations.
    - Expenses for property and equipment, including: purchasing, ordinary and regular maintenance and repair, depreciation, and rental.
    - Other expenditure related to operations, including: purchases of goods and services (e.g. advertising costs, staff training service expenses, and royalties paid for the use of other produced or non-produced assets).
    - Taxes other than income taxes less any subsidies received from general government.
- Gross income: same as 1.1.3.

1.1.5 Gains and losses on financial instruments to gross income

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

- Gains and losses on financial instruments include the following items:

- Realized and unrealized gains and losses in the statement of comprehensive income arising on all financial assets and liabilities which are held at fair value through profit or loss, available for sale, and held to maturity.
- Gains and losses on financial assets or liabilities carried at cost.
- Gains and losses on debt instruments without active markets.
- Foreign exchange gains and losses.

- Gross income: same as 1.1.3.

1.1.6 Employee benefits expenses to non-interest expenses

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

- Employee benefits expenses, including: wages and salaries, profit sharing and bonuses, allowances, pensions, social insurance and medical insurance, etc.
- Non-interest expenses: same as 1.1.4.

1.1.7 Spread between lending and deposit rates

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

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

1.2 Asset quality

1.2.1 Non-performing loans to total loans

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

- Non-performing loans:

  According to the *Regulations Governing the Procedures for Banking Institutions to Evaluate Assets and Deal with Non-performing / Non-accrual Loans*, non-performing loans include the following items:

  - Loans for which repayment of principal or interest has been overdue for three months or more.
  - Loans for which the bank has sought payment from primary/subordinate debtors or has disposed of collateral, although the repayment of principal or interest has not been overdue for more than three months.
- Total loans: Total loans include bills purchased, discounts, accrual and non-accrual loans, but excluding interbank loans.

1.2.2 Provision coverage ratio

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

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

1.3 Capital adequacy

1.3.1 Regulatory capital to risk-weighted assets

This indicator is to analyze the capital adequacy of domestic banks. The minimum statutory ratio of regulatory capital to risk-weighted assets of a bank shall not be less than a certain ratio, based

on the *Regulations Governing the Capital Adequacy Ratio and Capital Category of Banks*.

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

1.3.2 Tier 1 capital to risk-weighted assets

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

- Tier 1 capital: the aggregate amount of net Common Equity Tier 1 and net additional Tier 1 Capital.
- Risk-weighted assets: same as 1.3.1.

1.3.3 Common equity Tier 1 capital to risk-weighted assets

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

- Common equity Tier 1 capital: includes common stock and additional paid-in capital in excess of par value of common stock, capital collected in advance, capital reserves, statutory surplus reserves, special reserves, accumulated profit or loss, non-controlling interests and other items of interest, less supervisory deductions.
- Risk-weighted assets: same as 1.3.1.

1.3.4 Capital to total assets

This indicator is to analyze the degree of financial leverage on assets funded by other than banks' own funds.

- Capital: equity interest of owners in a bank (i.e. the difference between total assets and liabilities).
- Total assets: the sum of financial and non-financial assets.

1.3.5 Non-performing loans net of provisions to capital

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

- Non-performing loans net of provisions to capital = (non-performing loans - specific loan provisions) / capital
  - Non-performing loans: same as 1.2.1.
  - Specific loan provisions: the minimum provision that a bank should allocate in accordance with Article 5 of *Regulations Governing the Procedures for Banking Institutions to Evaluate Assets and Deal with Non-performing / Non-accrual Loans*.
  - Capital: same as 1.3.4.

1.4 Liquidity

1.4.1 Customer deposits to total loans

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

- Customer deposits: including check deposits, demand deposits, time deposits, saving deposits, and money remittances.

- Total loans: same as 1.2.1.

1.4.2 Liquid assets to total assets

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

- Liquid assets: the core liquid assets comprising cash, checks for clearing, amounts due from the Central Bank, amounts due from banks, and assets with remaining maturity of no more than three months, can be converted into cash quickly and with minimal impact to the price received.
- Total assets: same as 1.3.4.

1.4.3 Liquid assets to short-term liabilities

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

- Liquid assets: same as 1.4.2.
- Short-term liabilities: liabilities with remaining maturity of no more than one year, including deposits, borrowings, debt securities issued, and the net market value of financial derivatives positions (liabilities less assets).

1.5 Credit risk concentration

1.5.1 Household loans to total loans

This indicator is to analyze the concentration of loans to the household sector by domestic banking units (DBUs) of domestic banks.

- Household loans: loans from DBUs of domestic banks to the household sector.
- Total loans: total loans (excluding export bills purchased and non-accrual loans) of DBUs of domestic banks.

1.5.2 Corporate loans to total loans

This indicator is to analyze the concentration of loans to local public and private corporate borrowers by DBUs of domestic banks.

- Corporate loans: loans from DBUs of domestic banks to public and private non-financial corporate borrowers.
- Total loans: same as 1.5.1.

1.5.3 Large exposures to capital

This indicator is to analyze vulnerabilities at domestic banks arising from the concentration of credit risk on single individuals or corporate borrowers.

- Large exposures: refer to the total amount of credit to the first 20 private enterprises at domestic banks after integration.
- Capital: same as 1.3.4.

1.5.4 Gross asset positions in financial derivatives to capital

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

- Gross asset positions in financial derivatives: total amounts of positive fair value in hedged and non-hedged financial derivatives such as swap, forward, and option contracts, excluding embedded derivatives inseparable from the underlying instruments.
- Capital: same as 1.3.4.

1.5.5 Gross liability positions in financial derivatives to capital

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

- Gross liability positions in financial derivatives: total amounts of negative fair value in hedged and non-hedged financial derivatives such as swap, forward, and option contracts, excluding embedded derivatives inseparable from the underlying instruments.
- Capital: same as 1.3.4.

1.6 Sensitivity to market risk

1.6.1 Net open position in foreign exchange to capital

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

- Net open position in foreign exchange: the open foreign currency positions in balance sheet and financial derivatives, which are converted into NT dollars using the exchange rates as of the reporting date.
- Capital: same as 1.3.4.

1.6.2 Foreign-currency-denominated loans to total loans

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

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

1.6.3 Net open position in equities to capital

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

- Net open position in equities: the sum of on-balance-sheet holdings of equities and notional positions in equity derivatives.
- Capital: same as 1.3.4.

1.6.4 Foreign-currency-denominated liabilities to total liabilities

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

- Foreign-currency-denominated liabilities: the liabilities that are payable in foreign currency, or in domestic currency but with the amounts to be paid linked to a foreign currency.
- Total liabilities: the total amounts of current, non-contingent liabilities, and the liabilities positions in financial derivatives.

2. Non-financial corporate sector indicators

2.1 Total liabilities to equity

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

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

2.2 Return on equity

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

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

2.3 Net income before interest and tax / interest expenses

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

- Net income before interest and tax: same as 2.2.
- Interest expenses: the interest expense payments on debt within the specified time period of the statement.

3. Household sector indicators

3.1 Household borrowing to GDP

This indicator is to analyze the level of household borrowing to gross domestic product (GDP).

- Household borrowing: household outstanding loans and credit card revolving balances from financial institutions. Financial institutions include depository institutions and other financial institutions (trust and investment companies, life insurance companies, securities finance companies, and securities firms).

3.2 Borrowing service and principal payments to gross disposable income

This indicator is to analyze the capacity of households to cover their debt payments.

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

4. Real estate market indicators

4.1 Land price index

This indicator is to analyze the price movement of urban land prices in the Taiwan area.

- Land price index: the general index of urban land prices released by the Ministry of Interior each half year, and the reference dates are the end of March and September respectively.

4.2 Residential real estate loans to total loans

This indicator analyzes the concentration of domestic banks' loans in residential real estate.

- Residential real estate loans: individual loans that are collateralized by residential real estate. Residential real estate includes houses, apartments, and associated land (including owner use and rental use).
- Total loans: same as 1.2.1.

4.3 Commercial real estate loans to total loans

This indicator analyzes the concentration of domestic banks' loans in commercial real estate.

- Commercial real estate loans including: loans to corporate entities and individuals that are collateralized by commercial real estate, loans to construction companies, and loans to companies involved in the development of real estate. Commercial real estate includes buildings and associated land used by enterprises for retail, wholesale, manufacturing, or other purposes.
- Total loans: same as 1.2.1.

5. Market liquidity

5.1 The turnover ratio of trading value in stock market

This indicator is to analyze the average turnover frequency in the stock market (i.e. stock market liquidity).

- The turnover ratio of accumulated trading value: the accumulated value of monthly turnover ratio in terms of trading value within current year of the statement.
- The monthly turnover ratio in terms of trading value in stock market = total trading value / market value
- Total trading value: total trading value of stock transactions in the month.
- Market value: total market value of listed stocks as of the end of the month.

5.2 The monthly average turnover ratio in bond market

This indicator is to analyze the average turnover frequency in the bond market (i.e. bond market liquidity).

- Monthly average turnover ratio in bond market = total amount of monthly turnover ratio in terms of trading value in bond market / 12
    - Monthly turnover ratio in terms of trading value: trading value in the month / average bonds issued outstanding.
    - Trading value in the month: total bond trading value (excluding repo transactions).
    - Bonds issued outstanding: bonds that have been issued and are in the hands of the public.

- Average bonds issued outstanding = (bonds issued outstanding at the month-end plus bonds issued outstanding at previous month-end) / 2

Abbreviations

ABS	Australian Bureau of Statistics
ANIE	Asian Newly Industrialized Economies
APRA	Australian Prudential Regulation Authority
ASEAN	Association of South East Asian Nations
AUD	Australian dollar
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; Bank of Taiwan
BSI	Banking System Indicator
CBC	Central Bank of the Republic of China (Taiwan)
CCHS	Check Clearing House System
CFETS	China Foreign Exchange Trade System
CIFS	CBC Interbank Funds-Transfer System
CPI	Consumer price index
CPPCC	Chinese People's Political Consultative Conference
CVA	Credit valuation adjustment
DBUs	Domestic banking units
DGBAS	Directorate-General of Budget, Accounting and Statistics of the Executive Yuan
DKO	Discrete knock-out
DVP	Delivery-versus-payment
ECB	European Central Bank
EU	European Union
FDIC	Federal Deposit Insurance Corporation

FED	Federal Reserve System
FISC	Financial Information Service Co.
FMIs	Financial market infrastructures
FOI	Financial Ombudsman Institution
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 dollar
GDP	Gross domestic product
HCE	Host Card Emulation
HKD	Hong Kong dollar
HIBOR	Hong Kong Interbank Offered Rates
HKMA	Hong Kong Monetary Authority
IFRSs	International Financial Reporting Standards
IMF	International Monetary Fund
IRS	Interbank Remittance System
JCIC	Joint Credit Information Center
JPY	Japanese Yen
KRW	Korean Won
LCR	Liquidity coverage ratio
LTV	Loan-to-value
MLF	Medium-term Lending Facility
MOF	Ministry of Finance
MOI	Ministry of Interior
MPI	Macro-prudential indicator
MYR	Malaysian Ringgit dollar
NCD	Negotiable Certificate of Deposits
NCDs	Negotiable Certificates of Deposit
NDF	Non-Delivery Forward
NIRP	Negative interest rate policy

NPC	National People's Congress
NPL	Non-performing loan
NTD	New Taiwan dollar
OBUs	Offshore banking units
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
OTC	Over-the-counter
PBC	People's Bank of China
PP	Percentage Point
PPI	Producer price index
PSL	Pledged supplementary lending
PSP	Payment Service Provider
PVP	Payment-versus-payment
RBC	Risk-based capital
RMB	Renminbi
ROA	Return on assets
ROE	Return on equity
RP	Repurchase
RRR	Reserve requirement rate
RTGS	Real time gross settlement systems
S&P	Standard and Poor's
SDR	Special drawing right
SGD	Singapore dollar
SHIBOR	Shanghai Interbank Offered Rate
SIPSs	Systemically Important Payment Systems
SLO	Short-term liquidity operations
SMEG	Small and Medium Enterprise Credit Guarantee Fund of Taiwan
SMEs	Small- and medium-sized enterprises
SNB	Swiss National Bank
TAIEX	Taiwan Stock Exchange Weighted Index
TCH	Taiwan Clearing House
TEJ	Taiwan Economic Journal Co., Ltd
TIFRSs	Taiwan-IFRSs

TPEx	Taipei Exchange
TRF	Target redemption forward
TSM	Trusted Services Management
TWSE	Taiwan Stock Exchange
USD	US dollar
VaR	Value at Risk
VC	Venture capital
WPI	Wholesale price index

Financial Stability Report

Publisher: Central Bank of the Republic of China (Taiwan)

Address: 2, Section 1, Roosevelt Road, Zhongzheng District, Taipei City 10066, Taiwan, R. O. C.

Tel: 886-2-2393-6161

http://www.cbc.gov.tw

Editor: Department of Financial Inspection

Central Bank of the Republic of China (Taiwan)

Publishing Frequency: June 2008 to May 2009 – semiannually; from May 2010 – annually

Publishing Date: May 2016

First Issue Date: June 2008

Distributors:

Government Publication Bookstore (Songjiang Store)

Address: 1F, 209, Songjiang Road, Zhongshan District, Taipei City 10485, Taiwan, R. O. C.

Tel: 886-2-2518-0207

Government online bookstore: http://www.govbooks.com.tw

Wunan Cultural Plaza Bookstore (Taichung Main Store)

Address: 1F, 6, Jhongshan Road, Central District, Taichung City 40042, Taiwan, R. O. C.

Tel: 886-4-2226-0330

Wunan Cultural Plaza Bookstore (NTU College of Law Branch)

Address: 1, Tongshan St., Taipei City 10054, Taiwan, R. O. C.

Tel: 886-2-3322-4985

Printed by: Jhen Da typesetting printing company

Address: 7, Lane 51, Section 1, Nanchang Road, Zhongzheng District, Taipei City 10074, Taiwan, R. O. C.

Tel: 886-2-2396-5877

Price: NT$300 **GPN: 2009703514** **ISSN: 2071-8519**