BANK OF THAILAND

FINANCIAL STABILITY REPORT 2016

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Financial Stability Report 2016

Message from the Governor

The global economic and financial environment in 2016 remained highly precarious, as reflected in a fragile global economic recovery, uncertainties in the political development and the direction of economic and financial policies in major advanced economies, banking sector problems in Europe and China as well as various structural changes in the global financial system. Meanwhile, there were also challenges arising from several domestic factors, including the lower long-term economic growth trend due to the global trade contraction, the loss of competitiveness in some manufacturing industries, the transition into an aging society and the increasing roles played by non-bank financial institutions.

Under the increasingly connected global economic and financial system, together with the volatile, uncertain, complex and ambiguous (VUCA) environment, financial regulators must work in close coordination in order to timely identify early signs of financial fragility as well as to synchronize the supervisory policies so as to effectively cover financial institutions, capital markets, specialized financial institutions and savings cooperatives. This is to prevent any pocket of risk from spilling over and threatening the stability of the whole financial system. Consequently, the Bank of Thailand (BOT) set up the Financial Stability Unit (FSU) in 2016 with the task of being the center for monitoring financial risks, developing measures to cope with systemic risks (so called “macroprudential measures”) and coordinating with other regulatory bodies to ensure that the BOT can "detect the smoke quickly, put out the fire in time and prevent the fire from spreading."

Overall, Thailand's financial system was stable, thanks to the strong external position, as evident from a sustained current account surplus, a low level of foreign debt and a high level of international reserves, which in turn provided a cushion against potential external risks that might later arise. While Thailand's financial stability remained sound and the financial positions of corporate and financial institutions remained solid, the risks to Thailand's financial system could still increase in the periods ahead. This called for a close monitoring of a possible accumulation of systemic risks in certain areas, such as the deteriorating loan quality in some business segments, especially in the small and medium enterprises (SMEs), and the search for yield without proper risk assessment, which could give rise to pockets of fragility if left unchecked and not preempted at an early stage. Moreover, risks from capital flow volatility and a yield snapback in the bond market could weigh on borrowing costs and rollover risk. These issues warranted attentive monitoring in tandem with promoting proper public understanding and awareness regarding the risks associated with different types of investments.

The regulatory authorities, namely, the Bank of Thailand, the Securities and Exchange Commission (SEC) and the Office of Insurance Commission (OIC) have jointly assessed and monitored the various risks and have kept the public well-informed on key risk issues all along. Regulations have been revised to appropriately deal with the emerging risks at any given time. Furthermore, this Financial Stability Report is prepared with contributions from the SEC and the OIC regarding the risk assessment and the production in related sections so as to make the systemic risk assessment more connected, comprehensive and complete. The BOT hopes that this Financial Stability Report would promote the understanding of key risks and their potential impact on the Thai financial system and hopes it would be useful for the public and the business sectors in assessing risks, building immunity and planning around such risks so as to prevent and mitigate the impact that could potentially materialize.

Mr. Veerathai Santiprabhob
Governor
9 January 2017

Content

Chapter 1: Introduction

Overall, Thailand's financial system remained stable, as could be seen from the strong financial positions of large corporations. Financial institutions maintained high levels of loan loss provision and capital buffers, which very well served as a cushion against potential risk from the deteriorating credit quality due to a slow economic recovery, especially the credit given to small and medium enterprises (SMEs) as well as low-income and agricultural households. With regard to the external sector stability, Thailand's external position remained strong, supported by a low level of the external debt to GDP, a sustained current account surplus, and a high level of international reserves. These favorable external positions could help safeguard Thailand against the impact from heightened global risk factors resulting from a sluggish global economic recovery, banking problems in Europe and China, political developments in the U.S. and the Euro area, and uncertainties stemming from the economic and monetary policies implemented by major advanced economies.

The prolonged low interest rates had led to the increase in search-for-yield behaviors of investors and the public as well as a higher risk appetite, which could be seen from a growing portion of investment being allocated to riskier assets. At the same time, risker financial products became available to satisfy the need of investors who concentrated mainly on investing for higher yields, notably complex securities and unrated bonds. Moreover, yield-seeking behaviors were also being observed in savings cooperatives, whose amount of deposits and equity raised from members had been growing constantly. Such need to invest primarily for higher yields could undermine the importance of meticulous risk assessment and analysis and, in turn, could possibly lead to the underpricing of risks by investors. Looking ahead, the potential risk warranted monitoring would be the consequences of a possible yield snapback in the bond market. This could induce additional volatilities in the financial markets as well as in the flows of capital and also could have an impact on financing costs of the private sector and on investor confidence as a whole.

1) The slow recovery of the Thai economy resulted in the weakening income and debt serviceability, especially for the low-income, agricultural households and SMEs, and also led to the deteriorating credit quality of the banking system. Meanwhile, the demand for housing subsided in line with the overall economic conditions, while there was oversupply in certain areas.

In the past year, the overall financial position of the corporate sector remained sound. The corporate sector did not build leverage much more from last year's level, while large corporates had turned to the bond market for financing. However, some SMEs registered negative profit which consequently worsened their debt serviceability. As a result, the share of troubled credit extended to SMEs by the banking sector was higher compared to the

previous year, especially for SMEs in the export-oriented and commodity price-related manufacturing and trade sectors.

As for the real estate sector, the overall demand for housing subsided in line with economic conditions as well as with a more stringent credit approval standard of financial institutions for households with deteriorating debt serviceability. Consequently, the risk associated with the debt serviceability of some real estate developers, whose financial position was fragile and whose funding raised in the bond market was short-term, needed to be monitored closely. This is because, should they fail to service their debt, it could potentially affect the investor confidence in the financial market and could result in higher funding costs for others in the same industry. Meanwhile, the household sector remained fragile due to a high household debt level. Even though the household debt had expanded at a slower rate, its growth was still higher than the income growth, especially in the low-income, agricultural households and households operating SME businesses whose debt serviceability steadily worsened. Moreover, the share of troubled credit given to households increased in all loan types, particularly unsecured loans such as credit card and personal loans.

Nonetheless, despite the deteriorating overall credit quality, financial institutions had closely monitored and managed their credit quality. Moreover, the high level of capital and loan loss provision maintained by financial institutions could be used to cushion for the risk should the credit quality deteriorated further.

2) The prolonged low interest rates continued to pressure investors to search for yield and have a higher risk appetite, which could potentially lead to the underpricing of risks and undermine the importance of performing careful and thorough risk assessment and analysis on their investment products. In the meantime, the private sector turned to the bond market as a funding source due to its low financing cost and excess demand of investors.

Foreign investors increased their share of investment in emerging market economies (EMEs), including Thailand, after central banks in major advanced economies, except for the U.S., were thought to maintain their monetary policy easing. The inflow to invest in Thailand was observed in both the debt and equity markets, resulting in a steady gain in the index of the Stock Exchange of Thailand (SET Index) and the index of the Market for Alternative Investment (mai) since early 2016 but the signs indicating market overheating were not present. Also, the margin loan transactions employed by local investors remained at a low level relative to the total transaction value. In the bond market, the Thai government bond yields declined and remained low during the first three quarters of 2016 before rising in line with the higher U.S. Treasury yields in the last quarter.

The corporate sector turned to the bond market for financing. While the new bond issuance was mostly of good quality, there was also an increase in the issuance by first-time bond issuers in the market. Moreover, some business sectors had continuously issued more

unrated bonds, with some being issued by non-listed companies. However, the ratio of unrated bonds as a percentage of total corporate bonds remained low and they were available only to a selected group of investors, namely high net-worth investors, institutional investors, and private placement on 10 subscribers (PP10). On this note, the Securities Exchange Commission (SEC) closely monitored such bond issuance activities and implemented additional regulations regarding the market conduct relating to these unrated bonds to ensure that investors received transparent and accurate information before making investment decisions.

The search-for-yield behavior of investors investing in mutual funds continued to increase, as evident in the rising number of new mutual funds that mainly targeted higher returns, such as funds sold to only accredited investors (AI) and foreign investment funds (FIF). In addition, there was also a rapid growth in the daily fixed income funds, reflecting investors' appetite for a return higher than the deposit rates. In this regard, investors must seek detailed and complete information and must have a proper understanding of risks associated with each type of investment.

Life insurance companies increased their investment in higher-return assets such as foreign investment and real estate funds. However, life insurance companies managed to reduce the potential risk associated with the low interest rate environment by reducing assets and liabilities duration gap. In addition, they adjusted their sale strategies by switching from endowment or savings products to life protection products. Meanwhile, non-life insurance businesses also attempted to raise their returns by continually investing more in property funds and infrastructure funds since 2015. Yet, the portion of such investment remained low relative to the total investment value.

The size of savings cooperatives surged relative to the previous year because of the growth in deposits and equity raised from members which offered higher returns than other types of investments. As a result, savings cooperatives were under pressure to seek higher yields to meet the members' expectations, as reflected in an expansion of investments in financial securities. Moreover, some savings cooperatives relied on the external short-term borrowing to provide credit to fellow members. This could in turn create liquidity risk which could affect the confidence in the system of cooperatives. Thus, the revamp of both the legal framework as well as the risk management process of savings cooperatives should be supported so that they were prudent and consistent with the underlying philosophy of cooperatives.

3) Policies were implemented to ensure the stability of the financial system. In order to make the financial system sound and resilient against potential new risks as well as to have in place measures to mitigate systemic risk, apart from having the forward-looking and well-rounded risk assessment and suitable and readily available policy tools, another essential

element would be the collaboration on data sharing, risk monitoring and assessment among regulatory bodies. The Bank of Thailand together with the Securities Exchange Commission and the Office of Insurance Commission had together introduced the risk assessment matrix (RAM) for the first time to be used as a tool to generate common inputs for stress testing, which would be performed on the financial system in 2017 in order to assess potential impacts within the next two years. The RAM implementation helped enhance the standard for stress testing by making it more consistent and connected, compared to having each regulatory body carry out a separate stress test on the financial institutions under each one's supervision in the past.

In 2016, the Bank of Thailand collaborated with related agencies on the issuance of regulations for various types of financial institutions as well as the revision of regulations for both the financial system and the payment system so that safeguarding financial stability could be executed in a more comprehensive and suitable manner amid the ever-changing environment and financial system structure. This was to achieve the proper balance between encouraging healthy financial development and having a stable financial system that would be efficient and resilient against emerging risks in the future. The implemented regulations were the regulations on conservation capital buffer, liquidity coverage ratio (LCR), specialized financial institutions (SFIs) as well as the revisions of payment system legislations. In addition, the Bank of Thailand also established the Financial Stability Unit (FSU) to be the center for monitoring risks in the financial system as well as developing measures to mitigate and prevent systemic risk. FSU also acted as a core taskforce to coordinate with other regulatory agencies regarding financial stability surveillance.

In summary, even though the Thai financial system was stable, there were some financial fragilities that could potentially lead to systemic risk. Hence, these issues warranted close monitoring going forward, notably: (1) SMEs whose debt serviceability might be negatively affected by the prolonged weak economy and SMEs in some sectors that might run into liquidity problems following the tightening of the underwriting standards by financial institutions and potentially a credit crunch; (2) fragile low-income households with high debt-to-income ratio and households with a low level of liquidity and high debt burden; and (3) the rising search-for-yield behaviors amid the low-for-long interest rate environment, including those observed in the growing savings cooperatives. In addition, the impact from the potential yield snapback must be followed carefully as well, as it could exert pressure on corporate financing costs, the ability to rollover debt, and higher interest burdens on both corporate and household sectors.

Chapter 2: Assessment of the impact from a slow economic recovery on Thailand's financial system stability

Sound financial positions of the corporate sector and financial institutions as well as a strong external position had lent support to the stability of the Thai financial system and had very well served as a cushion for the emerging risks stemming from a slow economic recovery. However, in the periods ahead, the debt serviceability of corporate and household sectors called for cautious monitoring, especially for low-income households, agricultural households and SMEs, should the global and Thai economies recover slower than expected.

Summary of key risks to Thailand's financial system stability	
Impact from slow economic recovery	- Debt serviceability of SMEs and households worsened. Export-oriented and commodity-related manufacturing and trade sectors faced higher risks from uncertainties stemming from global economic conditions and low commodity prices. - Low-income households, agricultural households and households operating SME businesses were more fragile than other groups because their debt levels were high and household income had not fully recovered. - Demand in the real estate sector subsided overall in line with the economic conditions while there was oversupply in some areas and certain price ranges.
Risks warranted monitoring going forward	- High household debt weighed on their ability to cushion for risks. - Debt serviceability of some SMEs deteriorated which might lead to a tightening credit standard and a potential credit crunch for some businesses. - The impact of a yield snapback on the ability to rollover debt of businesses with a high debt level and whose borrowing was of short-term nature.

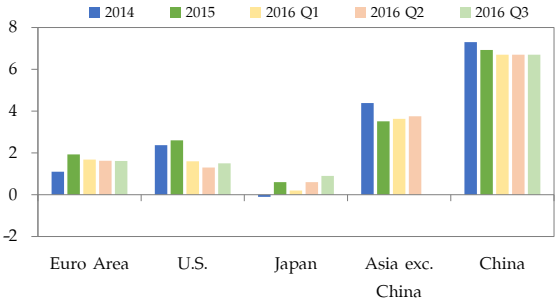
2.1 Global economy

The global economy in 2016 recovered at a gradual pace with uncertainties present in the periods ahead. Therefore, the key risks worth paying attention to include: banking sector problems in Europe and China, uncertainties from political developments in the U.S. and Europe, and the possible impact from structural changes on the economic growth potential.

The global economy in 2016 recovered at a gradual pace (Chart 2.1.1). Major advanced economies recovered on

the back of domestic demand, especially the private consumption which was supported by the steadily improved labor market. **The Chinese economy slowed down** due to the reform of its economic structure and the government's measures to promote economic and financial stability. Such reforms had geared the Chinese economy to rely more on domestic consumption rather than investment as it was being done in the past. As a result, the Chinese economy slowed down in the short run because the sudden slowdown in investment could not be fully compensated by the consumption which grew at a gradual pace. **The Asian economies (excluding China) recovered slowly**, as supported by fiscal measures and improved exports from the new product launch since the second quarter of the year, following the technological cycle.

Chart 2.1.1 Economic growth in different regions



Source : CEIC

Going forward, the global economy is expected to expand at a gradual pace while facing a number of risks, namely:

1. Uncertainties from the timing and types of measures employed by central banks in major advanced economies to shape their monetary policy directions. The sluggish economic recovery and low inflation allowed the European Central Bank (ECB) and the Bank of Japan (BOJ) to continue the accommodative stance in their monetary policy as well as using new monetary policy framework and tools. At the same time, central banks in emerging markets continued to maintain the accommodative monetary policy to stimulate an economic recovery. On the other hand, a steady recovery of the U.S. economy should enable the Federal Reserve (Fed) to gradually raise its policy interest rate. Such monetary policy divergence could potentially make financial markets more sensitive, particularly from the uncertainty regarding the timing and pace the Fed would raise its interest rate. Consequently, this could increase capital flow volatilities and could hamper investor confidence. It would also be a key factor affecting investment decisions of the private sector and the consumption of durable goods by households in the periods ahead.

2. An attempt by China to strike a balance between economic reforms and measures to boost growth could lead to volatilities in the financial market and eventually impact the Chinese and global economies. Main issues that warranted monitoring include: **(1) corporate debt, especially the debt by state-owned enterprises (SOE) whose debt level had been high and default continued.** This was partly due to the intention of the Chinese government to unload its assistance to the

unproductive businesses with excess production capacity and heavy reliance on the financial support from the government; **(2) an increase in shadow-banking transactions.** The tightening of the credit standard imposed by the government led to businesses turning to shadow banks for funding. Such financial transactions were sophisticated and difficult to monitor. They were also subject to high default risk and weaker risk management than that of the banking system; **(3) speculations in the real estate sector**, especially in big cities (tier 1-2) as a consequence of having an accommodative monetary policy and measures to bring down the outstanding units of unsold residences in small cities by the Chinese government; and **(4) ongoing capital outflows** due to lower returns on investment in China, depreciation trend of RMB and the policy rate hike bye the Fed.

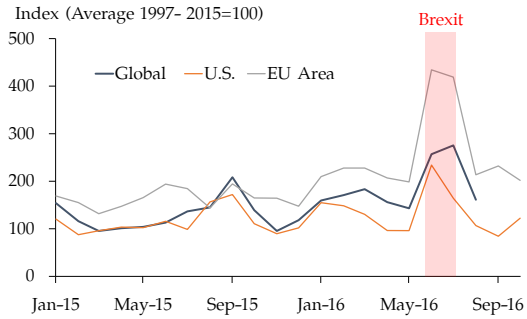
3. Risks pertaining to the European banking sector. The slow economic recovery, low interest rates and stricter regulations on financial institutions had undermined banks' ability to extend credit and earn profit while, at the same time, worsening the credit quality in the banking sector. This had the short-term negative effect on the banking sector currently undergoing debt restructuring, such as banks in Italy.

4. Heightened political risks (Chart 2.1.2) due to **(1) increased political uncertainties in Europe stemming from upcoming elections in many countries**, especially France, Italy and the Netherlands, whose election results might lend support to the anti-EU movements, and **(2) the United Kingdom (UK)'s exit from the EU (Brexit), policy uncertainties in the UK and the unity of the EU.** Such risks might affect economies in the euro area through the trade channel. Moreover, uncertainties regarding trade agreements between the UK and the Euro area in the periods ahead could potentially impact the confidence of businesses and investors in the financial market.

5. The U.S. economic policies under the new administration while the protectionist policies could be intensified. Such policies might put a strain on the global trade volume and the sentiment of businesses and investors, especially in the Asian region.

6. Geopolitical risks from terrorism and the cross-country migration in many regions. If there were no appropriate measures implemented, these risks might exacerbate political conflicts and might introduce adverse impacts on businesses and the financial market.

Chart 2.1.2 Economic policy uncertainty index



Source : Economic Policy Uncertainty

In addition to the aforementioned risks, the sluggish recovery of the global economy did stem from a few structural changes affecting the potential output of the global economy as well. First, entering the aging society meant that the share of working age population to total

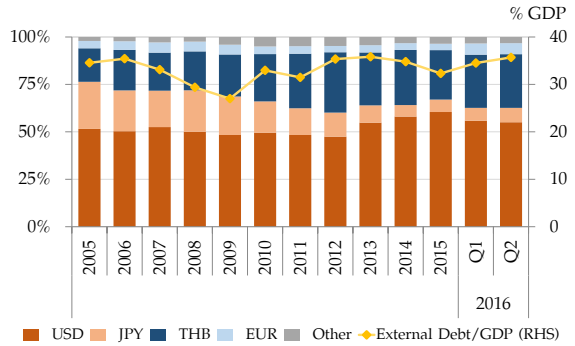
population would be falling. Second, capital formation slowed down and was restricted by the high debt levels of both the public and private sectors. Third, productivity growth fell after the positive growth driven by the technological advancement in telecommunications had been exhausted without being replaced by an equally leapfrogging technological development.

2.2 External stability

Thailand's external stability remained sound as reflected in the low external debt to GDP, continued current account surplus with respect to GDP, and a high level of international reserves. These could then help safeguard against the increasing volatility in the global economy and financial market.

Thailand's external stability remained sound because of the modest reliance on external funding compared to other countries. This was reflected in **the low ratio of external debt to GDP compared to the international standard[1] (Chart 2.2.1)**. Ample liquidity in the country remained sufficient to support investment and safeguard against capital outflows, as could be seen in **a sustained ratio of the current account surplus to GDP.** In 2016, the current account surplus to GDP was projected to be 10 percent. Moreover, **high international reserves** indicated the beneficial foreign currency position to withstand rollover risks from the short-term external debt. The ratio of international reserves to short-term external debt stood at 3.2 at the end of the third quarter of 2016, which was higher than the minimum threshold of one by the international standard.

Chart 2.2.1 Composition of Thailand's external debt by currency and ratio of exernal debt to GDP



Source : Bank of Thailand

Risks from exchange rate volatility on the external debt repayment remained limited. The structure of Thailand's external debt and behaviors of borrowers with external debt were favorable as followed:

(1) Around a quarter of external debt was in domestic currency (baht)[2] and therefore was not directly subject to the exchange rate volatility.

(2) Corporate sector managed risks associated with foreign exchange risks well. External debt of the corporate sector was concentrated in large corporates. According

[1] Concerns over external debt burden according to international standards can be categorized into 3 levels: (1) low – countries with lower than 48 percent of external debt to GDP
(2) medium – countries with 48-80 percent of external debt to GDP, and
(3) high – countries with more than 80 percent of external debt to GDP.

[2] External debt in baht term included the Thai government and Bank of Thailand bonds held by foreign investors and some of corporate loans with contracts expressed in baht term especially for joint ventures.

to an analysis on the top 200 firms with largest external debt at the end of the second quarter in 2016 (accounted for 67.5 percent of the total external debt), 40 percent of the firms in the sample had both revenue from exports and asset holding in foreign currencies. As a result, exchange rate risks were partly mitigated by means of natural hedging. Moreover, most firms with the revenue in baht term already executed foreign currency hedging transactions. For example, the auto-leasing businesses in the financial sector had been highly involved in foreign exchange hedging transactions, while some of these firms had all of their external debt in baht term.

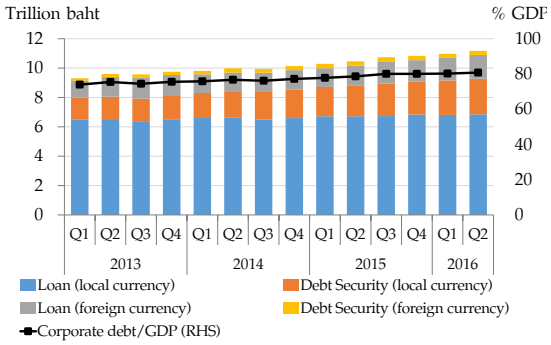
2.3 Business sector

Stability of the business sector remained sound. The corporate debt level stabilized compared to the previous year, while large enterprises still registered solid financial positions. However, the debt serviceability of some groups of SMEs warranted monitoring, especially those with limited liquidity.

The sluggish economic recovery caused some private firms to delay their investment, resulting in **only a slight increase in debt accumulation by the Thai business sector in 2016.** The ratio of corporate debt to GDP at the end of the second quarter of 2016 registered at 80.8 percent, which was higher than 80.4 percent at the end of 2015 **(Chart 2.3.1)**.

Financial positions of listed companies in the Stock Exchange of Thailand (SET) at the end of the third

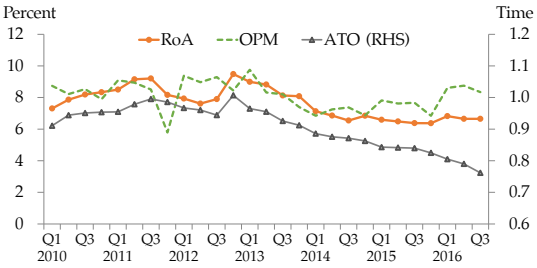
Chart 2.3.1 Non-financial corporate debt to GDP



Note : Corporate debt excludes trade credit
Source : Bank of Thailand

quarter of 2016 remained sound. While the ability to generate revenue, indicated by the asset turnover ratio (ATO), weakened following a sluggish economic recovery in recent periods, the operating profit margin (OPM) and return on asset (RoA) of most firms improved compared to the same period last year. This reflected a better cost management of these firms **(Chart 2.3.2)**.

Chart 2.3.2 Profitability and revenue generation

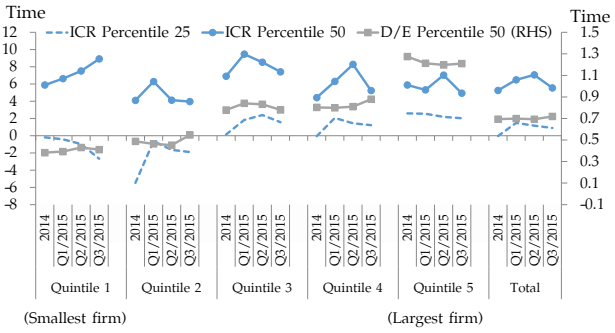


Note : *median, ATO is the ratio of revenue to assets on average, RoA is returns on assets on average, OPM is operating profit margin on average.
Source : Stock Exchange of Thailand, calculations by Bank of Thailand

The debt serviceability continued to be sound overall, as the median interest coverage ratio (ICR) at the end of the third quarter of 2016 remained high compared to the past average, despite having a steady decline since 2010. When classifying the listed companies into 5 quintiles based on their asset size **(Chart 2.3.3), some small companies had constrained liquidity positions and had limited ability to cushion**

for risk. In addition, some small enterprises continued to experience losses, as reflected in the persisting negative ICR of firms at the 25th percentile within the first and second quintiles. This indicated that the debt serviceability of small companies was deteriorating. Using these small companies as representatives of the general non-listed SMEs, it could be implied that the liquidity and debt serviceability problems of SMEs seemed to be worsened. **This was consistent with the continuously deteriorating credit quality extended to SMEs in the banking system** (details in Chapter 2.6: financial institutions sector).

Chart 2.3.3 Interest coverage ratio (ICR*) and debt to equity ratio (D/E) classified by firm size

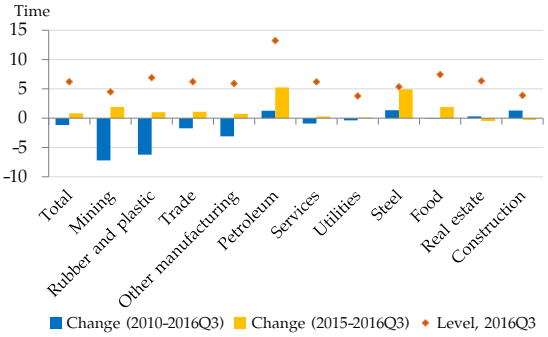


Note : *The 25th percentile reflects firms with low debt serviceability; D/E is median estimate; Firms divided based on their asset size into 5 quintiles from smallest to largest.

Source : Stock Exchange of Thailand, calculations by Bank of Thailand

Moreover, the analysis of firms by sectors indicated that the debt serviceability of those manufacturing companies whose revenue depended on commodity prices was still fragile. Nonetheless, some of these companies saw an improvement in their debt serviceability, especially those in rubber and plastic, petroleum and petro-chemical businesses **(Chart 2.3.4)**. Such businesses were able to manage their raw material costs that were highly volatile due to their co-movement with oil prices.

Chart 2.3.4 Annual interest coverage ratios, classified by industry

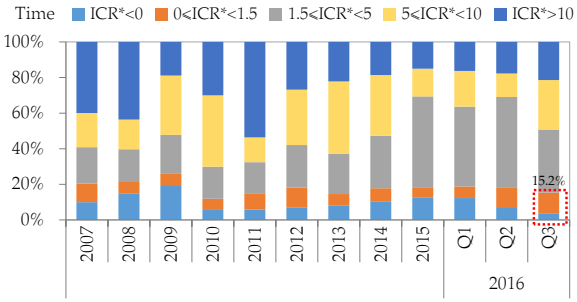


Note : Median value, *manufacturing sector excluding petroleum and petrochemical

Source : Stock Exchange of Thailand, calculations by Bank of Thailand

The probability of default of listed companies in the SET improved overall, as reflect in **the lower ratio of debt at risk**[3] to total debt of 15.2 percent **(Chart 2.3.5)**.

Chart 2.3.5 Debt at risk



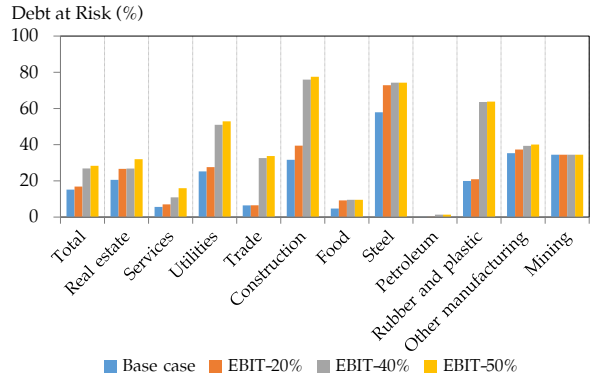
Note: *Debt at risk refers to the ratio of debt with an ICR below 1.5 to total debt of non-financial listed firms in the SET and mai.
The ICR is calculated as the ratio of earnings before interest and taxes (EBIT) to total annual interest payments.

Source: Stock Exchange of Thailand, calculations by Bank of Thailand

[3] Debt at risks is calculated from the ratio of value of debt of companies with an interest coverage ratio below 1.5 to the total value of debt of all companies.

However, sector-wise, some sectors were faced with high levels of debt at risk, such as those in steel and mining industries which were affected by depressed steel and coal prices. But such impact was somewhat alleviated because the steel and coal prices began to recover since the beginning of the year. Such recovery of prices was a result of higher demand from China together with the dampened supply of such commodities following China's policy on growth slowdown in the preceding year.

Chart 2.3.6 Stress test results



Note : *Debt at risk refers to the ratio of debt with an ICR below 1.5 to total debt of firms based on data of listed firms in the SET and mai in Q3/2016. The ICR is calculated as the ratio of earnings before interest and taxes (EBIT) to total annual interst payments.
Source : Stock Exchange of Thailand, calculations by Bank of Thailand

In addition, the ability of firms to service debt was further assessed through a stress test[4] on listed companies in the SET (data as of the third quarter of 2016). The analyses on the value of debt at risk to total debt by sector revealed that most sectors were able to withstand the stress scenario under the assumption of profit falling by 20 percent. Nevertheless, companies were highly susceptible to a 40 percent decline in profit. In particular, those in the construction and utility sectors seemed to exhibit a significantly higher probably of default. This was partly because of the high levels of investment capital needed for such business, leading to these firms having high debt burdens **(Chart 2.3.6)**. In addition, the result from the stress test indicated that, although liquidity and debt serviceability overall did not pose an immediate concern, but if the revenue continued to be low following a slow recovery of the global and Thai economies, debt serviceability of the business sector could be affected.

While financial positions of the business sector were sound overall, there still was risk from large corporates with high debt burdens, partly due to the accumulation of debt given the favorable funding costs which were continually decreasing after the Global Financial Crisis. This resulted in some businesses having high levels of debt burdens as well as having more fragile financial positions, especially if the economic recovery remained slow. Despite a lower debt accumulation seen in large companies (quintile 5 group), their stable median debt-to-equity ratio (D/E) of 1.2 **(Chart 2.3.3)** was still high relative to the average in the past. Hence, these firms should be cautious in conducting their businesses under the circumstances where the economy had not fully recovered and borrowing costs could

[4] Given the assumptions that gross profit and interest payments are lowered by 20-50 percent where 50 percent is benchmarked to the level during the Global Financial Crisis.

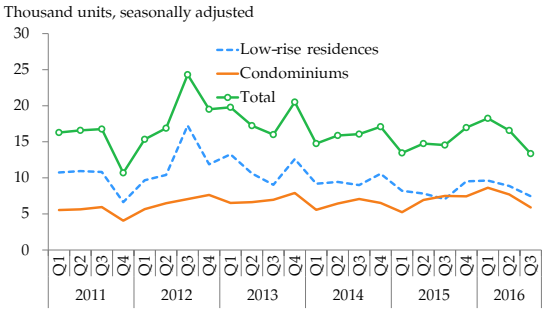
increase from the potential yield snapback. **However, Thailand's monetary conditions remained accommodative, which helped relieve some of the interest burdens of the business sector.** Notwithstanding the rate hike prospect by the Fed might subsequently lead to higher financing costs, overall financial costs of the business sector remained low. In addition, businesses had recently turned to the bond market for financing more than ever before. The ratio of corporate bonds which would mature in 2017 currently stood at 32 percent of the total corporate bonds. Most businesses were expected to be able to rollover their debt, especially those with high credit ratings and healthy financial positions.

2.4 Real estate sector

Demand in the real estate sector subsided overall in line with the economic conditions. In the periods ahead, the risks that warranted monitoring included the oversupply of condominiums in some areas and certain price ranges.

Overall the real estate sector in 2016 **recovered at a slow pace in accordance with domestic economic conditions.** Despite some temporary positive effect from the government's economic stimulus measure on the real estate market,[5] the slow economic recovery and the deteriorating ability to borrow of those consumers with high debt burden, commercial banks became more cautious about issuing mortgage loans. This was evident in the number of residences financed by the newly approved mortgage loans in Bangkok and its vicinity in the third quarter of 2016, which grew at a slower rate of 8.2 percent compared to the same period last year **(Chart 2.4.1)**.

Chart 2.4.1 Residential units in Bangkok and vicinity with approved mortgages by commercial banks



Source : Bank of Thailand

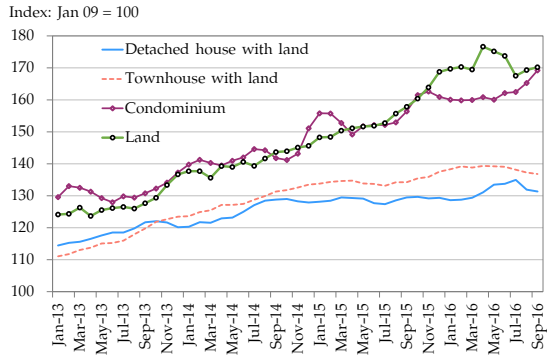
On the supply side, developers focused more on selling the completed units at the beginning of 2016 instead of launching new projects, as they wished to leverage on the government's real estate stimulus measures. Although there was a gradual increase in the number of new projects launched by real estate developers in the second half of 2016, the total number of new projects launched in 2016 was lower than it was in the past.

Residential real estate prices continued to rise in 2016 in tandem with the continuously increasing costs of land prices, particularly for condominium prices. The condominium price index in the third quarter of 2016 expanded by 8.2 percent from the same period last year, while price

[5] Measures on discounted fees on registration and transfer of ownership between October 29, 2015 and April 28, 2016.

indices for detached houses and town houses grew by 1.4 and 1.9 percent, respectively **(Chart 2.4.2)**.

Chart 2.4.2 Residential real estate price indices

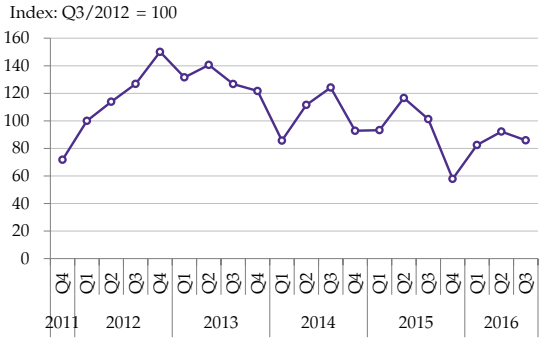


Source : Bank of Thailand

Nonetheless, the risk of having housing price bubbles from the short-term speculation, by means of trading reservation agreements, subsided **(Chart 2.4.3)**. This was consistent with the opinions of real estate developers in a survey. The survey indicated that the speculation through the trading of reservation agreements steadily declined since the end of 2014. However, it would be worth monitoring the potential rise of unsold units in some areas and certain price ranges, such as condominium units along the Purple Line Train (Bearing-Samutprakarn) with the price range of two to five million baht and the Green Line Train with the price range of more than five million baht **(Chart 2.4.4)**. Moreover, declining quality of post-finance mortgage loans should be constantly assessed, as reflected in the rising ratio of non-performing loans (NPL) from 2.55 percent in the first quarter to 2.81 percent in the third quarter of 2016. The continually deteriorating asset quality might cause commercial banks to consider tightening their lending standards.

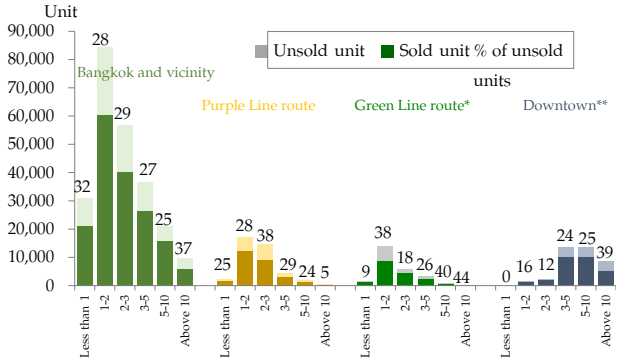
Furthermore, additional risk worth following included the ability to service debt of some real estate developers who had fragile financial positions and had issued short-term bonds. Should they fail to service debt and roll over their debt, this would have an impact on investor confidence and financing costs of businesses in the real estate sector as a whole by means of affecting investor confidence in the financial market.

Chart 2.4.3 Index for speculation through trading of reservation agreements



Source : Index for speculation through trading of reservation agreements calculated from data from google.com/trends with the search terms "reservation agreements condo" (in Thai),

Chart 2.4.4 Share of unsold condominium units in the first half of 2016



Note : * Bearing-Samutprakarn route
** Covering areas in Phaholyothin, Pathumwan, Sukhumvit, Rama 4, Yannawa, Silom and Pranakhorn

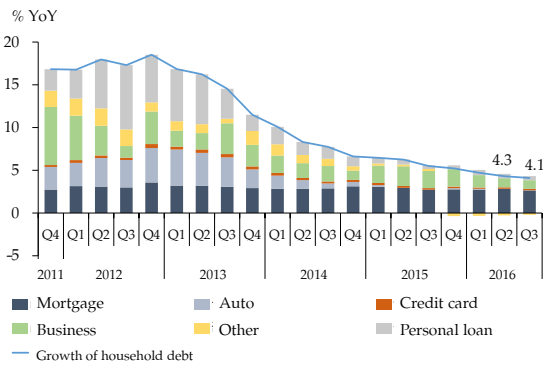
Source: AREA, calculations by Bank of Thailand

2.5 Household sector

The household sector remained fragile due to the high level of household debt and a worsening prospect of debt serviceability, particularly for low-income households, agricultural households and households operating SME businesses.

Household income was affected by the slow economic recovery in Thailand. Despite household debt growing at a slower rate **(Chart 2.5.1)**, household debt continued to rise faster than household income, which resulted in a persistently high level of household debt relative to income. As households accumulated a lot of debt in earlier periods, their debt-servicing ability continued to weaken. In fact, the NPL ratio of consumer loans extended by commercial banks rose from 2.55 percent at the end of 2015 to 2.89 percent at the end of the third quarter of 2016. Such increase was mainly contributed by mortgage loans and credit card loans (details in Section 2.6: financial institutions sector).

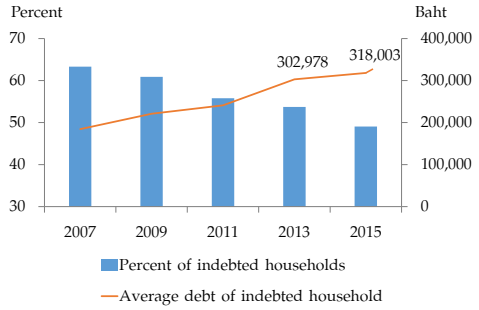
Chart 2.5.1 Composition of household debt [1/]



Note : [1/] Loans to household by financial institutions
Source : Bank of Thailand

Moreover, the vulnerability in the household sector was reflected in the higher debt accumulation by the already-indebted households. According to the data from the socio-economic survey (SES) collected by the National Statistical Office of Thailand (NSO), while the number of the indebted households compared to total household had decreased, the debt level of those households with debt had accelerated **(Chart 2.5.2)**.

Chart 2.5.2 Ratio of indebted households and average debt of indebted households



Source : Socio-economic survey (SES)

Upon further investigation, different groups of households were subjected to different degrees of vulnerability. This could be summarized as follows **(Chart 2.5.3-2.5.5)**:

(1) Low-income households (1st and 2nd income quintiles), **agricultural households and households operating SME businesses were more vulnerable than other groups.** The levels of their debt service ratio (DSR) and debt to financial asset ratio were high. This reflected that these households had high debt burdens with respect to their monthly average income and had limited financial assets compared to their debt burdens.

(2) Households who worked as workers possessed lower ability to cushion for risks. Although their debt levels and monthly debt burdens were low relative to

their income, their financial assets were also limited. This indicated that these households had quite active spending behaviors relative to their income. Consequently, they had low savings as well as a low financial cushion, leaving them vulnerable to future economic shocks such as unemployment.

(3) For households with high income and those working as professionals, despite having limited short-term risks with a reasonable DSR and high levels of financial assets, they had high levels of debt with long maturity, notably the debt from acquiring residential properties. This prolonged debt burden would leave these households vulnerable to the downturn of future employment prospects and potentially higher interest rates. This risk should therefore be constantly monitored and reassessed.

Looking ahead, if household debt would continue to rise faster than income, households' resilience to various risks would decrease and their ability to deleverage would also deteriorate. From the additional risk assessment via stress testing the household sector, assuming that household income fell by 20 percent while leaving their consumption level unchanged, about 70 percent of the indebted households of most occupations would have their net income fall below the level required to fully service their monthly debt payments **(Chart 2.5.6)**. This was with an exception of households working as professionals due to their superior resilience to risks compared to other groups.

Chart 2.5.3 Debt Service Ratio [1/]

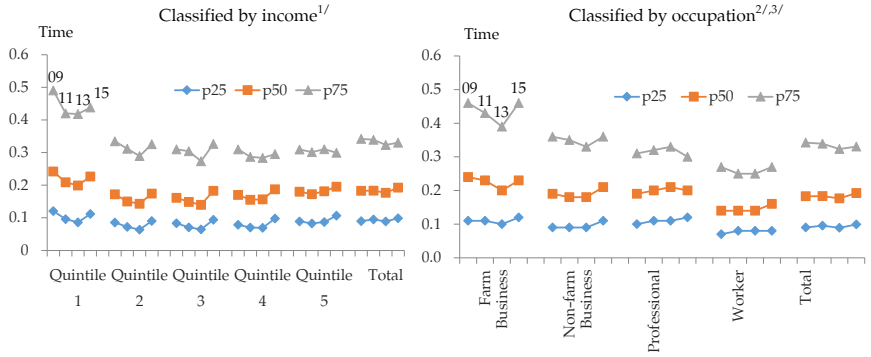


Chart 2.5.4 Debt to annual income [1/]

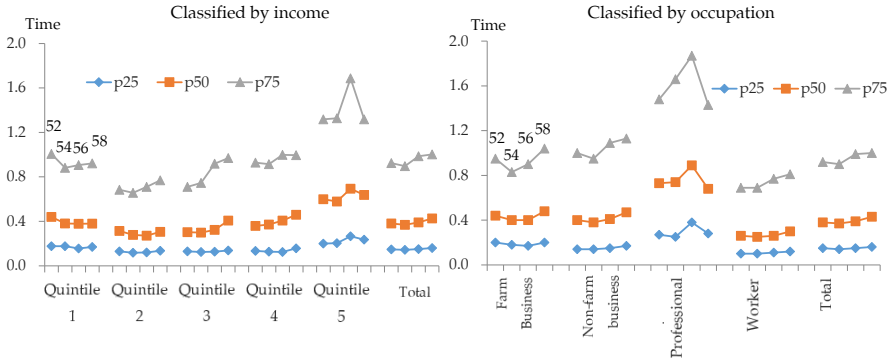
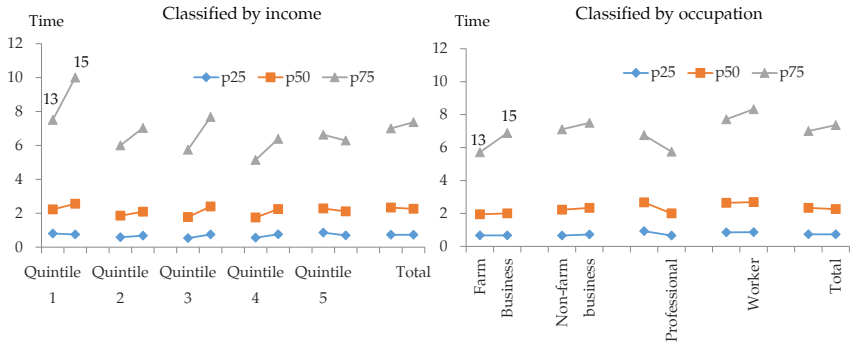


Chart 2.5.5 Debt to financial assets



Note: calculated based on indebted households

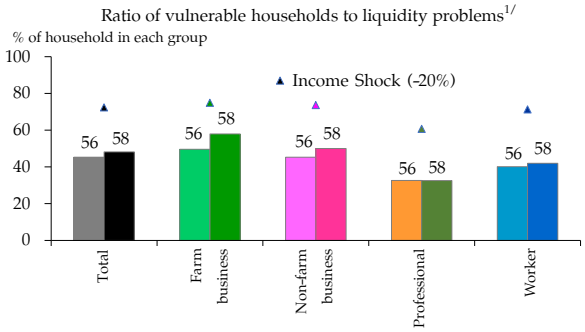
1/ classified by household income per capita, quintile 1 with the lowest income per capita and quintile 5 with the highest income per capita

2/ professional housheolds include managers, academics and professionals, technicians, etc

3/ worker households refer to workers in agriculture, forestry, fishery, machine operations, clerks, services, handicrafts, production processing, etc

Source: Socio-economic Survey (SES), calculations by Bank of Thailand

Chart 2.5.6 Stress test[1/]



Income stress: assuming households maintain their consumption level and do not sell assets to service debt

Note : calculated from indebted households

1/ Refers to households with insufficient income after deducting consumption and taxes to fully service monthly debt payment

Source: Socio-economic household Survey, calculations by Bank of Thailand

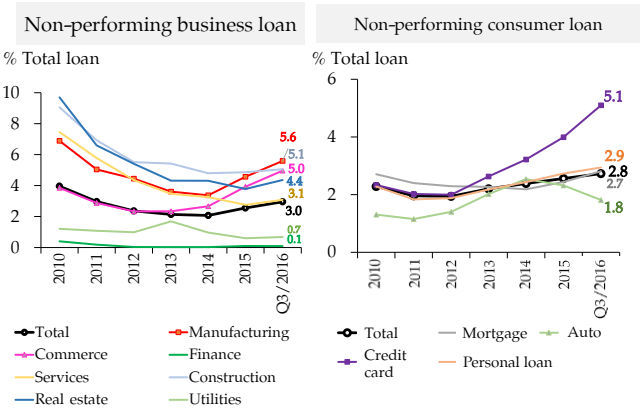
2.6 Financial institutions sector

The slow and uneven economic recovery still put pressure on the credit quality and profitability of commercial banks. However, the financial sector remained stable, thanks to the strong financial positions of commercial banks and specialized financial institutions. Capital buffers and loan loss provision remained high, providing comfortable cushion against risks that might arise from the deteriorating credit quality.

The slow economic recovery undermined debt servicing ability of the **business and household sectors, as reflected in a continuous deterioration of loan quality of financial institutions.** The NPL ratio of commercial banks and specialized financial institutions increased from 2.55 and 4.89 percent at the end of 2015 to 2.89 and 5.32 percent at the end of the third quarter of 2016, respectively **(Chart 2.6.1)**. Because the economic recovery was still concentrated in some sectors, the corporate NPL ratio of commercial banks rose. The contribution to such increase came mainly from the export-oriented and commodity price-related manufacturing and trade sectors as well as small businesses who might have lower

ability to adjust to the downturn environment **(Chart 2.6.2)**.

Chart 2.6.2 Non-performing business and consumer loans in the commercial banking system

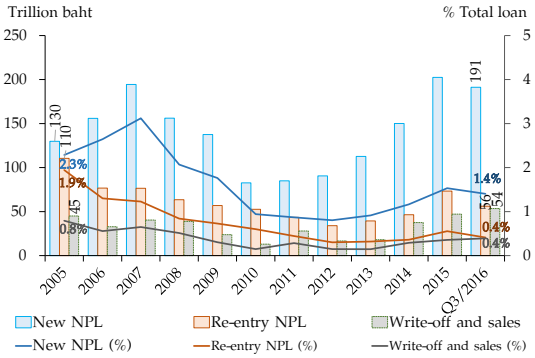


Source : Bank of Thailand

Meanwhile, the quality of consumer loans tended to deteriorate, especially for credit card and personal loans under supervision. However, risks to the commercial banking system ("banking system") remained limited as the outstanding value of credit card and personal loans under supervision only accounted for 2 percent and 1 percent of total loans, respectively.

Nonetheless, loan quality must be monitored closely in the periods ahead, as loan quality might continue to deteriorate further. This was reflected in an increase in the ratio of non-performing loans of new borrowers to total loans (new NPL) relative to the previous year. Such rise in NPL was also larger than the average over the past 5 years. Meanwhile, the ratio of non-performing loans of borrowers with debt restructuring (re-entry NPL) **(Chart 2.6.3)** slightly rose.

Chart 2.6.3 Non-performing debt accumulation in the commercial banking system



Source : Bank of Thailand

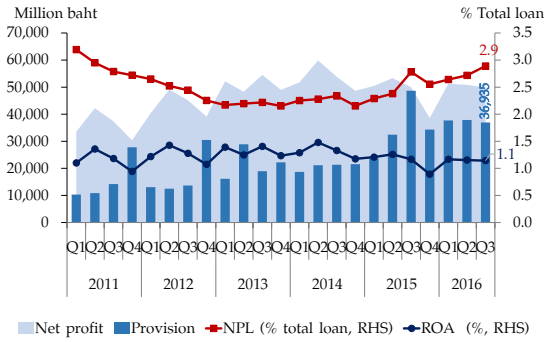
However, commercial banks had closely monitored and managed their loan quality. This involved screening for the borrowers who were qualified to have their loans approved, closely monitoring debt serviceability of borrowers, and giving assistance to high-quality borrowers who faced temporary financial difficulties. For instance, debt rescheduling could help reduce the probability of loan quality being deteriorated further while troubled debt restructuring (TDR) could help borrowers who were financially troubled but had the potential to turn around and become good borrowers again. Debt write-offs and debt sales to asset management companies by commercial banks could help alleviate the burden of having to ineffectively manage some non-performing loans on their own.

Loan growth in the banking system had slowed down compared to the previous year due to the weak economic conditions and dampened demand for loans from the private sector. Furthermore, commercial banks remained cautious in extending loan. Meanwhile, some businesses recently turned to the bond

and equity markets for financing amid the low interest rate environment.

Pressures from higher credit risk coupled with the decelerated loan growth weighed on the profitability of commercial banks. During the first three quarters of 2016, net profit stood at 152 billion baht, down from 192.3 billion baht registered during the first three quarters of 2015. The decline was mainly due to an increase in provision expense. On the other hand, net interest income remained stable due to the effective management of deposit structures. As a result, the interest expense were managed to be lower in line with the decline in interest income. Moreover, income from fees and services which expanded slightly by 3.97 percent somewhat helped lessen the adverse effect of slow economic conditions on commercial banks' profitability **(Chart 2.6.4)**.

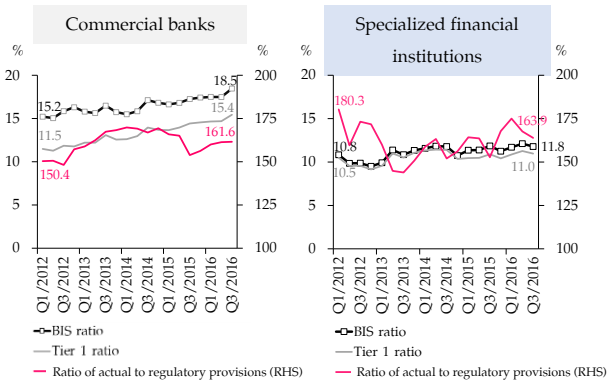
Chart 2.6.4 Net profits, provision, and loan quality of commercial banking system



Source : Bank of Thailand

Overall, the stability of the financial system was well maintained, as reflected in robust financial positions. In particular, capital buffers and loan loss provision were high. At the end of the third quarter of 2016, the banking system had the ratio of capital buffers to risk-weighted assets (BIS ratio) and the common equity tier-1 ratio at 18.5 and 15.4 percent, respectively. The ratio of the actual to regulatory loan loss provision stood at 158 percent while the liquidity coverage ratio (LCR) stood strongly at 163.9 percent. In addition, the LCR of every commercial bank was above the Bank of Thailand's required threshold.[6] For specialized financial institutions, capital buffers also remained at a high level with the BIS ratio and the Tier-1 ratio of 11.8 and 11 percent, respectively, as of the third quarter of 2016. Meanwhile, the ratio of loan loss provision to NPL stood at 164 percent **(Chart 2.6.5).**

Chart 2.6.5 Capital buffer and provision in the commercial banking and specialized financial institutions systems



Source : Bank of Thailand

Commercial banks had strong financial positions that could withstand various potential risks in the future, as

[6] Bank of Thailand amended regulations for commercial banks to maintain sufficient liquid assets at the level of forecast 30-day net cash outflows (replacement of the reserve requirement at 6 percent). The amended regulation was effective as of January 1, 2016 with the minimum criterion at 60 percent with an annual increase of 10 percent until reaching 100 percent on January 1, 2020.

reflected in the stress test[7] results. The strength of the banking system was assessed under stress scenarios assuming that the Thai economy had contracted for 2 consecutive years **(Table 2.6.1)**. Under such scenarios, the commercial banking system could withstand various risks stemming from continuously deteriorating loan quality, falling asset prices and worsening liquidity due to capital outflows, thanks to high levels of capital buffers and loan loss provision as well as sufficient liquid assets.

In addition, the Bank of Thailand also preemptively regulated financial institutions by means of conducting a thematic examination so as to monitor risks and determine the possible areas of vulnerability. For instance, an examination of debt restructuring processes and debt rescheduling were carried out to ensure that financial institutions had in place the appropriate business and risk management.

Table 2.6.1 : Key assumptions on the stress scenario used in stress testing the commercial banking system

Key assumptions on stress scenario	2016	2017
Real GDP (%YoY)	-4.5	-2.5
Headline inflation (%YoY)	-0.4	0.9
Dubai oil price (U.S. dollar per barrel)	34	37
Farm price index (%YoY)	-20	-15
Stock price index (%YoY)	-20	-15
Exchange rate (Thai baht per U.S. dollar)	42	42

Source : Bank of Thailand

[7] The Bank of Thailand cooperated with 15 commercial banks on carrying out the annual stress test in 2016, using the data from commercial banks at the end of 2015. The test aimed at assessing the impact from credit risk and market risk on the adequacy of capital buffers and loan loss provision. Moreover, the Bank of Thailand also conducted the liquidity stress test based upon the data submitted by the commercial banks to ensure that banks held sufficient liquid assets.

Chapter 3: Risks from search-for-yield activities under the low interest rate environment

Prolonged low interest rates resulting from the implementation of accommodative monetary policies to foster the economic recovery led to a continuous increase in the search-for-yield behaviors among investors who also developed a higher risk appetite. It also induced the private sector to raise funds in the capital markets more. In addition, low interest rates exerted pressures on the profitability of financial institutions and consequently might encourage them to accept higher risks.

The short-term risk related to the search-for-yield behavior might be a result of the underpricing of risks. The need for investors to invest in high-yield assets may detract them from meticulously assessing risks associated with the financial products they invested in. Hence, financial intermediaries offering these products must provide to investors comprehensive and accurate information, especially on the relating risks. Looking ahead, the risk that warranted monitoring would be the possible impact of the yield snapback which might cause volatilities in the financial markets and flows of capital and, in turn, could affect the value of investments and investor confidence as a whole.

Summary of key risks to Thailand's financial system stability

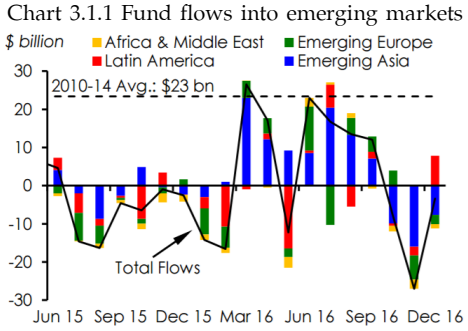
Risk from the search-for-yield behavior under the low interest rate environment	- Continuous increase of investments in mutual funds, particularly in foreign investment funds (FIF) and quasi-deposit funds with daily redemption capability. Investors must understand the risks associated with each type of investment. - The business sector had turned to the bond market as a source of funding. There was also an increase in the issuance of unrated bonds which some were issued by firms with lower-than-average financial positions compared to their peers. - The asset size of savings cooperatives continued to expand due to an increase in deposits and equities raised from members, while the search-for-yield behavior was also observed through a rise in financial securities investments.
Risks warranted monitoring going forward	- Underpricing of risk by investors. Hence, investors must have thorough and accurate information regarding the associated risks. - Impact of volatile capital flows and the potential yield snapback in the financial market, which might affect the funding costs and debt rollover of the business sector, especially firms funded by short-term bonds. - Growing asset size of savings cooperatives with a higher degree of connectedness to the financial system and, if facing with difficulties, could undermine the confidence and affect a large number of stakeholders.

3.1 Thai financial markets

Prevailing low interest rates in global financial markets, especially during the first three quarters of 2016 with the prospect that rates would continue to stay low, prompted the search-for-yield behaviors of investors. Such behaviors were evident as capital had flowed into emerging market economies which offered higher returns than those in advanced countries **(Chart 3.1.1)**. The inflows exerted the downward pressure on bond yields and drove up stock market indices.

However, toward the end of 2016, investors adjusted their expectations on the dynamic of interest rates with regard to the U.S. Federal Reserve's (Fed) interest rate outlook. The view taken was that the greater fiscal stimulus under President Donald J. Trump's administration would lead to higher U.S. inflation than previously assessed, thus prompting the Fed to raise interest rates sooner than previously planned. **Such attitude somewhat helped ease the yield-seeking behaviors.**

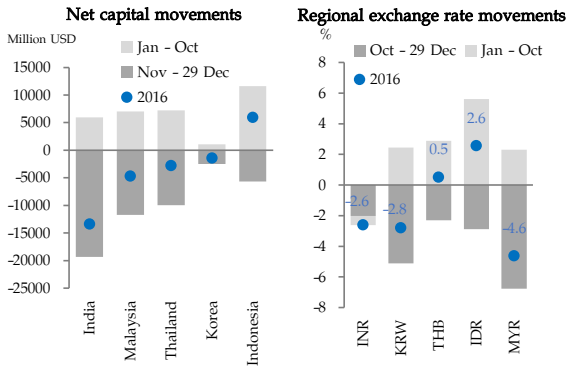
Chart 3.1.1 Fund flows into emerging markets



Source : The Institute of International Finance

Similar to other emerging markets, the Thai financial markets also experienced the search-for-yield behaviors of **investors.** From the beginning of 2016 to October, the Thai financial markets had about USD 7,200 million in net fund inflows, which were mainly invested in securities and short-term debt instruments. As a result, the baht appreciated in the same fashion as other regional currencies **(Chart 3.1.2)**.

Chart 3.1.2 Net capital movements and exchange rates



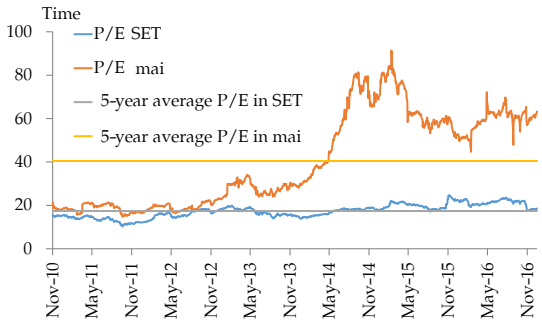
Note : Net capital flow data as of December 29, 2016
Source : Bank of Thailand

In fact, the Stock Exchange of Thailand (SET) Index and the mai Index as of December 29, 2016 rose 19.8 percent and 17.9 percent respectively, causing the P/E ratios of the Thai stock markets to remain high relative to the historical averages **(Chart 3.1.3)**. However, there was limited risk from market overheating, as the turnover ratios did not indicate an abnormal level of transaction volume while the level of margin loans remained low **(Chart 3.1.4)**.

The Thai government bond yields decreased and stayed low during the first three quarters of 2016 **(Chart 3.1.5)**. **Consequently, corporate bond yields also declined, which was beneficial for the business sector's**

financing and served as the main driver behind the increasing corporate bond issuances. In 2016, the total value of new corporate bond issued reached a record high at about 760 billion baht.

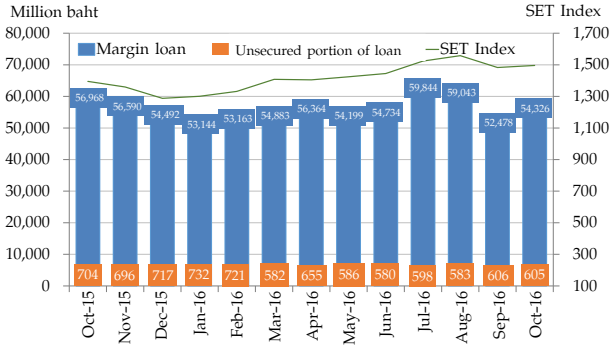
Chart 3.1.3 P/E ratios of SET and mai



Note : Data as of December 30, 2016

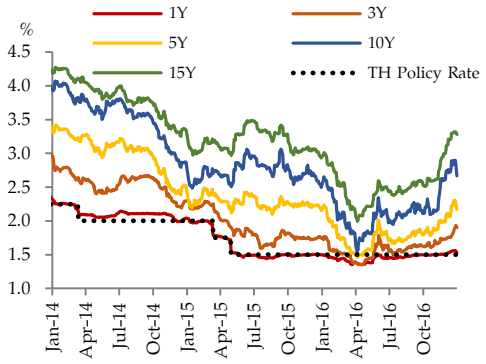
Source : Stock Exchange of Thailand, calculations by Bank of Thailand

Chart 3.1.4 Margin loan volume



Source: Stock Exchange of Thailand, calculations by Bank of Thailand

Chart 3.1.5 Thai government bond yields



Source: Thai Bond Market Association, calculations by Bank of Thailand

However, with a significant adjustment of the investors' expectations following the U.S. presidential election (on November 8, 2016), the rapid surge of U.S. Treasury yields drove investors to shift their investments from emerging markets to the U.S. markets. Consequently, **the capital outflows from Thai financial markets were observed, leading to the depreciation of Thai baht.** For the whole 2016, the total net capital flows into the Thai financial markets were just USD 2,779 million while Thai baht closed at the rate near the one registered at the end of 2015 **(Chart 3.1.2)**.

During this period, the Thai government bond yields advanced in line with the rising U.S. Treasury yields. The ten-year Thai government bond yield increased 0.6 percent (60 basis points) within one month and was on a continually rising trend. **This caused local investors to adjust their holdings from long-term bonds to short- term bonds or deposits so as to shorten duration.**

Going forward, uncertainties surrounding the U.S. fiscal and monetary policies as well as political situations in the Euro area would be the key factors driving the sensitivity of investor confidence as well as influencing the volatilities in the global financial markets and flows of capital. In addition, **the upward movement in yields might lead to a higher financing cost born by the private sector in the bond market and the rollover of debt might become**

more difficult. These risks would be continually monitored going forward.

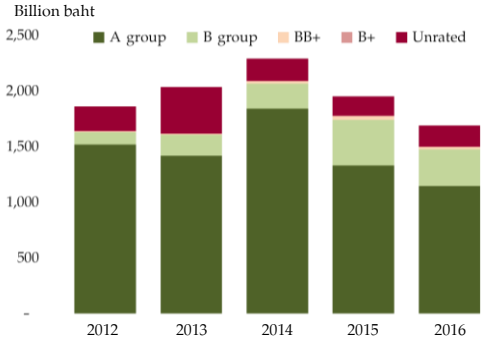
3.2 Corporate bond issuance

The low interest rate environment did have an effect on the investment choice of businesses, turning them to the bond market as a preferred source of fund. Meanwhile, investors continued to search for higher yields. Consequently, it should be deemed important that investors must obtain crucial information and meticulously assessing risk regarding the financial products in which they intended to invest.

The private sector increasingly used the bond market as the funding source. New corporate bonds issued at the end of 2016 rose 20 percent in relation to the previous year, while most of the new bonds issued were of good quality. However, there was a continuous increase in the issuance by the newcomers while the issuance of unrated bonds[8] was also on the rise **(Chart 3.2.1)**.

The surge in the issuance of unrated bonds was contributed partly from the bond issuance by non-listed companies with inferior financial positions compared to the averages of their peer groups. The debt to equity (D/E) ratios of these companies were higher than their industry's averages

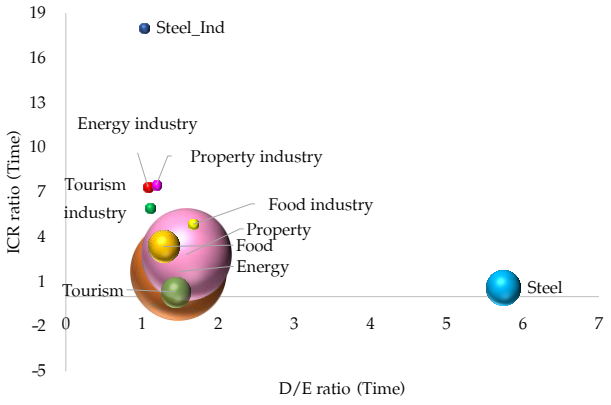
Chart 3.2.1 Total new corporate bonds issued classified by credit rating



Source: Thai Bond Market Association (registered issuers only)

and their interest coverage (ICR) ratios were lower, notably companies in the steel, real estate and energy sectors **(Chart 3.2.2)**. Hence, investors should be well-informed on the key information regarding the issuers of such bonds and must have a complete understanding of risks associated with the financial products in which they intended to invest.

Chart 3.2.2 Financial ratios of unrated bond issuers relative to the industry's averages

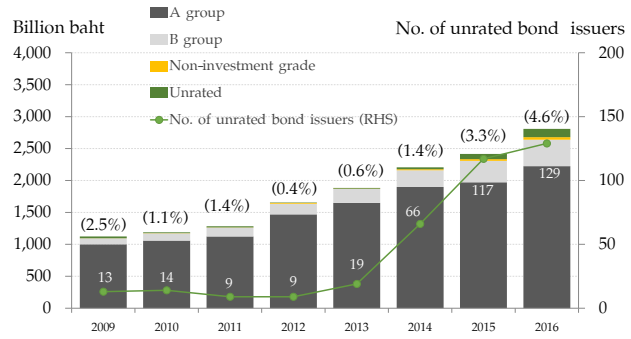


Note : Financial ratios of the steel industry exclude that of Sahaviriya Steel which was under debt restructuring. Ratios are annualized. The size of the circle represents outstanding value of bonds issued in the industry and the dot represents the industry's averages of financial ratios.

Source : Stock Exchange of Thailand and Thai Bond Market Association, calculations by the Bank of Thailand

[8] No rating for both bond issuers and bond issues

Chart 3.2.3 Outstanding corporate bonds issued classified by credit rating



Note : The A group consists of AAA to A-, while the B group consists of BBB+, BBB, and BBB- . Unrated bonds refer to either bonds or bond issuers with no credit rating.

: () refers to ratio of unrated bond outstanding to total corporate bond outstanding

: * corporate bonds include short and long-term bonds that are registered with Thai BMA

Source: Thai Bond Market Association

Nevertheless, the outstanding of unrated bonds only accounted for a minor 4.5 percent of total corporate bond outstanding (Chart 3.2.3). In addition, investments in unrated bonds were restricted only to specific groups of investors. Most unrated long-term bonds were sold to institutional or high net-worth investors, while short-term unrated bonds were mainly offered to private placements with no more than 10 subscribers (PP10). Following the persistent growth of unrated bond being issued and on-going concerns over investors' search-for-yield behaviors, the SEC had closely monitored the development and had been in the process of introducing more-fitted surveillance measures regarding unrated bonds to safeguard investors while, at the same time, still allowing financially-sound companies to raise funds through this channel.

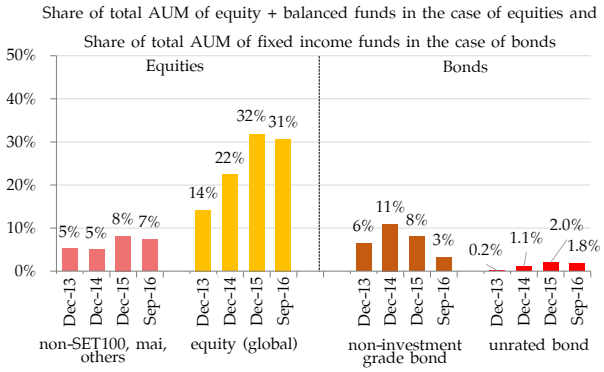
3.3 Mutual funds

Persistently low interest rates coupled with abundant liquidity in the financial system were key factors driving **the search for yield behaviors of investors by means of continually increasing their investments in mutual funds.** As a result, there was a rise in the offering of higher-risk mutual funds and a notable growth of the quasi-deposit funds, especially daily fixed income funds ("daily FI").

Investments by mutual funds in risky assets were on an upward trend between 2013 and 2015, though slowing down in 2016. As of September 2016, the shares of investments in non-investment grade and unrated bonds by the existing fixed income funds stood at 3 percent and 1.8 percent of the total value of assets under management, respectively **(Chart 3.3.1)**.

With regard to foreign investments, most **foreign investment funds (FIF)** had invested in countries whose credit ratings were of investment grades, though there might be some concentration of investments in some countries or regions, such as China and the Middle East **(Table 3.1)**. However, asset management companies (AMCs) had embraced the importance of risk diversification and had placed their position in assets of good quality. In addition, the foreign exchange risks were mainly hedged, thereby making the associated risks well-contained.

Chart 3.3.1 Mutual funds' investments in assets



Source : SEC

Table 3.1 Top five countries for FIF investment

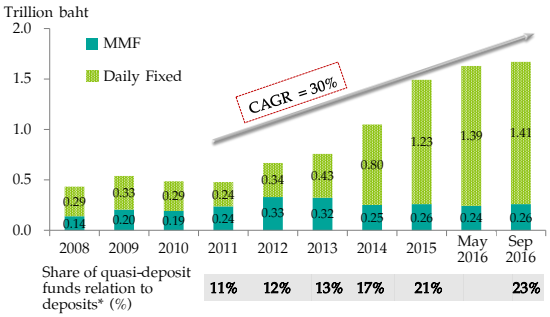
Country	Value (million baht)	Share (%)
1. United Arab Emirates	293,877	22.3
2. China	270,342	20.6
3. Qatar	178,485	13.6
4. Turley	73,442	5.6
5. United States	65,990	5.0
Total 5 countries	882,135	67.1
Total foreign investment	1,315,194	100

Source : SEC

Quasi-deposit funds, namely money market funds (MMF) and daily FI, experienced a very rapid growth over the past five years, with an average growth rate of 30 percent per annum. The size of these funds, which accounted for 23 percent of savings and demand deposits, was a reflection of the depositors' needs to obtain higher returns on their savings than the usual deposit rates **(Chart 3.3.2)**.

Although daily FI funds could invest in higher-risk instruments than the MMF[9], their investments in the past carried low risks, whether in terms of credit risk, liquidity risk and risk from price volatility. As of September 2016,

Chart 3.3.2 Value and growth of MMF and daily FI

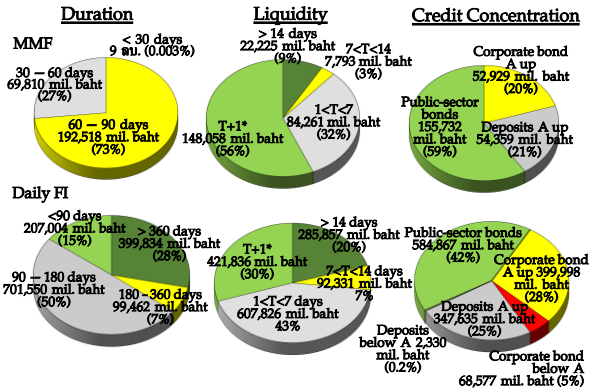


Note : Deposits = savings + demand deposits
Source : SEC

daily FIs' investments in public-sector bonds, deposits and corporate bonds with an A rating or higher, accounted for 95 percent of their total investment value. Also, the share of their investments in highly liquid assets, which could be redeemed within one day, registered around 30 percent of their total investment value **(Chart 3.3.3)**. In addition, these quasi-deposit funds were under the close monitoring and supervision by the SEC for any change in their risk profile. Should a situation that could prompt massive redemptions by unit-holders arise, AMCs were equipped with measures to stop accepting redemption orders or to postpone redemption payments. On top of that, the SEC also performed regular monthly stress tests on these funds to ensure that these funds held adequate liquid assets to cushion for sudden redemptions under stressed time *(Box 1: Supervision of daily FI and investment in risk assets)*.

[9] Like MMF, the settlement date for most daily FI redemption is t+1. However MMF is required to invest in high-quality and highly liquid assets with low price volatility, while daily FI can invest in higher-risk assets. Examples are instruments with short-term credit rating of at least the second highest, or long-term credit rating of at least the third highest/ instruments with maturity over 397 days.

Chart 3.3.3 Asset allocation of MMF and daily FI



Note : *T+1 means that assets can be liquidated into cash within 1 day, namely cash, deposits, treasury bills and short-term Bank of Thailand bonds

Source : SEC

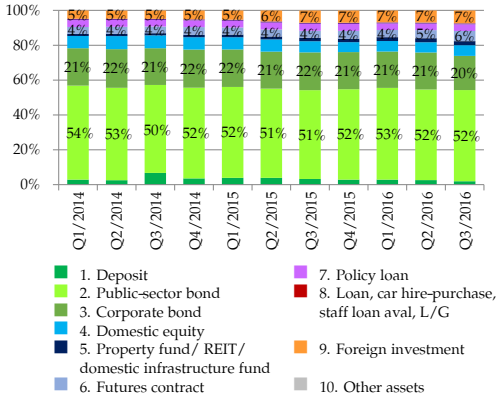
Nevertheless, **there was risk associated with daily FIs still from the potential volatility in the net asset value (NAV) which could emerge from a downgrade of the credit rating related to the assets held by the funds as well as the potential yield snapback which might result in the further deterioration of the NAV.** This could affect investor confidence and consequently could lead to massive panic redemptions. AMCs were advised to have on hand sufficient liquidity to cushion for such redemption by way of asset sales and/or deposit withdrawals. However, fire sales could cause the market value of assets to plunge rapidly, putting additional pressures on the NAV and potentially triggering chain redemptions. This would be an on-going issue which warranted monitoring, together with enhancing investors' understanding of different risks in relation to each type of investment.

3.4 Insurance businesses

Insurance businesses were affected by the low interest rate environment as the present value of their liabilities surged due to a lower discount rate. In addition, the offering of life insurance policies with guaranteed returns to policyholders forced life insurance companies to search for higher yields by means of investing in riskier assets to honor such guaranteed returns.

Despite increasing investments in higher-yield assets, there was no significant change in the composition of investment portfolios of life insurance companies. Deposits, public-sector bonds and corporate bonds together accounted for over 70 percent of the total value of life insurers' investment portfolio, which was worth about 2.9 trillion baht as of the third quarter of 2016 **(Chart 3.4.1)**.

Chart 3.4.1 Composition of life insurance companies' investment portfolio

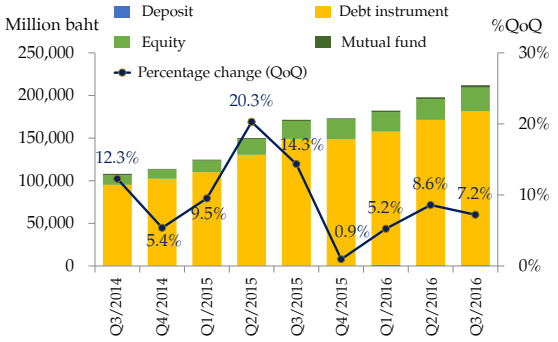


Source : OIC

Life insurance companies' foreign investment increased gradually and continuously. As of the third quarter of 2016, the foreign investment was worth around 210 billion baht, or 7.4 percent of the total investment portfolio, with the

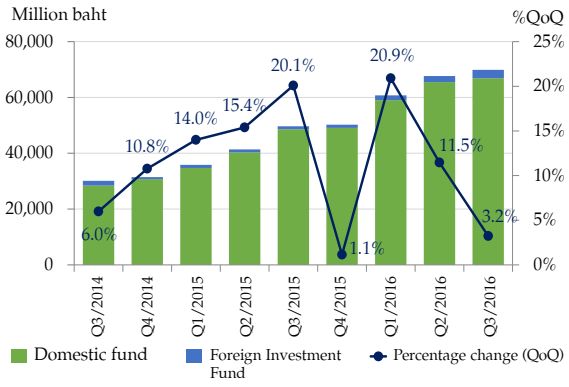
focus on foreign debt instruments. The share of investments in domestic and foreign REIT as well as in infrastructure funds also increased **(Charts 3.4.2 and 3.4.3)**, as this yielded the benefits of both enhancing returns and diversifying risks. Similar trends were also observed globally among life insurers.

Chart 3.4.2 Composition of life insurance companies' foreign investment portfolio



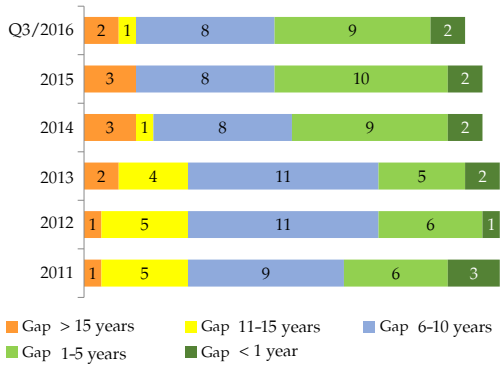
Source : OIC

Chart 3.4.3 Life insurance companies' investment in property funds/REIT/traditional funds and infrastructure funds



To deal with the growing liabilities stemming from low interest rates, life insurers made adjustments to reduce insurance risks and realigned management of assets and liabilities. Consequently, the duration gap was reduced from 7.08 years in 2011 to 5.72 years in the third quarter of 2016. Looking ahead, a yield snapback would have a positive effect on life insurers since the duration of their liabilities was longer than the duration of their assets **(Chart 3.4.4)**.

Chart 3.4.4 Number of life insurers within each duration gap* range



Note : * Duration gap is the difference between the duration of assets and liabilities

Source : OIC

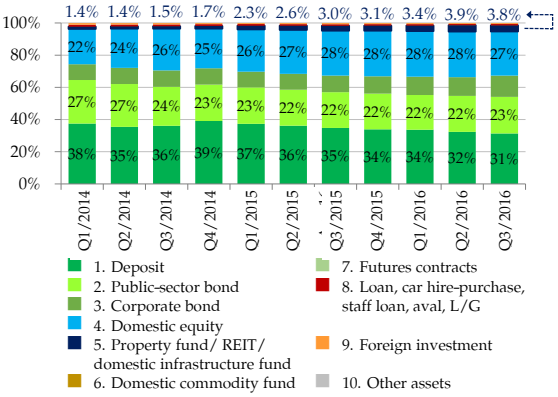
In addition, to reduce the impact of low interest rates further, life insurers also switched from selling endowment or savings products to life protection products, which benefits paid solely depended on the living or death of policyholders and not on the coupon during contract term, thereby reducing pressures to seek higher yields to pay policy holders the guaranteed returns.

The effect from the gradual economic recovery and the direction of interest rates were two main risks needed to be regularly monitored going forward. Even though signs of rising long-term bond yields were observed toward the end of 2016, interest rates which remained low could still affect the profitability of life insurers. However, the duration gap between assets and liabilities continuously declined with a slight increase in the duration of assets, thanks to the new issuance of long-term bonds in the market. At the same time, the

duration of liabilities was also shortened due to the sales of policies with a shorter coverage period. Moreover, the Office of Insurance Commission (OIC) put life insurers to the test in order to assess the capital adequacy of these firms. The test results indicated that life insurers were able to meet mandatory capital requirements, lending support to the healthy insurance businesses overall.

Similar to life insurers, non-life insurance companies invested more in property funds and infrastructure funds to boost returns. The proportion of such investments was on the rise since 2014 **(Chart 3.4.5)**.

Chart 3.4.5 Investment portfolio composition of non-life insurance companies



Source : OIC

The investment portfolio of non-life insurers as of the third quarter of 2016 was worth around 300 billion baht, with 67.3 percent invested in deposits and debt instruments, 27.4 percent in equities, and 3.8 percent in property funds and infrastructure funds.

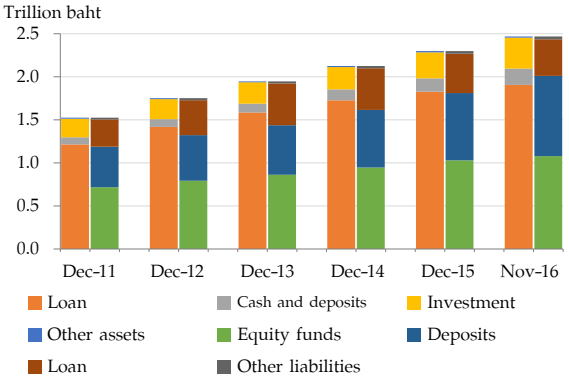
For the non-life insurers, movements of the interest rates did not have much of an effect on the assessed value of their liabilities because most of the liabilities were of short-duration. Hence, non-life insurers held only a moderate share of debt instruments which mainly consisted of short-term highly-liquid assets. Besides, given that non-life insurance was generally sold on an annual basis, insurers could adjust their premiums in response to changes in economic conditions.

3.5 Savings cooperatives

Deposit rates and average dividends offered by savings cooperatives, which were higher than those offered by banks, were the main factors that induced some search-for-yield savers to place their savings in the savings cooperatives' deposits and equities.

The asset size of savings cooperatives continued to expand from the previous year, both in terms of loans and investment in securities. As of November 2016, total assets of savings cooperatives stood at 2.5 trillion baht **(Chart 3.5.1)**, up 8.1 percent from the same period last year.

Chart 3.5.1 Sources and uses of funds of savings cooperatives

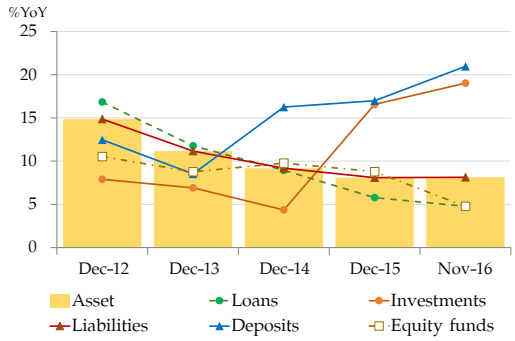


Source : Cooperative Auditing Department, calculations by Bank of Thailand

The major share of assets was still loans. Although loan growth slowed to 4.8

percent from a year earlier, the slowdown was in loans to members while loans extended to other savings cooperatives continued to rise. Meanwhile, investments in securities surged 19 percent from the same period a year earlier **(Chart 3.5.2)**.

Chart 3.5.2 Growth of savings cooperatives' total assets and liabilities



Source : Cooperative Auditing Department, calculations by Bank of Thailand

Investment in stocks had lately grown at a higher rate than that of debt securities. It was also found that some savings cooperatives had borrowed money to invest in securities. Such activity was a reflection of the savings cooperatives' search-for-yield behavior through increasing leverage. Nonetheless, stock investment accounted for just 1.7 percent of total assets of savings cooperatives as of November 2016.

The largest share of savings cooperatives' funding source came from deposits. Deposit growth was 21 percent—a sharp acceleration over the same period last year. Deposit rates and average dividends offered by savings cooperatives were higher than those offered by banks, leading members to place more money in savings cooperatives' deposits and equities. **Such behavior exerted pressure on savings cooperatives with excess liquidity to seek higher yields by investing in alternative assets in order to enhance returns that would meet the depositors' expectations.**

Even though savings cooperatives' had searched for yield by means of investing more in securities, the moderate proportion of such investment, which registered at 14.5 percent with respect to total assets, was not a major concern. In addition, the majority of such investment was in debt instruments, which accounted for 88 percent of the total investment value. In fact, the investment choices were restricted by regulations which allowed savings cooperatives to invest only in certain types of assets. Namely, they were allowed to invest only in high-quality low-risk securities, such as government and state-owned enterprise bonds, bonds issued by financial institutions or corporate bonds with A- or higher ratings. Thus, credit risk of savings cooperatives' securities investment remained limited. However, the presence of market risk should still be monitored cautiously as it could cause fluctuations in the investment value should interest rates rise in future.

Furthermore, extending credit to other savings cooperatives served as an additional channel for yield enhancement executed by some savings cooperatives. Cooperatives in need of funding usually relied on short-term loans, either from commercial banks or other cooperatives, which had lower interest rates than long-term ones, while using it to lend long-term to their members. Cooperatives engaging

in this scheme incurred liquidity risk, which might in turn affect the overall confidence in the savings cooperative system.

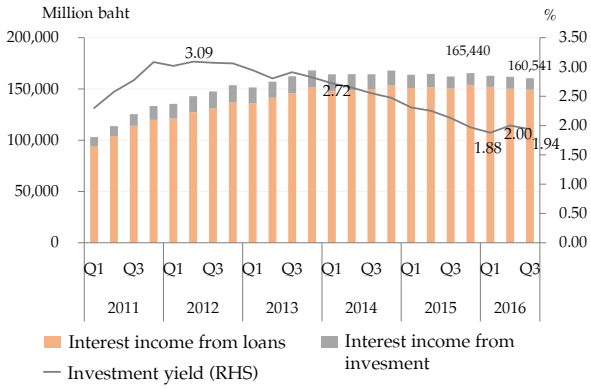
In the periods ahead, due to the growing size of savings cooperatives, their increasing connection with the rest of the financial system, as well as having a large number of stakeholders involved, it was deemed essential to improve and strengthen the regulatory framework and the supervision as well as the risk management process of savings cooperatives so as to be in line with the underlying philosophy of cooperatives.

3.6 Commercial banks

A low interest rates environment did not materially affected commercial banks' profitability, thanks to the effective interest cost management and an increase in fee income. Nevertheless, the risk assessment and investment behavior of banks still needed to be monitored should the interest rates persistently stay low.

Low interest rates environment did not have much of an effect on interest income, which was the main source of income for commercial banks. In the third quarter of 2016, total interest income from loans and investments of the commercial banking system amounted to 160,541 million baht, a slight decline from the fourth quarter of 2015. This was attributed to the lower interest income from loans, because banks decreased lending rates during 2016, and to the decline in interest income from bond investment amid the lower investment yields **(Chart 3.6.1)**.

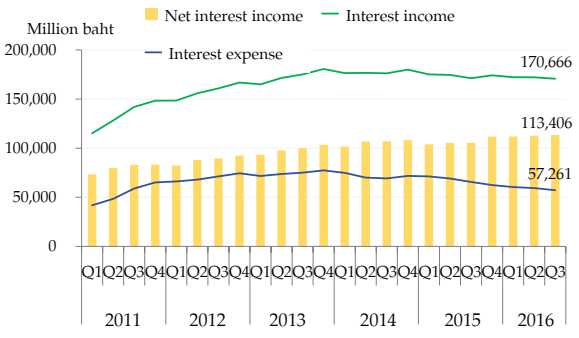
Chart 3.6.1 Commercial banks' interest rate income from loans and investment



Source : Bank of Thailand

Banks also managed their interest expense to compensate for the lower interest revenue. Most banks reduced interest rates on special fixed deposits and shifted the funding source to cheaper current accounts and savings accounts (CASA). Consequently, the commercial banking system was able to lower interest expense and maintain stable net interest income **(Chart 3.6.2)**.

Chart 3.6.2 Commercial banks' interest income, interest expense and net interest income



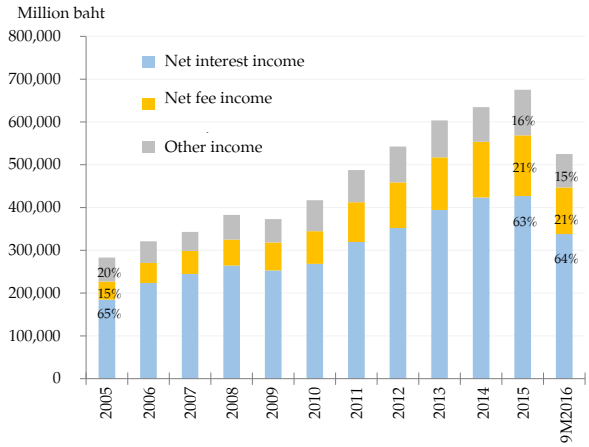
Source : Bank of Thailand

Going forward, how commercial banks would further manage the structure of deposit funding to lower their interest costs needed to be monitored, given that

they had already accumulated quite a high level of CASA.

Commercial banks had also diversified their sources of revenue more toward fee income. The share of net fee income to total income of the banking system constantly increased, from 15 percent at the end of 2005 to 21 percent at the end of the third quarter of 2016 **(Chart 3.6.3)**. This was partly due to the increase in fees from the rising volume of financial services performed under the prevailing low interest rate environment, such as brokerage fees on securities transactions, selling agent fees on insurance and mutual fund products, and financial advisory fees from securities underwriting and bond trading.

Chart 3.6.3 Structure of commercial banks' income



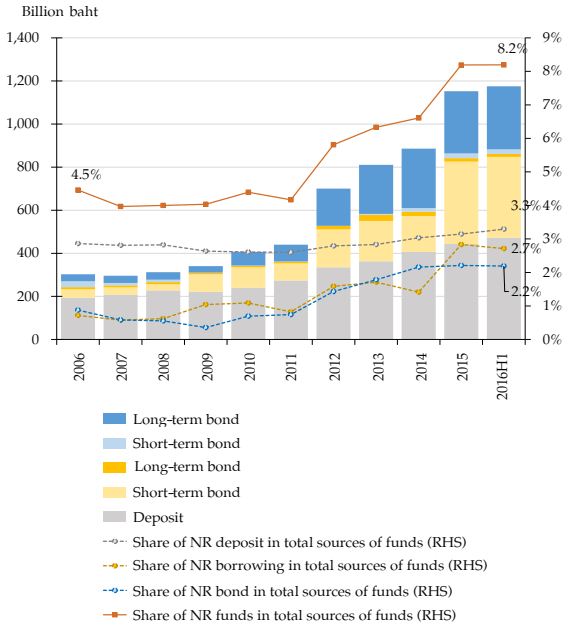
Source : Bank of Thailand

The roles of commercial banks and their financial conglomerates as intermediaries offering various types of financial services were deemed critical, both in (1) the determination of fees, rates or returns on financial instruments to appropriately reflect the associated risks and (2) the offering of financial products to investors in general with accurate, comprehensive and clear information and without forcing cross-selling of financial products. Accordingly, guidelines on the market conduct became one of the regulatory policies being actively promoted by the BOT, the SEC and the OIC. The purpose of this market conduct regulation was to protect financial consumers as well as to monitor emerging risks in a way that would be consistent with the developments in the financial system which had become increasingly more complex and more connected. *(Box 2 : Risks to financial stability from interconnectedness between the commercial banking system and non-banks*).

In the medium term, a yield snapback was expected to have a limited impact on commercial banks. Banks mainly held short to medium term bonds while the exposure was minor in relation to their capital base. Therefore, any change in interest rates would have limited effects on banks' financial positions. **Meanwhile, the main source of funding for commercial banks was still domestic deposits,** accounting for almost 80 percent of the banking system's total liabilities, thus providing a stable funding base. Furthermore, the offshore funding and the non-resident borrowings and deposits registered just 8.2 percent of total funding sources **(Chart 3.6.4)**. Despite the upward trend since 2012, the current proportion of such non-domestic funding source was

still low compared to the 20 percent level[10] recorded before the 1997 financial crisis, and was also lower than those of ASEAN 5 countries.[11]

Chart 3.6.4 Non-resident sources of funds of commercial banks



Source : Bank of Thailand

In addition, sources of funds from non-resident and banks' bond holdings were not very interest rate sensitive. In fact, the growth of non-resident funding sources mainly stemmed from the short-term borrowings from offshore parent companies with relatively low rollover risk. Another type was the issuance of long-term bonds to foster offshore credit and investments of Thai corporates, hereby reducing risks from both maturity and currency mismatches.

[10] Estimated from the combined amount of foreign deposits and offshore borrowing.

[11] ASEAN 5 countries are Thailand (8.2%), Malaysia (8.5%), Indonesia (18.7%), the Philippines (16.9%), and Singapore (39.1%). Figures in parentheses refers to the NR share in each country.

Box 1 : Supervision of frequently redeemed mutual funds and investment in risky assets *(written by the Securities and Exchange Commission)*

In its oversight of capital market stability with respect to asset management companies (AMC), the SEC conducts regular and close offsite monitoring of mutual funds. All aspects of risks are assessed, namely market risk, credit risk, and liquidity risk, both at the industry-wide and individual fund levels. Changes in credit ratings of debt instruments that funds invest in and news that may affect funds are monitored. The supervision encompasses:

1. Supervision of frequently redeemed funds. There are two types of quasi-deposit and frequently redeemed funds: (1) money market funds (MMF) and (2) daily fixed income funds (daily FI). Given the rapid growth of these funds in the past 5 years and strong connections with the financial system, risks associated with such funds are closely monitored by the SEC.

According to the SEC guidelines, MMF's investments are subject to more constraints than daily FI. The major constraints are:

(1) Stricter single entity limit.
(2) Types of investment assets. MMF can only invest in deposits or high-quality debt instruments with a short-term credit rating of at least the second highest or long-term credit rating of at least the third highest.
(3) Investment in foreign assets must not exceed 50 percent of net asset value (NAV) of fund under management.

As daily FI can invest in risker assets than what MMF does, risks are closely monitored by the SEC. These include issuer concentration, concentration of credit ratings, time to maturity, liquidity asset ratio, unit redemptions. Stress tests are also conducted to gauge the adequacy of liquidity assets to accommodate panic redemptions.

In addition to off-site monitoring, the SEC performs on-site audits of risk management systems of AMC. The audits cover market risk, credit risk, and liquidity risk, as well as stress tests on AMC. In the event that shortcomings have been identified, AMC will be instructed to make improvements and results are monitored until they are completed. Other activities of the SEC in this regard include liaison with AMC, Association of Asset Management Companies, and Thai Bond Market Association for information exchange and joint stipulation of regulations. Supervision tools under the SEC regulations to protect investors and mitigate knock-on effects on capital market stability include guidelines for setting aside problem assets, halting sales and redemption of fund units.

In addition to consideration of portfolio risks, the SEC places emphasis on promoting proper investor understanding. Investors must understand the important characteristics of daily FI so that they do not mistake such funds as being the same as MMF, or that daily FI's risks are low similar to MMF or bank deposits. Accordingly, the SEC and the private sector have promoted mutual understandings on the following issues:

(1) Daily FI's name must not be misleading
(2) Daily FI's disclosure and warning must be presented in its prospectus and factsheet containing a clear explanation of differences between daily FI and MMF and a warning that, unlike MMF, daily FI is not required to invest in low-risk assets.
(3) Information on daily FI in the media, such as AMC's website, must not be put in the same group as MMF because investors may not be able to distinguish the differences between these two types of funds.
(4) Regarding fund sales, AMC and the limited broker dealer underwriter (LBDU) must have systems to ensure that their investment advisors receive comprehensive information about the features, risks and differences between daily FI and MMF so that they can accurately advise investors. Investment advisors must place emphasis on providing a clear communication and explanation to investors.

2. Supervision of daily FI's investment in risky assets. Funds were found to invest in risky assets to enhance portfolio returns. Examples are non-investment grade bonds or unrated bonds, which are sold in private placement to not more than 10 subscribers (PP10), and public disclosures are not available.

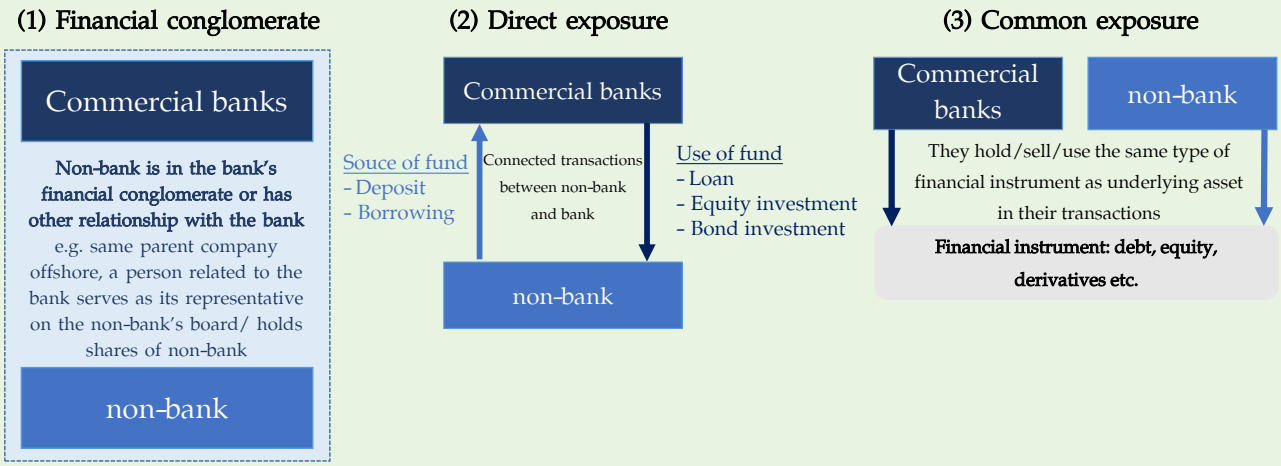
To mitigate portfolio risks from investment in such assets, the SEC 's guideline on characteristics of debt securities that funds can invest in stipulates that, AMC must have access to information on the securities issuer and information on price that reflects fair value. In addition, in the case of non-investment grade bonds or unrated bonds, exposure limits to each issuer are more conservative. In the case that public disclosures are not available (i.e. no filing or the issuer is not a listed company), the exposure limit to such debt issue is set at 15 percent of NAV. The SEC will conduct theme inspection should there be a buildup of material risk. For instance, audits of the quality review process of unrated bonds have been carried which show that investment in such bonds have been increasing.

Box 2 : Risks to financial stability from interconnectedness between the commercial banking system and non-banks

Developments in the financial system and the prolonged low interest rate environment have overtime contributed to the increasing importance of non-bank financial institutions (non-bank) such as mutual funds, insurance companies, savings cooperatives, credit card and personal loan companies. In relation to the commercial banking system, the growing non-banks have implications in several ways, which could pose rise to risks to banks' income, liquidity, reputation, and ultimately to the overall financial stability. This article thus aims to present a framework for risk assessment and transmission mechanism between the commercial banking system and non-banks, and consequently provide a preliminary assessment of the non-bank implications to the stability of Thailand's financial system.

Risk assessment and transmission mechanism between banks and non-banks can be assessed from the three critical linkages **(Chart 1.1)**.

Chart 1.1 Three types of linkages



(1) Linkage via financial conglomerate[12]**:** refers to the interrelationship between banks and non-banks in the same financial conglomerate as well as other applicable cases such as those that have same parent companies offshore, or having a person related to the bank serves as its representative on the non-bank's board/ holds shares of non-banks.

(2) Linkage via direct exposure: refers to financial transactions between banks and non-banks on both sides, which are *sources of fund* by the amount that banks take deposit and borrow from non-banks and *uses of fund* by the amount that banks lends to or invests in debt / equity instrument issued by non-banks.

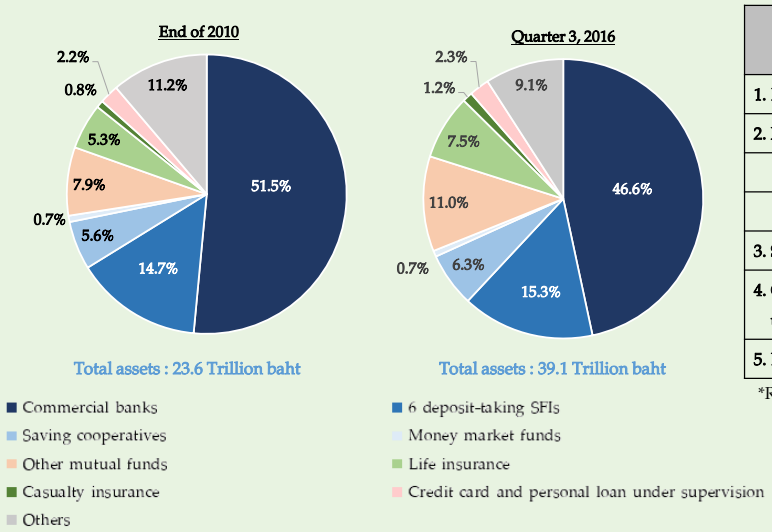
(3) Linkage via common exposure: refers to having the same type of financial instruments commonly being hold, sold, or used by banks and non-banks as collateral or

[12] Financial conglomerate refers to entities conducting commercial banking business, other financial services, and other businesss in supportive of financial services, according to the Financial Institution Business Act B.E. 2551.

underlying asset in their transactions. A rapid decline in value of such instruments may have spillover effects and thus systemic impacts.

Given the commercial banks' key roles in financial intermediation, the importance of non-banks has become more apparent. In the third quarter of 2016, the top five non-banks in terms of total asset growth since 2010 were insurance, mutual fund, savings cooperative, credit card and personal loan, and deposit-taking specialized financial institutions **(Chart 1.2)**. Therefore, in monitoring and assessing risks to financial stability, it is vital to incorporate risks associated with the interconnectedness between the banking system and non-banks.

Chart 1.2 Total assets of different types of financial institutions as of quarter 3, 2016



Top 5 fastest growing non-bank*	% growth Q3/2016 relative to 2010
1. Insurance	134.3%
2. Mutual funds	124.7%
Mutual funds in generalInsurance	130.9%
Money market funds	57.5%
3. Saving cooperatives	85.4%
4. Credit card and personal loan under supervision	73.6%
5. Deposit taking SFIs (6 SFIs)	72.8

*Rate of growth of commercial banks = 50.3%

Note : 1) Others consist of non-deposit taking SFIs, finance companies, leasing companies, provident funds, asset management companies, securities companies, nano finance companies, government pension fund, credit unions, agricultural cooperatives, pawn shops. 2) Total assets of the mutual fund business are calculated from NAV of all funds under management . 3) Nano financial assets are calculated from outstanding loan amount.

Source : Bank of Thailand

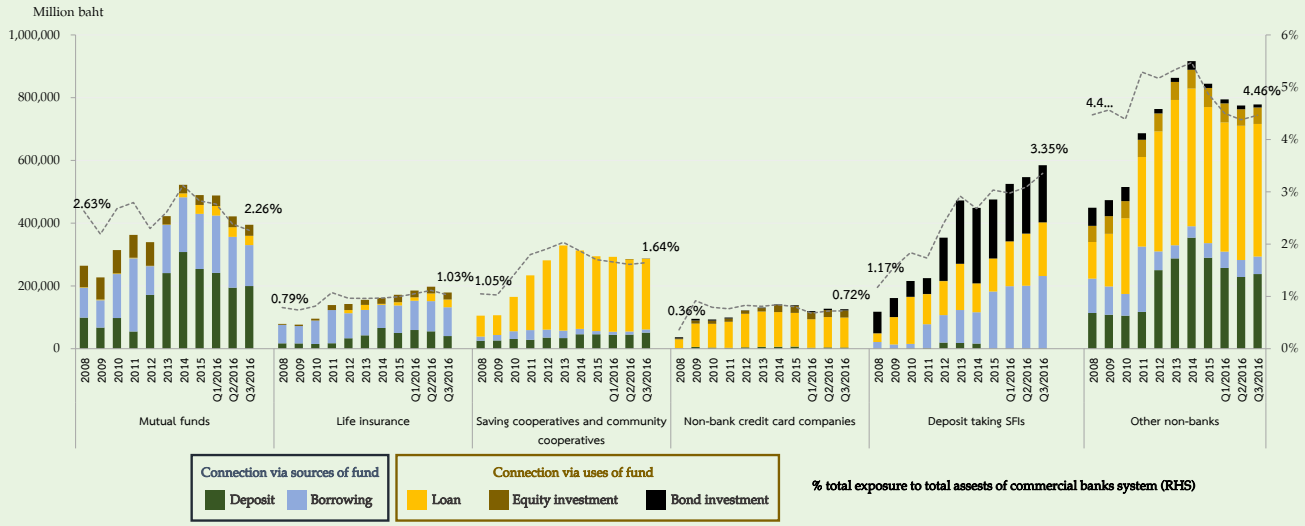
The preliminary assessment suggests the following results:

(1) Risks via financial conglomerate and other types of relationships. Almost all Thai commercial banks have non-bank subsidiaries in their financial conglomerate. These companies are playing increasingly important roles in Thailand's financial system. In particular, asset management companies of major commercial banks' conglomerates are all significant players in the mutual fund business. Given the growth momentum of these non-bank subsidiaries, the banking conglomerate has benefited in terms of enlarging revenue sources, the non-bank business operations however may have adverse effects on income, liquidity and reputation of the parent bank. Nonetheless, most commercial banks have recently put in place their risk management policies that extend to their subsidiaries and/or establish guidelines for providing liquidity facility support. The Bank of Thailand, in conjunction with relevant supervisory authorities——the SEC, the OIC, and the Ministry of Finance——also place critical emphasis on developing a framework for consolidated

supervision covering liquidity risk management, capital regulations, guidelines for cross-selling financial products within the financial conglomerate, as well as addressing regulatory arbitrage issues between financial service providers.

(2) Risks from direct exposure. The amount of financial transactions between banks and non-banks, in regard to both sources and uses of funds, had continuously risen from 1.24 trillion baht in 2008 to 2.56 trillion as of the third quarter of 2016 (Chart 1.3). The results show that mutual fund and life insurance businesses are linked to the banking system as banks' source of fund providers, via taking deposits and debt instruments issued by banks. Hence, liquidity risk in the banking system may arise in the case of massive panic withdrawal of deposits by such non-banks or banks' debt issues are not rolled over. For non-banks which are credit providers (such as deposit taking SFIs, savings cooperatives, credit card and personal loan companies), they are mainly linked to the banking system as users of banks' funds. Thus, non-banks' default on repayment may give rise to a systemic credit risk. To contain the spillover effect from the growing interconnectedness of both sides, the Bank of Thailand has ensured prudential regulations by warranting sufficient mandatory liquidity coverage (LCR) ratio, upholding the single lending limit (SLL), maintaining loan provisions and capital funds corresponding to the risk level of such loans.

Chart 1.3 Summary of direct exposure of each type of non-bank to the banking system



Note : 1) Others consist of non-deposit taking SFIs, finance companies, leasing companies, provident funds, asset management companies, securities companies, nano finance companies, government pension fund, credit unions, agricultural cooperatives, pawn shops. 2) Total assets of the mutual fund business are calculated from NAV of all funds under management. 3) Nano finance assets are calculated from outstanding loan amount

Source : Bank of Thailand

(3) Risk from common exposure. Common exposure risk was found to be limited but on an upward trend. For example, mutual funds and insurance companies are major holders of the government bonds and the Bank of Thailand bonds (30 percent of outstanding value as of the third quarter of 2016). Massive sales of these bonds by non-banks may affect

bond prices and banks that hold these bonds would incur losses, especially in the event of panic fire sales, bond values would plunge rapidly.

In conclusion, the expansion of non-banks is a critical factor in overseeing Thailand's financial stability. This is because risks arising from non-banks could adversely affect the banking system via various dimensions — via financial conglomerate interrelationships, via direct exposure, and via common exposure. Although the assessment, based on financial conglomerate and direct exposure information, revealed that on the whole the linkages were rather small, they are continuously increasing. Therefore, the relevant authorities have focused on raising the levels of financial stability oversight in many respects, including assessment and monitoring of non-bank risks, analysis of their linkages to the commercial banking system, coordination among the supervisory college to develop a framework for consolidated supervision, and information sharing. For example, information exchange with the SEC and joint development of a database on individual financial institutions for linkage analyses via common exposure. The measures aim to ensure the country has effective and timely oversight of financial stability in the face of rapidly changing situations.

Chapter 4: Promoting financial stability and key supervisory development in 2016

To maintain both financial stability and to prevent a single point of vulnerability from graduating to systemic risk require close coordination between regulatory bodies to continually assess risk and financial fragilities. In addition, the development of the efficient policymaking process and effective macroprudential measures to address and mitigate emerging new risks is essential. In other words, such measures should be implemented in a timely manner to prevent an accumulation of systemic risk and should be tailor-made for the targeted segment so as to limit any side effect. Moreover, the Bank of Thailand (BOT) together with the Securities and Exchange Commission (SEC) and the Office of Insurance Commission (OIC) have been in collaboration to create a common risk assessment matrix (RAM) which would help enhance the standard for stress testing on the financial system.

In 2016, the BOT introduced new regulations for various types of financial institutions and revised the regulations regarding the payment system supervision. This is to ensure that the financial stability oversight will be executed in a way that is more inclusive and suitable for the changing environment and financial landscape. Such endeavor aims at striking a balance between the financial system development and effectively maintaining financial system stability so that it will be resilient to any shock that may emerge in the future.

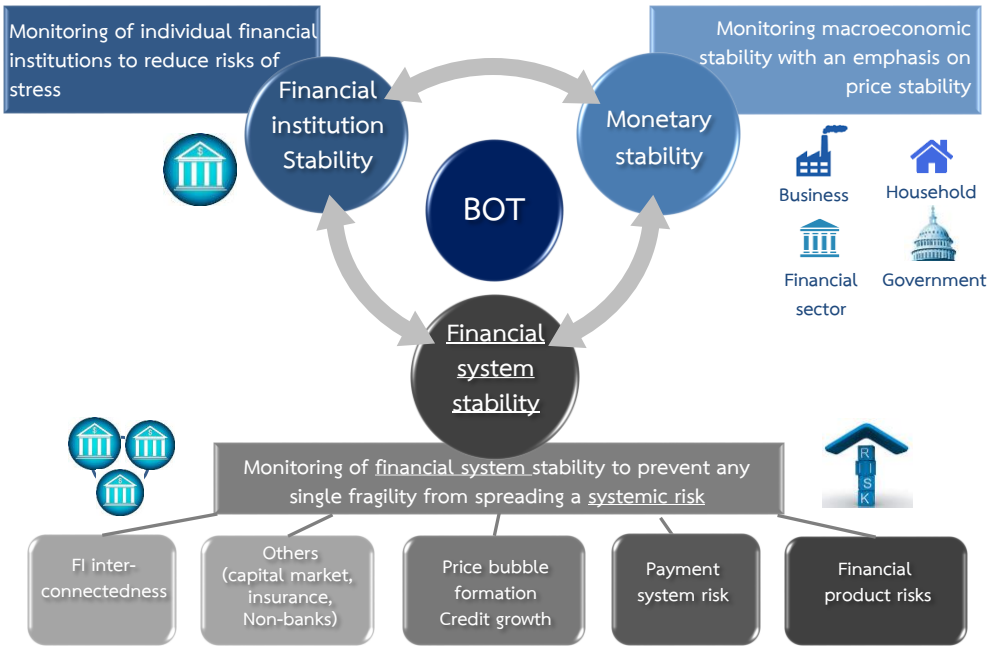
4.1 Policies to promote financial stability

A set of policies used by central banks to mitigate systemic risks is generally referred to as macroprudential policies. These differ from the monetary policies whose main purpose is to maintain economic and price stability. It is also distinct from the microprudential policies which are used to supervise the financial institutions to ensure the stability of each individual institution **(Chart 4.1.1)**.

In principle, macroprudential policies are designed to mitigate systemic risk, which can be defined as: **(1) risk from interconnectedness among financial institutions[13] and (2) risk build-up that could lead to price bubbles and financial crises,** especially the build-up stemming from the continually high credit expansion.

[13] "Financial institutions" in this chapter refer to financial institutions as defined in the Financial Institution Business Act (B.E. 2551), financial service providers in a similar category as commercial banks, and other financial service providers under the supervision of the Bank of Thailand, the Securities and Exchange Commission, and the Office of Insurance Commission.

Chart 4.1.1 Objectives of stability monitoring



Source : Bank of Thailand

Accordingly, macroprudential policies can be classified according to their purposes as follows[14] :

(1) Capital and loan loss provision policy This type of policy tool allows for flexible adjustments to the capital adequacy ratio and the loan loss provision level of financial institutions, with the key purposes being:

- To reduce risks from interconnectedness among financial institutions. According to the Basel Committee on Banking Supervision (BCBS)[15], any financial institution identified to be the systemically important financial institution (SIFI) with a high level of interconnectedness to the financial system must maintain a higher level of capital than other financial institutions. According to the BCBS recommendation, the assessment of SIFI depends on various factors such as size and the importance of an institution's business, the interconnectedness with other institutions, and the complexity level of their businesses.

- To cope with the risk build-up and the potential bubbles, the requirements on the capital buffers and loan loss provisions can be used to achieve this goal. The boom period, when the economy is expanding with persistently high credit expansion, may provide the environment for price bubbles to emerge and risks to be

[14] International examples are from Committee on the Global Financial System. (2012) "Operationalizing the selection and application of macroprudential instruments." CGFS Paper No. 48.

[15] Basel Committee on Banking Supervision. (2013) "Global systemically important banks: Updated assessment methodology and the additional loss absorbency requirement."

underpriced. This condition can be assessed via, for example, the behaviors of credit growth and credit concentration or a high credit to GDP ratio relative to its long-term trend (credit to GDP gap). **Therefore, during this boom time, capital and provision requirements might be tightened to mitigate the potentially emerging risks (counter-cycle)**. Also if there is a risk accumulation in a specific sector, such as in a certain type of loans, sector-specific capital and provision requirements can be implemented to target the risk in that specific sector.

(2) Liquidity policy Liquidity-related tool may be considered when there are signs of behaviors that may potentially lead to liquidity risk, such as maturity mismatching in the financial system and dependency on wholesale funding.

(3) Credit policy This type of policy refers to regulations that limit the amount of credit a financial institution can extend to a borrower. For instance, the maximum loan to value ratio (LTV) is commonly used to prevent price speculation in the real estate sector and/or to reduce the overheating in the mortgage market when prices expand rapidly. Another tool is to set a ceiling for the debt-service ratio (DSR) or the debt-to-income ratio (DTI) to prevent an over expansion of the overall household debt or to prevent abnormal credit expansion for specific types of loans

Thailand has been employing various types of macroprudential policies since 2002. The policies issued are mostly credit and provision-related, notably the policies on personal loans, credit card loans, and mortgage loans **(Table 4.1)**.

Although the Thai financial system currently remains stable, a close monitoring of financial fragilities going forward is still essential so as to be prepared to issue policies which could prevent or mitigate systemic risk. **Looking ahead, key risks to monitor are:**

(1) Lower debt serviceability among small and medium-sized enterprises (SME) due to the sluggish economic growth might cause the loan quality to deteriorate further and consequently led financial institutions to tighten their lending standards even more, resulting in a credit crunch in some business sectors.

(2) High level of household debt and financial fragility of the low-income households. Low-income households with a high level of debt relative to income and a low level of liquidity had a thin cushion for risk compared to other types of households.

(3) Search-for-yield behavior of investors and underpricing of risks amid the prolonged low-interest rate environment. The monitoring on this issue would also be focused on the **potential effects of the yield snapback** on borrowing costs and debt rollovers for the business sector as well as on the interest burdens born by both the business and household sectors.

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Table 4.1: Thailand's macroprudential policies

Policy measure	Purpose	Details
Setting a maximum loan to value ratio (LTV)	Pre-emptive measure to prevent speculation in the real estate market and to reduce overheating of mortgage loan growth	- 2003: set a mortgage ceiling for commercial banks to no more than 70% of collateral (LTV < 70%) for houses valued over 10 million baht. - 2009: canceled the LTV ceiling of 70% set in 2003, changed to a flexible LTV that better reflects credit risks. This is done by specifying risk-weighted capital requirement and allowing risk weight to adjust with LTV for houses valued over 10 million baht. ○ If LTV > 80%, risk weight is 75% ○ If LTV ⩽ 80%, risk weight is 35% - In 2011, issued a LTV measure for mortgage of high-rise housing valued less than 10 million baht ○ If LTV > 90%, risk weight is 75% ○ If LTV ⩽ 90%, risk weight is 35% - In 2013, issued a LTV measure for mortgage of ground-level housing valued less than 10 million baht ○ If LTV > 95%, risk weight is 75% ○ If LTV ⩽ 95%, risk weight is 35%
Counter-cycle provisioning	Provisioning for possible impaired loans	In 2012, the BOT mandated commercial banks to set aside provisions to buffer against risks of NPLs in case of an economic slowdown.
Setting a monthly credit limit and minimum payment for credit card loans	A measure to slow down household indebtedness and instill financial discipline	- Monthly credit limit should not exceed five times of monthly income for personal consumption and credit card loan. - Setting a minimum monthly income for credit card loans from commercial banks at 15,000 baht and raising a minimum monthly payment from 5% to 10% of total amount owed.

Moreover, an increase in economic uncertainties coupled with the inter-connectedness within the financial market which became more complex, and non-banks becoming more important, financial stability oversight required a well-rounded forward-looking risk assessment. This could be achieved through having a close coordination between regulatory agencies to assess the overall risks in the financial system together as well as to develop new tools to cope with new types of risks and apply them in a timely manner. This well-designed policy measures should be capable of effectively preventing a systemic risk build-up as well as targeting the proper segments with limited side effects. Also, the authorities must also prepare in advance the possible policies to be used for managing risks as well any challenging situation which might emerge during the crisis time.

The BOT, together with the SEC and OIC, have developed a common risk assessment matrix (RAM) for the first time in 2016. This tool was used to generate inputs for the stress testing to be performed on financial institutions in 2017. The use of RAM had enhanced the standard for stress testing by means of producing the scenarios which were more consistent and connected *(Box 3: Assessing risks in the Thai financial system using the Risk Assessment Matrix*). Furthermore, the BOT had also set up the Financial Stability Unit (FSU) to be the center for monitoring risks in the financial system as well as developing measures to mitigate and prevent systemic risk. FSU also acted as a core taskforce to coordinate with other regulatory agencies regarding financial stability surveillance.

4.2 Major supervisory development in 2016

4.2.1 Implementation of Basel III supervisory framework

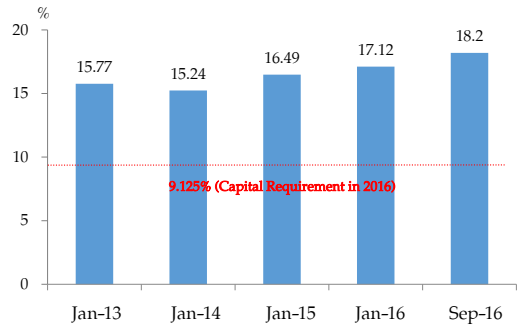
International standards regarding banking supervision have been developed and improved constantly to reflect risks and the changing environment. The BOT has gradually introduced the newly developed framework for Thai commercial banks as deemed appropriate. In fact, the minimum capital adequacy ratio following the Basel III[16] became effective for all Thai commercial banks on January 1, 2013, while other Basel III regulations implemented as of January 1, 2016 include:

(1) A capital conservation buffer to absorb loss during the periods of stress requires commercial banks to maintain an additional Common Equity Tier 1 (CET1) ratio of 2.5 percent. The requirement will be phased in at 0.625 percent per year to reach the target of 2.5 percent by 2019. Therefore, in 2016, the total required CET1 ratio was 9.125 percent of risk-weighted assets. Note that, since the start of the Basel III framework in 2013, the capital ratio of the commercial banking system

[16] The regulation requires commercial banks to maintain 3 types of capital as follows: 1) common equity tier 1 ratio ⩾ 4.5 percent, 2) total tier 1 ratio ⩾ 6 percent, and 3) total capital ratio ⩾ 8.5 percent.

has always been well above the required level, averaging between 5-18 percent **(Chart 4.2.1)**.

Chart 4.2.1 Average capital ratio for the commercial banking system (January 2013 - September 2016)



Source : Bank of Thailand

(2) The liquidity coverage ratio (LCR)[17] requirement was implemented with the purpose of having commercial banks maintain an adequate stock of liquid assets to meet their potential outflows, as classified by types of funding, under short-term severe liquidity stress scenarios. The LCR was implemented on January 1, 2016 with the phase-in starting at 60 percent and increasing 10 percent each year to 100 percent in 2020. The phase-in arrangement was to allow more time for banks to adjust to the new regulation. Since the implementation, all commercial banks satisfied the requirement, with the LCR of the commercial banking system averaging between 167.1-178.6 percent (January - August 2016).

Other regulatory frameworks are currently under consideration. The BOT, in collaboration with commercial banks, is in the process of assessing the overall impact of the new BCBS regulatory frameworks. The results will be incorporated into the consideration regarding the appropriateness and necessity as well as the timing of the implementation of these regulations (Details provided in the 2015 Supervision Report)

4.2.2 Supervision of specialized financial institutions (SFIs)

Specialized financial institutions (SFIs) play an important role in the Thai economic and financial systems. Together, they held over 5 trillion baht worth of assets, accounting for 25 percent of the total assets in the financial system. In fact, the asset size had doubled within 7 years.

Altogether, SFIs have 2,500 branches distributed all over Thailand, especially in areas outside of Bangkok. **They are crucial in providing financial access for those who are not served by commercial banks**, such as low-income households, farmers, and SMEs particularly small SME (SSME). **Moreover, another key function of SFIs is to carry out government policies.** For example, SFIs act as a key distributor for welfare payment, a provider of financial support for the targeted groups, or even a promoter of business improvement to enhance national competitiveness. Hence, the stability of SFIs is important for maintaining the overall stability of the Thai financial system.

Transferring the supervision of SFIs to the BOT was part of the state-

[17] LCR is a ratio of high-quality liquid assets (HQLA) to total net cash outflows over 30 days during a stress period. The regulation requires banks to maintain LCR ⩾ 100.

owned enterprises (SOE) reform based on the Cabinet's resolution on December 2, 2014. The Cabinet approved a recommendation by the State Enterprise Policy Office (SEPO) that detailed **the role of the BOT in overseeing SFIs in 4 areas: (1) issuing supervisory rules, (2) validating SFIs' management, (3) monitoring and examination, and (4) rectifying problems.** The transfer of these roles to the BOT allowed for independent supervision of SFIs and for a clear assignment of roles, notably the role of the policymaker and the owner by the Ministry of Finance and the role of the regulator by the BOT. The Minister of Finance issued an order on April 2, 2015 for the BOT to supervise eight SFIs, according to Section 120 of the Financial Institution Business Act B.E. 2551. The roles of the BOT were according to those stated in the Cabinet's resolution mentioned above.

Nevertheless, as each SFI was established to fulfill missions binding in law, the approach to business management differs across SFIs in terms of customer targets and types of services **(Chart 4.2.2).**

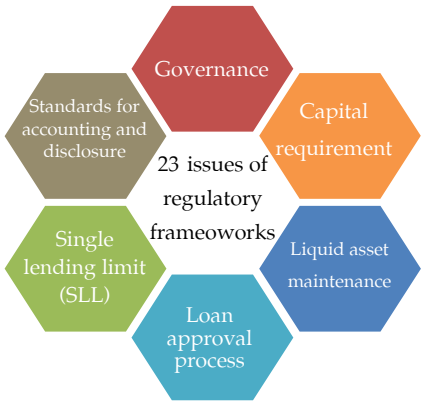
However, several SFIs take in deposit and provide financial services similar to commercial banks. **Thus, the regulatory frameworks for SFIs remain similar to those applied to commercial banks but with adjustments to suit SFI's specific missions and are not as complex.** In 2016, the BOT released 23 issues of regulatory frameworks for SFIs in 6 areas as follows **(Chart 4.2.3)**:

Chart 4.2.2 Differing missions of SFIs

Asset / Liability	All products all customers	All products limited customers	Limited products all customers	Limited products limited customers
Depository / All depositors	Government Savings Bank Islamic Bank of Thailand	Bank for Agriculture and Agricultural Cooperatives (farmer borrowers) Small and Medium Enterprise Development Bank (SME borrowers)	Government Housing Bank (mortgage product))	
Depository / Limited depositors (borrowers: operating account		Export–Import Bank of Thailand		
Non-depository				Small Business Credit Guarantee Corporation (credit guaranteeing), Secondary Mortgage Corporation (securitization)

Source : Bank of Thailand

Chart 4.2.3 Areas of SFI supervisory standards



Source : Bank of Thailand

(1) Governance This is to ensure competency, integrity and fiduciary duty of the SFI management.

(2) Capital requirement SFIs must ensure that they have adequate capital to cushion for possible future losses

(3) Liquid asset maintenance SFIs must have sufficient liquidity to cope with sudden cash outflows and to assure public confidence. SFIs are required to have an appropriate liquidity management as well.

(4) Loan approval process SFIs must have an appropriate and cautious loan approval process and must set aside sufficient provision for possible future loss.

(5) Single lending limit (SLL) This is to prevent the concentration of risks in a specific borrower that could affect the stability of SFIs.

(6) Standards for accounting and disclosure Accounting standards and financial statements must meet public standards for comparison purposes and transparency. SFIs must separately disclose information regarding the public service account (PSA).

In addition to these areas, the BOT also issued a special framework for the SFI that also complies with the Islamic banking practice which is not associated with interest payments. Such framework covers areas similar to the supervision of other SFIs.

Most frameworks came to effect starting on January 1, 2017, with an exception of regulations regarding the preparation and disclosure of financial statements which would take effect starting in the second quarter of 2016. Also, as capital requirement to address complex market risks and liquidity reports take time to prepare, the regulation will be implemented starting from January 1, 2018 to allow for the transition periods as well as the preparation to meet the requirement.

4.2.3 Framework for bank resolution

The global financial crisis in 2007 had a profound effect on economic and financial stability worldwide. In response, efforts have been made in several countries to establish frameworks for resolution of distressed banks and to put in place coordination framework among related agencies, both domestically and across borders.

To ensure the effective and timely response in order to reduce potential impacts on financial and economic stability, the BOT acknowledges the importance of an effective resolution framework. Therefore, the BOT has proceeded in developing the essential infrastructure to facilitate orderly bank resolutions that are well-suited in the context of Thailand. This in turn will help prevent the potential contagion and impact on the economy and financial system as a whole. **In addition, the BOT has planned for banks to undertake recovery planning, which will further** strengthen their risk management and enhance the preparation for potential crises.

4.2.4 Improvement of supervisory laws for payment system

Payment system is an important mechanism that drives the financial system, supports economic activities, and strengthens the financial system and the economy as a whole. Accordingly, the BOT, in collaboration with the Ministry of Finance (MOF), drafted the

Payment Systems Act to regulate and supervise the payment systems and services. The Payment Systems Act was drafted with the aims to: (1) make payment system supervision more efficient, complete and comprehensive; (2) lend support to the Thai payment system development so as to be internationally accepted; and (3) build public confidence in using the electronic payments (e-Payment). The new laws incorporated the Royal Decree Regulating Electronic Payment Service Business B.E. (2551) and the Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (Business of Electronic Money Card). On December 31, 2016, the draft was accepted in principle by the Cabinet and later approved by the Council of State. It is currently in the process of being submitted to the Secretariat of the Cabinet to be proposed to the National Legislative Assembly for future implementation. **The Payment Systems Act will be a key tool in maintaining the stability of the payment systems in Thailand for four important reasons:**

(1) Enhancing Thailand's payment systems to meet international standards. The draft placed an emphasis on the payment finality protection and guarantees collateral assets of members of Systemically Important Payment Systems (SIPS) such as BAHTNET, in an event of a participant's insolvency, in which several countries (e.g. Malaysia, Australia, Singapore, and Hong Kong) had also incorporated in their respective laws. Having a clear legal protection would help mitigate risks in the payment systems and prevent a widespread impact on other members or systemic risk.

Moreover, the new laws articulated the legal basis of the float protection for prepaid transactions from the claims of other creditors in the event of service providers insolvency. Having a proper protection measure would also help build confidence among customers.

(2) Unifying laws related to payment systems supervision. Today, there are several related legislations: Financial Institution Business Act B.E. 2551, the Royal Decree Regulating Electronic Payment Service Business B.E. (2551) and the Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (Business of Electronic Money Card). These legislations are overlapping in nature and could create a burden for businesses to comply with these regulations. For instance, e-Money service providers must receive a license for supervision under two laws.[18] Therefore, the Payment Systems Act will unify related laws into one piece of

[18] The Royal Decree Regulating Electronic Payment Service Business B.E. (2551) and the B.E. Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (Business of Electronic Money Card)

legislation so as to the increase efficiency in supervision. To effectively maintain the stability of Thailand's payment systems, the unified law will also provide the same supervision standard across payment service providers, such as financial institutions, SFIs, and non-banks, which are under the supervision of the BOT.

(3) Creating a flexible regulatory framework to promote innovation. The supervision will be based on related material risks and size of its business. Rules and regulations are also consistent with the size and risks of businesses and applied without hindering payment innovations.

(4) Promoting competitiveness and payment system development at the regional level. The Payment Systems Act aims to build confidence and encourage various types of financial transactions with appropriate, safe, high-standard, and trustworthy consumer protection. The Act will help promote national competitiveness and upgrade payment systems to the regional level as well as help support the government policies on promoting digital economy.

4.2.5 Enhancing other supervisory standards

As the Thai financial system develops, financial institutions are continuingly offering new financial products and services. New services include electronic-based financial services employing advanced technology. These developments, in turn, add more challenges to financial stability surveillance. To improve the supervision standards, the BOT, SEC, and OIC placed importance on enhancing supervisory standards on the following key areas:

(1) Reforming legal frameworks and supervising processes for savings cooperatives. The supervising framework must be prudent and consistent with the principles of savings cooperatives' operations. It should also support management of savings cooperatives to acquire necessary management skills, promote good governance, and manage risks properly.

(2) Increasing restrictions on sales of financial products and ensuring that complete and transparent information is being provided to customers (market conduct). Recently, the BOT set up the Financial Consumer Protection Center. Its role is to ensure that financial institutions provide services of the same standards and are fair to customers. The center will work with other regulatory bodies and agencies related to the financially-related consumer protection to oversee the cross-selling of financial securities and insurance products by commercial banks. It will also supervise the marketing of financial products to customers as well as maintain an appropriate balance on the services provided by financial institutions and on promoting competitiveness within the system.

(3) Enhancing supervision for cyber resilience. Financial institutions must be ready to detect, protect against, cope with risks from cyber-attacks, hereby preventing it from generating a widespread impact on the Thai financial system. This is deemed crucial, given the pace of development of new technology used in providing such financial services. There should also be collaboration across multiple stakeholders to continuously reinforce cyber security in order to instill confidence in customers using the new financial services.

Box 3 : Assessment of risks to the Thai financial system using the Risk Assessment Matrix (RAM)

Changing domestic and global environment poses a challenge to the maintenance of financial stability. Risks to economic and financial stability have increased in complexity, interconnectedness, and pace. As a result, the probability of tail risks to the economic and financial systems is higher than in the past. Therefore, forward-looking risk assessment and scenario building become important tools to evaluate potential risks to the financial system.

The Risk Assessment Matrix (RAM)[19] is a risk assessment tool that specifies scenarios with potential impact on financial stability going forward. It contains 3 key components: (1) sources of risk, (2) likelihood of severe realization in 1-3 years, and (3) expected impact on financial stability. The specified scenarios will be used as references in conducting stress tests for financial institutions to estimate the impact from domestic and external factors.

Using RAM to assess risks in the case of Thailand

The BOT, SEC, and OIC have assessed risks using RAM for 2016 under 3 scenarios as follows:

Scenario	Source of risk	Likelihood of severe realization in 1-3 years	Expected impact
Most likely	Uncertainties in macroeconomic policies of major economies create volatility in the global financial market, while search-for-yield behavior of investors continues	**High probability** - Brexit process goes smoothly and European banking problems are contained - The US Federal Reserve raises policy interest rate in December 2016 - The European Central Bank, the Bank of England, and the Bank of Japan continue their monetary easing	**Medium impact** Economy: Stable, but with distinct impact between (1) export sector affected by the global economy, and (2) domestic economy benefiting from government stimulus Financial markets: Volatile capital flows, higher government bond yields in line with the Fed's interest rate hike, slight improvement in the equity market Government: Continuation of economic stimulus Financial institutions: Search-for-yield behavior, possibility of further investment in risky assets, a slowdown in credit growth as

[19] After the global financial crisis, the International Monetary Fund (IMF) along with regulatory agencies in several countries have developed systematic and interconnected processes for assessment of risks to the financial system. RAM is used as a starting point and a communication tool with the public as reflected in the IMF Staff Reports for the Article IV Consultations with member countries and in the reports on the Financial Sector Assessment Program (FSAP)

Scenario	Source of risk	Likelihood of severe realization in 1-3 years	Expected impact
			businesses substitute towards other types of funding
Moderate	Sluggish global recovery with high volatility in the global financial markets	**Moderate probability** - Contagion from European banking problems, shaky confidence in the EU due to Brexit - A substantial slowdown in the Chinese economy due to unexpected impact of rebalancing and intensifying private-sector debt issues - Loss of confidence among global investors	**Medium to high impact** Economy: Slow, but positive growth with some support from the government offsetting the impact from weak external demand Financial market: Higher bond yields from capital outflows from Thailand and other emerging markets, a decline in equity markets Businesses and households: Lower employment, weaker household and business financial position Financial institutions: Rising NPLs, a slowdown in credit growth and other types of funding Monetary policy: Interest rate cut to help stimulate the economy
Severe	Thailand's credit rating is downgraded by 2 notches	**Low probability** - Credit ratings agencies adjust Thailand's credit rating by 2 notches due to factors affecting economic outlook and causing loss of confidence	**High impact** Economy: Sharp contraction from shaky confidence and shrinking private consumption and investment, while external demand remains weak Financial market: Higher country risk premium leading to sudden capital outflows, higher bond yields, sharp fall in equity markets, and weak Thai baht Government: Constrained public spending to stimulate the economy Businesses and households: High unemployment, failures of some businesses Financial institution: higher NPLs, contraction of credit, withdrawal of cash from financial institutions Monetary policy: Unable to lower interest rate due to constraints on capital outflows

1) Most likely scenario: Uncertainty over macroeconomic policies in major economies has risen. The U.S. Federal Reserve increases its policy interest rate, adding volatility to the global

financial markets and increasing bond yields. At the same time, search-for-yield behavior remains among businesses, households, and financial institutions. Meanwhile, the Thai economy stabilizes as government spending helps offset shrinking external demand.

2) Moderate scenario: This scenario differs from the Most Likely case from higher risks in the global financial markets due to European banking problems, the impact of Brexit on the establishment of the EU, and unexpected slowdown in the Chinese economy due to re-balancing and private-sector debt problems. Nonetheless, the Thai government can stimulate the economy through monetary and fiscal policies to some extent. The Thai economy is then able to expand slightly without contraction. In this scenario, capital flows out of Thailand and other emerging markets to safe haven (especially the U.S. and Japan), raising long-term bond yields. On the other hand, short-term bond yields are lower in line with policy interest rate adjustment.

3) Severe scenario: The Thai economy faces similar global risks as in the Moderate case with additional domestic issues that severely shake up the confidence in the economic outlook. In this scenario, Thailand's credit rating is downgraded by 2 notches, leading to sudden capital outflows. Meanwhile, the government is constrained in its ability to stimulate the economy. Monetary policies cannot be used because an interest rate cut could quicken the pace of capital outflows. These factors along with sluggish global demand cause a sharp contraction of the Thai economy. Furthermore, the country risk premium rises, heightening long-term bond yields. At the same time, asset prices fall.

The use of RAM in stress testing

After assessing overall risks using RAM, the BOT has translated aforementioned scenarios to economic and financial variables for quantitative evaluation (quantification). In doing so, the Bank of Thailand employs a macroeconomic model, financial model, expert judgments, and past experiences to help quantify the impact of the scenarios in terms of economic and financial indicators **(Table 1)**.

Table 1 Examples of economic and financial factors and indicators from RAM

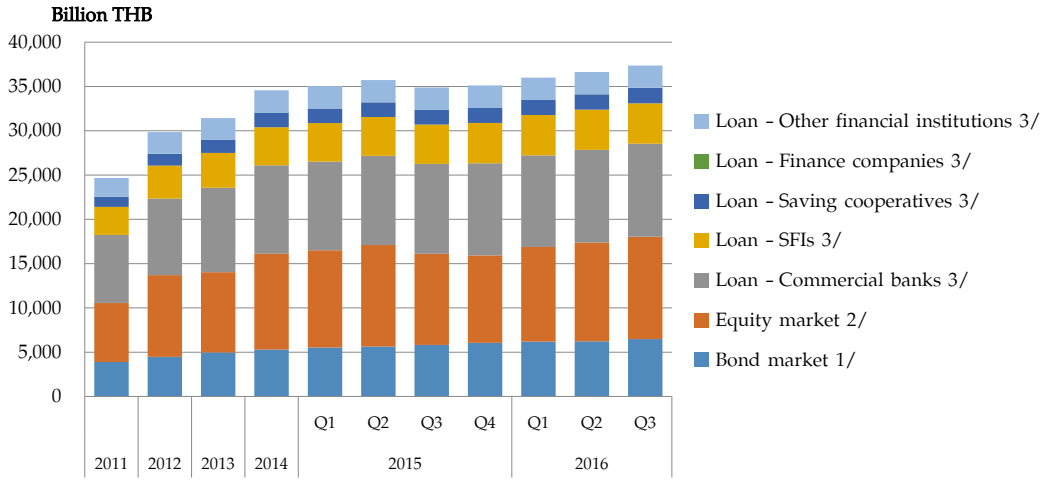
Factors	Most Likely			Moderate			Severe		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
1. GDP growth (Real GDP)	3.2%	3.3%	3.5%	1.0%	1.0%	1.0%	-3.0%	-1.5%	0.0%
2. Number of tourists (%YoY)	5.0%	5.0%	5.0%	0.0%	0.0%	0.0%	-20.0%	-10.0%	0.0%
3. Agricultural price index (%YoY)	1.3%	3.6%	3.6%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
4. Real GDP growth : US	2.5%	2.4%	2.1%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
5. Credit growth	approximately 3-5%			0%	0%	0%	-10%	-5%	0%

Source : Bank of Thailand

The economic and financial factors and indicators will be used in stress test exercise to assess resiliency of financial institutions under possible risk scenarios mentioned above.

Annex: Thai financial system

1. Thai financial system: By types of funding



1/ Par values of bonds issued in Thailand, excluding the issuance in financial sector and non-residents

2/ Market values of listed equities in SET and mai, excluding the issuance in financial sector

3/ Loan to households, non-financial corporations and the government

2. Financial institutions system: Number and asset size of major financial institutions

Types of financial institutions	2016 Q3 P/	
	Number	% of total assets of financial institutions
Depository corporations		
Commercial banks	31	46.70
Specialized financial institutions (SFIs)	6	15.32
Savings cooperatives 1/	1,419	6.28
Finance companies	2	0.04
Money market mutual funds (MMFs)	38	0.69
Other financial corporations		
Mutual funds (excluding MMFs)	1,394	11.02
Insurance companies	86	8.67
Leasing companies	796	1.91
Credit card, personal loan and nano finance companies under regulation 3/ 4/	36	2.33
Provident funds	404	2.47
Government pension fund	1	1.98
Asset management companies	39	0.72
Securities companies	53	0.96
Agricultural cooperatives 2/	3,612	0.58
Pawnshops	616	0.19
Secondary mortgage corporation (SMC)	1	0.04
Thai credit guarantee corporation (TCG)	1	0.10

P/ Preliminary data

1/ Excluding credit unions

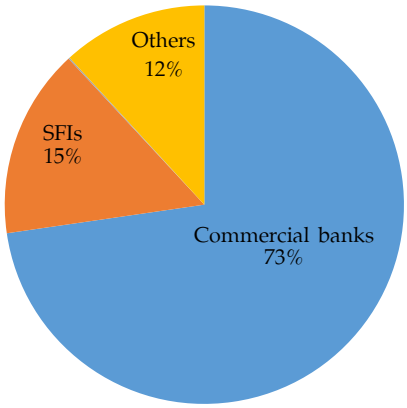
2/ Agricultural cooperatives data are provided as of 2015 Q4

3/ Only including financial institutions with licenses issued by the Bank of Thailand and operate in line with definitions of financial institutions according to Monetary and Financial Statistics Manual 2000

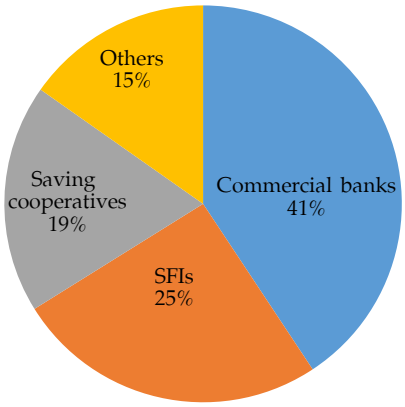
4/ As of 2016 Q3, there were 22 nano-finance companies in total

3. Loan: Corporate and consumer loan

Shares of corporate loan as of 2016 Q3
classified by type of financial institutions

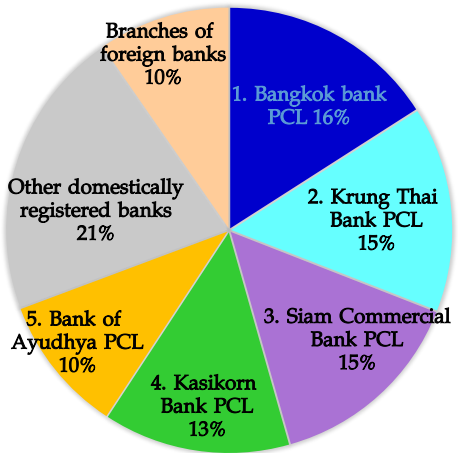


Shares of consumer loan as of 2016 Q3
classified by type of financial institutions

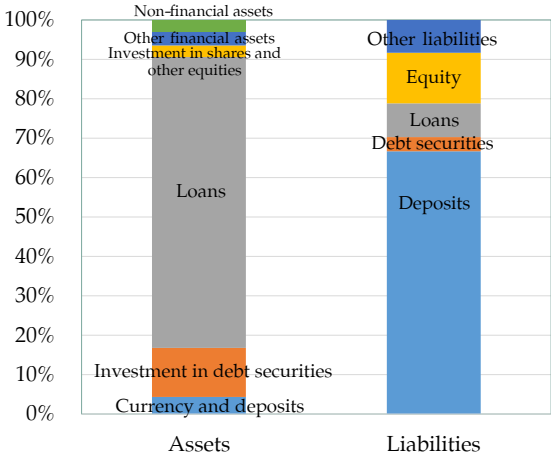


4. Structure of the commercial banking system

Shares of commercial bank by asset size

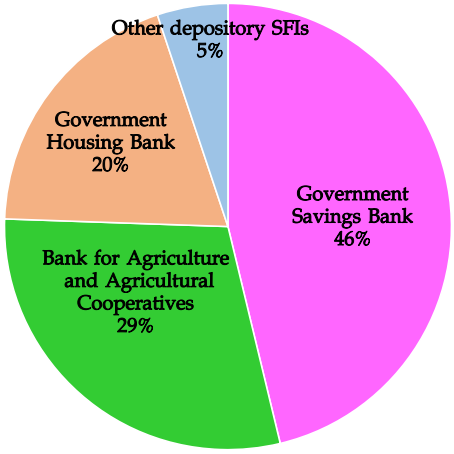


Asset and liability structure of commercial bank

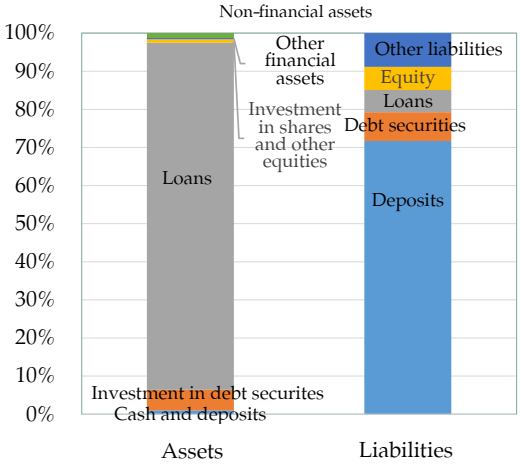


5. Structure of the depository specialized financial institutions (depository SFIs)

Shares of depository SFIs by asset size



Asset and liability structure of depository SFIs



Indicators for financial condition and assessing risk to financial stability

Indicators	2011	2012	2013	2014	2015	2016		
						Q1	Q2	Q3
Overall financial system								
GDP at current price (million baht)[1/]	11,300,485	12,349,026	12,901,498	13,132,234	13,533,596	13,666,438[2/]	13,832,607[2/]	14,002,039[2/]
Funding structures								
Private credit to GDP (times)	1.2	1.3	1.3	1.4	1.4	1.4	1.4	1.4
Stock market capitalization to GDP (times)	0.6	0.8	0.7	0.9	0.8	0.8	0.8	0.8
Bonds market capitalization to GDP (times)	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5
1. Financial institutions								
1.1 Commercial banks								
Total asset (billion baht)	12,981	14,774	16,182	16,746	17,314	17,654	17,704	17,437
% yoy	10.5	13.8	9.5	3.5	3.4	4.4	4.4	1.4
Deposit (excluding Interbank)	7,865	10,000	10,930	11,693	12,022	12,204	12,165	12,099
% yoy	6.8	27.1	9.3	7.0	2.8	3.0	3.4	2.8
Loans (excluding Interbank)	8,476	9,637	10,701	11,240	11,729	11,626	11,779	11,778
% yoy	15.1	13.7	11.0	5.0	4.3	3.3	3.3	2.4
Corporate loan	6,080	6,723	7,473	7,774	8,017	7,901	7,998	7,967
% yoy	14.8	10.6	11.2	4.0	3.1	1.9	2.0	1.1
- Small and medium-sized enterprises (SMEs)	14.4	10.7	14.0	7.5	5.6	3.1	3.5	3.1
- large corporate	15.1	10.5	8.1	0.1	0.1	0.2	0.2	-1.4
Consumer loan	2,396	2,914	3,228	3,467	3,711	3,726	3,781	3,811
% yoy	15.8	21.6	10.8	7.4	7.1	6.5	6.0	5.2
- Housing loan	10.1	11.7	12.5	12.1	9.3	9.3	9.0	7.7
- Car loan	21.8	39.0	8.4	-3.4	1.0	1.7	1.6	1.9
- Credit card and personal loan under regulation	15.0	20.3	14.6	5.0	2.8	1.1	1.6	1.9
- Other personal loan	28.3	27.1	7.3	14.2	12.2	8.4	5.6	4.0
Liquidity (%)								
Loan to deposit	107.8	96.4	97.9	96.1	97.6	95.3	96.8	97.4
Loan to deposit and B/E	89.9	93.1	96.6	95.7	97.0	94.8	96.4	96.9
Asset quality								
NPL Ratio (%)	2.72	2.25	2.15	2.15	2.55	2.64	2.72	2.89
SM Ratio (%)	2.25	2.16	2.40	2.61	2.38	2.26	2.17	2.38
Actual/Regulatory loan loss provision (%)	146.7	157.2	168.3	169.4	156.3	160.0	161.3	161.6
NPL coverage ratio (%)	112.6	132.8	143.7	142.8	131.0	130.4	131.0	129.8
Profitability								
Operating profit (billion baht)	255	288	338	345	370	100	98	97
Net profit (billion baht)	144	174	204	214	192	51	51	50
Return on asset (ROA)	1.1	1.2	1.3	1.3	1.1	1.2	1.2	1.1
Net Interest Margin (%)	2.5	2.5	2.6	2.6	2.5	2.6	2.6	2.6
Capital adequacy								
Regulatory capital to risk-weighted asset (%)	15.2	16.3	15.7	16.8	17.4	17.5	17.5	18.5
Tier-1 Ratio (%)	11.8	11.8	12.6	13.7	14.6	14.7	14.7	15.4
Common Equity Tier 1 (%)	-	-	12.4	13.6	14.5	14.6	14.6	15.4
Interest rates								
Minimum loan rate (MLR)	7.7	7.6	7.6	7.5	7.4	7.4	7.3	7.3
12-month fixed deposit	2.8	2.5	2.4	2.1	1.5	1.4	1.4	1.4

1/ GDP at current price data from 2012 are revised and calculated by 4-quarterly data moving run

2/ GDP at current price calculated by 4-quarterly data average moving

Indicators for financial condition and assessing risk to financial stability

Indicators	2011	2012	2013	2014	2015	2016		
						Q1	Q2	Q3
1.2 Specialized financial institutions [3/]								
Total asset (billion baht)	3,772	4,140	4,492	4,678	5,006	5,141	5,197	5,139
% yoy	16.3	9.8	8.5	4.1	7.0	5.9	7.2	6.7
Deposit (excluding Interbank)	3,071	3,348	3,692	3,867	4,181	4,283	4,279	4,214
% yoy	21.6	9.0	10.3	4.8	8.1	7.1	6.2	5.2
Loan (excluding Interbank)	3,065	3,405	3,523	3,717	3,979	3,965	3,971	3,997
% yoy	20.3	11.1	3.4	5.5	7.1	5.5	5.4	3.9
Asset quality								
NPL Ratio (%)	4.7	4.4	4.9	5.1	4.9	4.7	5.0	5.3
SM Ratio (%)	2.4	1.9	2.3	3.2	2.9	2.9	3.7	3.3
Profitability								
Operating profit (billion baht)	65	70	80	79	91	25	24	25
Net profit (billion baht)	36	20	44	34	38	10	8	12
Return on asset (ROA)	1.0	0.5	1.0	0.7	0.8	0.8	0.7	1.0
Net Interest Margin (%)	3.1	3.0	2.9	2.8	2.9	2.8	2.6	3.0
Capital adequacy								
Regulatory capital to risk-weighted asset (%)	10.9	9.5	11.3	10.8	11.3	11.7	12.1	11.8
2. Financial markets								
Government bond market								
Bond spread (10years-2years)	0.2	0.6	1.3	0.6	0.9	0.4	0.5	0.6
Non-Resident holdings (%)	7.4	10.6	10.3	10.0	7.8	8.8	8.9	9.6
Stock markets SET + mai								
SET Index (End of period)	1,025.3	1,391.9	1,298.7	1,497.7	1,288.0	1,407.7	1,445.0	1,483.2
SET Actual volatility (%)	21.0	12.2	19.7	11.9	13.7	15.5	11.9	13.6
SET Price to earning ratio (times)	12.1	18.3	14.6	17.8	22.6	20.7	22.0	21.3
mai Index (End of period)	264.2	415.7	356.8	700.05	522.6	518.4	527.4	551.7
mai Actual volatility (%)	17.8	13.1	26.4	18.3	16.9	13.2	9.4	21.5
mai Price to earning ratio (times)	16.4	22.8	28.3	69.6	52.9	58.6	62.1	57.8
Foreign exchange market								
Exchange rates (End of period) (USD/THB)	31.6	30.6	32.9	32.9	36.0	35.2	35.1	34.7
Actual volatility (%annualized)	4.8	4.6	5.9	4.0	5.1	4.4	4.6	3.8
Nominal effective exchange rate (NEER)	100.2	100.0	107.0	104.3	108.5	106.6	105.1	105.8
Real effective exchange rate (REER)	99.7	100.0	106.5	103.1	104.3	100.9	100.0	100.3
3. External sector								
Current account to GDP [4/]	2.6	-0.4	-1.0	3.8	8.2	18.0	8.1	10.2
External debt to GDP [5/]	31.5	35.4	35.8	34.8	32.3	34.5	35.7	34.8
Foreign currency external debt to GDP	22.4	24.1	25.8	24.3	23.4	24.8	25.6	23.9
External debt (million USD)	104,334	130,747	141,933	141,715	131,427	139,142	143,121	139,344
Short-term (%)	45.3	44.5	43.6	40.2	40.0	42.3	42.5	40.2
Long-term (%)	54.7	55.5	56.4	59.8	60.0	57.7	57.5	59.8
International reserves								
Net reserves (million USD.)	206,370	205,751	190,239	180,238	168,164	188,953	194,329	200,713
Gross reserves to short-term debt (times)	3.7	3.1	2.7	2.8	3.0	3.0	2.9	3.2

3/ Include Government Savings Bank, Bank for Agriculture and Agricultural Cooperatives, Government Housing Bank, Islamic Bank of Thailand, SME Bank, Export-Import Bank of Thailand, Thai Credit Guarantee Corporation, and Secondary Mortgage Corporation

4/ Current account to GDP ratio is calculated by quarterly nominal GDP in the same period

5/ External debt to GDP ratio is calculated by 3-years averaged nominal GDP

Indicators for financial condition and assessing risk to financial stability

Indicators	2011	2012	2013	2014	2015	2016		
						Q1	Q2	Q3
Capital flow								
Net capital flow (million USD)	-8,269	12,790	-2,488	-16,204	-17,102	-300	-3,062	-9,096
Direct investment (flow)								
Thailand direct investment abroad	-7,176	-14,261	-12,121	-5,742	-4,991	-4,391	-3,872	-2,945
Foreign direct investment in Thailand	2,474	12,899	15,936	4,975	9,004	2,022	1,696	-3,306
Portfolio investment (flow)								
Thailand portfolio investment abroad	2,260	-6,960	-3,399	-7,318	-3,817	-834	1,316	-2,816
Foreign portfolio investment in Thailand	3,903	10,358	-1,368	-4,695	-12,691	2,590	-419	5,304
4. Households								
Household debt to GDP (%)	66.2	71.8	76.7	80.3	82.0	81.5	81.2	81.0
%YoY	16.8	18.5	11.5	6.6	5.2	4.7	4.3	4.1
Financial assets to debt (times)	2.4	2.5	2.3	2.5	2.5	2.5	2.6	n.a.
Commercial banks NPL and SM ratio (%)								
- Housing loan	4.0	3.7	3.9	3.8	4.1	4.1	4.2	4.4
- Car loan	9.2	7.4	9.8	10.8	10.1	9.8	10.1	9.9
- Credit card and personal loan under regulation	4.5	4.7	6.0	6.8	7.1	7.4	7.1	7.6
- Other personal loan	3.0	2.8	3.7	4.0	4.2	4.1	4.3	4.6
5. Corporates								
Corporate debt to GDP (%)	74.7	74.5	75.5	77.2	80.0	80.2	80.8	n.a.
Commercial banks NPL and SM ratio (%) :								
- Small and medium-sized enterprises (SMEs)	6.4	5.7	5.5	5.5	5.7	5.9	5.8	6.3
- Large corporate	3.7	3.2	3.0	3.3	3.5	3.4	3.4	3.8
Performance of non-financial listed companies								
Net profit margin (%)	8.1	9.0	8.4	7.1	7.5	8.6	8.7	8.3
Debt to equity ratio	0.8	0.8	0.7	0.8	0.7	0.7	0.7	0.7
Interest coverage ratio (times)	6.5	6.6	6.3	5.8	5.5	6.5	7.1	5.5
Current ratio (times)	1.5	1.5	1.5	1.6	1.7	1.7	1.7	1.7
6.Real estates								
Number of new mortgage loan from commercial banks								
Single-detached and semi-detaced house	17,329	22,949	18,353	15,694	13,152	3,511	3,503	3,216
Townhouse and commercial building	20,577	26,277	25,261	21,764	19,210	5,092	5,410	4,718
Condominium	20,478	26,477	28,087	25,381	27,305	6,884	6,698	6,215
Number of new residential launches in Bangkok and its vicinities								
Single-detached and semi-detaced house	19,104	15,100	17,226	18,933	17,637	4,655	2,918	5,379
Townhouse and commercial building	22,343	24,390	30,074	26,980	27,518	7,308	5,735	9,674
Condominium	40,134	62,548	84,250	65,298	62,833	13,704	8,931	13,462
Housing price index (Jan 2553/2010= 100)								
Single-detached house (including land)	106.8	110.3	119.0	126.1	129.3	129.4	133.7	131.3
Townhouse (including land)	104.6	107.5	117.9	129.0	137.5	138.8	139.1	136.8
Condominium	118.7	127.8	132.1	141.3	160.9	160.0	162.1	169.2
Land	114.8	118.2	129.2	140.9	168.8	169.5	173.7	170.2
7. Fiscal sector								
Public debt to GDP (%)	38.0	40.2	42.2	42.8	44.4	44.0	42.8	42.8

Pursuing Sustainable
Economic Well-Being

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