

III. Financial sector assessment

3.1 Financial markets

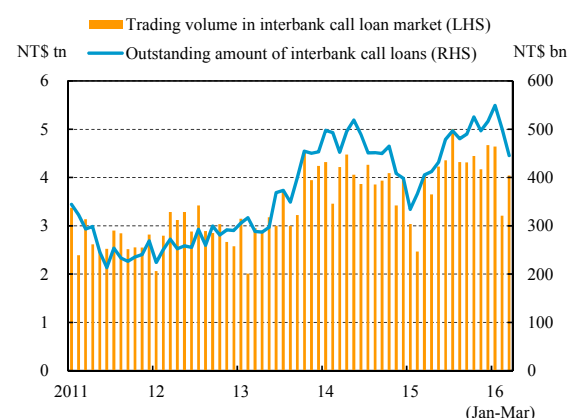
With respect to money and bond markets in 2015, the trading volume of interbank call loans roughly remained unchanged. The trading volume of bills in the secondary market fell, although the outstanding amount in the primary market increased. In the bond market, the turnover of outright transactions in 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 turned to diminish (Chart 3.1).

Chart 3.1 Interbank call loan market



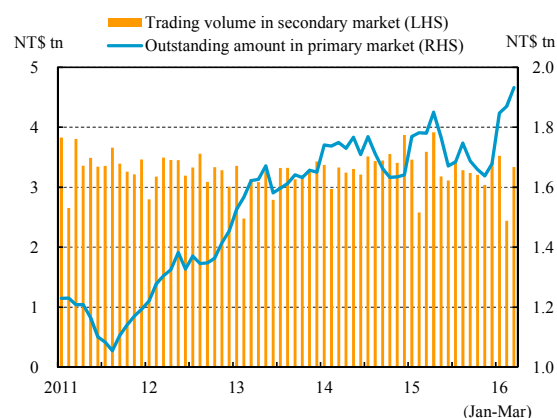
Note: Outstanding amount is the monthly average of daily data.
Source: CBC.

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).

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 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 3.2 Primary and secondary bill markets



Sources: CBC and FSC.

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.

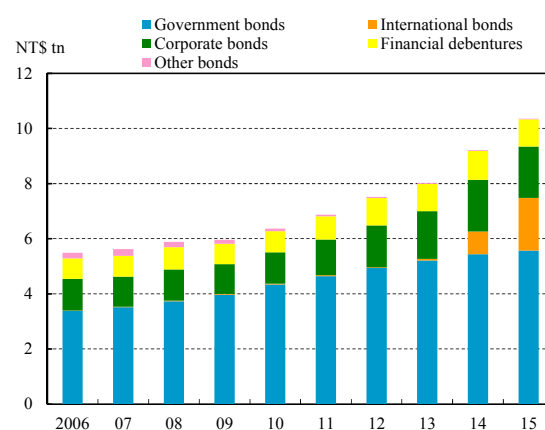
⁴⁸ With consideration to transactions, bills finance companies actively purchased NCDs to expand the source of bills. On the other hand, the Ministry of Finance, after having achieved annual tax budget goals ahead of schedule, redeemed more treasury bills to reduce the interest burden.

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 Bonds⁴⁹ 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 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

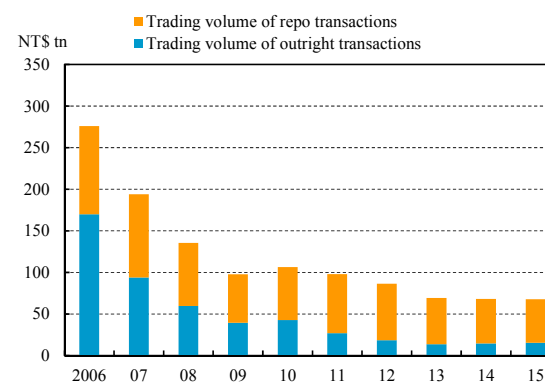
Chart 3.3 Outstanding amount of bond issuance in the primary market



Note: Other bonds include beneficiary securities and foreign bonds.

Source: FSC.

Chart 3.4 Outright and repo transactions in the bond market



Source: CBC.

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.

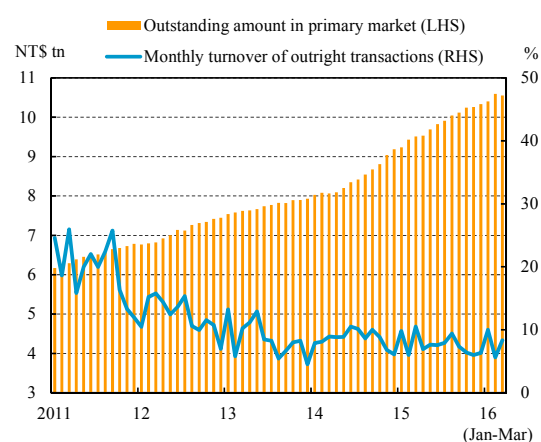
secondary bond market was insufficient, driven by the fact that life insurance companies mainly invested in international bonds by adopting buy-and-hold strategies, as well as an amplified concentration of bonds held in the market owing to rising bond holdings by banks. Therefore, in 2016 Q1, the monthly turnover ratio in the primary bond market⁵¹ 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

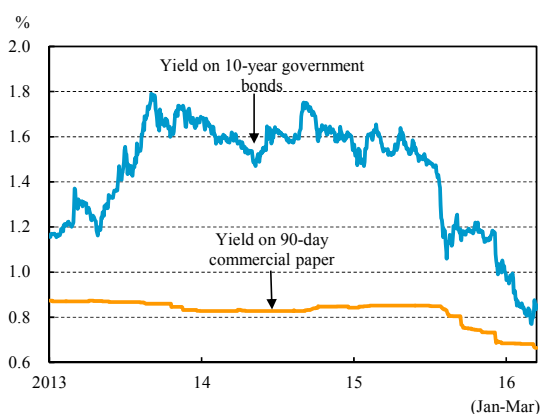
Chart 3.5 Outstanding amount and turnover in primary bond market



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.

Chart 3.6 Yield spread



Source: Bloomberg.

⁵¹ See Note 6.

early 2016, fueled by the global financial market 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.

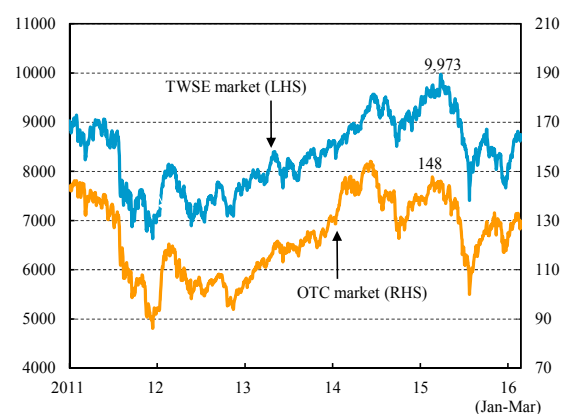
3.1.2 Equity markets

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 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,

Chart 3.7 Taiwan's stock market indices



Sources: TWSE and TPEx.

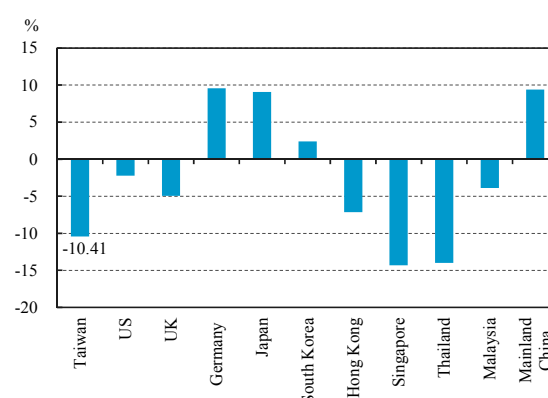
falling oil prices, implementation of the “circuit breaker” mechanism in Mainland China and depreciation of the renminbi. As a result, the TWSE market also slumped over the same period. Afterwards, thanks to the support from the National Financial Stabilization Fund, the measures implemented by Taiwan’s 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).

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).

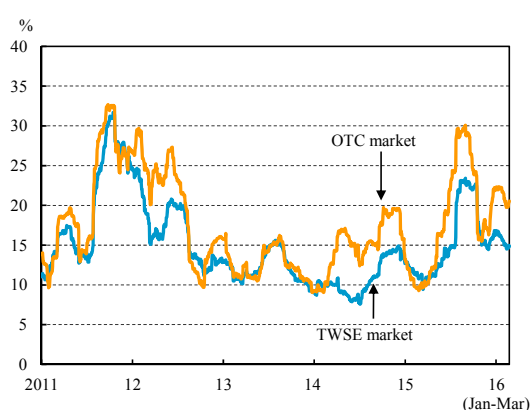
In 2015, volatility in the TWSE and the OTC markets amplified and broadly rose to its highest levels in Q3, reaching 23.42% and 30.07%, respectively. Subsequently, volatility in those two markets turned to drop to 14.48% and 16.30%, respectively, at the end of December. At the beginning of 2016, volatility of local stock indices amplified again and stood at 14.85% and 20.55%, respectively, at the end of March (Chart 3.9).

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.

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.

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).

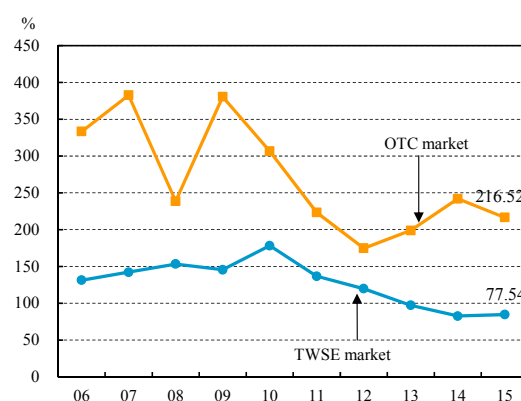
3.1.3 Foreign exchange market

The NT dollar exchange rate reversed

from appreciation to depreciation and the trading volume continued to increase

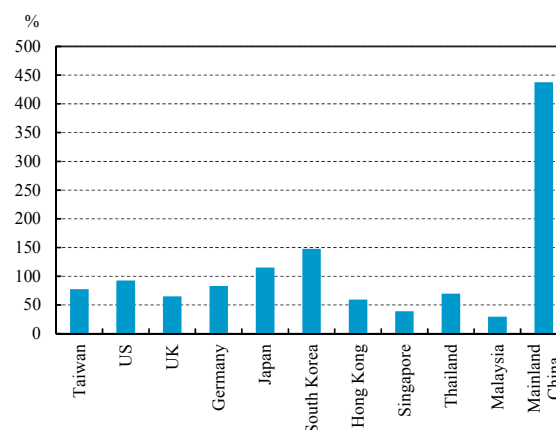
In early 2015, major economies, such as the euro area and Mainland China, adopted monetary easing policies. Moreover, the Swiss National Bank's (SNB's) announcement to abandon the Swiss franc's cap against the euro, coupled with the implementation of negative interest rates in Sweden, induced an international 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

Chart 3.10 Annual turnover ratios in Taiwan's stock markets



Sources: TWSE and TPEX.

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.

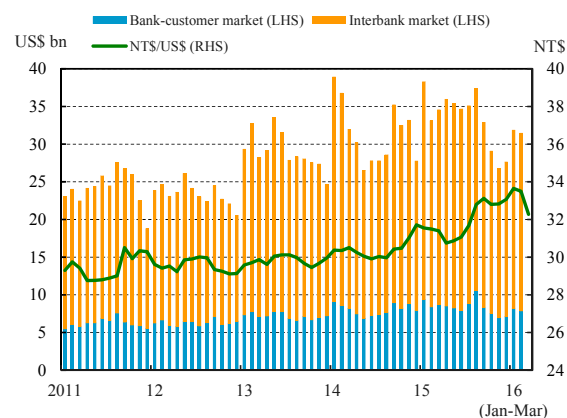
Taiwan and net selling from foreign investors in the domestic stock market brought the NT dollar exchange rate to turn to depreciation against the US dollar, hitting a yearly low of 33.292 on 25 September. At the end of 2015, the NT dollar exchange rate reversed to appreciate marginally and stood at 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).

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).

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

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

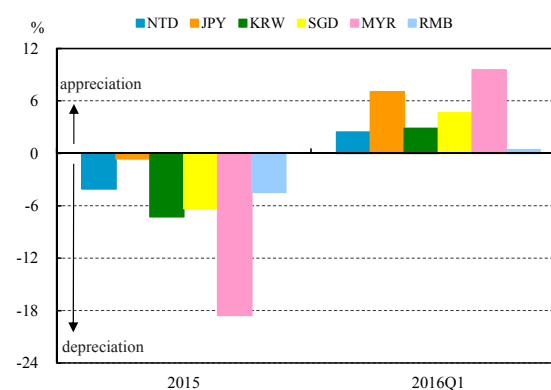


Notes: 1. Trading volume is the monthly average of daily data, while exchange rate is end-of-period data.

2. The latest data for trading volume is as of February 2016.

Source: CBC.

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



Source: CBC.

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%.

NT dollar exchange rate volatility remained relatively stable

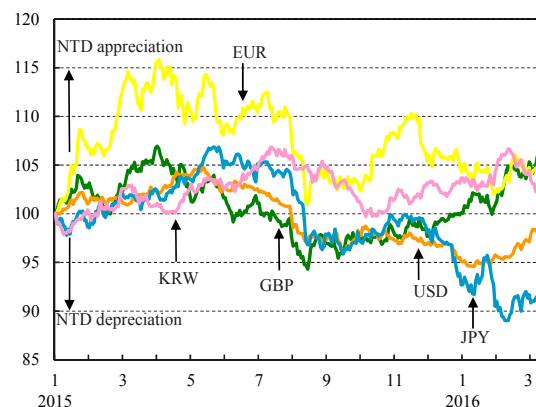
Volatility in the NT dollar exchange rate against the US dollar fluctuated between 2.22% and 7.67% in 2015, and registered an annual average of 4.54%. In early 2016, owing to the fluctuations of the renminbi, the exchange rates of other Asian currencies fluctuated dramatically. Notably, volatility in 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

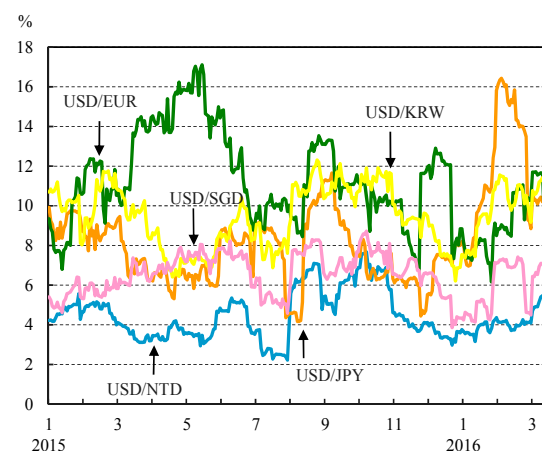
In 2015, the total assets of domestic banks⁵² accumulated continuously, though at a slower pace than in the previous year. Asset quality improved and the concentration in corporate loans kept declining while the concentration of credit exposures in real estate loans decreased

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



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

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.

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

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.

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.

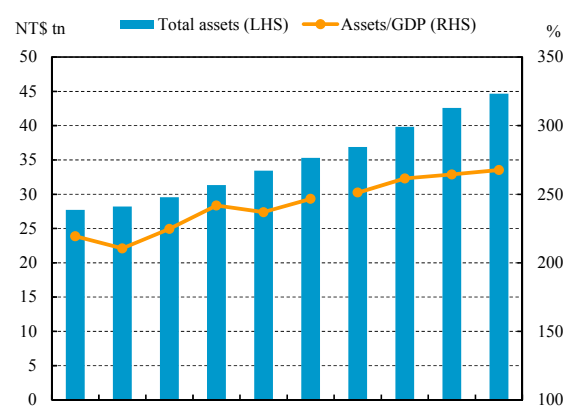
Credit risk

Customer loans growth slowed

In 2015, customer loans⁵³ were the major source of credit risk for domestic banks.

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.

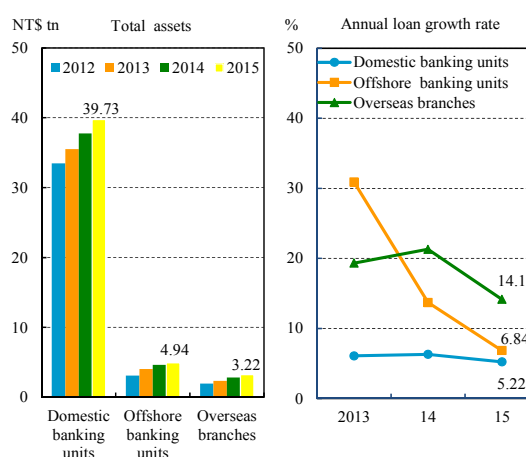
Chart 3.16 Total assets of domestic banks



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.

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.

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).

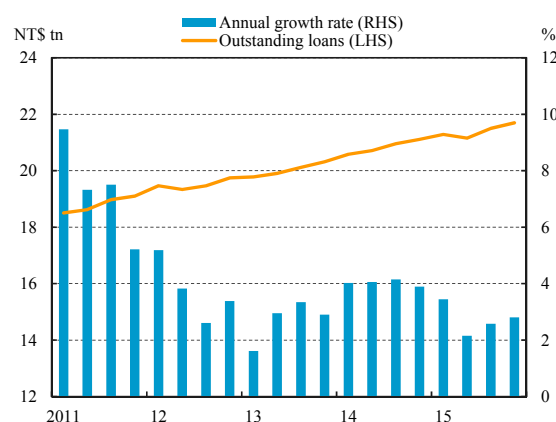
In terms of borrowers of loans, at the end of 2015, the annual growth rate of corporate loans decreased to 1.48% from 3.11% a year earlier as a sluggish global economy affected firms' demand for borrowing. The annual growth rate of individual loans fell to 5.17% from 5.93% at the end of the previous 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.

Concentration of credit exposure in real estate loans descended slightly

Outstanding real estate loans⁵⁴ 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 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

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



Source: CBC.

Chart 3.19 Credit by type of collateral in domestic banks



Note: End-of-period figures.

Source: CBC.

⁵⁴ The term "real estate loans" herein refers to house-purchase loans, house-refurbishment loans, and construction loans.

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

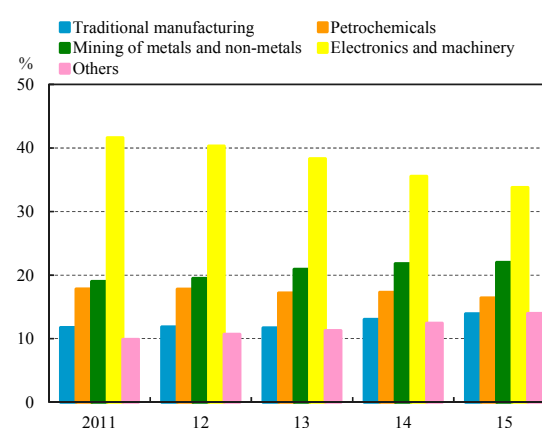
policy, a rise in the property tax, and a slack domestic economy. Banks should cautiously adjust their loan policies and strengthen risk control mechanisms to address related credit risks.

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 concentration in corporate loans.

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

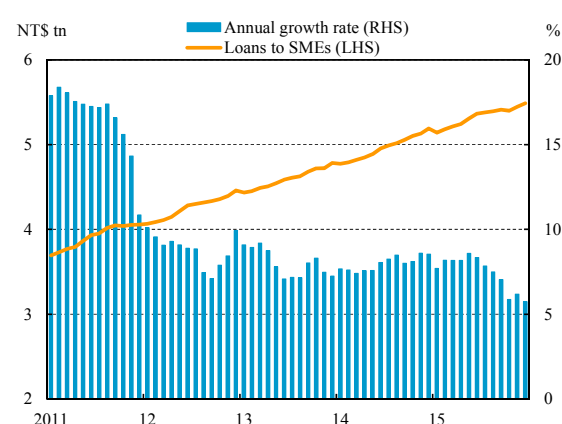
Chart 3.20 Exposure to the manufacturing sector by domestic banks



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.

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.

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.

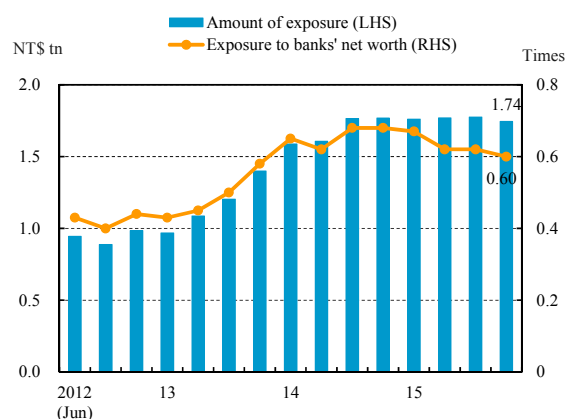
The outstanding nominal amount of TRFs and DKO's has decreased, but the default risks should be cautiously monitored

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 DKO's, 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 markedly⁵⁷ 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 3.22 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.

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.

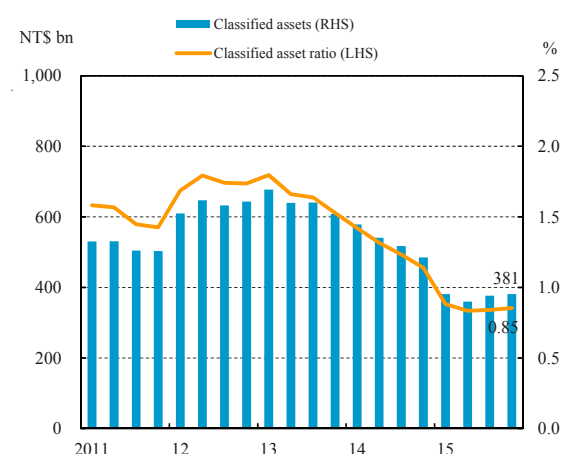
In order to reinforce risk control and risk-bearing capacity for credit exposure of domestic banks to customers in the Mainland Area, the FSC implemented four intensified measures⁵⁹ in 2015. However, affected by a slowdown in economic growth in Mainland China, rising volatility in stock and foreign exchange 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.

Asset quality improved continuously

Outstanding classified assets⁶⁰ 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 assets⁶¹ 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.

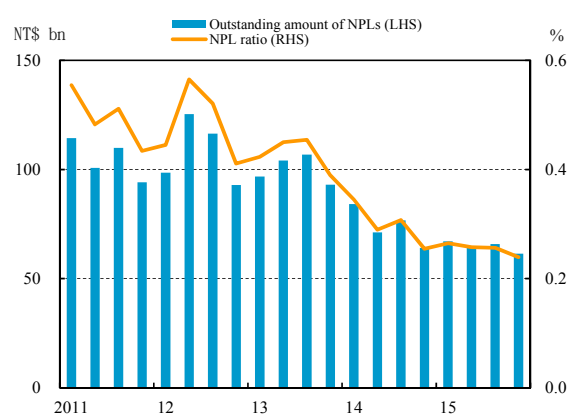
The outstanding NPLs of domestic banks registered NT\$61.4 billion at the end of 2015, decreasing by 4.05% year on year, owing to bad debt write-offs and NPL recoveries. The average NPL ratio fell to a record low of 0.24%

Chart 3.23 Classified assets of domestic banks



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

Chart 3.24 NPL ratio of domestic banks



Note: Excludes interbank loans.
Source: CBC.

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.

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 3.24). 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 (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).

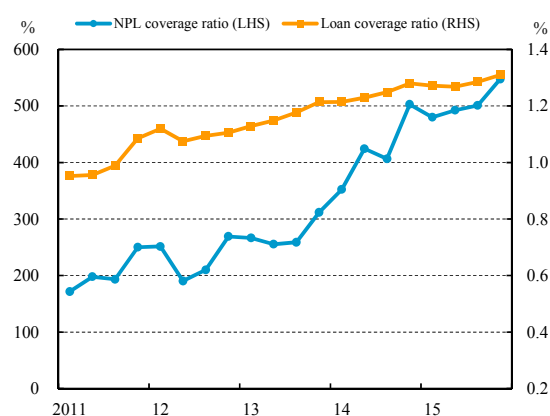
Compared to the US and neighboring Asian countries, the average NPL ratio of domestic banks in Taiwan was much lower (Chart 3.27).

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 VaR for each of those market risk exposures was higher than a year earlier. Among them, the

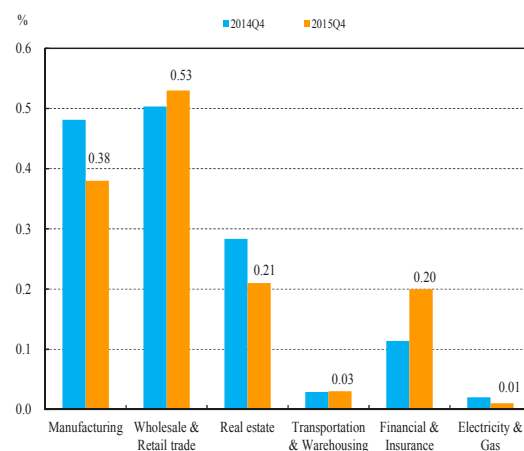
Chart 3.25 NPL coverage ratio and loan coverage ratio of domestic banks



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

Source: CBC.

Chart 3.26 NPL ratios of domestic banks in selected industries



Note: Excludes interbank loans.

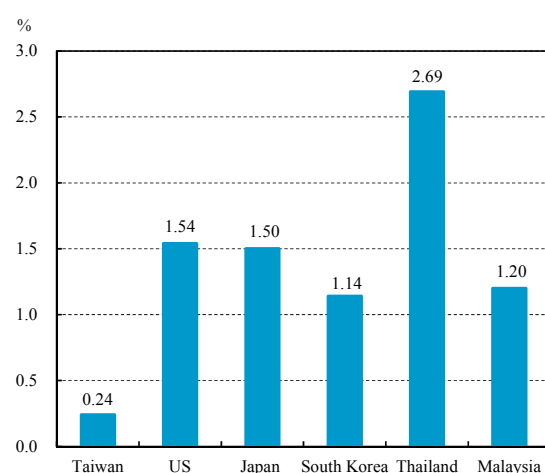
Source: JCIC.

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 3.27 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.

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.

Liquidity risk

Liquidity in the banking system remained ample

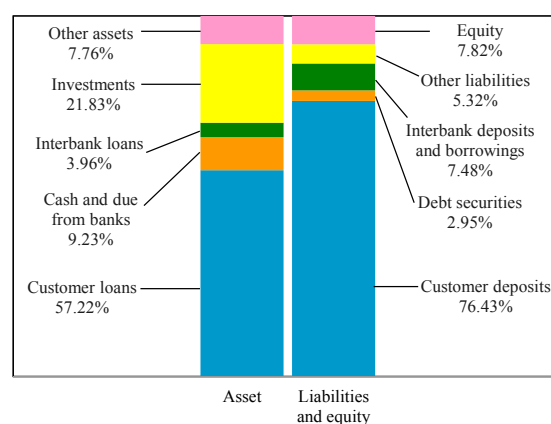
The structure of assets and liabilities for domestic banks roughly remained unchanged in 2015. As for the sources of funds, relatively stable customer deposits still made up the largest share of 76.43% of the total, followed by equity at 7.82%, while debt securities issues contributed a mere 2.95%. Regarding 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.

Chart 3.28 Asset/liability structure of domestic banks

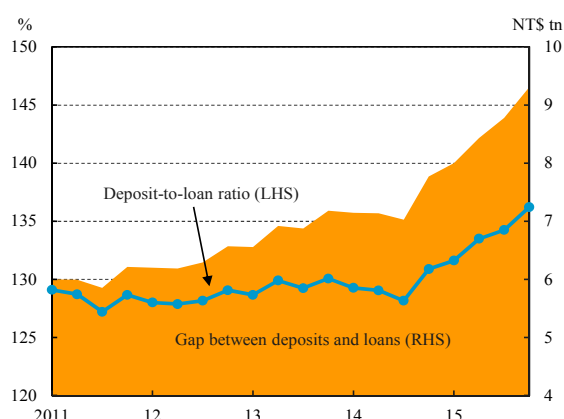


Notes: 1. Figures are as of end-December 2015.

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.

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.

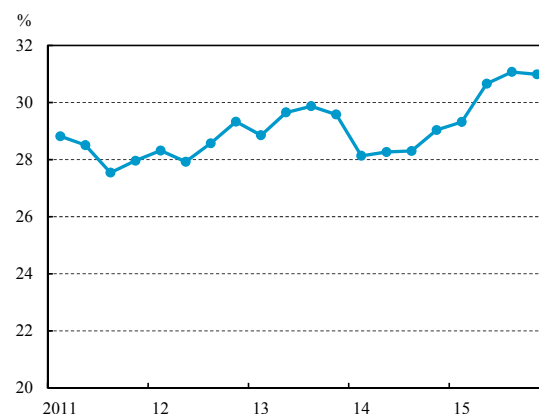
Profitability

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 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 strengthen 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).

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

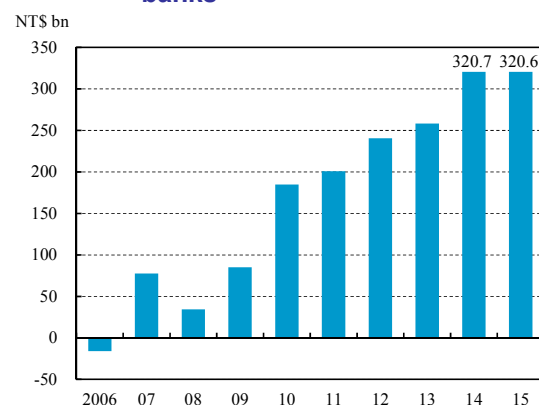
Chart 3.30 Liquid reserve ratio of domestic banks



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

Source: CBC.

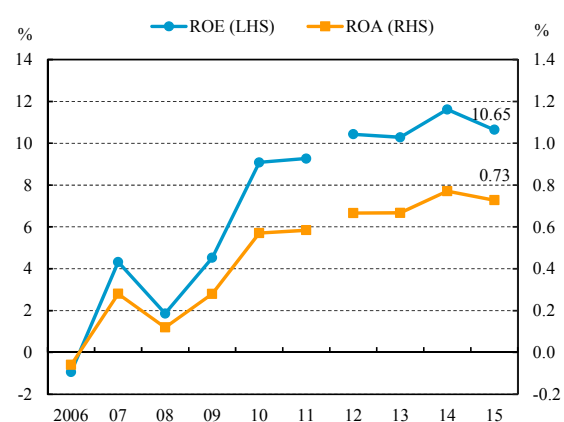
Chart 3.31 Net income before tax of domestic banks



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.

and Japan (Chart 3.33).

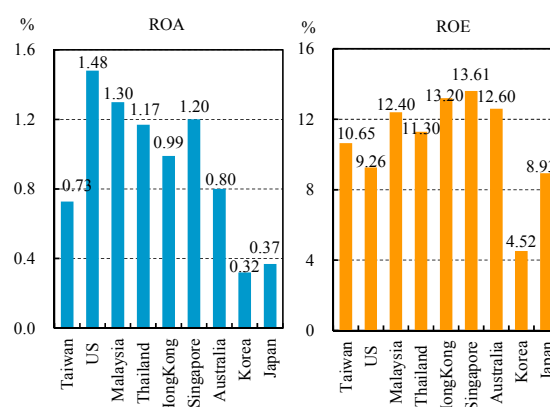
Among the sources of income, offshore banking units (OBUs) and overseas branches' annual net income before tax in 2015 declined for the first time in recent years, dropping by 16.34% and 7.07%, respectively. OBUs contributed 22.27% of total profit, decreasing from 26.61% a year earlier, and the ratio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

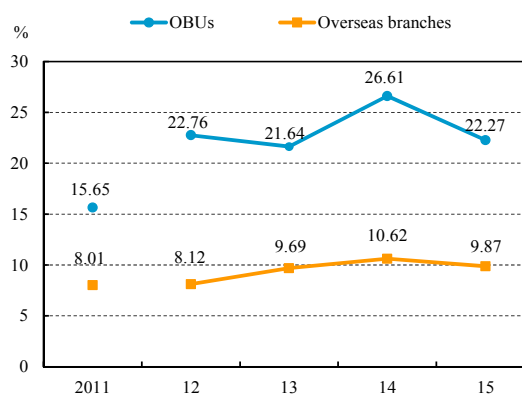
Chart 3.33 Comparison of ROAs and ROEs of banks in selected economies



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.

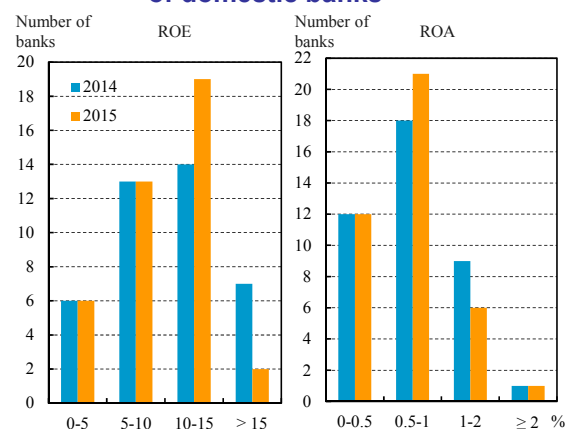
Chart 3.34 Profit contributions of OBUs and overseas branches



Note: Overseas branches include branches in Mainland China.

Source: CBC.

Chart 3.35 Distribution of ROEs and ROAs of domestic banks



Source: CBC.

valuation gains (Chart 3.36).

Operating costs increased by a smaller margin

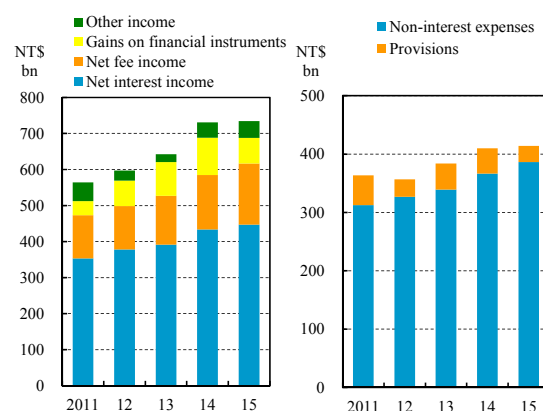
The operating costs of domestic banks registered NT\$414 billion in 2015, rising slightly by NT\$3.9 billion or 0.94% compared to the previous year. Among them, non-interest expenses⁶² increased by NT\$20 billion or 5.45% and accounted for an increasing share of 93% of total operating costs, owing to 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).

Factors that might affect future profitability

In the first three quarters of 2015, the interest rate spread 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.

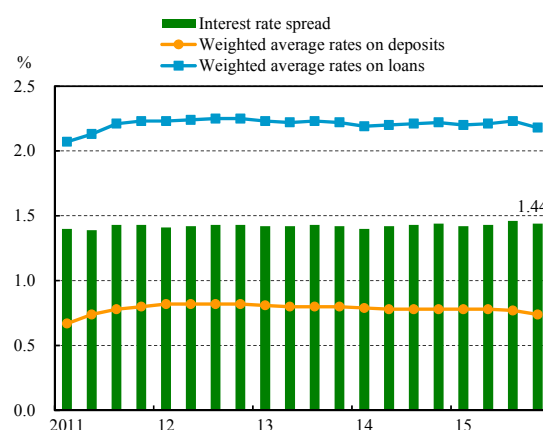
In December 2014, the FSC required that domestic banks maintain a provision ratio of at least 1.5% against loans for home purchase, refurbishment, or construction by the end of

Chart 3.36 Composition of income and costs of domestic banks



Source: CBC.

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.

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

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.

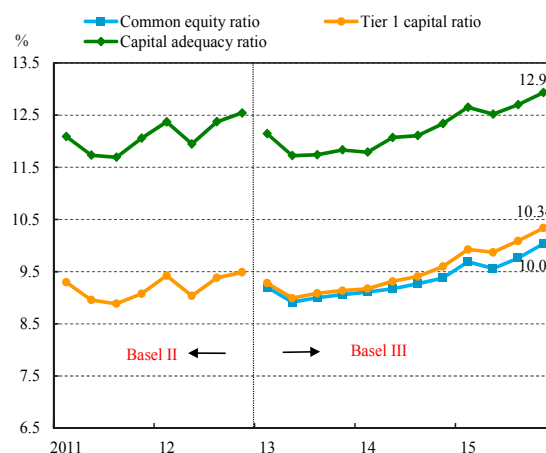
Moreover, in response to the trends of global FinTech innovation and the need to enhance service effectiveness of domestic banks, the FSC implemented the policy of “Building Digital Financial Environment 3.0” in January 2015, set up the Financial Technology Office, permitted banks to invest 100% in a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

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).

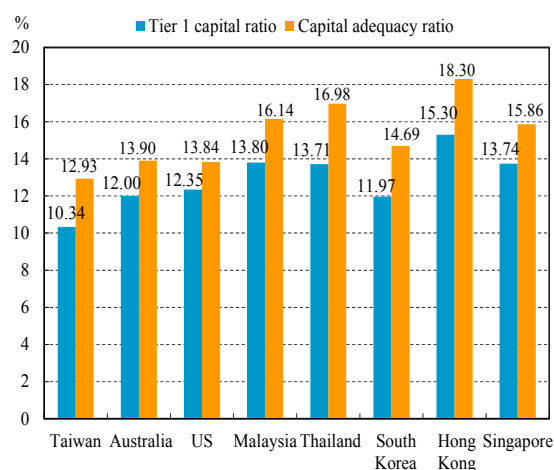
Chart 3.38 Capital ratios of domestic banks



- 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.

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.

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.

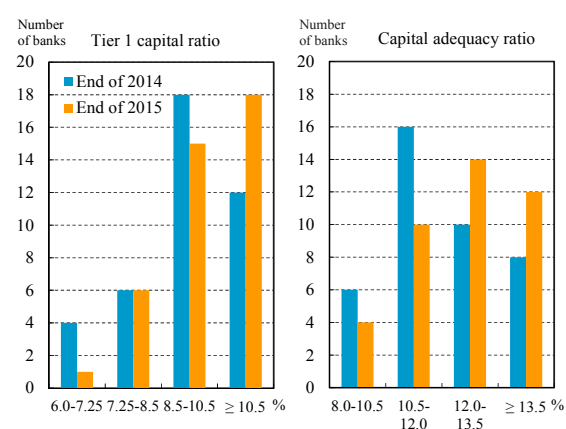
The capital levels of all domestic banks were higher than the 2015 statutory minimum

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).

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.

Chart 3.40 Number of domestic banks classified by capital ratios



Source: CBC.

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).

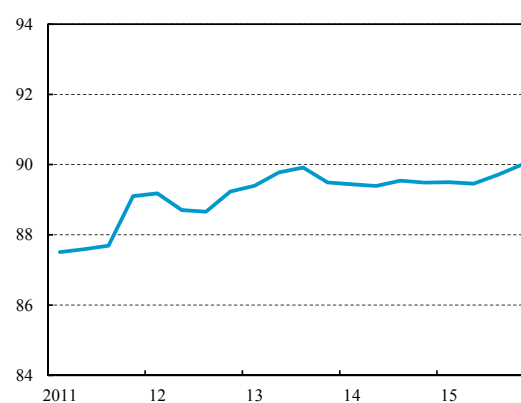
All domestic banks were rated by credit rating agencies for 2015. As for the rating results⁶⁶ released by credit rating agencies, the credit rating index⁶⁷ of domestic banks went up in 2015 (Chart 3.41), mainly because three banks received rating upgrades.

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.

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.

3.2.2 Life insurance companies

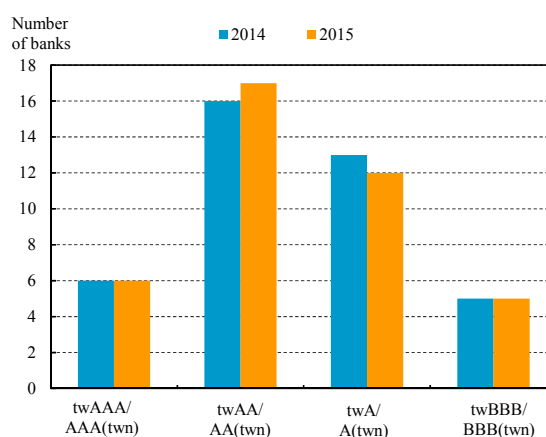
In 2015, asset growth in life insurance companies moderated and their profitability enhanced, showing an improvement in operating performance. At the end of 2015, the average RBC ratio of life insurance companies decreased slightly. However, the RBC ratios for all insurance companies were higher than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

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 companies⁶⁹ held a 98.57% market share by assets, four of which were foreign affiliates holding a 2.77% market share, while four foreign

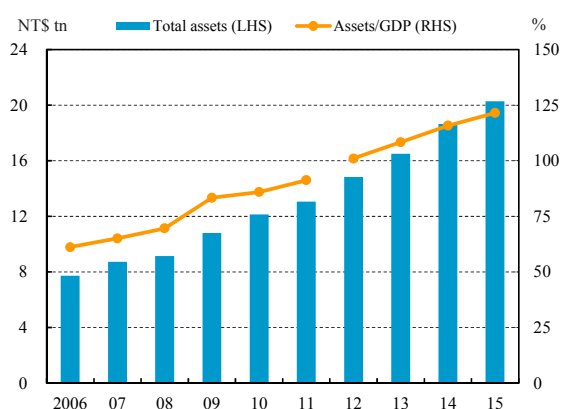
Chart 3.42 Number of domestic banks classified by credit ratings



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.

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.

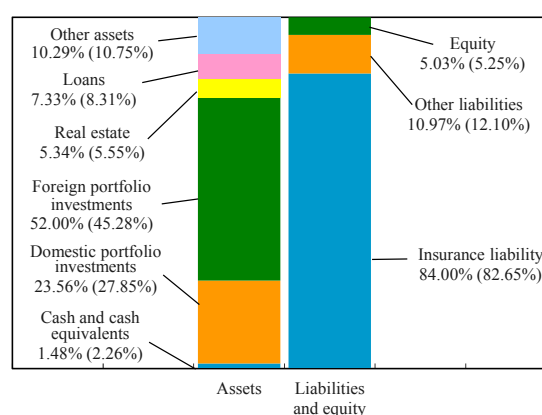
The share of foreign portfolio investments increased rapidly

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 investments⁷⁰ 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

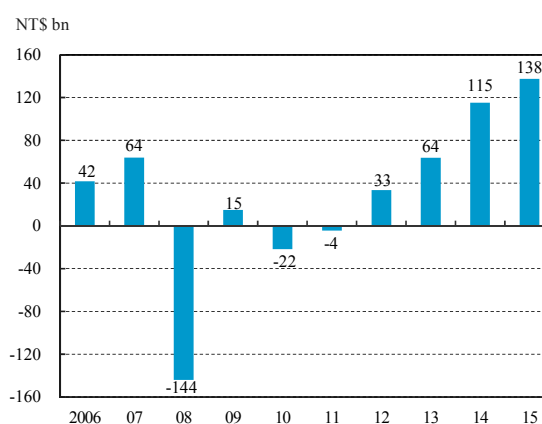
Chart 3.44 Asset/liability structure of life insurance companies



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

Source: FSC.

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.

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.

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

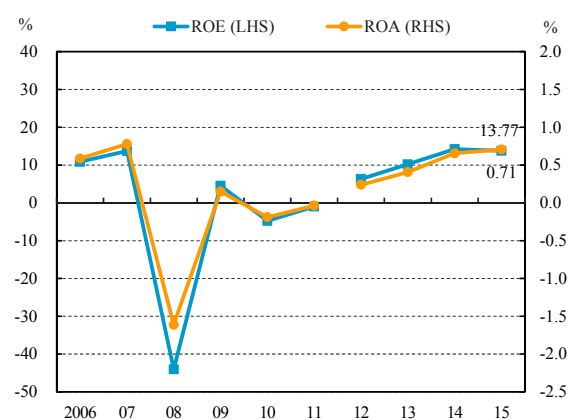
During the same period, average ROE and ROA were 13.77% and 0.71%, respectively (Chart 3.46). While the ROA posted an eight-year high, the ROE was slightly lower than the 14.20% registered in the previous year yet remained at a high level. Among all 25 life insurance companies, ten companies posted better 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 assets⁷¹ 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 charge⁷² 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).

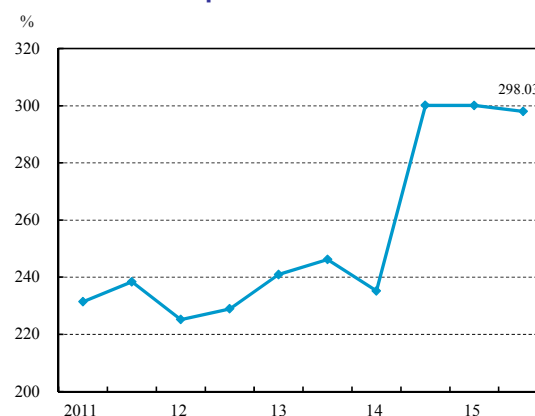
Chart 3.46 ROE & ROA of life insurance companies



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.

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.

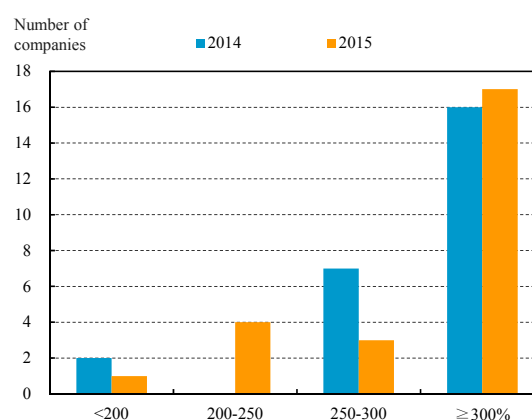
Source: FSC.

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.

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.

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.

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 Company⁷³ 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.

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

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.

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 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

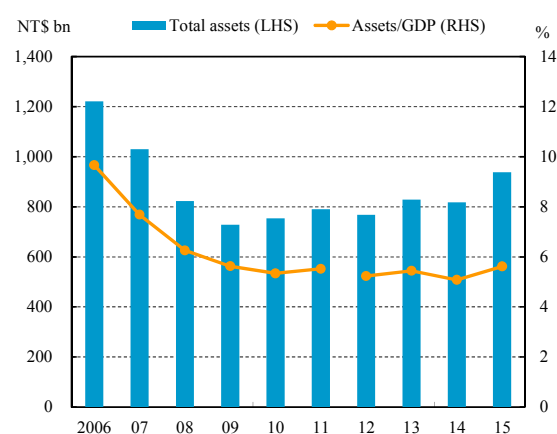
The total assets of bills finance companies expanded markedly in 2015, whereas the outstanding balance of guarantees grew slowly. Profitability improved and the average capital adequacy ratio rose, while credit asset quality remained sound. However, liquidity risk in bills finance companies stayed high.

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).

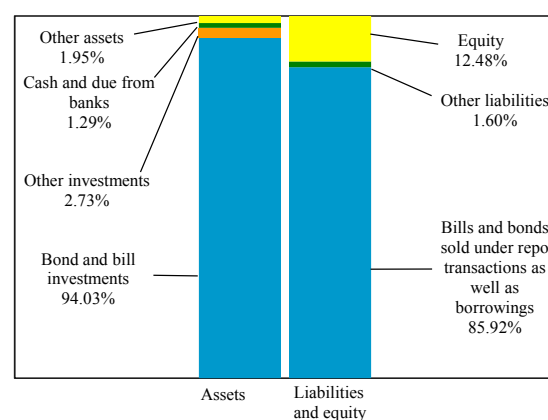
In terms of the asset and liability structure at the end of 2015, bond and bill investments constituted 94.03% of total assets, an increase of 0.72 percentage points year on year. On the liability side, bills and bonds sold under repo transactions as well as borrowings accounted for 85.92% of total assets,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

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.

Chart 3.50 Asset/liability structure of bills finance companies



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

Credit risk

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

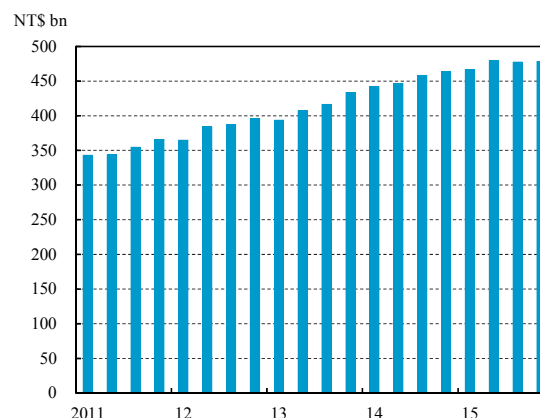
The outstanding guarantees business undertaken by bills finance companies registered NT\$478.6 billion at the end of 2015, a slower increase of NT\$14.9 billion or 3.22% year on year owing to weak funding demand of enterprises in view of sluggish domestic economic growth in the second half of the year (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

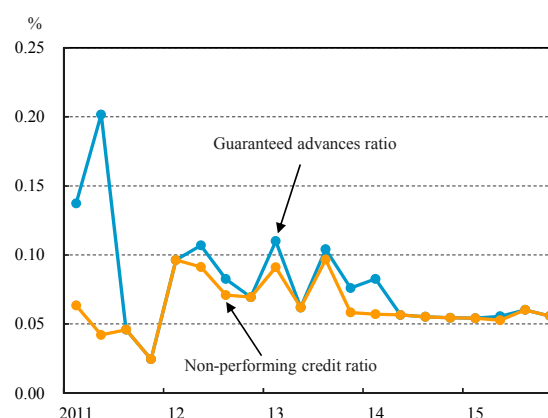
At the end of 2015, the average guaranteed advances ratio and the non-performing credit ratio of

Chart 3.51 Outstanding commercial paper guarantees of bills finance companies



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

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.

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.

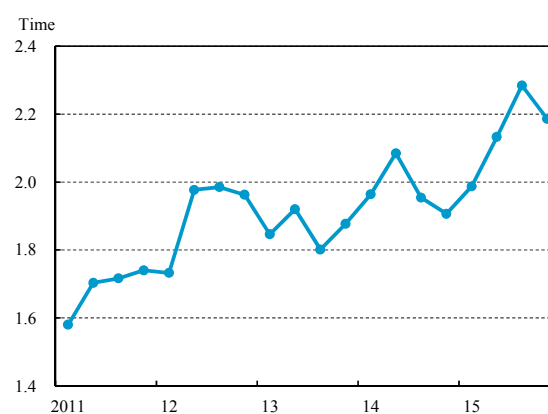
bills finance companies both grew slightly but stayed at a relatively low level of 0.056%, reflecting sound credit quality (Chart 3.52). At the same time, both the ratios of credit loss reserves to total guaranteed advances and those to non-performing credits were 29.38 times, indicating that the reserves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

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).

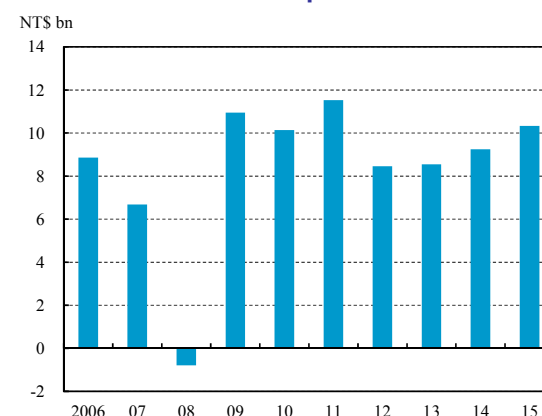
As the total assets expanded, major liabilities in bills finance companies grew by 16.10% in 2015, bringing the average multiple of major liabilities⁷⁶ to equity higher to 7.77 times at the end of 2015, compared to 6.85 times a year before. However, the multiple of each bills finance company was below 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.

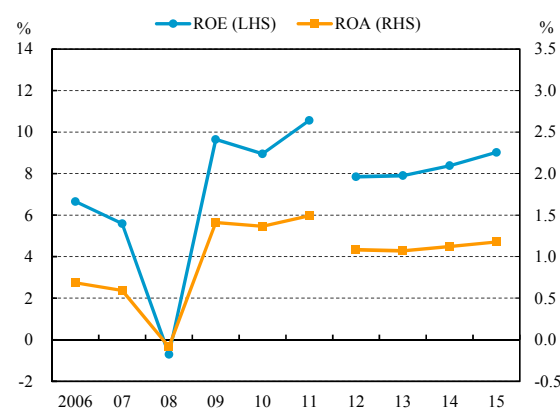
Profitability rose markedly

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.

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).

Chart 3.55 ROE & ROA of bills finance companies



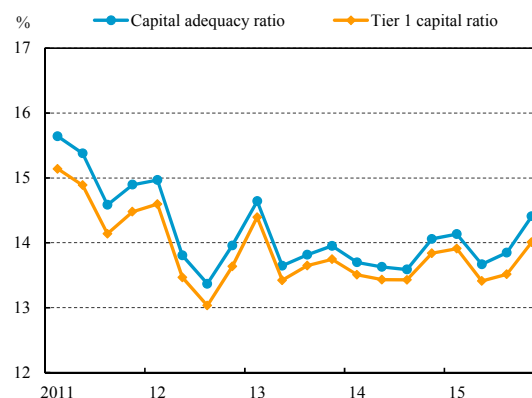
Notes: 1. Figures from 2012 forward are on the TIFRSs basis, while prior years are on the ROC GAAP basis.

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.

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	<ul style="list-style-type: none"> • 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**

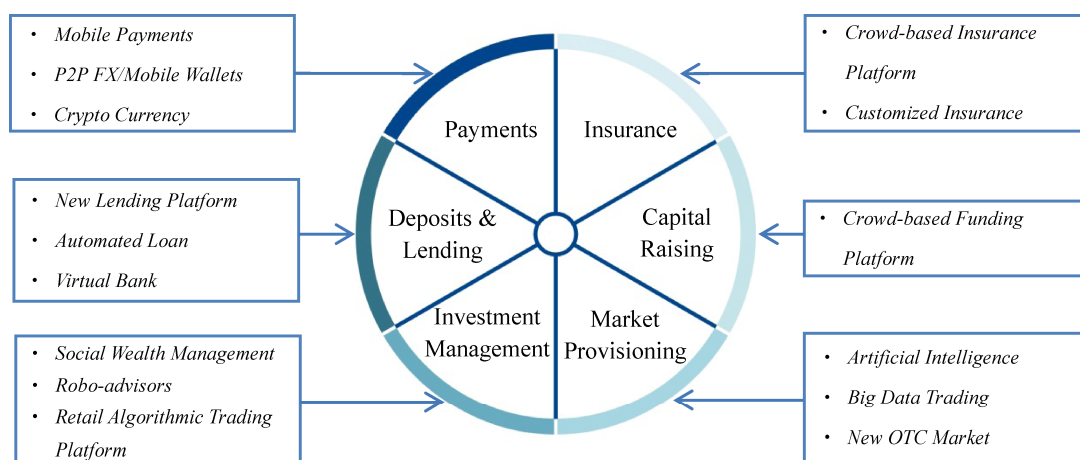
According to Accenture (2015), global investment in FinTech ventures has grown 12 times during 2008-2014. In the first half of 2015, the total amount of investment in FinTech further increased to US\$16 billion from US\$12.21 billion registered in 2014. Furthermore, as reported by CB Insight (2015), 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 area¹ (Chart B3.1).

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



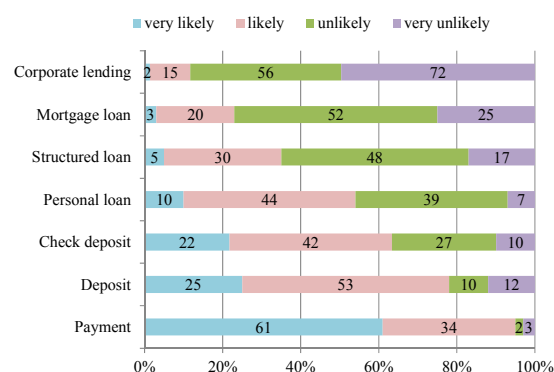
Note: In this chart, the CBC merely reveal a part of the innovative services in each field instead of covering all the services mentioned in the report.

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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

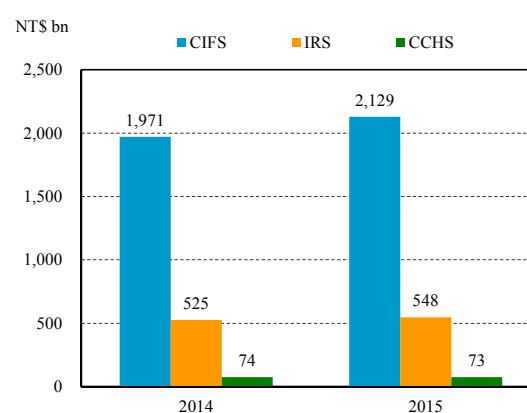
In 2015, the daily average amount of funds transferred via the three SIPs,⁷⁹ which process domestic interbank payments, continued to expand, except for a slight decline of the CCHS. Among them, the CBC's CIFS⁸⁰ grew the fastest, mainly owing to the increase in settlements of interbank foreign exchange 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).

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).

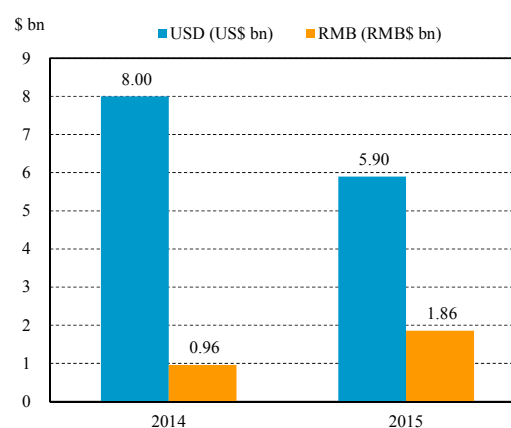
In 2015, the CBC continued to expand the functions of the foreign currency clearing platform

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



Source: CBC.

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



Source: CBC.

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 fees⁸⁴ 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 tokenization⁸⁶ 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 simulations 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	<p>With growing TRF investment disputes after great depreciation of the renminbi, the FSC launched the following supervisory measures:</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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	<p>While banks turned to sell DKO's 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:</p> <ol style="list-style-type: none"> 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	<p>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:</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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

	<p>transaction amount for complex high-risk derivatives should not exceed 2.5 times the verifiable financial resources of a customer.</p> <p>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.</p> <p>4. Requiring banks to reinforce the calculation requirements for credit valuation adjustment (CVA) for over-the-counter derivatives.</p>
2016/3-2016/4	<p>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.</p> <p>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.</p>

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.