BANK OF THAILAND

Financial Stability Report

2018

BANK OF THAILAND

Financial Stability Report 2018

Message from the Governor

In 2018, Thailand faced a number of challenges in safeguarding its financial system stability, as was the case with many countries around the world. Key risks stemmed from uncertainties surrounding monetary policy directions in major advanced economies (G3), the impact from trade tensions between the US and China, as well as geopolitical risks. These headwinds contributed to volatility in global financial markets and international capital flows.

Nonetheless, Thailand's overall financial stability remained sound. The financial institutions system was resilient, while external stability remained strong as reflected by low external debt, sustained current account surplus, and high international reserves. These strengths served as buffers that helped cushion the Thai financial system against volatile capital flows and external risks throughout the year.

While the overall financial stability remains sound, there remain some pockets of risks that have not shown signs of improvement and could undermine financial stability in the future. First, fragilities remain in the real estate sector. Financial institutions' intense competition in giving mortgage loans, fueled by their increased risk tolerance, have led to lenient lending practices that are conducive to speculation. To address this issue, the Bank of Thailand has revised the macroprudential measure on mortgage loans to rein in excessive competition in the mortgage loan market while keeping a lid on speculative activities. In the meantime, excess supply situations continue to warrant monitoring. Second, the search-for-yield behavior, which could lead to widespread underpricing of risks, continues to persist amid the low interest rate environment. This could be seen from household debt that shows no clear sign of abating and savings cooperatives that keep expanding at a high rate. Moreover, large conglomerates, many of which have substantial interlinkages with the financial system, have been raising funds actively through bonds and loans amid low interest rates. Some of them also appear to channel more investment to non-core businesses and abroad.

Looking into 2019, the global economic and financial contexts are poised to remain highly uncertain, and this warrants monitoring given Thailand's close integration with the global financial system. Challenges due to new advancements in financial innovation and technology will also emerge. Against this backdrop, the Thai financial system could possibly face a severe and abrupt impact due to shocks from both the domestic and external front. In this regard, key financial sector regulators including the Bank of Thailand, the Office of the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC) have been collaborating closely to detect emerging risks in a timely manner, while placing emphasis on monitoring and gauging the potential impact on vulnerable sectors. The collaboration also involves launching pre-emptive measures to prevent a pocket of risk from escalating into a systemic concern.

In this light, it is our hope that this *Financial Stability Report* will inform the general public about key developments in the economic and financial system, together with their impact on financial stability. This information will prove useful in assessing risks related to savings, investment, financing, and business, as well as in preparing for future challenges.

Mr. Veerathai Santiprabhob
Governor
14 January 2019

Contents

Preface

Thailand's overall financial stability remained sound. The Thai economy continued to grow at a pace close to potential, even in the face of external headwinds. These included the uncertainties surrounding monetary policy normalization in G3 countries and US trade protectionist measures, which weighed on global economic growth and induced capital outflows from emerging market (EM) economies especially the vulnerable ones. For Thailand's case, there were several buffers in place that helped cushion the economic and financial system against external risks and volatilities in global financial markets. In addition to the country's strong fundamentals overall, the financial institutions system remained resilient and continued to facilitate activities in the real sector. External stability was also solid, as reflected by low external debt, sustained current account surplus, and ample international reserves.

With the rise in interconnectedness in the global economic and financial landscape, uncertainties are likely to increase going forward. Key sources of uncertainties include the financial market volatility due to monetary policy directions in G3 countries, as well as the impact of trade tensions between the US and its trading partners, which could become more widespread and intensified. Indeed, the global economic and financial system has been in a state often referred to as "VUCA", which stands for volatility, uncertain, complex, and ambiguous. New technological advancements have also brought new risks to the Thai financial system, such as those related to cyber threats, cryptocurrencies, and disruptions of existing business models. To safeguard financial stability in such environment, it is thus essential for regulators to collaborate closely to detect emerging risks, while placing emphasis on monitoring and gauging the potential impact on vulnerable sectors. The regulators must also ensure that sufficient measures are in place to prevent a pocket of risk from escalating into a systemic concern.

Key areas of vulnerabilities that could undermine financial stability going forward are as follows:

(1) Financial sector: Savings cooperatives continue to exhibit the search-for-yield behavior, as they raise funds through deposits and members' shares for investment in securities, especially for long-term debt securities with high yields. Some large savings cooperatives are also found to borrow funds to invest in securities. These behaviors could translate into additional liquidity and market risks. Furthermore, the interconnectedness within the cooperatives system has increased with mutual borrowings and deposits. Given such context, a liquidity problem at one cooperative might trigger a chain effect on other cooperatives, hurting confidence in the cooperatives system as a whole. Savings cooperatives should thus place emphasis on risk management and financial governance. They should also support the ongoing efforts to enhance the supervisory standards to keep up with risks and align their operations with the underlying philosophy of cooperatives.

Foreign investment by mutual funds remains highly concentrated in three countries, namely China, United Arab Emirates, and Qatar. Moreover, the issuance of low-rated debt securities remains concentrated in the real estate development sector. Despite the decline in low-rated corporate bonds outstanding from the previous year, investors still need to place emphasis on assessing risks of the products they invest in. Doing so will help prevent underpricing of risks and ensure reasonable returns within their risk tolerance.

(2) Real estate sector: Excess supply in the real estate sector continues to warrant monitoring. Foreign demand, notably from China, has been gaining significance in the Thai condominium market in the recent years, so the impact of a possible slowdown in foreign demand needs to be assessed. Competition among financial institutions in the mortgage loan market also needs to be monitored, following the Bank of Thailand's revision on the macroprudential measure on mortgage loans. Furthermore, as mixed-use projects become more popular among large developers, the supply of office and retail spaces may surge quickly especially from 2020 onwards. This may contribute to oversupply in the future, and much will depend on developers' capability to manage risks and time project launches appropriately, considering market conditions for each type of real estate.

(3) Household sector: Households' financial positions remain fragile, as reflected by the high ratio of household debt to GDP and the pick-up in household debt mainly due to housing and auto loans. This could impair households' cushion against shocks and lead to higher non-performing loans (NPLs). Thus, households' debt creation and serviceability, especially among low-income households, continue to warrant monitoring going forward.

(4) Business sector: While the business sector has sound financial positions overall, certain segments appear more sensitive to higher interest rates or lower revenues. These include businesses with high leverage, businesses whose product or input prices move with commodity prices, businesses that are affected by e-commerce, as well as SMEs with rising NPL ratios. For SMEs, their vulnerability is partly due to structural concerns and their limited ability to compete in a changing business environment.

Large conglomerates have been raising funds actively via bank loans and bonds during the period of low interest rates. Their business structures have also become more complex, given their increased investment in non-core businesses and abroad. This has made monitoring and assessing risks related to these large conglomerates more difficult, potentially leading to underpricing of risks. Given their significant interlinkages with the rest of the financial system, shocks to their financial positions could have a widespread impact on the financial system at large.

The Bank of Thailand (BOT), the Office of the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC) have been collaborating closely in safeguarding Thailand's financial stability. The regulators have also introduced appropriate measures to prevent a pocket of vulnerability from escalating into systemic risk. In 2018, the BOT has revised the supervisory guideline on mortgage loans, which is a macroprudential policy designed to strengthen financial institutions' lending standards, support housing affordability for real-demand homebuyers, and curb speculation in the real estate market. This measure also aims to encourage households' financial discipline by requiring them to save more for down payments, as well as to prevent over-indebtedness. The measure is preventive in nature, and is expected to contribute to the overall stability of the financial system.

The regulators have also issued new regulations to ensure that the supervision of banks and capital markets comply with the international standard, keep up with new developments in digital asset businesses, enhance readiness for cyber threats, as well as improve protection for bond and mutual fund investors. Moreover, in 2018 and 2019, the regulators also participate in the Financial Sector Assessment Program (FSAP), which is aimed to ensure that Thailand's financial sector supervision is on par with the international standard. However, several challenges remain in the area of financial stability oversight, one of which is for regulators to jointly develop a risk assessment framework that covers all sectors in the financial system comprehensively. For instance, the macro stress-testing framework needs to be more aligned with increased complexity in economic and financial environments. For savings cooperatives, more work remains to be done in improving the risk management and governance framework, following the passage of the Cooperatives Act by the National Legislative Assembly.

Chapter 1: Recent developments and outlook of the economy and the financial system

Thailand's financial stability remained sound overall. Domestic economic growth continued to gain traction, which benefitted businesses' financial positions especially the large ones. Commercial banks and insurance companies maintained high capital buffers. Meanwhile, external stability remained solid, as reflected by low external debt, sustained current account surplus, and high international reserves. Altogether, these helped cushion the Thai financial system against external risks and volatilities in global financial markets. These external headwinds stemmed mainly from G3 countries' economic and monetary policies, concerns over trade protectionism measures, and geopolitical risks that could add to volatilities in global financial markets and commodity prices, especially for oil prices, in the periods ahead.

1. Recent developments of the economy and the financial system

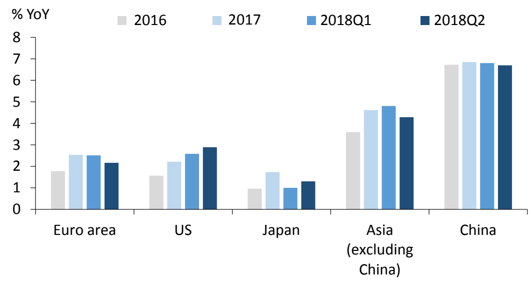
1.1 Real sector

The global economy

Global economic growth is viewed to moderate mainly due to risks from monetary policy uncertainty in G3 economies, trade protectionist measures, and geopolitical risks.

Global economic growth moderated in 2018, after having accelerated in the year before (Chart 1.1.1). G3 economies kept expanding faster than their long-term trend. This was particularly the case for the US economy, which was supported by strong labor market, income tax reductions, and buoyed consumer confidence. Meanwhile, the euro area and Japan benefitted from accommodative monetary conditions and strong labor markets, despite some impact from trade tensions, political issues in the euro area, and natural disasters in Japan. As inflation in advanced economies edged up toward policy targets, some central banks began to hike their policy rates gradually.

Chart 1.1.1 Economic growth in different regions



Source: CEIC.

Demand improvements in G3 economies also lent support to economic growth in Asia, with further support coming from domestic demand, strong labor markets, and favorable consumer and business confidence. However, there were increasing pressures from tightening financial conditions, as well as exports that started to subside with slowing global demand and trade tensions between the US and China. The trade tensions, in particular, had indirect effects on several businesses along global supply chains, especially for electronic products. This started to weigh on Asia's economic growth more visibly in late 2018. **Meanwhile, China's economic growth continued to decelerate**, partly from slower domestic demand due to stricter regulations on the financial sector.

Nonetheless, the Chinese government also introduced additional stimulus measures, including investments in infrastructure projects and tax reductions for businesses and households.

Looking ahead, global economic growth is expected to moderate and show more divergence. G3 economies are likely to continue expanding on the back of robust domestic demand. On the other hand, the Chinese and Asian economies are expected to moderate due to tightening financial conditions and slowing exports. These economies will also face challenges from the divergence in monetary policy normalization among G3 economies, as well as the uncertainties surrounding trade conflicts and geopolitical risks.

The Thai economy

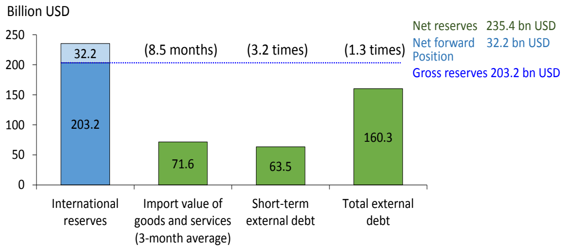
Thailand's economic growth is likely to continue going forward. External stability remains solid, despite the uncertainties surrounding external risk factors.

In 2018 and the following years, Thailand's economic growth is expected to sustain at a pace close to potential. Key growth drivers are merchandise exports and tourism, which benefit from global growth, as well as sustained momentum in domestic demand. While merchandise exports are likely to decelerate due to trade tensions between the US and China, the impact would be partially offset by the relocation of production bases in some industries to Thailand. Private consumption is projected to grow steadily on the back of improved income and employment, but elevated household debt would continue to weigh on the pace of demand recovery. Public expenditure is projected to rise, but with some limitations on disbursement. Private investment is poised to continue growing, with additional support from government projects and the relocation of production bases to Thailand. However, progresses of these investment projects need to be monitored. Going forward, the Thai economy still have downside risks and need to cope with the uncertainties surrounding the US trade protectionist measures that could intensify, retaliatory measures from US major trading partners, as well as geopolitical risks.

With regard to external stability, Thailand's standings on this front are solid, as reflected by several aspects. (1) The external debt to GDP ratio stayed low. The ratio stood at 35.6 percent as of 2018Q3, which is considered low by the international standard[1], thanks to the country's relatively low reliance on external funding. **(2) The current account continued to be in surplus.** This resulted in sufficient foreign-currency liquidity, which could help reduce risks to the overall financial system if capital flights were to occur. **(3) The international reserves remained high, which helped the country withstand volatile capital flows.** The international reserves stood at 203.2 billion US dollars in November 2018, or at about 3.2 times of short-term external debt and 1.3 times of total external debt **(Chart 1.1.2).** This reflected that the level of international reserves was sufficient to cover external debt burden even in the case where none of the external debt could be rolled over.

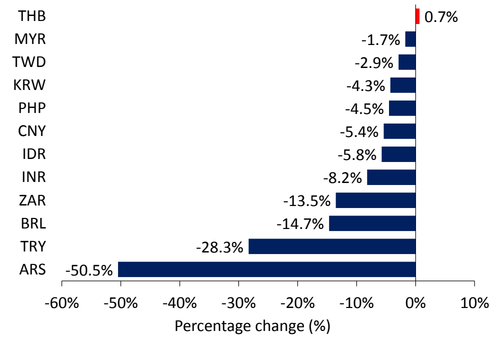
[1] This is in reference to the World Bank's guidelines, which categorize concerns over external debt burden into three levels: (1) low – countries with the external debt to GDP ratio lower than 48 percent; (2) medium – countries with the external debt to GDP ratio of 48-80 percent; and (3) high – countries with the external debt to GDP ratio higher than 80 percent.

Chart 1.1.2 Assessment of Thailand's international reserve adequacy as of November 2018



Note: The numbers in parentheses show the ratio of gross reserves to selected reserve adequacy measures. The value of monthly imports of goods and services is a 12-month average. External debt as of November 2018 is an estimated data.
Source: Bank of Thailand.

Chart 1.2.1 Changes in regional currencies against the US dollar since the beginning of 2018



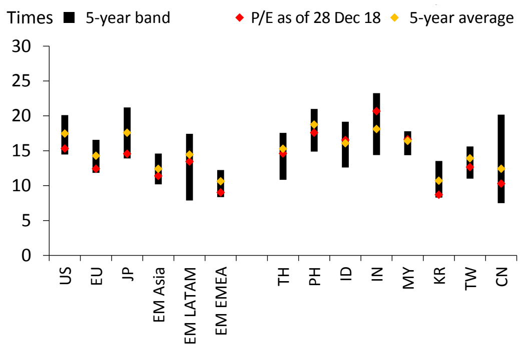
Sources: Bloomberg and Bank calculations (data as of 28 December 2018).

1.2 Financial markets

Global financial market volatilities surged in 2018, mainly due to monetary policy tightening in some G3 countries and trade tensions between the US and its trading partners. As a result, investors reduced their holdings of risky assets and investments in emerging markets (EMs), especially those with fragile economic fundamentals. This caused asset prices in these EMs to fall and put a depreciating pressure on local currencies. While Thailand also experienced some capital outflows, the impact was limited, thanks to sustained current account surplus and high international reserves, which helped cushion against some of the impact. This led the Thai baht to strengthen vis-à-vis the US dollar and outperform regional currencies **(Chart 1.2.1).**

The SET Index declined about 10 percent in 2018 in line with regional equity markets, mainly due to global risk factors. Throughout the year, the Thai equity market witnessed an outflow of 8.9 billion US dollars. Part of this was attributable to the price-to-earning (P/E) ratio of the Thai equity market that stood at a relatively high level compared to the past **(Chart 1.2.2).**

Chart 1.2.2 SET forward P/E ratio compared to global and regional peers

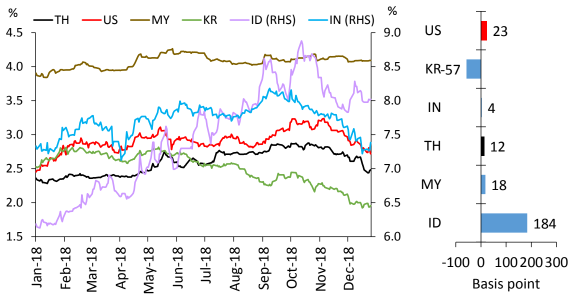


Sources: Bloomberg and Bank calculations (data as of 28 December 2018).

Short-term government bond yields rose from the preceding year. Key drivers included: (1) a policy rate hike by the Monetary Policy Committee; (2) a gradual increase in the supply of short-term BOT bonds since mid-May 2018; and (3) foreign investors' reduced investment in short-term government bonds during the period of baht depreciation.

Meanwhile, medium- and long-term government bond yields rose in line with US treasury yields. However, the yields of long-term Thai government bonds increased by a smaller degree compared to those of other regional countries **(Chart 1.2.3).** Part of this was due to foreign investors' increased demand for long-term Thai government bonds for the purpose of tracking the Global Bond Index[2]. Moreover, foreign investors also shifted investments away from vulnerable EMs to the Thai bond market. **Over the course of 2018, the Thai bond market experienced an inflow of 4.8 billion US dollars, most of which flowed into long-term bonds.**

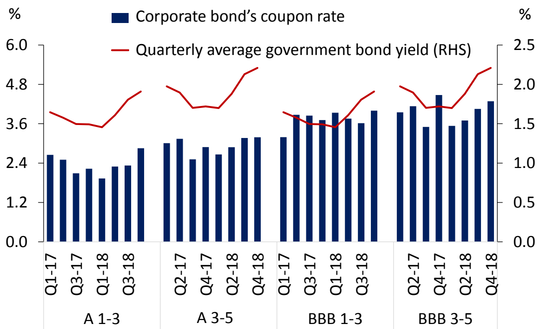
Chart 1.2.3 10-year government bond yields



Sources: Bloomberg and Bank calculations (data as of 28 December 2018).

Costs of financing via corporate bonds gradually picked up in line with government bond yields. In addition, the credit spread between corporate and government bond yields began to increase. This was a result of greater supply of corporate bonds and investors' demand for higher returns, given their expectations on a lower degree of accommodative monetary policy in the future **(Chart 1.2.4).**

Chart 1.2.4 Coupon rates of Thai corporate bonds, classified by credit rating and maturity (year)



Note: Categories indicate credit rating and maturity (e.g. A 1-3 denotes A-rated bonds with maturity 1-3 years).
Sources: Thai Bond Market Association and Bank of Thailand (data as of 28 December 2018).

[2] In May, July and September 2018, the JP Morgan GBI-EM Index added 15-, 30- and 5-year Thai government benchmark bonds, respectively.

1.3 Stability of the financial institutions sector

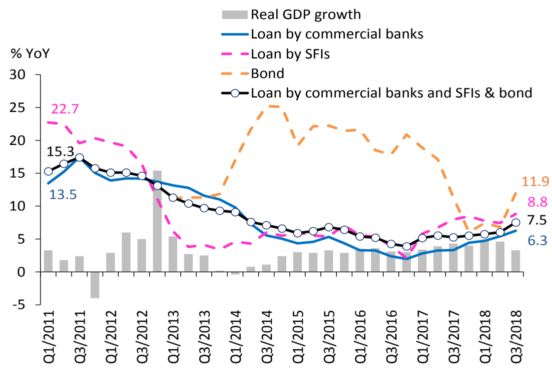
Commercial banks and specialized financial institutions

Financial positions of commercial banks were strong due to high levels of capitals and liquidity. Credit growth of loans extended by commercial banks and specialized financial institutions (SFIs) improved with economic conditions. However, risks of defaults among SMEs and vulnerable households continued to warrant monitoring.

Sustained growth momentum in the Thai economy supported expansions in both corporate and consumer loans. In 2018Q3, the growth in loans extended by commercial banks picked up at a year-on-year growth of 6.3 percent, compared to 4.4 percent in 2017. However, credit growth was concentrated only in some sectors, such as the real estate, hotel, and commerce sectors. A closer inspection also revealed that growth in SME loans came from borrowers with relatively large sizes. Meanwhile, loans by SFIs grew by 8.8 percent from the same period last year, mainly due to loans extended to the public sector, SMEs in the agricultural sector, as well as mortgage loans **(Chart 1.3.1).**

Credit quality was yet to benefit visibly from economic growth. As of 2018Q3, the ratio of non-performing loans to total loans (NPL ratio) among commercial banks and SFIs stood at 2.94 and 4.4 percent, respectively, slightly higher than those at end-2017. Debt serviceability continued to pose concerns for loans given to some SMEs, especially those affected by structural concerns or changing business models, as well as mortgage loans **(Chart 1.3.2).** Looking ahead, credit quality of these SMEs and households could weaken further should interest rates resume an upward trend.

Chart 1.3.1 Loan growth of the commercial banking system and the specialized financial institutions system

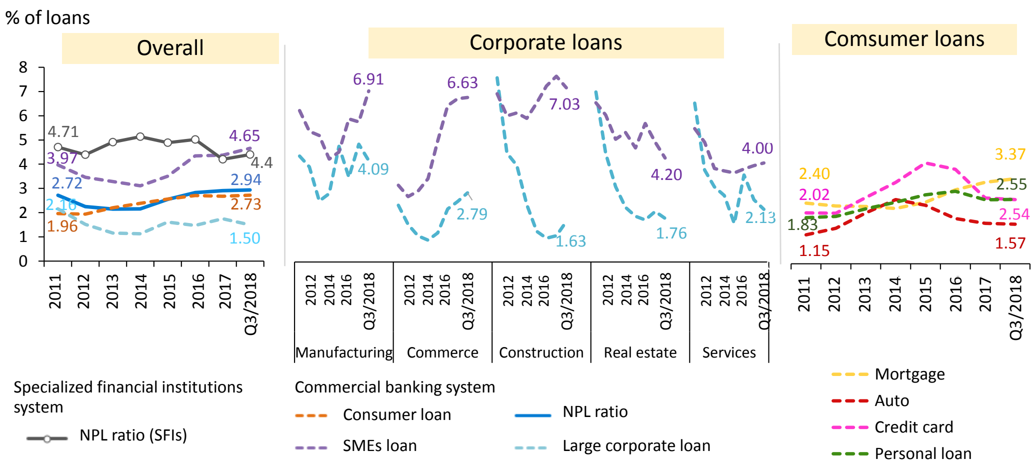


Sources: Bank of Thailand and Office of the National Economic and Social Development Board (NESDB).

Commercial banks continued to maintain their profitability, despite the challenges from lower fee incomes from financial services and electronic payments. This was reflected in their return on assets (ROA), return on equity (ROE), and net interest margin (NIM) that remained quite stable **(Chart 1.3.3).** Looking ahead, the rising popularity of conducting transactions via electronic channels would help lower operating costs related to cash management, branch operation, and personnel. Commercial banks could also utilize these additional data to inform information-based lending for SMEs and develop financial products that cater to consumers' demand.

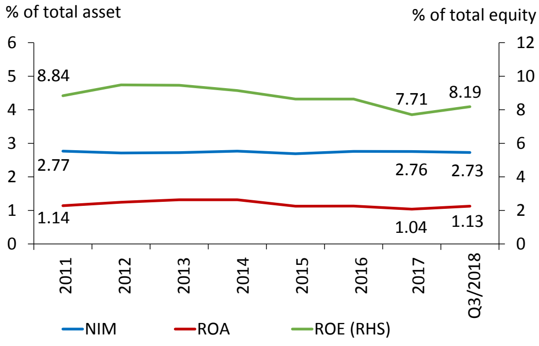
The commercial banking system maintained high capitals and reserves, which played a key role in upholding the strength of the financial institutions system. As of 2018Q3, the ratio of capital to risk-weighted assets (BIS ratio) and the Tier 1 ratio of the commercial banking system stood at 18.4 and 15.8 percent, respectively, while the ratio of actual to regulatory loan loss provision stood at 146.5 percent. **Also, liquidity according to the Basel 3 framework remained high.** The liquidity coverage ratio (LCR) averaged at 176.0 percent, while the net stable funding ratio (NSFR) averaged at 129.3 percent.

Chart 1.3.2 NPL ratios in the commercial banking system and the specialized financial institutions system



Source: Bank of Thailand.

Chart 1.3.3 Profitability of the commercial banking system



Source: Bank of Thailand.

Insurance businesses

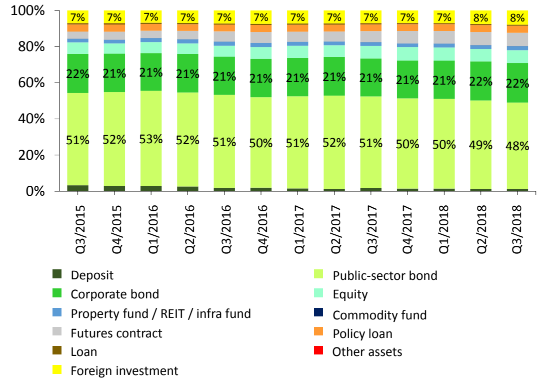
Insurance businesses were sound and continued to expand. Investment patterns across asset classes were broadly unchanged from last year.

Insurance businesses continued to grow in line with economic growth. In 2018Q3, their gross premium income grew by 2.59 percent from the same period in 2017, with life and non-life segments growing by 1.35 and 5.98 percent, respectively. In overall, both life and non-life insurance companies were resilient, with all of the firms having the capital adequacy ratio above the level required by law.

Life insurance companies increased their investment steadily, with the composition of their portfolios largely unchanged from the previous year. As of 2018Q3, the total value of life insurers' investment portfolio stood at 3.4 trillion baht, an increase of 7 percent from the same period in 2017. Most investment was still concentrated in domestic government and corporate bonds, which accounted for 70 percent of the total portfolio value **(Chart 1.3.4).**

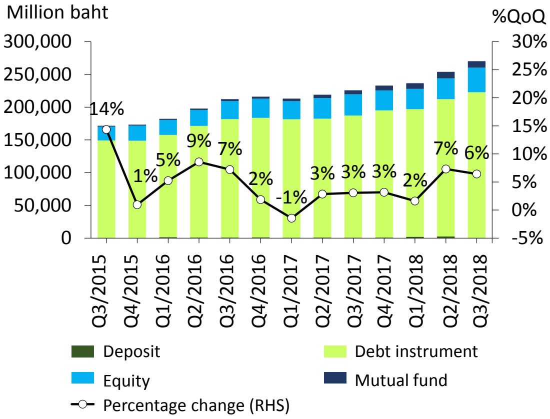
Nonetheless, life insurers appeared to increase diversification and seek higher yields by investing more abroad, mostly in debt securities **(Chart 1.3.5).** Given this, the proportion of foreign investment rose slightly from the preceding year to about 8 percent of the total investment value.

Chart 1.3.4 Composition of life insurance companies' investment portfolio



Source: Office of Insurance Commission.

Chart 1.3.5 Composition of life insurance companies' foreign investment portfolio

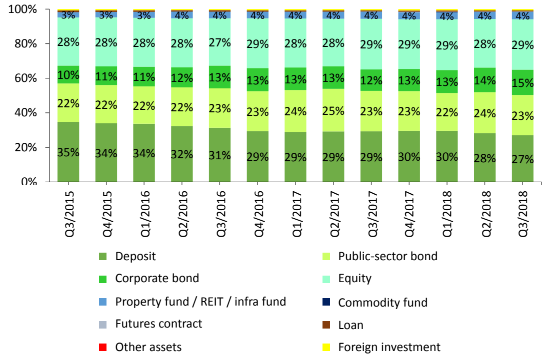


Source: Office of Insurance Commission.

Life insurers' investment was mostly in debt securities, whose values are sensitive to changes in interest rates. However, one unique aspect of the life insurance business is that its contractual obligations tend to have longer maturities compared to those of investment assets. Given this, life insurance businesses would not be significantly affected should an interest rate upcycle resume in the future **(Details in Box 1).**

With regard to non-life insurance companies, the composition of their investment portfolio remained broadly unchanged from the previous year. Their total investment portfolio was worth 320 billion baht as of 2018Q3, up 2.86 percent from the same period of 2017. Most of the investment portfolio was in domestic government and corporate bonds, deposits at financial institutions, and equities, with shares across asset classes broadly similar to those in 2017 **(Chart 1.3.6).**

Chart 1.3.6 Composition of non-life insurance companies' investment portfolio



Source: Office of Insurance Commission.

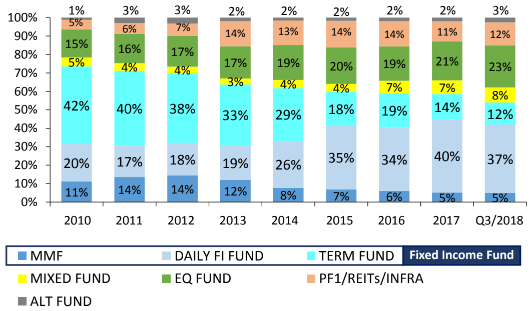
Mutual funds

Investment in mutual funds increased only by 1 percent from the previous year mainly due to the decline in asset prices. Investors curbed investment in foreign investment funds, while shifting more towards equity and mixed funds.

In 2018Q3, the total assets under management of mutual funds totaled 4.73 trillion baht, growing by 1 percent from end-2017. The growth rate slowed from 5 percent in 2017, mainly due to the decline in asset prices. The mutual fund industry has evolved over the years, from an industry that used to be dominated by fixed-income funds to one with greater diversity. Indeed, the shares of equity funds, alternative funds, and mixed funds had risen to 23, 12, and 8 percent of the mutual fund industry, respectively.

On the contrary, the proportion of fixed-income funds continued to shrink from 73 percent in 2010 to 54 percent in 2018Q3, along with notable changes in the structure of the fixed-income fund category. More specifically, within the fixed-income segment, the share of term funds declined due to both the lower demand for foreign investment and the reduction in investment in low-rated domestic bonds following defaults by some issuers of bills of exchange (B/E) in late 2016. This contrasted with the recent expansion in daily fixed income (daily FI) funds **(Chart 1.3.7).**

Chart 1.3.7 Composition of mutual funds, classified by type of fund



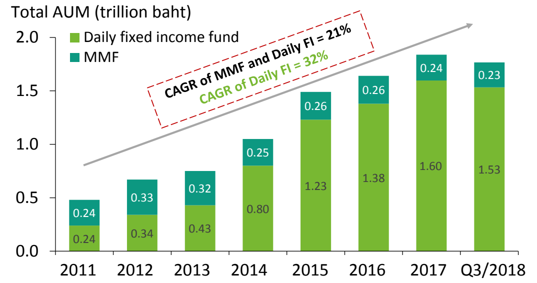
Source: Office of the Securities and Exchange Commission.

Daily FI funds still carried low risks and had ample liquidity. Daily FI funds continued to be popular among investors, totaling 1.53 trillion baht as of 2018Q3[3] **(Chart 1.3.8)**. Although daily FI funds were allowed to invest in some risky assets, their investment in the past carried low risks. Indeed, 31 percent of their portfolio was in highly liquid assets[4]. More than 90 percent of their portfolio was in deposits, government bonds, and corporate bonds with credit rating of A or above. Also, 77 percent of daily FI funds had a portfolio duration of less than one year. These observations pointed to daily FI funds' limited liquidity, credit, and market risks, respectively.

[3] This excludes daily FI funds that are indirect investment funds, with total size of 0.23 trillion baht.

[4] Highly-liquid assets include cash, deposits, treasury bills and short-term Bank of Thailand bonds.

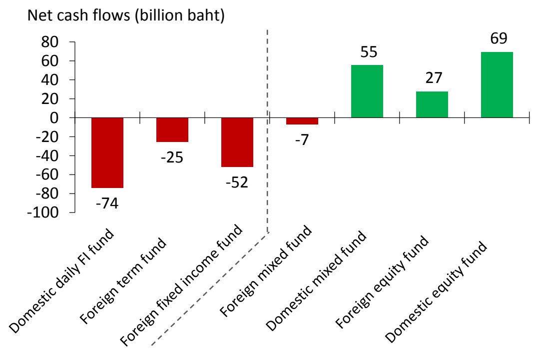
Chart 1.3.8 Size and growth of Daily FI funds and MMFs



Source: Office of the Securities and Exchange Commission.

Mutual funds trimmed down their investment abroad, given lower returns and concerns over external risk factors. The total value of foreign investment by mutual funds stood at 1.50 trillion baht at the end of 2018Q3, or 37 percent of their total assets. This represented a decline of 89 billion baht, or about 6 percent, from end-2017, largely attributable to the reduced sizes of domestic daily FI funds and foreign fixed-income funds. For both fund categories, net outflows totaled 74.2 and 52.1 billion baht, respectively, over the first nine months of 2018. However, equity and mixed funds saw net inflows of 96.9 and 48.3 billion baht, respectively **(Chart 1.3.9).**

Chart 1.3.9 Comparison of net cash flows of mutual funds focusing on foreign and domestic assets (January to September 2018)



Source: Office of the Securities and Exchange Commission.

2. Risks in the period ahead

Looking ahead, key risk factors that could weigh on Thailand's financial stability are as follows.

2.1 The uncertainties resulting from monetary policy normalization in G3 economies could rise. Several central banks in major advanced economies normalized their monetary policy gradually over the course of 2018. But later in the year, growth outlook appeared likely to turn weaker for many countries due to the impact of trade tensions and global trade slowdown. This led some central banks, including the US Federal Reserve (Fed) and the European Central Bank (ECB), to begin signaling a slower pace of rate hikes.

Nonetheless, there remains some possibility that the Fed could raise its policy rate faster than expected. This could be justified by several conditions in the US economy, including robust growth outlook, tight labor market, limited production capacity, the procyclicality of expansionary fiscal policy, and rising inflationary pressure. The uncertainties surrounding Fed's rate hikes could add to volatilities in global financial markets and lead to tightening financial conditions. In such cases, borrowing costs could surge and asset prices could experience a sharp correction.

Against this backdrop, preparing for such volatilities is a key challenge for preserving financial stability in the periods ahead. This is particularly important for countries with limited shock buffers, such as EMs with vulnerable external positions due to high external debt or low levels of international reserves. Furthermore, the continued rise in global leverage and the limited fiscal space due to high public debt could add pressure to financial and liquidity conditions in these vulnerable countries, thereby weighing on economic growth.

2.2 The impact of the US trade policy and retaliations from its trading partners could intensify and become

more widespread. Non-tariff measures such as investment restrictions and rules of origin could also be used, and this could have a substantial impact on global supply chains and trade volumes.

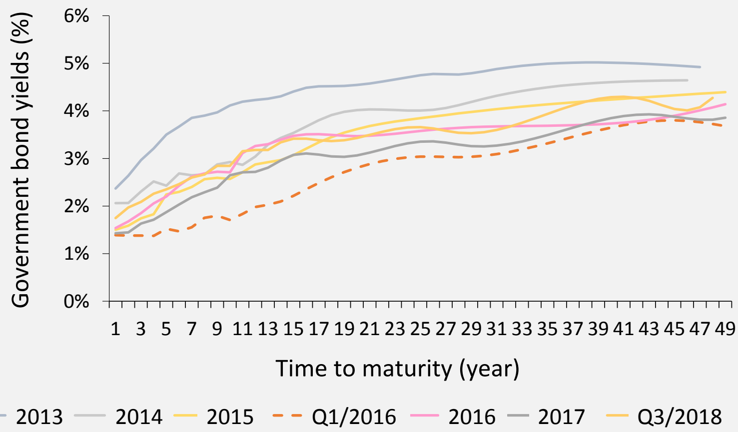
On top of this, geopolitical risks continue to warrant monitoring. While these risks do not lead to financial market volatilities directly or put a significant drag on global economic activities, these risks may add to volatilities in financial markets and commodity prices, especially oil prices, going forward.

With these potential risks and the increased interconnectedness in today's economic and financial system, Thailand remains at risk of facing sudden external shocks, and a pocket of vulnerability may lead to a widespread contagion on other players in the financial system **(Further details in Box 2).** Thus, to safeguard financial system stability, the key focus remains on monitoring developments and assessing the potential impact on vulnerable segments in the Thai financial system. These segments include those that are sensitive to tightening financial conditions, which stand to face higher borrowing costs as well as volatilities in the baht and asset prices at home and abroad. In addition, there is also a need to monitor vulnerable sectors in the event of global and domestic growth slowdown, which could impair these sectors' profitability and debt serviceability in the period ahead.

Box 1: Impact from changes in interest rates on insurance businesses[5]

Interest rates are one of the key assumptions used by life insurers to price life insurance products, along with other assumptions such as mortality rates, operating costs, and other factors. Moreover, interest rates play a key role in valuing insurance liabilities arising from insurance contracts. Changes in interest rates in either direction can affect business operations, profitability, and risk-based capitals. Over the recent years, the low interest rate environment and its associated volatility have affected many sectors in the economy including insurance businesses. Therefore, life insurance companies must place emphasis and deepen their understanding on the impact from interest rate changes on life insurance businesses.

Chart 1.1: Zero coupon yield curves for Thai government bonds (as of 2013 to 2018Q3)



Source: Thai Bond Market Association.

Over the past 3-4 years, persistently low interest rates have been putting significant pressures on life insurance companies. These pressures have been on life insurers' ability to pay returns to the insured as indicated in the contracts, sustain profitability, maintain appropriate risk-based capitals, as well as handle the management of assets and insurance liabilities. These have led life insurers to adapt their product mix, for example, by offering unit-linked products whereby the insured bear all investment risks and products that are focused on coverage rather than savings. In addition, life insurers have also adapted their investment strategies to invest in riskier assets to achieve higher returns, such as low-rated bonds with high yields, equities, and property funds.

The improved economic outlook and the gradual increase in interest rates are expected to benefit insurance businesses, especially for life insurers. For life insurance companies, both their assets and insurance liabilities are sensitive to changes in interest rates, given that interest rates are used in calculating the values of assets and liabilities. Generally speaking, the values of life insurers' assets and liabilities are inversely related to interest rates. On the asset side, most of life insurers' investment is in assets that are sensitive to interest rates, such as government and corporate bonds. Indeed, the values of long-term bonds are more sensitive to changes in interest rates than short-term bonds.

[5] This article is contributed by the Office of Insurance Commission.

When interest rates increase, bonds fall in value and this leads to lower values of assets. Meanwhile, on the liability side, interest rates are used as discount rates in calculating the values of liabilities. Higher interest rates thus also result in lower values of liabilities. In general, the maturity of insurance liabilities is longer than the maturity of assets, given the long-term coverage of most life insurance products. **Thus, an interest rate increase will reduce the values of liabilities more than those of assets, making life insurers better off.**

When considering changes in interest rates alone, a gradual increase in interest rates benefits life insurers by allowing them to manage assets and insurance liabilities better. Life insurers can achieve higher returns from new investments, which help enhance their overall investment returns and reduce reinvestment risks. Furthermore, during the recent years of low interest rates, life insurers' investment returns have been lower than the interest rates used to price insurance products, especially when compared to the products that were sold during the earlier period of high interest rates. Given this, insurance companies have to bear higher costs. With higher interest rates, investment returns will edge closer toward the rates used to price products, lifting off some burdens from life insurance products with guaranteed returns. Indeed, the current levels of interest rates are still considered low. The 5-year, 10-year, 20-year, and 30-year government bond yields stood at 2.35, 2.85, 3.43, and 3.55 percent, respectively, as of 2018Q3. These are still lower than the rates of around 3.0 to 4.0 percent used for determining average prices of insurance products **(Chart 1.1).** Despite the gradual increase in interest rates, current rates still remain at low levels and thus have not had a significant impact on life insurers' strategy on their product mix.

Nonetheless, a sudden increase in interest rates could have a negative impact on life insurers, as the insured would have more incentives to redeem their existing policies and reinvest the funds into new policies with higher yields or other financial products. This may trigger a situation where many policyholders redeem policies at once, resulting in a mass withdrawal of cash similar to a bank run. But this event is unlikely, given that the cash surrender value of an insurance policy is low in early years before rising gradually in later years. In addition, Thais' purchases of insurance products are partly for the purpose of income tax deduction. An early redemption of insurance policies could result in retrospective tax payments according to the criteria set by the Revenue Department.

With regard to non-life insurance businesses, most obligations are short-term and their bond investment is mostly in short-term bonds as well. Therefore, changes in interest rates do not have a significant impact on non-life insurance businesses.

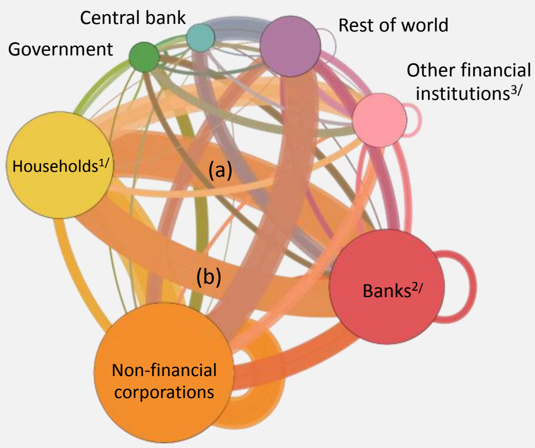
Box 2: Interconnectedness and risk transmission in the Thai financial system

Developments in financial products, the expansion of mutual funds and insurance sectors, and cross-border financial transaction have led the interconnectedness among players in the financial system to heighten in several dimensions. The interlinkages can be through both *direct* exposures (e.g. banks' loans given to firms) and *indirect* exposures (e.g. via holding a common asset). Indeed, in the latter case, several investors may incur loss at the same time without being directly related. Given the increased complexity in financial interconnectedness, a pocket of vulnerability in the financial system could spill over and escalate into a systemic risk unexpectedly. Thus, it is crucial to understand the interlinkages and the risk transmission mechanisms within the financial system. **The key to study financial interconnectedness systematically is balance sheet data**, which keep track of each player's assets and liabilities. Balance sheet data can be further integrated with other databases to link issuers and holders of financial instruments together, creating a *balance sheet network* that represents interlinkages among all players in the financial system.

Mapping Thailand's Financial Landscape: A Perspective through Balance Sheet Linkages and Contagion is a pioneering study that integrates micro-level granular data with sectoral balance sheet data to construct an in-depth and comprehensive balance sheet network of the Thai financial system[6]. **The study consists of two main parts. The first part conducts an empirical profiling of the Thai financial system**. The goal of this part is to study the structure of balance sheets, their interlinkages, as well as the role that each sector plays in the financial system. Key results are highlighted below:

(1) Based on sectoral balance sheet data as of end-2017, the overall structure of financial interconnectedness indicates that the non-financial corporation, banking, and household sectors are the most connected to the overall financial system[7] **(Chart 2.1). In particular, the balance sheets of banks and households have the largest mutual linkages**, with their relationship being bi-directional[8]. This reflects that the two sectors are highly interdependent. In addition, while banks continue to be the main financial intermediaries, **other financial institutions (OFCs) have been playing an increasing role and could**

Chart 2.1 Interconnectedness among the seven economic sectors (as of 2017Q4)

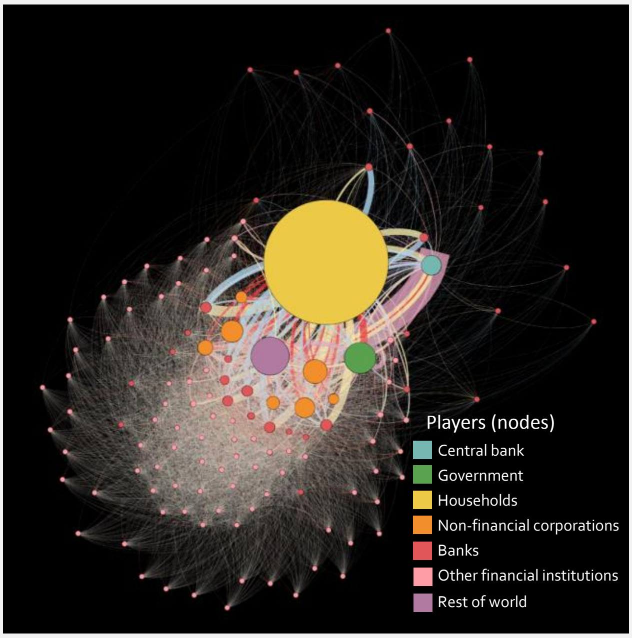


Note: Node size is proportional to the sum of players' assets and liabilities. Edge thickness is proportional to the size of balance sheet linkages. For each linkage, the flow of funds goes from the source node to the target node in clockwise direction.
1/ "Households" here include non-profit institutions serving households. 2/ "Banks" here include non-bank depository institutions.
3/ "Other financial institutions" refer to non-depository financial institutions, most importantly mutual funds (excluding money market funds) and insurance companies.
Sources: Bank of Thailand and Authors' calculations.

[6] The paper is authored by Bodin Civilize, Thaisiri Watewai, Sakkapop Punyanukul, and Kaipichit Ruengsrichaiya, and was presented at the Bank of Thailand Symposium 2018.
[7] Here, each sector's financial interconnectedness is represented by the sum of its financial assets and liabilities.
[8] Bi-directional relationships are indicated by (a) and (b) in Chart 2.1, where (a) represents households' deposits with banks and (b) represents loans that banks extend to households.

become a key channel of shock propagation. Over the study period (2011-2017), the assets of OFCs, especially mutual funds and life insurance companies, have grown at a much faster pace than those of commercial banks. Such developments could lead to faster shock propagation in the financial system, since OFCs' assets are mostly in bonds and equities and the changes in their market values can impact a large number of investors at the same time.

Chart 2.2 Disaggregated Balance Sheet Network (DBN)
(as of 2017Q4)



Note: Node size is proportional to the sum of player's assets and liabilities. Edge thickness is proportional to the size of balance sheet linkages. For each linkage, the flow of funds goes from the source node to the target node in clockwise direction.
Sources: Bank of Thailand, Office of the Securities and Exchange Commission, and Authors' calculations.

(2) Based on the Disaggregated Balance Sheet Network (DBN), which is constructed from micro-level data **(Chart 2.2)**, it is found that **players form clusters based on their balance sheet interlinkages, with a central cluster that serves as the core of the Thai financial system.** The core cluster contains systematically important players, including the household sector, non-financial corporations, D-SIBs[9], and equity funds under asset management companies (AMCs) that are subsidiaries of large commercial banks. Regulators must place emphasis on the stability of these core players, given their systemic significance and the dense interlinkages among them that allow for rapid shock propagation.

The second part of the paper conducts stress-testing exercises based on a network model of financial contagion. The stress-testing framework is designed to capture three shock transmission channels as follows. (1) <u>The liability and ownership channel</u> works via direct linkages, which can be those between issuers and holders of financial instruments or between debtors and creditors. (2) <u>The risk channel</u> reflects a decline in the value of asset in the case that its issuer becomes riskier. (3) <u>The market liquidity channel</u> captures a decline in asset prices due to fire sales[10]. The Thai financial system has been tested under two types of shocks, namely industry shocks (i.e. shocks to industry-level balance sheets) and bank reputational shocks (i.e. loss in investors' confidence on banks and mutual funds in the same financial group). **The results suggest that for (1) industry shocks**, losses generally propagate via the liability and ownership channel. But when the shocks are large enough, losses surge rapidly via the market liquidity channel. **For (2) bank reputational shocks**, the overall losses are much smaller, but the mutual fund industry stands to suffer severely from fire sales.

---

[9] Domestic systemically important banks (D-SIBs).
[10] The model incorporates two shock amplification effects: (1) <u>panic sell</u> among investors that leads to a sharp decline in asset prices and (2) <u>bank deleveraging</u> that could lead to a sell-off in assets and credit contraction.

The findings yield a number of important policy implications on financial stability oversight in the context of increased interconnectedness, as follows. (1) Financial stability oversight must encompass non-bank financial intermediaries and market-based financing. Although these entities have been playing an increasing role in the financial system, most are not as strictly regulated as commercial banks, which may lead to regulatory arbitrage. (2) Regulators need to collaborate closely, as entities within each regulator's perimeter have become more related. For instance, many banks have AMCs and insurance companies as subsidiaries within the same financial group. Lastly, (3) macroprudential policy, which aims at maintaining financial system stability, should be synchronized with other economic and financial policies. This is particularly the case for monetary policy, which has a direct influence on credit cycle, private investment, and the search-for-yield behavior among investors.

Chapter 2: Vulnerabilities in the Thai financial system that could be affected by risk factors in the period ahead

Although Thailand's financial stability remains sound overall, there continues to be need to monitor several pockets of risks that could threaten financial system stability in the future. Looking ahead, the global economic and financial environments are poised to face greater risks. In particular, monetary policy developments in G3 economies could lead to higher volatilities in global financial markets, while the US trade protectionist measures and responses from its trading partners could have an impact that is more widespread and intensified. Key areas of vulnerabilities that could be affected by risk factors in the periods ahead include: (1) the search-for-yield behavior that could lead to underpricing of risks, especially the continued presence of such behavior in the savings cooperatives system, as reflected by high growth in both the funds raised from members and investment in securities; the real estate sector, where there remains a need to monitor the competition in the mortgage loan market, the possible slowdown in foreign demand, as well as the surge in the supply of office and retail spaces due to new mixed-used projects; (3) the elevated level of household debt; and (4) the business sector, where there is a need to monitor the health of businesses especially some groups of SMEs that are sensitive to rising interest rates and income uncertainty, as well as the impact of tightening financial conditions on rollover risks and borrowing costs especially for businesses that rely heavily on bond issuance.

Summary of key vulnerabilities that could be affected by risk factors going forward	
Financial sector	▪ Savings cooperatives continue to exhibit the search-for-yield behavior, as many of them raise funds from deposits, members' shares, and borrowings to invest in securities. Meanwhile, the interconnectedness within the cooperatives system has increased due to mutual borrowings and deposits. Indeed, the majority of these transactions remain concentrated at federations of cooperatives, which play an intermediary role. Given this, a liquidity problem at one cooperative might trigger a chain effect on other cooperatives. ▪ Mutual funds' investment abroad remains highly concentrated in a few countries, notably China. ▪ Despite the decline in low-rated bonds, their issuers remain concentrated in the real estate development sector.
Real estate sector	▪ The proportion of vulnerable mortgage loans has increased, while borrowers' debt burden has risen compared to their income. In addition, there have been signs of an increase in speculation in the housing market, as opposed to real demand. These add more vulnerabilities to the real estate sector. ▪ Housing demand from non-residents could slow down in the future. ▪ Risks could arise from the surge in the supply of office and retail spaces due to new mixed-projects in the coming years.
Household sector	▪ Household debt remains elevated, which in turn impairs households' ability to withstand economic shocks. Mortgage and auto loans have picked up sharply in the recent periods.
Business sector	▪ Certain businesses are particularly sensitive to higher borrowing costs and lower revenues. These businesses include those with high leverage, those whose product or input prices move with commodity prices, those affected by the growth of e-commerce, as well as some groups of SMEs that face structural concerns or changing business landscape.

- Large conglomerates have been raising funds actively both via loans and bonds during the period of low interest rates. In addition, some conglomerates appear to channel more investment into non-core businesses and abroad.

2.1 Financial sector

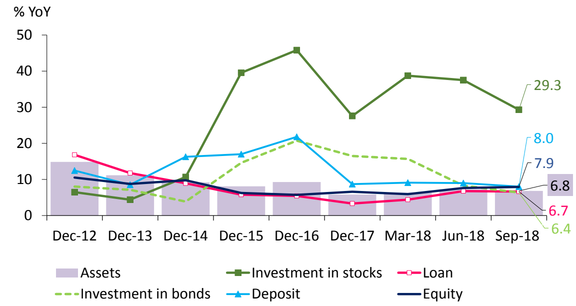
2.1.1 Saving cooperatives

The search-for-yield behavior via savings cooperatives continued to persist. This was reflected in the sustained growth in deposits and members' shares, along with cooperatives' increased investment in securities to seek returns. Moreover, some large savings cooperatives raised funds via short-term borrowings to invest in securities, which exposed them to higher risks especially given the likelihood of an interest rate upcycle going forward. Within the cooperatives system, interlinkages via mutual borrowings and deposits also increased, with the bulk of transactions largely concentrated at federations of cooperatives, which serve as a financial intermediary for primary cooperatives in the system. Savings cooperatives should thus place emphasis on risk management and financial governance. They should also support the ongoing efforts to upgrade the supervisory standards to keep up with risks and align their operations with the underlying philosophy of cooperatives.

Savings cooperatives continued to seek returns via investment in securities to a greater extent. As of September 2018, savings cooperatives' total assets stood at 2.9 trillion baht, expanding by 6.8 percent from the same period in 2017. This was driven by deposits and members' equities, which grew by 8.0 and 7.9 percent, respectively, over the same period in 2017. Meanwhile, loan extension grew by only 6.7 percent. This resulted in excess liquidity, which was then used to invest in securities to obtain higher returns **(Chart 2.1.1)**.

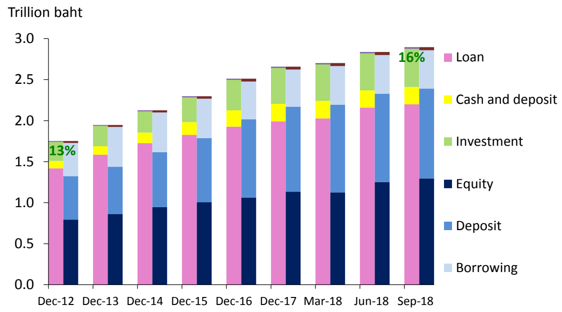
Savings cooperatives' investment in securities expanded by 9.1 percent from the same period in 2017. Investment in bonds and stocks rose by 6.4 and 29.3 percent, respectively. Thus, the share of investment securities to total assets continued to rise, reaching 16.0 percent in 2018Q3 **(Chart 2.1.2)**.

Chart 2.1.1 Growth in assets and liabilities of the savings cooperatives system



Sources: Cooperative Auditing Department and Bank calculations.

Chart 2.1.2 Sources and uses of funds of the savings cooperatives system



Source: Cooperative Auditing Department and Bank calculations

The proportion of stocks in savings cooperatives' investment in securities was on the rise. Currently, most of savings cooperatives' investment in securities remained in bonds, given that they are allowed to invest only in high-quality low-risk securities. These included securities issued by the government, state-owned enterprises, or financial institutions, as well as corporate bonds with good credit ratings (A- or above). Nonetheless, savings cooperatives continued to increase their investment in stocks, with the proportion of stocks in total investment in securities rising from 7.5 percent in 2012 to 13.8 percent in 2018Q3. On the contrary, the share of investment in bonds edged lower to 86.2 percent.

In addition, the majority of savings cooperatives' bond investment was in long-term corporate bonds, which could lead to mark-to-market losses as interest rates rise. While the share of investment in bonds declined, the absolute value of bond investment continued to rise, and most of bond investment was in long-term corporate bonds due to higher yields. In overall, savings cooperatives' holding of bonds accounted for 3.3 percent of the total bond outstanding.

An in-depth study by the Bank of Thailand and the Cooperative Promotion Department finds that surplus savings cooperatives[11] usually invest their funds in long-term bonds with an average maturity of 9-10 years. These bonds give relatively high returns of about 4 percent annually. By investing in these securities, cooperatives could be exposed to potential losses due to sharply lower bond prices, in the case that they are forced to liquidate these bonds before maturity. Moreover, the decline in the value of securities that are pledged as loan collaterals could impair cooperatives' ability to borrow from banks. These risks should be noted especially given the likely increase in bond yields. Indeed, a 1 percent increase in interest rates is estimated to lead to an average loss of 6 percent to the value of bonds held by these large savings cooperatives[12].

Furthermore, some surplus savings cooperatives were also found to increase borrowings and investment in securities at the same time. This suggested that they borrowed funds to invest in securities, seeking to profit from the gap between the returns from securities and the borrowing costs. In addition, some cooperatives used bonds as loan collaterals to obtain lower interest rates. Thus, the impact of an interest rate upcycle on these cooperatives will be two-fold: higher borrowing costs and lower values of securities pledged as loan collaterals.

For deficit savings cooperatives[13] relying on loans from fellow cooperatives or other financial institutions, they are poised to face higher funding costs once interest rates start to rise. Although the total borrowings of savings cooperatives stayed unchanged from the previous year and amounted to only 16.1 percent of total assets, deficit cooperatives appeared to have a much higher borrowings-to-assets ratio compared to the cooperatives system's average. Thus, these cooperatives stand to face rollover risks and higher funding costs going forward.

With regard to interconnectedness, savings cooperatives appeared to conduct more transactions among themselves. The savings cooperatives system had rather limited interlinkages with other sectors in the financial system, such as banks and bond markets. But the interconnectedness within the cooperatives system appeared to increase due to mutual borrowings and deposits. Federations of cooperatives served as key intermediaries that took funds from surplus cooperatives to lend to those with liquidity needs, and this intermediary role

[11] Surplus cooperatives are those with the sum of deposits and members' equity exceeding total loans to members.
[12] This estimation is based on the portfolio duration of five large savings cooperatives' investment in securities during the period of May to September 2018.
[13] Deficit cooperatives are those with the sum of deposits and members' equity below total loans to members.

had expanded over the past three years. Given such context, a liquidity problem at one cooperative could trigger a chain effect on other cooperatives, hurting confidence in the cooperatives system as a whole. Hence, it is necessary to place emphasis on risk management and good governance in the operations of savings cooperatives. This applies especially for federations of cooperatives, which serve as key intermediaries in the cooperatives system.

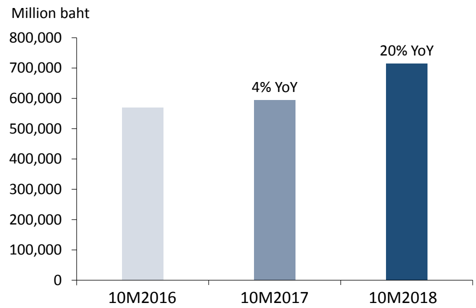
The sustained expansion of savings cooperatives, their operations that keep evolving with the financial system, as well as their increased interconnectedness – all these factors have made savings cooperatives more exposed to financial risks than before. The Cooperatives Act, which has been recently approved by the National Legislative Assembly, presents a first step in the right direction towards upgrading the supervisory standards for cooperatives. **Still, there remains an urgent need for improvements in the areas of risk management and governance. These will help strengthen savings cooperatives, and ensure that they can operate in line with their underlying philosophy without posing risks to the financial system (Further details in Box 3).**

2.1.2 Corporate bond market

Businesses continued to raise funds via the bond market, with a preference for long-term bonds given the expectation of an interest rate upcycle. Although new issuance of low-rated bonds was likely to decrease, their issuers were concentrated in the real estate sector.

New issuance of low-rated bonds declined, while that of long-term bonds increased. At the end of October 2018, the total corporate bonds outstanding stood at 3.52 trillion baht [14], growing by 1.1 percent from end-2017. Of the total outstanding amount, 80.2 percent was rated A or above, roughly unchanged from 80.6 percent at end-2017. Also, there was an increase in long-term bond issuance in 2018, given the expectation of an interest rate upcycle **(Chart 2.1.3).** The average maturity of new issuance was 3.66 years in 2018, longer than 3.54 years in 2017. Large issuers were concentrated in the real estate and construction sector, the food and beverage sector, as well as the financial sector.

Chart 2.1.3 Long-term corporate bond issuance over the first ten months of the year

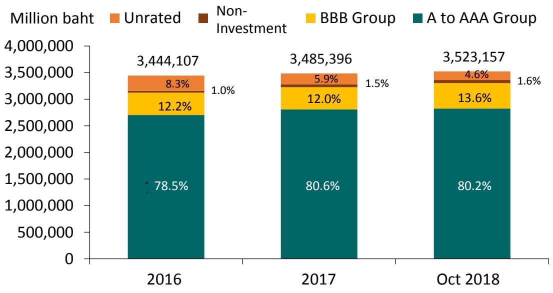


Source: Office of the Securities and Exchange Commission.

New issuance of non-investment grade and unrated bonds continued to fall. At the end of October 2018, the number of issuers of these bonds declined to only 326 issuers. The total amount outstanding fell by 15 percent from end-2017 to 219,600 million baht, or only 6.2 percent of the total corporate bonds outstanding **(Chart 2.1.4).** Nonetheless, issuance of low-rate bonds remained concentrated in the real estate development sector. Given an environment of rising interest rates, this sector may face rollover risks and higher funding costs going forward.

[14] If foreign juristic persons and public entities who sought approval from, submitted filing to, or reported sales to the SEC are included, the total outstanding would be 3.95 trillion baht.

Chart 2.1.4 Corporate bond outstanding classified by credit rating



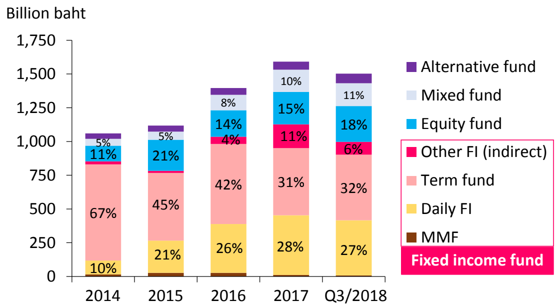
Source: Office of the Securities and Exchange Commission.

2.1.3 Mutual funds

Mutual funds' investment abroad remained concentrated in a few countries, notably China, which may be affected from the uncertainties surrounding US trade policy and tightening financial conditions.

Mutual funds' foreign investment totaled 1.50 trillion baht as of 2018Q3, slightly lower than at end-2017 **(Chart 2.1.5).** Daily FI funds, term funds, and equity funds accounted for most of the investment abroad.

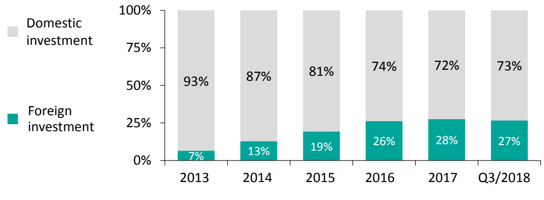
Chart 2.1.5 Mutual funds' foreign investment classified by type of fund



Source: Office of the Securities and Exchange Commission.

The share of foreign investment of term funds shrank. In contrast, daily FI funds continued to invest more abroad, at a compound annual growth rate (CAGR) of 76 percent over the 2013-2018 period **(Chart 2.1.6).** Most of the investment was in deposits and high-rated bonds, and was hedged against exchange rate risks.

Chart 2.1.6 Decomposition of daily FI funds' portfolio into domestic and foreign investment

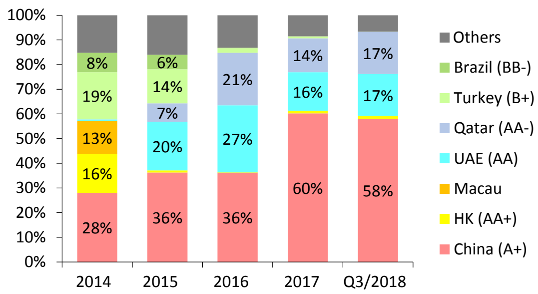


Value of daily FI funds' foreign investment (million baht)	27,834	102,659	238,769	361,361	441,789	408,039
Daily FI funds' foreign investment as a percentage of mutual funds' total foreign investment	3%	10%	21%	26%	28%	27%

Source: Office of the Securities and Exchange Commission.

In addition, 92 percent of mutual funds' direct investment abroad was concentrated in only three countries. As of 2018Q3, these top three destinations namely China, United Arab Emirates, and Qatar accounted for 58, 17, and 17 percent of mutual funds' total investment abroad, respectively. **(Chart 2.1.7)**

Chart 2.1.7 Concentration of mutual funds' foreign direct investment



Source: Office of the Securities and Exchange Commission.

With the high concentration of their investment in a few countries, mutual funds continue to face a risk that their investment assets could fall in values, despite the fact that these destination countries have good sovereign ratings and exchange rate risks are well-hedged. This could happen especially in the case that the US trade measures and tightening global financial conditions put a significant drag on China's economic growth. Thus, investors should also understand mutual funds' foreign investment policies and risk factors that could affect values of foreign assets when making investment decisions. The SEC has been supervising mutual funds closely and placing emphasis on informing investors, so that they can choose mutual funds that are appropriate given their risk tolerance.

2.1.4 Commercial banks

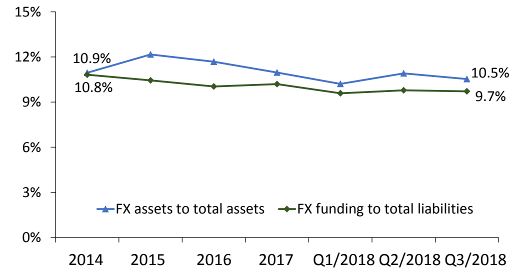
Thai commercial banks faced limited risks from monetary policy normalization in G3 economies. But rollover and funding cost risks could be an issue for some banks, especially those relying heavily on short-term funding in foreign currencies.

The commercial banking system's reliance on funds denominated in foreign currencies (FX funding) was rather limited. The ratio of FX funding to total liabilities[15] was 9.7 percent in 2018Q3 **(Chart 2.1.8)**, which was in line with the ratio of FX assets to total assets[16] that stood at 10.5 percent. Meanwhile, the difference between assets and liabilities in foreign currencies (FX currency mismatch) stood at 327 billion baht **(Chart 2.1.9)**, or only 1.9 percent of the total assets of the commercial banking system.

However, the tightening US dollar liquidity could affect banks' funding activities and lead to three main types of risks for Thai commercial banks, as follows.

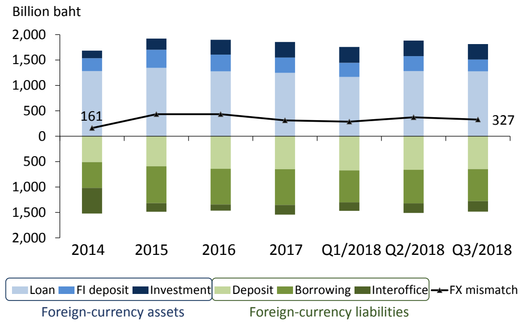
(1) Rollover risk: This represents the risk that banks might not be able to roll over matured loans. This risk is deemed to be low, because the commercial banking system relies on short-term (less than one year) borrowings in foreign currencies to a limited extent. The total amount of such loan was only 1,082 billion baht **(Chart 2.1.10)**, or 7.1 percent of total liabilities as of 2018Q3. In addition, most banks that borrow short-term in foreign currencies do so mainly from their parent banks, which further limits the potential impact from tightening US dollar liquidity.

Chart 2.1.8 Ratios of FX assets and FX funding for the commercial banking system



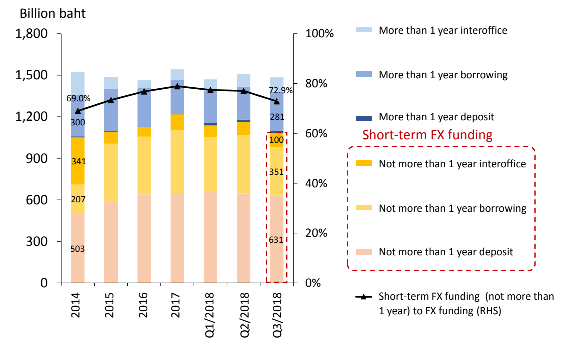
Source: Bank of Thailand.

Chart 2.1.9 Foreign-currency assets and liabilities of the commercial banking system



Source: Bank of Thailand.

Chart 2.1.10 Short-term FX funding (not more than one year) to the commercial banking system's total FX funding



Source: Bank of Thailand.

(2) Funding cost risk: This is the risk that funding costs could rise, which is also assessed to be limited. To assess such risk, one measure is the one-year repricing gap, which reflects the net effect of a change in interest rates on interest income on the asset side, interest expense on the liability side, as well as interest income or expense on off-balance sheet items. As of 2018Q3, the commercial banking system's repricing

[15] Total liabilities include deposits, borrowings, and interoffice borrowings.

[16] Total assets include all types of loans, deposits at financial institutions, and investment in securities.

gap was a positive value of 244 billion baht. This implies that for an increase of 100 basis points in interest rates, net interest income of the commercial banking system will increase by 0.1 percent of the system's total capital.

(3) Exchange rate risk: This is the risk from fluctuations in exchange rates, which is deemed to be low. To assess this risk, one metric is the net open position (NOP), which reflects FX currency mismatch including that resulting from off-balance sheet items such as derivatives used to hedge against exchange rate risks. As of 2018Q3, the NOP of the Thai commercial banking system was a small positive value of 54 billion baht, suggesting limited sensitivity to changes in exchange rates. More specifically, this implies that for each one-baht depreciation vis-à-vis the US dollar, profits of the commercial banking system will increase by 0.06 percent of the system's total capital.

In summary, the Thai commercial banking system is capable of withstanding the risk arising from tightening US dollar liquidity. However, it remains necessary to monitor individual banks' rollover and funding cost risks going forward, especially for those with high reliance on short-term FX funding.

2.2 Real estate sector

Real estate demand continued to grow in 2018. Key risk factors to monitor include the competition among financial institutions in the mortgage loan market, the impact due to a possible slowdown in foreign demand, the excess supply of office and retail spaces that could surge due to new mix-used projects[17], as well as some developers' debt serviceability.

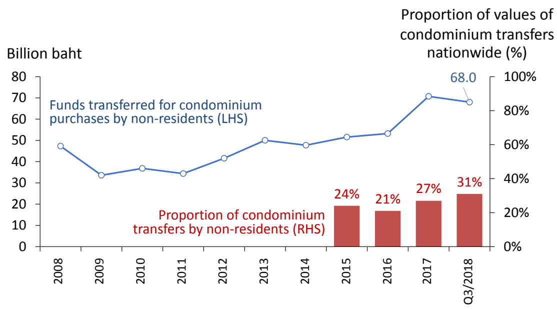
2.2.1 Developments in the real estate market

Housing market

Housing demand continued to grow, while new residential units for sale seemed to stabilize. So far, there was no sign of a widespread house price bubble that could lead to systemic risks. But there remains a need to monitor: (1) the risk from a drag in foreign demand, which has been playing an increasing role in the recent years; and (2) the risk from aggressive selling and lending practices, which could add more vulnerabilities to households and the real estate sector.

The increase in property ownership transfer during the first nine months of 2018 indicated growth in housing demand, partly supported by rising foreign demand. This was reflected in the value of funds transferred for condominium purchases by non-residents, which totaled 67,997 million baht for the first nine months of 2018, a 41.5 percent growth from the same period in 2017 **(Chart 2.2.1).**

Chart 2.2.1 Condominium purchases by non-residents



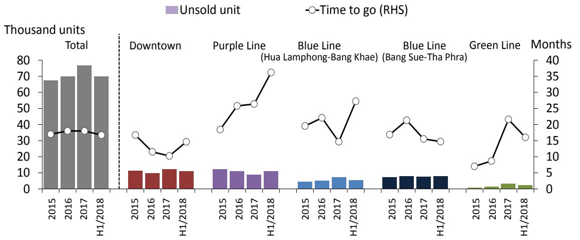
Sources: Bank of Thailand and Real Estate Information Center.

With regard to housing supply, the number of new residential units for sale in Bangkok and its vicinity during the first nine months of 2018 remained stable

[17] Mixed-use real estate projects are development projects that integrate multiple uses of land or buildings. Most mixed-use projects involve a mixture of residential and commercial uses.

compared to the same period in 2017. This owed mainly to the fact that developers were cautious in launching new projects in 2018H1 and focused instead on selling completed units. Also, the risk from excess supply subsided in 2018H1, as shown by the decline in both the number of unsold units and the time-to-go of various types of residential projects. Although the risk of oversupply increased for condominiums in some locations, especially along the Purple Line Train **(Chart 2.2.2)**, there was still no sign that the oversupply issue would spread to the point of posing a systemic concern.

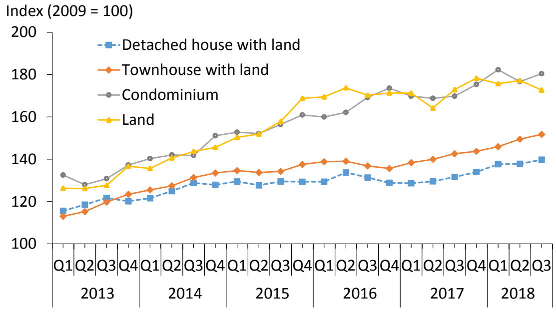
Chart 2.2.2 Unsold units and time-to-go periods for condominiums in Bangkok and its vicinity, classified by locations and nearby train lines



Note: Downtown areas include Phaholyothin, Pathumwan, Sukhumvit-Rama 4, Yannawa-Silom, and Phranakorn.
Sources: AREA and Bank calculations.

House prices in 2018 rose from the previous year, but without signs of price bubble that would pose risks to financial stability. The prices of low-rise residences rose, both for single-detached houses and townhouses. This was shown by the price indices of single houses and townhouses, which for the first nine months of 2018 rose by 5.7 and 5.6 percent, respectively, compared to the 2017 averages. These growth rates are higher than historical averages (2013-2017). Meanwhile, growths in condominium and land prices slowed to 5.5 and 2.1 percent, respectively **(Chart 2.2.3)**, due to the expansion of real-estate projects from central business districts to suburban areas.

Chart 2.2.3 Real estate price indices

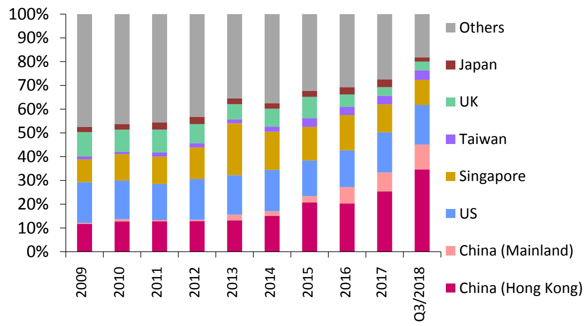


Note: The calculations are based on the database on commercial banks' new loans.
Source: Bank of Thailand.

There remain some risk issues that warrant monitoring in the periods ahead, as follows:

(1) Finding the balance between buyers' demand and developers' plans for launching new projects could be challenging. In the recent years, low-cost funding has become more accessible for developers, making it easier for them to start or scale up new projects. But this could potentially lead to underpricing of risks, as reflected in the situation where new supply exceeds actual demand, especially for the projects targeted at foreign buyers (i.e. reflecting developers' overestimation of demand). The significance of foreign demand should also be noted. Indeed, demand from China (including Hong Kong) now accounted for about 40 percent of foreign purchases of condominiums **(Chart 2.2.4)**, and this group of buyers also stands to face the negative impact from the US trade measures in the future. Going forward, a possible slowdown in foreign demand, notably from China, could cause the excess supply problem to intensify. This, in turn, could lead to a sharp decline in real estate prices and weaken developers' financial positions.

Chart 2.2.4 Composition of non-residents' funds transferred for condominium purchases, classified by buyer's country of residence



Note: The value of funds transferred for condominium purchases by non-residents is estimated from (1) the amount of foreign currencies sold for down payments or purchases of condominiums and (2) the amount of funds withdrawn from baht-denominated accounts for condominium purchases by non-residents.
Source: Bank of Thailand.

(2) Developers' selling strategies may contribute to the build-up of risks in the household sector and the real estate market going forward. For instance, these strategies include helping buyers to obtain loans in excess of actual selling prices (i.e. cash-back loans) and guaranteeing rental yields. These strategies could prompt households to take out more loans than necessary or purchase housing mainly for investment purposes. This could lead to higher default risks among households, in the case that they do not understand or underprice the risks involved.

(3) The intensified competition in the mortgage loan market among financial institutions has led to more lenient lending standards. This was seen from an increase in the share of new mortgage loans with loan-to-value (LTV) ratio exceeding 90 percent. Households received loans more easily, and both their mortgage debt service ratio and loan-to-income ratio climbed higher. These conditions could lead to over-indebtedness among households and induce excessive speculation in the real estate market. The NPLs of mortgage loans could also rise, affecting financial positions of financial institutions **(Further details in Box 4)**.

Commercial real estate market

The commercial real estate segment continued to grow, especially for large mixed-use projects that will add substantial supply to the market in the future. Thus, there remains a need to monitor risks to the success of these projects and their developers' financial strength, which could affect the overall financial system.

The commercial real estate market continued to expand in 2018 in line with economic growth. New supply of office and retail spaces increased from 2017, with the occupancy rate staying high. Furthermore, many developers started to expand into mixed-use projects. By doing so, the developers expected that rental spaces would increase the proportion of recurring income to help stabilize their income stream. They also sought to add values to their projects to align with surging costs of land.

According to the launch schedules of large mixed-use projects[18] already advertised in 2018, the supply of office and retail spaces is expected to increase by 1,120,000 and 510,000 square meters, respectively, in the coming years. Most of the new supply is projected to enter the market after 2020.

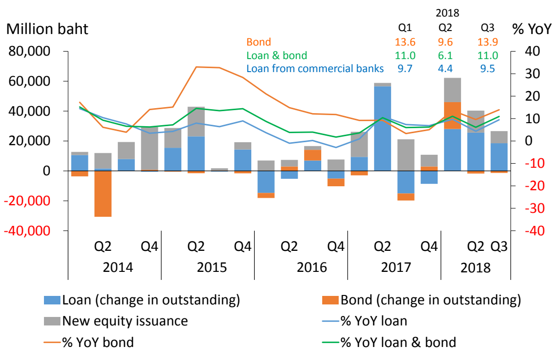
The principal risk arising from mixed-use projects that could lead to systemic risks is developers' ability to raise funds and manage liquidity. This is because large mixed-use projects require intensive investment capital, long construction time, as well as the expertise in project planning

[18] Large mixed-use projects include those valued more than 10 billion baht, based on information from Bangkok Property Report by CBRE, which surveys office and retail spaces in Bangkok. In estimating new supply, exact figures of new supply each year could be determined only for projects that are already under construction. For the projects where construction has not begun, exact figures of new supply cannot be specified.

considering different market conditions for each type of real estate. At the same time, break-even points of mixed-use projects are longer than those of residential projects. Hence, if developers misestimate future demand, their income, liquidity and debt serviceability could be affected.

2.2.2 Funding activities of real estate developers

Chart 2.2.5 Real estate companies' loans from commercial banks, bonds, and new equity issuance



Sources: Bank of Thailand and Office of the Securities and Exchange Commission.

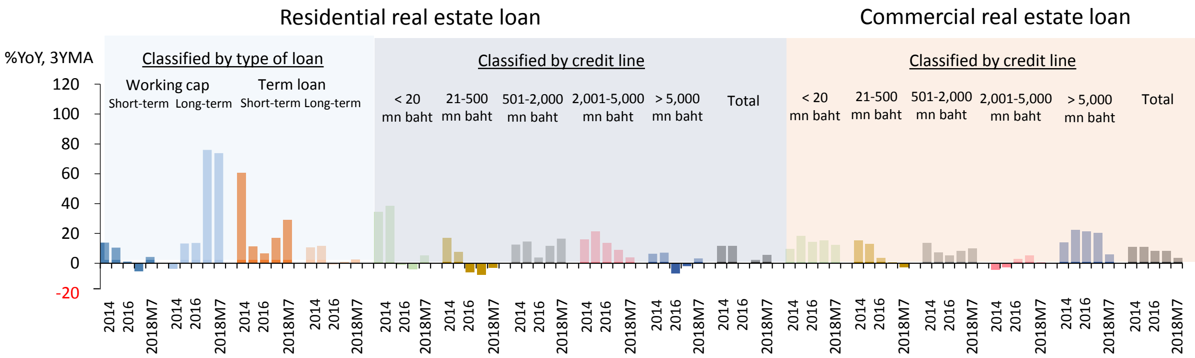
Real estate developers continued to raise more funds, in line with improved conditions in the real estate market (Chart 2.2.5). Developers' financing via bank loans and bonds both increased. In 2018Q3, bank loans and bonds outstanding of real estate developers grew by 9.5 and 13.9 percent, respectively, from the same period in 2017.

Funding via bank loans

As a means of financing, the use of bank loans rose mainly from residential real estate developers. Bank loans given to the residential segment grew by 5.6 percent from the same period in 2017. This owed mainly to the growth in long-term working capital, especially among developers with credit lines between 500-2,000 million baht **(Chart 2.2.6)**. This suggests that new supply could continue to rise in the future, partly driven by small- and medium-sized developers.

Meanwhile, commercial real estate developers relied less on bank loans, partly because large developers shifted toward bond issuance. In 2018Q3, bank loans given to the commercial segment expanded by merely 3.5 percent from the same period in 2017, down from 8.0 percent in 2017. The subdued lending growth was mainly due to the slowdown among large developers with credit lines greater than 5,000 million baht **(Chart 2.2.6).**

Chart 2.2.6 Real estate companies' loan growth

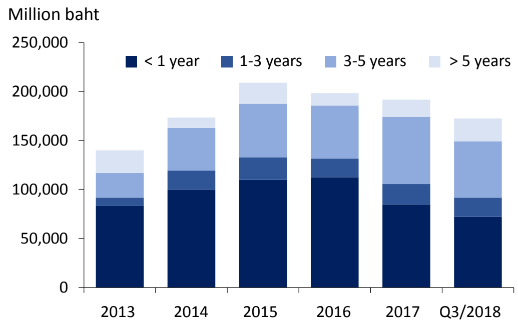


Note: Working capital here consists of O/D loans and non-O/D working capital loans.
Source: Bank of Thailand.

Funding via bond issuance

The real estate sector issued more bonds to fund business expansion. For the first nine months of 2018, bond issuance by the real estate sector totaled 172,614 million baht, growing by 19 percent from the same period in 2017. The funding was used mainly to support business expansion of large companies. Moreover, developers also showed a preference for long-term issuance, given their expectation of higher interest rates. Therefore, in the first nine months of 2018, the real estate sector issued 100,497 million baht worth of bonds with maturity longer than one year. This presented a 27.6 percent growth from the same period in 2017 **(Chart 2.2.7)**.

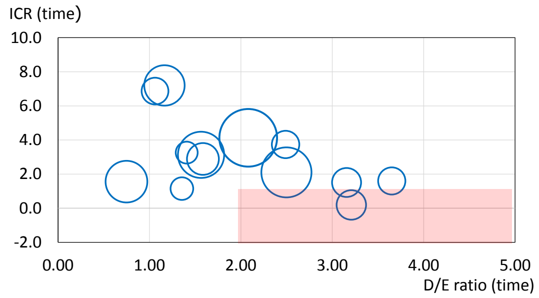
Chart 2.2.7 Bond issuance of real estate companies, classified by maturity



Source: Thai Bond Market Association (data as of September 2018).

Despite the high quality of bonds overall, some issuers continued to have an elevated debt burden. Thus, there remains a need to monitor the potential impact of a faster-than-expected increase in interest rates on these issuers. Most of the bonds issued by 30 large real estate developers (accounting for 87 percent of the total bond issuance by 134 developers) were rated in the A group. These issuers also showed a good ability to meet interest payments, as reflected in the interest coverage ratio (ICR) of 1.5 or above. But some of these issuers had a relatively high debt-to-equity (D/E) ratio **(Chart 2.2.8)**. This could affect financial institutions' lending decisions or these issuers' ability to rollover bonds, especially in the event of a yield snapback.

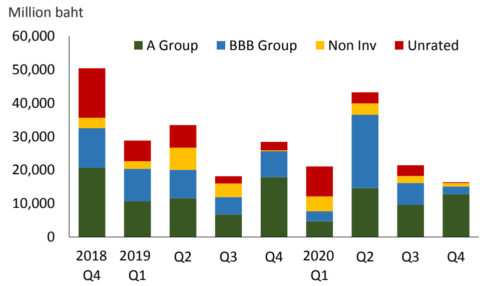
Chart 2.2.8 D/E and ICR of real estate companies



Note: Bubble size represents the size of outstanding bonds as of September 2018. Shown on the chart are the top 30 companies that have highest outstanding of bonds and have an ICR of no greater than 10 times.
Sources: Office of the Securities and Exchange Commission and Stock Exchange of Thailand (financial statements of listed companies as of 2018Q3); and Department of Business Development (financial statements of non-listed companies as of 2016).

Going forward, there continue to be a need to monitor the rollover of bonds maturing in 2019 and 2020, given that funding costs are likely to rise in line with tightening global financial conditions. This is particularly the case for unrated bonds, whose issuers are likely to face higher rollover risk compared to other groups of issuers **(Chart 2.2.9).**

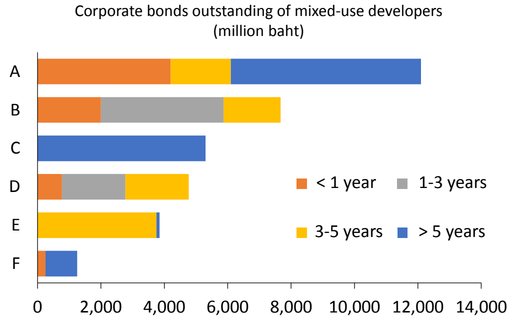
Chart 2.2.9 Maturity dates of real estate companies' bonds, classified by credit rating



Source: Office of the Securities and Exchange Commission (data as of September 2018).

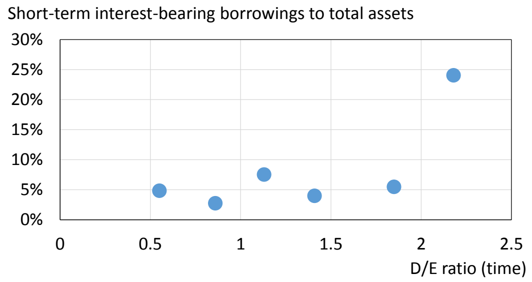
Bond issuance by developers of mixed-use projects was largely long-term (Chart 2.2.10), consistent with the long-term nature of investment in mixed-use projects. A closer look at the financial positions of six mixed-use developers listed on the SET reveals that the risks related to their leverage were limited. This was reflected in the D/E ratio that remained manageable, as well as the ratio of short-term interest-bearing debt to total assets that was quite low. There were only a few developers that relied heavily on short-term borrowings, with the ratio of short-term borrowings to total assets exceeding 20 percent **(Chart 2.2.11)**. The impact of rising interest rates on these developers should be monitored going forward.

Chart 2.2.10 Maturity structure of bonds issued by large mixed-use developers



Source: Thai Bond Market Association (data as of September 2018).

Chart 2.2.11 Risks from leverage of large mixed-use developers listed in the stock market



Source: Stock Exchange of Thailand (data as of September 2018).

2.3 Household sector

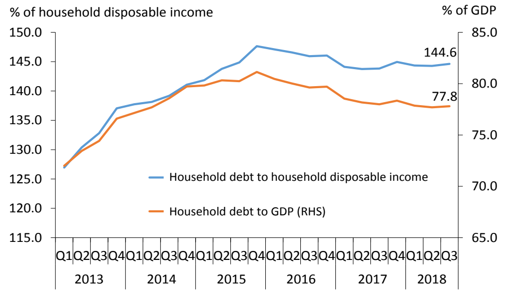
Households remained fragile given their elevated debt burden, which impaired their capacity to withstand shocks and could lead to rising NPLs in the future. Recently, the BOT has issued macroprudential policy, with an aim to prevent the household debt situation from escalating into a systemic concern.

Thailand's household debt to GDP stayed high compared to regional peers, with the debt level picking up steadily. Considering the trend, some improvements were observed. The household debt to GDP ratio[19] continued to decline gradually since 2016, to a value of 77.8 percent at the end of 2018Q3. Similarly, the ratio of household debt to disposable income declined slowly to 144.6 percent in 2018Q3 **(Chart 2.3.1)**. Despite their slowing trend, both ratios still remained high compared to regional peers **(Chart 2.3.2).** Moreover, the household debt level itself continued to accelerate, mainly attributable to growth in housing and auto loans. Indeed, mortgage loans still expanded given intense competition in the mortgage loan market. For auto loans, a sharp pick-up was driven in part by some leasing companies' campaigns to boost sales, such as the reduction of down payments.

While the higher debt accumulation reflects better financial access, it could make households' financial positions more fragile. This, in turn, could impair households' financial cushion for shocks, potentially leading to NPL problems. **This highlights the fact that debt accumulation needs to be at a well-balanced level. Such level is the debt level that would not lead to current or future NPL problems, which could potentially spread and pose a systemic concern.**

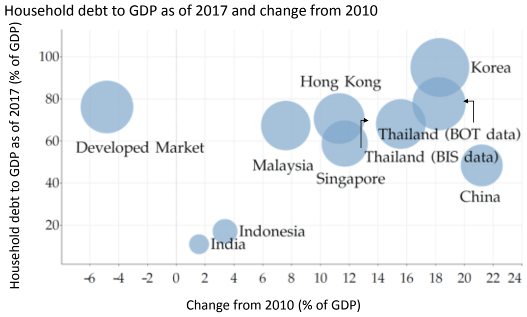
[19] Household debt includes only formal loans that financial institutions extend to individuals who reside in the country. Financial institutions refer to (1) depository financial institutions such as commercial banks, depository SFIs, savings cooperatives, and (2) other financial institutions, such as credit companies, leasing companies, personal loan companies, insurance companies, and pawn shops. Household debt excludes loans that have been written off, loans from the Student Loans Fund, and informal loans.

Chart 2.3.1 Household debt



Note: Debt refers to the loans granted to households by financial institutions. Household income is household disposable income (actual data up to 2016Q4).
Sources: Bank of Thailand and Office of the National Economic and Social Development Board (NESDB).

Chart 2.3.2 Thailand's household debt to GDP compared to those of regional countries



Note: To ensure consistent data definitions and allow for comparison of household debt data across countries, data from the Bank of International Settlements (BIS) are used. Unlike BIS data, the BOT's own household debt data also includes loans from other financial corporations, such as non-banks. Thus, the BOT data would normally show a higher level of household debt compared to BIS data. The size of the bubbles represents the household debt to GDP ratios.
Sources: Bank for International Settlements (BIS) and Bank of Thailand.

In assessing risks associated with each type of household debt, several factors have been taken into account. These include households' balance sheets, creditors' lending standards, as well as households' ability to withstand income and interest rate shocks. All these factors are interlinked, as shown in the framework for in-depth household debt assessment **(Chart 2.3.3)**, and can be summarized into six risk metrics, as follows.

(1) Leverage, as reflected by the debt-to-GDP or debt-to-income ratios, is an important risk factor that indicates the fragility of households' financial positions. This is because the debt level also has an impact on debt serviceability indicators, such as the ratio of debt to financial assets and the ratio of monthly debt payments to monthly income.

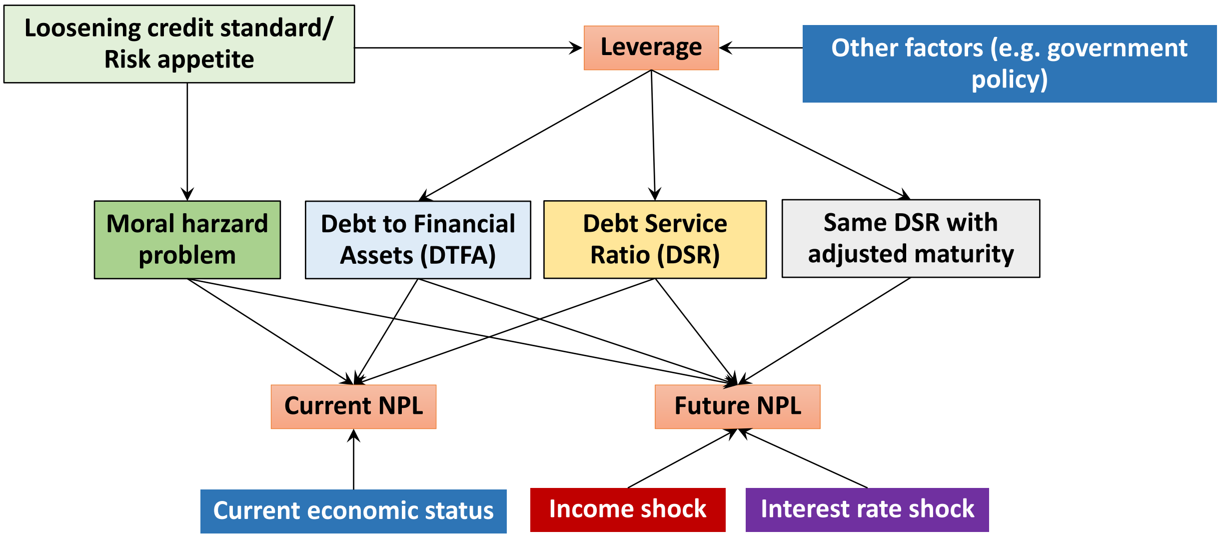
(2) Credit standard or risk appetite, as reflected by the ratio of credit line to income or the loan-to-value (LTV) ratio, is a factor that determines the pace of debt accumulation, as well as the quality of loans and households' discipline in using such loans, which is often referred to as a moral hazard situation. In other words, loose credit standards allow households to borrow easily without adequate savings. This could lead to speculation in asset prices and the lack of financial discipline, potentially leading to NPL problems.

(3) Debt service ratio (DSR) is a factor that reflects households' ability of households to meet debt payments, and is directly related to defaults. A higher debt level could lead to two possibilities: either (1) the DSR increases or (2) the DSR stays unchanged but the repayment period is extended.

(4) Debt-to-financial assets ratio (DTFA) reflects households' financial cushion and ability to pay off debts given their savings.

(5) Current debt serviceability of households, as reflected by the NPL ratio or the NPL new-entry rate, is also key. The latter ratio, in particular, can provide an early warning that the NPL ratio is about to rise. It should be noted that households' debt serviceability also depends on the business cycle. For instance, a slowdown in economic growth could weigh on households' income.

Chart 2.3.3 Household debt analysis framework



Source: Bank of Thailand.

Chart 2.3.4 Results of household debt analysis classified by loan type 1/

<table>
<tr><th></th><th>Leverage</th><th>Loosening credit standard / Risk appetite</th><th>Debt Service Ratio (DSR)</th><th>Debt to Financial Assets (DTFA)</th><th>Current NPL situation</th><th>Risk of rising NPL in the future</th></tr>
<tr><td>Mortgages</td><td>Increasing gradually, and remain elevated</td><td>Increasing (Higher LTV and refinancing)</td><td>Increasing marginally (with longer repayment period)</td><td>Deteriorating</td><td>Increasing</td><td>Increasing (Deteriorating balance sheet and longer repayment period made households vulnerable to negative shocks)</td></tr>
<tr><td>Auto loan</td><td>Resume expansion (after a period of constant deleveraging 2/)</td><td>Increasing (Competition in the credit market during the recovery period)</td><td rowspan="3">Increasing (Data did not allow for assessment by type of loan)</td><td rowspan="3">Deteriorating (Data did not allow for assessment by type of loan)</td><td>Decreasing</td><td>Increasing slightly (due to loosening credit standard)</td></tr>
<tr><td>Credit card and PLR 3/</td><td>Stable (expanding in line with GDP)</td><td>Decreasing (due to supervision measures imposed on credit cards and PLR)</td><td>Decreasing</td><td>Stable</td></tr>
<tr><td>Other personal loan</td><td>Decreasing</td><td>No sufficient data for assessment</td><td>Stable</td><td>Stable</td></tr>
<tr><td>Business loan</td><td>Decreasing</td><td>Decreasing (Financial institutions became more cautious in lending to SMEs)</td><td>Increasing</td><td>Deteriorating</td><td>Increasing (NPL of SMEs remained elevated)</td><td>Increasing (Probability of facing negative shocks is higher than other groups)</td></tr>
</table>

Note: 1/ There were 4 levels of concerns, with the green color representing marginal concern, yellow = moderate concern, orange = high concern, and red = very high concern.

2/ Deleveraging is measured by a fall in the ratio of debt to GDP or to income.

3/ Personal Loans under Regulations (PLR) refer to personal loans under the supervision of the Bank of Thailand such as cash cards.

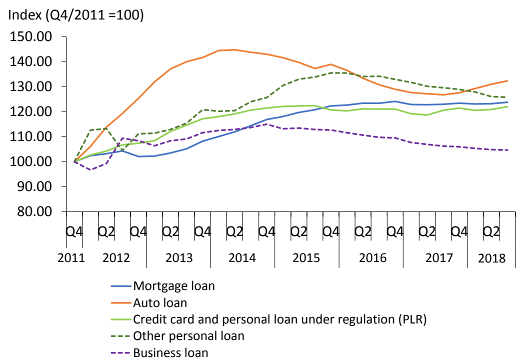
Sources: Bank of Thailand and Socioeconomic Survey (SES) by National Statistical Office.

(6) Future debt serviceability of households is assessed based on the five risk metrics mentioned above, coupled with the assessment of the probability and magnitude of negative income shocks and interest rate shocks. Such assessment is conducted in form of a stress test, and is going to serve as a main indicator of households' ability to withstand shocks.

The assessment framework outlined above was used to analyze the fragilities of each type of household debt. **The results revealed that housing and business loans were more fragile than other types of debt, while auto loans continued to warrant monitoring (Chart 2.3.4).**

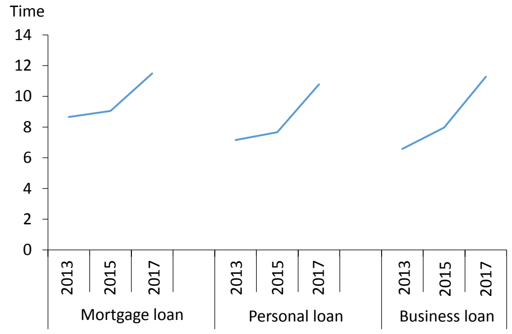
(1) Mortgage loans deserved to be monitored regularly, since the indicators pointed to rising risks in many aspects that could weigh on debt serviceability. Indeed, the level of debt kept rising and stayed high compared to historical levels **(Chart 2.3.5)**, lending standards for mortgage loans loosened, the DSR appeared to be on an uptrend, while loan repayment periods lengthened. The ratio of debt to financial assets (DTFA) **(Chart 2.3.6)** and the NPL ratio for mortgage loans both deteriorated **(Chart 2.3.7)**. Lastly, although the NPL new-entry rate edged up, the NPL exit rate remained stable **(Chart 2.3.8).**

Chart 2.3.5 Indices of household debt to GDP, classified by loan type



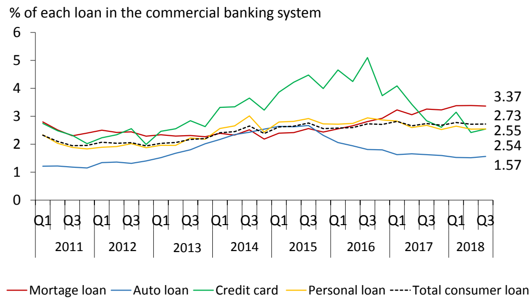
Source: Bank of Thailand.

Chart 2.3.6 Debt to financial assets, classified by loan type



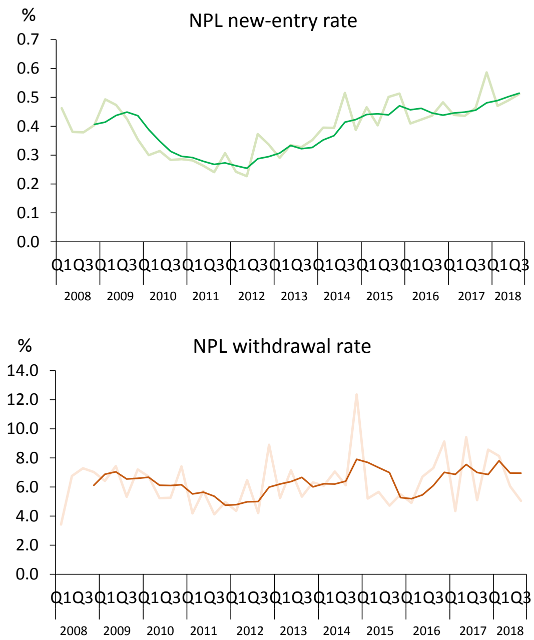
Sources: Socioeconomic Survey (SES) by National Statistical Office and Bank calculations.

Chart 2.3.7 NPL ratios classified by loan type



Source: Bank of Thailand.

Chart 2.3.8 NPL new-entry rate and NPL withdrawal rate of mortgage loans



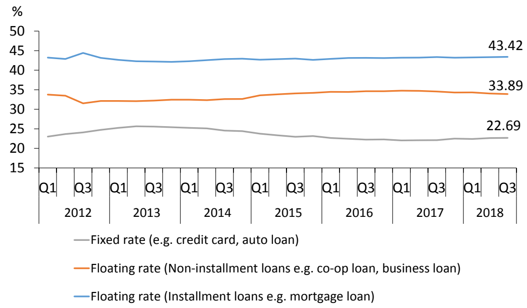
Note: NPL new-entry rate = the value of additional loans that becomes NPL in the current period / total loan outstanding in the previous period. NPL withdrawal rate = the value of loans that switches from NPL to normal loans or NPL loans that are repaid in the current period / total NPL outstanding in the previous period.
Source: Bank of Thailand.

(2) Business loans. Although the ratio of business loans to GDP trended lower and financial institutions increased caution in lending to SMEs, key indicators especially the DSR, DTFA, and actual debt serviceability continued to deteriorate. In 2018Q3, the NPL ratio of SMEs remained elevated at 4.4 percent. This was in part due to a number of structural factors, such as the changing competitive landscape, as well as the penetration of technology and e-commerce that could affect SMEs' ability to adapt to changes.

(3) Auto loans. Debt serviceability for auto loans showed some signs of improvement in line with gradual economic recovery. This was reflected in a downward trend in the NPL ratio, with the NPL exit rate rising steadily since the beginning of 2017. Nevertheless, the NPL new-entry rate continued to edge higher, partly due to loosening lending standards driven by competition among auto-leasing companies.

A potential rise in interest rates was assessed to have a limited impact on debt serviceability. A sensitivity analysis was conducted to assess the impact of interest rate changes on households' debt serviceability. **The results revealed that households' overall interest burden was indeed not that sensitive to changes in interest rates.** This was because most of household debt was installment loans, for which higher interest rates would lead to a longer repayment period but no change in monthly debt payments. In 2018Q3, such installment loans accounted for a high proportion of 43.4 percent of total consumer loans **(Chart 2.3.9)**[20], while the share of fixed-rate loans was 22.7 percent. This means that only one third of total consumer loans was sensitive to changes in interest rates, and most of these loans were business loans or loans from savings cooperatives.

Chart 2.3.9 Composition of consumer loans, classified by interest rate type



Note:
- The share of fixed-interest rates loans includes "others uncategorized" group, which accounts for around 4.76 percent of total loans in 2018Q3.
- Rising interest rates will affect borrowers of two loan types. First, borrowers with installment loans will experience longer installment periods. Second, borrowers with non-installment loans will see a direct change in the size of monthly installments.

Source: Bank of Thailand.

Still, households were assessed to be sensitive to income fluctuations, particularly for those with mortgage loans. Based on an income sensitivity analysis, the proportion of household debt that could be prone to repayment liquidity problems[21,22] (% debt at risk) was high at 46.8 percent. Moreover, under the stressed scenario where income was assumed to drop by 20 percent, the % debt at risk would surge to 72.5 percent, reflecting households' limited ability to withstand economic shocks. Households with mortgage loans appeared to be the

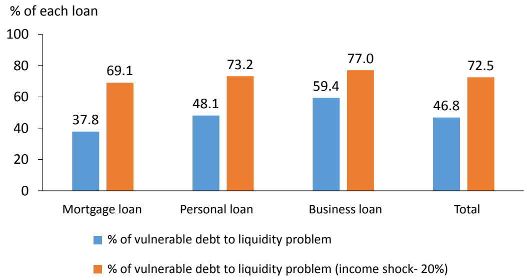
[20] There were changes to the assumptions and the data used in the assessment of interest rate sensitivity, resulting in the discrepancies between the figures shown in this report and in the 2017 report.

[21] The proportion of debt that was prone to liquidity and repayment problems was defined as the value of debt of households whose income after deducting expenses and taxes was insufficient to cover full monthly payment.

[22] The actual proportion of debt that was prone to liquidity and repayment problems might be lower than reported above, as the calculation here was based on the data from the Socio-Economic Survey (SES) where households might misreport or under-report their income.

most sensitive to income shocks **(Chart 2.3.10).**

Chart 2.3.10 Stress testing households that are vulnerable to liquidity shocks



Note: (1) Income stress is under the assumption that households do not cut back their consumption or sell assets to pay off debts. (2) Personal consumption loans include borrowings for educational and other purposes. (3) Business loans include both agricultural and non-agricultural businesses.
Sources: Socioeconomic Survey (SES) by National Statistical Office and Bank calculations.

Going forward, the issue of household debt accumulation remains at the forefront and continues to warrant monitoring. As of now, default situations still do not pose a systemic threat to the Thai financial system. But it is essential to have macroprudential policies in place to mitigate financial stability risks that could arise from fragilities in the household sector. Such policies would help prevent households from taking out excessive loans or having debt burden that exceeds their ability to service. Thus, in 2018Q4, the Bank of Thailand introduced the macroprudential measure on mortgage loans, to be effective on 1 April 2019 **(Further details in Box 4).**

2.4 Business sector

2.4.1 Overall business sector

The systemic risks stemming from the business sector remained limited. The business sector was assessed to be resilient to an increase in interest rates and a drop in sales. However, some segments appeared more vulnerable than others. These included businesses with high leverage, businesses whose product or input prices move with commodity prices, as well as businesses affected by the growth of e-commerce.

Tightening financial conditions due to monetary policy normalization in G3 economies, together with US trade protectionist measures, could have a widespread impact on Thai businesses' performances and debt serviceability. Two key transmission channels would be through higher financing costs and lower revenues. On top of this, businesses with foreign debt could also be exposed to volatility of the Thai baht.

In conducting a sensitivity analysis under stressed scenarios, **the emphasis was placed on vulnerabilities that could arise from (1) a rise in borrowing costs[23] and (2) a drop in sales[24].** The degree of vulnerability was measured by changes in the debt at risk measure, which was computed by dividing the debt value of firms susceptible to defaults[25] by the total debt value of all firms. The calculation was done based on financial statements of listed firms as of 2018Q3. The results showed that interest expenses did not increase substantially, given the fact that businesses' performances had improved with economic recovery and the debt build-up relative to GDP growth was not that fast. Moreover, their earnings before interest and taxes (EBIT) remained at a level that was sufficient to cover a rise in interest expenses or a drop in revenues. This suggested that the systemic risks

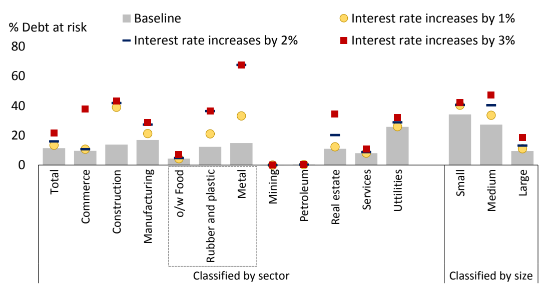
[23] Assumed that the borrowing cost increased between 0.25 percent and 2 percent, while sales remained unchanged. Implied interest rate was used as a borrowing cost, and was calculated by debt burdens divided by the outstanding of interest bearing debt.

[24] Assumed that sales dropped by 0.25 percent to 2 percent, while debt burdens remained unchanged.
[25] Firms that are prone to default are defined as ones with below 1.5 interest rate coverage ratio (ICR).

arising from the business sector remained limited.

(1) The overall business sector appeared resilient to a 2 percent rise in implied interest rates (Chart 2.4.1). In other words, the majority of firms would have a sufficient level of EBIT to cover higher interest expenses if interest rates were to increase by no more than 2 percent. But firms in the construction and metal sectors appeared to be less resilient compared to others. Also, several business sectors started to show significantly higher sensitivity once interest rates rose by more than 2 percent. These included the rubber and plastics sector as well as the real estate sector. When classified by size, small firms seemed to exhibit a rather high percentage of debt at risk. However, they were not sensitive to changes in interest rates, which might reflect the difference between those with debt serviceability issues and those without.

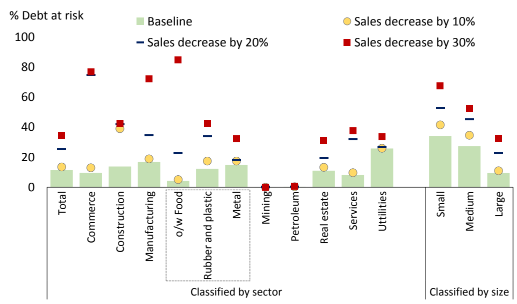
Chart 2.4.1 Stress test results – Interest rate sensitivity



Note: (1) The analysis is based on balance sheet data of 549 listed companies with interest expense in 2018Q3.
(2) The above stress test results are under conservative assumptions, meaning that in reality companies may be more resilient to changes in the interest rates than suggested by the stress test. The analysis is based on the following assumptions.
2.1 All bonds are rolled over at maturity, and face higher funding costs straightaway.
2.2 All loans have floating interest rates.
2.3 Assume complete interest rate pass-through.
Sources: Stock Exchange of Thailand and Bank calculations.

(2) The majority of firms remained resilient to a drop in sales of no more than 10 percent[26], but showed higher sensitivity as sales dropped by more than 20 percent (Chart 2.4.2). The construction, commerce, and manufacturing sectors appeared less resilient to a drop in sales compared to other sectors. In contrast, firms in some sectors managed to stay resilient even amid a 30 percent drop in sales. These included the petroleum and utilities sectors. When classified by size, businesses of all sizes were found to be resilient to a 10 percent drop in sales.

Chart 2.4.2 Stress test results – Sales sensitivity



Note: The analysis is based on balance sheet data of 549 listed companies with interest expense in 2018Q3.
Sources: Stock Exchange of Thailand and Bank calculations.

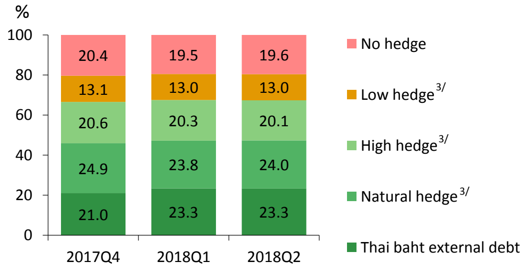
An assessment was conducted to gauge the impact of exchange rate movements on businesses with external debt, drawing on the data on external debt and international trade transactions of over 700 [27] firms with highest external debt outstanding. **The results showed that, in overall, the business sector faced limited exposures to risks from valuation changes and exchange rate volatilities.** As of 2018Q2, around one fourth of external debt was denominated in Thai baht, and thus would be immune from exchange rate fluctuations. Meanwhile, external debt with high hedge and natural hedge constituted 44.1 percent of total external

[26] A study based on a Factor-Augmented Vector Autoregressive indicated that a 1 percent drop in sale was equivalent to a 2 percent drop in GDP.

[27] Around 770 firms are included in the calculation, accounting for 80 percent of the total foreign debt outstanding of the business sector.

debt, reflecting that most firms managed their exchange rate risks well **(Chart 2.4.3).**

Chart 2.4.3 External debt[1/] analysis of corporate sector[2/] (calculated from a sample of corporations with external debt covering 80% of total external corporate debt)



Note:
[1/] External debt includes outstanding liabilities of residents to non-residents.
[2/] Non-financial corporations include domestic juristic persons and state-owned enterprises, but exclude financial intermediaries.
[3/] Low hedge refers to cases with exchange rate hedging ratio of less than 50 percent, or the ratio of foreign assets to foreign liabilities of less than 1. High hedge refers to cases with exchange rate hedging ratio of more than 50 percent, or the ratio of foreign assets to foreign liabilities of 1 or above.
Source: Bank of Thailand.

It should be noted that the analysis above, which assesses the sensitivity of the business sector to higher borrowing costs and lower revenues, was undertaken using only the data of firms listed in the SET, as this presented the most up-to-date information that reflected businesses' performances. SMEs, which were unlisted[28], were outside of the coverage, and it is possible that they were in fact even less resilient compared to those covered in the analysis. With regard to their financial linkages, SMEs are linked to the financial system mainly via the bank lending channel. In the recent periods, SMEs showed a slight deterioration in their debt serviceability and contributed to more NPLs in the financial institutions system **(Chart 1.3.2 in Chapter 1)**. But thanks to commercial banks' solid financial positions, the weakness in SMEs has not had an impact on the stability of the commercial banking system, which is the main intermediary sector in the Thai financial system.

2.4.2 Large conglomerates

The top 20 large conglomerates[29]– those with highest total values of loans from financial institutions, corporate bonds, and external borrowings–were found to have significant linkages to the financial system. They also raised funds actively during the period of low interest rates, with some of them channeled more investment into non-core businesses and abroad. This contributed to the increased complexity in their business structures and made it more difficult to assess risks related to them, potentially leading to underpricing of risks.

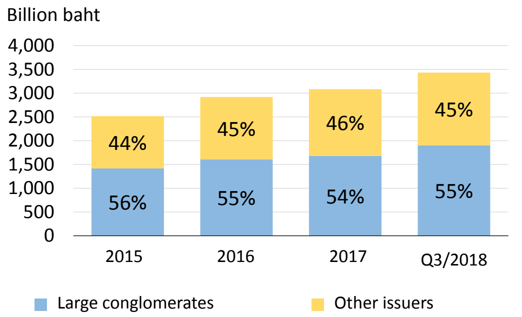
Large conglomerates exhibited significant linkages with the financial system, especially in the corporate bond market where more than half of total bonds outstanding were issued by these large conglomerates. Based on a study on their funding and investment behaviors, these large conglomerates had significant linkages to the financial system via three main funding channels, namely: (1) loans from financial institutions, (2) corporate bonds, and (3) external borrowings.

Large conglomerates recorded the total debt outstanding of 4.8 trillion baht from these three channels at the end of 2018Q3. Of this amount: (1) loans from commercial banks and specialized financial institutions totaled 2.0 trillion baht (12 percent of total financial institutions' loans

[28] For unlisted firms, latest financial data were only available up to 2016, from the Department of Business Development.
[29] Large businesses were defined as those with the 20 highest total debt as of June 2018, from the following sources (1) bank loan (2) corporate bond issuance and (3) external debt. The names of the firms in each category were referenced to the data that were publicly available on the SET's website, in the news, and from the views of bank supervisors. Therefore, the result might differ from the classification based on the single lending limit guideline under the Financial Institutions Businesses Act B.E. 2551.

outstanding); (2) corporate bonds totaled 2.0 trillion baht (55 percent of total corporate bonds outstanding); and (3) external borrowings totaled 0.78 trillion baht[30] (37 percent of total external debt of the private sector and state-owned enterprises combined). It is also worth noting that large conglomerates continued to dominate the corporate bond market, with their bonds accounting for over 50 percent of total corporate bonds outstanding throughout the years **(Chart 2.4.4).**

Chart 2.4.4 Concentration of corporate bond outstanding issued by large conglomerates

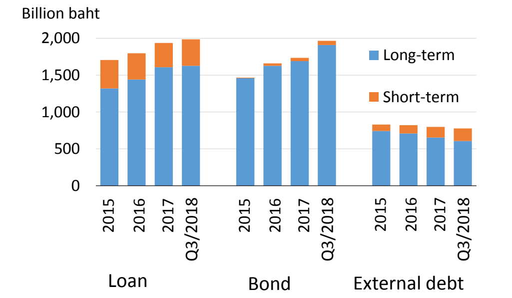


Note: The percent (%) figures show the shares of corporate bonds compared to the total corporate bond outstanding in the market.
Sources: Bank of Thailand, Thailand Securities Depository Co., Ltd., Custodian, and Securities Broker and Dealer.

The recent increase in large conglomerates' new debt came primarily from domestic sources. From 2015 to 2018Q3, large conglomerates' borrowings rose by 0.73 trillion baht, or at a growth rate of 18 percent. This was largely attributable to domestic sources of funds, namely loans from financial institutions and corporate bond issuances, while external borrowings remained stable **(Chart 2.4.5).** However, some conglomerates appeared to ramp up their borrowing both from domestic and external sources. These were conglomerates with extensive investment in several lines of businesses abroad.

Furthermore, some conglomerates borrowed from external sources more than 20 percent of their total borrowing[31]. Examples included those with overseas headquarters and those with the need to acquire main operating assets from abroad. However, these conglomerates were found to hedged most of their exchange rate risks, so their exposures to exchange rate fluctuations were somewhat limited.

Chart 2.4.5 Large conglomerates' debt outstanding classified by contract maturity



Sources: Bank of Thailand, Thailand Securities Depository Co., Ltd., Custodian, and Securities Broker and Dealer.

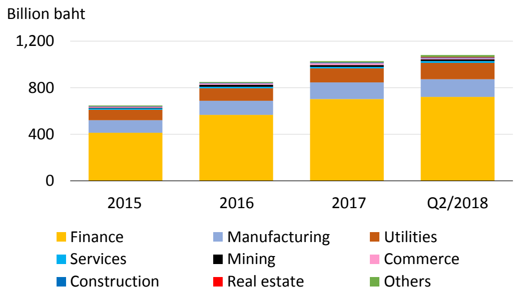
While most of large conglomerates' borrowing were long-term[32], there seemed to be a shift toward short-term borrowing as of late. This served to reduce interest expenses, particularly for corporate bonds and external borrowings **(Chart 2.4.5).** A closer look at the interest rates of new loans that banks offered to conglomerates showed that **large conglomerates seemed to receive better rate offers compared to other corporates, and the rates have been trending lower.** This reflected intense competition among banks to lend to large conglomerates, which had higher bargaining power than other borrowers.

Low funding costs could be a factor that allowed large conglomerates to take on more risks from their investment. So, in the recent periods, there were some large conglomerates that began to expand their

[30] Latest external debt data as of the end of June 2018.
[31] Total borrowing is defined as the sum of bank loan, corporate bond issuance, and external debt.
[32] Long-term borrowings include bank loans, corporate bond issuance, and foreign borrowing with contracts of longer than 1 year. Short-term borrowings refers to ones with contracts of less than 1 year.

investment outside their core businesses, as reflected in their increased investment in large mixed-use projects and overseas. The total outward direct investment of large conglomerates stood at 1,080 billion baht[33] as of 2018Q2, growing by 67 percent from end-2015. Most of their investment abroad was in financial holding companies, as well as firms in the manufacturing and utilities sectors **(Chart 2.4.6).**

Chart 2.4.6 Large conglomerates' foreign direct investment classified by business type



Note: Excluding the portion of foreign investment by state-owned enterprises in the oil industry, of which the type of businesses cannot be identified.
Source: Bank of Thailand.

Given these large conglomerates' expansion into a more diversified set of businesses, assessing risks related to them has become more difficult and complex. Moreover, the fact that large conglomerates have better access to low-cost funds than other corporates could lead to underpricing of risks by these large conglomerates, their creditors, as well as the investors involved. Going forward, key risk factors include the uncertainties due to the upcycle in global interest rates and the trade disputes between the US and major trading partners. These factors could lead to higher funding costs and a possibility of lower revenues and investment returns.

[33] When including the outward investment of the State-owned enterprises with linkages to large businesses, the total investment stood at 1,685 billion Baht.

Box 3: Amending the Cooperatives Act – towards the new era of financial cooperatives supervision

Financial cooperatives, which include savings cooperatives and credit union cooperatives, account for 90 percent of cooperatives system's total assets. Over the past decade, financial cooperatives' assets have grown at a high rate of 13.4 percent annually[34]. At the same time, their business models have changed along with financial market developments. In particular, their operations have become increasingly interconnected with the financial institutions system and capital markets, as well as among cooperatives themselves. Given these developments, many articles in the Cooperatives Act of B.E. 2542 (1999) have become obsolete for today's development and protection of the cooperatives system. This is evident in several cases, where the lack of adequate risk management and good governance among cooperatives inflicted losses on their members. For this reason, the government proposed an amendment to the existing Cooperatives Act, with the objective of upgrading supervisory standards and ensuring stability of the cooperatives system. On 29 November 2018, the National Legislative Assembly voted to pass the draft of **the Cooperatives Act (No. …) B.E. …** into law, to be effective 60 days after published in the Royal Gazette.

Key points of the amendment, which is aimed at upgrading the supervisory standards and ensuring stability of financial cooperatives, are as follow:

(1) The Registrars of Cooperatives will have an expanded role and authority in the supervision of all cooperatives, with an aim to ensure that cooperatives operate according to their missions and scopes specified for their registered types.

(2) The supervision of financial cooperatives, namely savings and credit union cooperatives, will be separated from that of other cooperatives. Ministerial regulations will be issued specifically to cover the operating and supervisory rules for financial cooperatives. These rules may differ according to the size of cooperatives, so that the rules suit the risk levels of cooperatives better. To be included in the regulations are the qualifications and responsibilities of cooperatives' management boards and managers; the governance rules; the operating requirements for proper risk management related to lending, deposit taking, and borrowing activities; the maintenance of reserve and capital requirements; as well as the accounting and reporting requirements. In drafting the ministerial regulations, the Ministry of Agriculture and Cooperatives shall consult with the Ministry of Finance and the Bank of Thailand.

(3) The roles and responsibilities of cooperatives' management boards, board members, and managers are specified. Penalties are also raised to be in line with the current circumstances.

(4) A new "Savings and Credit Union Cooperatives Supervision Advisory Committee" will be established to support the supervision of savings and credit union cooperatives. The Permanent Secretary (or Deputy Permanent Secretary as appointed) of the Ministry of Agriculture and Cooperatives will serve as the Chair of the Committee. Committee members will include representatives from the Ministry of Finance, the Cooperatives Auditing Department, the Bank of Thailand, and the Office of the Securities

[34] Compound annual growth rate (CAGR) from September 2008 to September 2018.

Exchange Commission. The roles of the Committee are to provide the Registrars of Cooperatives with consultations, recommendations on preventive or corrective measures, as well as recommendations on amendments of regulations or notifications related to the supervision of savings and credit union cooperatives.

(5) The “Appeals Committee” is to be established, tasked at facilitating appeals considerations. Experts on finance, marketing, agriculture, law, as well as digital economy and society will be added to the National Committee for Cooperatives Development, to support the development of cooperatives in the fast-changing world.

The passing of the new Cooperatives Act by the National Legislative Assembly is considered the first step forward in the effort to upgrade the supervisory standards for cooperatives. Nevertheless, relevant authorities still have further works to do in enhancing risk management and governance framework for cooperatives. Ministerial regulations on operational and supervisory rules have to be issued, and the supervisory infrastructures have to be developed. Moreover, the capacity and readiness of relevant supervisory authorities have to be enhanced, which include improving the information system, human resources, and contingency plans. Such efforts will support the strength of the cooperatives system, which in turn contributes to the stability of the financial system as a whole.

Box 4: Issuing the macroprudential measure on mortgage loans

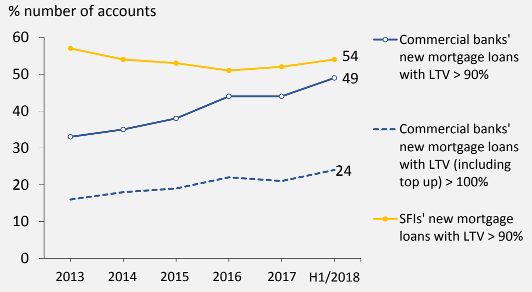
Risk issues

In the 1/2018 Joint Meeting between the Monetary Policy Committee (MPC) and the Financial Institutions Policy Committee (FIPC), the committee members concluded that competition in the mortgage loan market should be closely monitored to prevent issues to financial stability going forward. A closer assessment that followed revealed that higher competition led to more lenient credit underwriting standards among financial institutions. Using the data on new mortgage loans from commercial banks and specialized financial institutions during 2018H1, the in-depth analysis yielded the following three insights:

(1) The proportion of new mortgage loan accounts with the loan-to-value (LTV) ratio exceeding 90 percent has increased steadily in the recent years (Chart 4.1). Moreover, once top-up loans[35] (both from new and refinancing loans) were included, there seemed to be a widespread practice among commercial banks of lending with LTV greater than 100 percent (i.e. the value of loan exceeds the value of collateral). This trend was evident in both detached houses and condominiums in all price ranges. Also, this behavior was found when mortgage loans were taken out for the second time or more, and when two or more mortgage loan contracts were being paid at the same time.

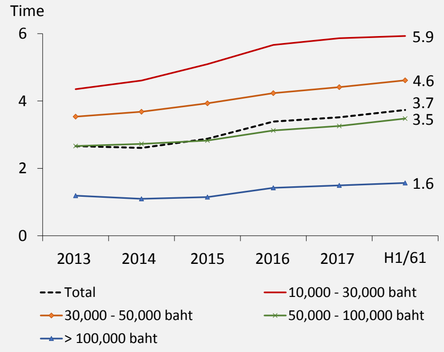
(2) The loan-to-income (LTI) ratio of mortgage loans from financial institutions has been on the rise (Chart 4.2), especially for low-income borrowers. Although the repayment periods for mortgage loans have been lengthened, borrowers' mortgage debt service ratio (M-DSR) stayed elevated **(Chart 4.3).**

Chart 4.1 Proportion of new mortgage loan accounts with high LTV ratio (not including and including top-up loans)



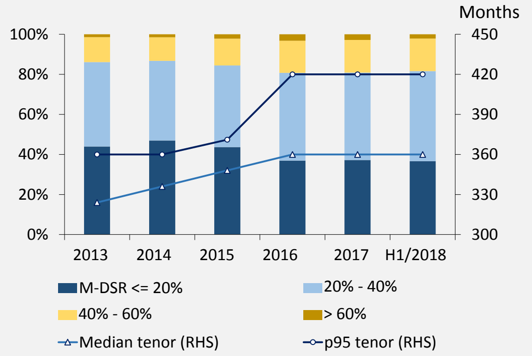
Source: Bank of Thailand.

Chart 4.2 Loan-to-income (LTI) ratios by income groups, of borrowers in the commercial banking system



Source: Bank of Thailand.

Chart 4.3 Proportion of loan accounts by M-DSR and tenor, of borrowers in the commercial banking system



Note: M-DSR is computed from services of mortgage loans only, excluding top-up loans and others.
Source: Bank of Thailand.

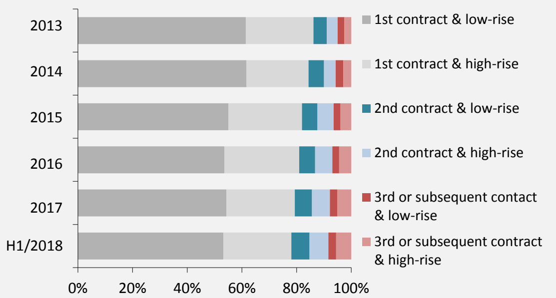
---

[35] Top-up loans are loans that are issued for a purpose other than housing, such as personal loans and loans for mortgage-reducing term assurances (MRTA), but against the same collaterals used for mortgage loans. Financial institutions may grant top-up loans to borrowers at the same time when mortgage loans are taken out, or during the installment period, such as in the form of home-for-cash loans. Currently, top-up loans are not included under the purview of Bank of Thailand's regulation on mortgage loans.

Furthermore, top-up loans that accompany mortgage loans (in all cases including top-up loans coming with new and refinancing mortgage loans as well as top-up loans granted afterwards) have grown significantly, which in turn add to borrowers' debt burden. Offering more attractive interest rates compared to uncollateralized personal loans, these top-up loans prompt households to over-borrow to finance their consumption spending.

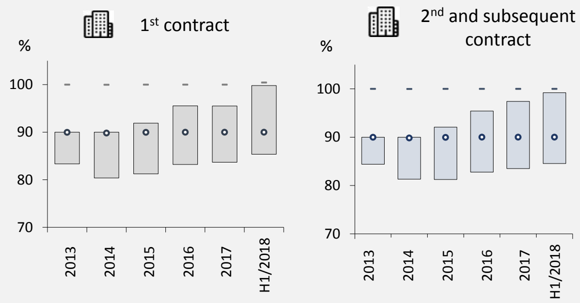
(3) Mortgage loans played a role in facilitating a widespread search-for-yield behavior, where homebuyers hope to profit from rental yields or capital gains. The number of mortgage loans taken out for the second time or more rose steadily **(Chart 4.4)**, with LTV as high as the first contract **(Chart 4.5).** There was also a pick-up in LTV for residential properties valued at 10 million baht or more **(Chart 4.6)**. To some extent, these mortgage loans helped provide liquidity that kept housing prices afloat, under the market conditions that were already prone to risks from speculation. Should new demand turn out weaker than expected, a sharp price correction could occur, which in turn could threaten the aggregate economic and financial stability.

Chart 4.4 Proportion of new mortgage loan accounts by the number of contracts and type of collateral, of borrowers in the commercial banking system



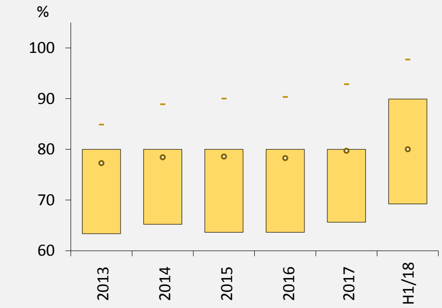
Note: Contracts are counted by borrower ID, accumulative from 2008 to present. It is assumed that borrowers have been making payments continuously since the beginning of the contract.
Source: Bank of Thailand.

Chart 4.5 LTV ratio of high-rise residential properties by the number of contracts, of borrowers in the commercial banking system



Note: Box plots represent LTV distributions of mortgage loans only where: (1) the bottom of the box shows the 25th percentile, (2) the top of the box shows the 75th percentile, and (3) the circle inside the box shows the median. The dashed line above the box plots represent the 75th percentile of LTV when top-up loans are included.
Source: Bank of Thailand.

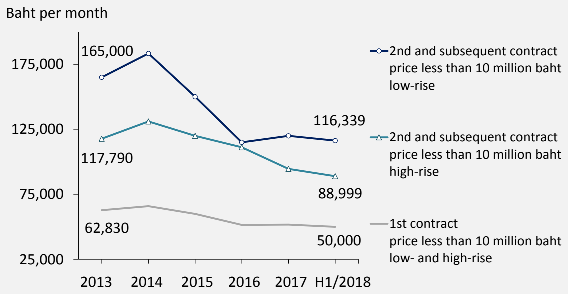
Chart 4.6 LTV ratio of residential properties valued at 10 million baht or above, of borrowers in the commercial banking system



Source: Bank of Thailand.

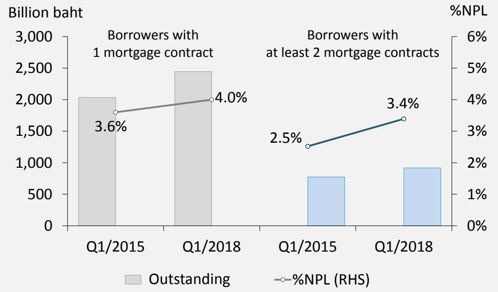
On top of this, the growth of real estate prices outpaced that of borrowers' income, especially for low-income borrowers. This made housing less affordable for real-demand homebuyers. Meanwhile, the income level of borrowers with two mortgage contracts or more fell steadily **(Chart 4.7)**, in line with the pick-up in NPL ratios of these borrowers **(Chart 4.8)**.

Chart 4.7 Income of borrowers in the commercial banking system (median)



Source: Bank of Thailand.

Chart 4.8 Mortgage loans outstanding and loan quality of the financial institutions system



Sources: National Credit Bureau (NCB) and Bank calculations.

Indeed, the intense competition in the mortgage loan market suggests that the existing regulations on mortgage lending might be inadequate. Barring any further actions or preventive measures, the competition could intensify further. This could allow fragilities to keep building up to the point of being a systemic risk and impairing the ability of the economic and financial system to withstand shocks going forward. As seen from the experiences of many countries, problems in the real estate sector are often one of the main causes of economic and financial crises.

Improving the regulation on mortgage loans

Given these pressing concerns, it is the responsibility of relevant regulators to set appropriate rules for competition among financial institutions. By employing a macroprudential measure, the BOT seeks to lay the foundation for a prudent credit culture, which encompasses many aspects. Most importantly, financial institutions should maintain proper credit standards for mortgage loans, placing a priority on giving loans to real-demand homebuyers. Financial institutions should also refrain from giving a loan in excess of the value of collaterals, stimulate over-borrowing by households, or facilitate speculation in the real estate market. These efforts will help prevent the build-up of systemic risks and foster the resilience of the overall financial system, allowing it to support economic growth that is truly sustainable.

The BOT published a consultation paper describing policy recommendations and held a media briefing on 4 October 2018, seeking public opinions via its website. Then, a hearing was held on 11 October 2018 to allow financial institutions, real estate developers, and other related agencies to voice their opinions. Having considered all the comments received, the BOT fine-tuned the details of the proposed measure to make it more targeted and allow all stakeholders to make adjustments. Key points of the finalized measure can be summarized as follows: **(Chart 4.9)**

(1) For the first mortgage contract, the LTV limit is set to 100 percent of the collateral value, with top-up loans included in the loan value.

(2) For a mortgage contract to buy a property valued at 10 million baht or above, both the first and second contract are subject to an LTV limit of 80 percent.

(3) For a mortgage contract to buy a property valued below 10 million baht, the second contract is subject to an LTV limit of 90 percent if the first contract has been paid for three years or longer, and an LTV limit of 80 percent if the first contract has been paid for less than three years.

(4) For the third and subsequent mortgage contract, the LTV limit is set to 70 percent for any property price.

(5) The LTV calculation <u>excludes</u> **loans for mortgage-reducing term assurances (MRTA) and non-life insurances**, which help mitigate risks for both the borrowers and the financial institutions. The calculation also excludes **loans given to SMEs**, which support funding access for small businesses.

Chart 4.9 The loan-to-value measure to be effective on 1 April 2019

Property price	Mortgage contract*	Collateral	LTV ratio	Type of measure
< 10 million baht	1st contract	Low-rise	95%**	RW
		High-rise	90%**	RW
	2nd contract	Low-rise and high-rise (case 1: the 1st outstanding contract having been paid for ≥ 3 years)	90%	Limit
		Low-rise and high-rise (case 2: the 1st outstanding contract having been paid for < 3 years)	80%	Limit
≥ 10 million baht	1st and 2nd contract	Low-rise and high-rise	80%	Limit
Any	3rd contract and above	Low-rise and high-rise	70%	Limit

Note: * As an example of how contracts are counted, the borrower is said to have a "second contract" when he is currently paying for the first outstanding mortgage loan and, on top of that, is going to service the second mortgage loan at the same time. ** The total value of loans must not exceed that of the collaterals.
Source: Bank of Thailand.

(6) The revised regulation will be applied to loan contracts signed from 1 April 2019 onwards. An exemption is made for mortgage loan contracts with the sales and purchase agreement signed before 15 October 2018. This is to provide sufficient time for buyers and sellers to adjust, and to eliminate the impact on buyers who had started making down payments or planned for home purchases before the BOT began to communicate this policy.

Benefits of the measure

The new LTV measure is designed to balance the benefits of all stakeholders and support financial system stability in a sustainable manner. **Households** will be able to purchase housing at a reasonable price, refrain from over-borrowing, and prepare themselves well by saving prior to taking out loans. **The real estate sector** will adjust their development plans to be better aligned with real housing demand, which in turn will reduce risks from excess supply in the future. Meanwhile, **financial institutions** will face lower risks, given that borrowers' quality will improve and the chance of facing loss due to the uncertainty in collateral values will decline. Ultimately, these will support **the overall economic and financial system** to grow in a stable and sustainable manner going forward.

Following the implementation of the new regulation, the BOT will closely monitor the adjustments and behaviors of related stakeholders. An emphasis will be placed on ensuring that financial institutions' lending policies and loan approval processes comply with the revised regulation. The effectiveness of the measure will also be evaluated.

Chapter 3: Key supervisory developments and safeguarding financial stability going forward

Financial sector regulators have been collaborating closely in safeguarding Thailand's financial stability and introducing necessary measures to prevent pockets of vulnerabilities from escalating into systemic risks. In 2018, the Bank of Thailand (BOT) has made revisions to the supervisory guidelines for mortgage loans. This macroprudential measure was introduced after the credit standards of mortgage loans showed signs of loosening due to increased competition. Also, other regulators have introduced new regulations and laws, such as the supervisory guidelines for commercial banks and capital markets to ensure compliance with the international standard, cyber security measures, as well as additional measures to enhance protection for corporate bond and mutual fund investors.

During 2018 and 2019, Thailand's financial sector regulators have been participating in the Financial Sector Assessment Program (FSAP) in order to enhance and further ensure that the supervisory framework are in line with international standards. However, the challenges in financial stability oversight remain with the regulators to jointly develop a risk assessment mechanism that captures all sectors in the financial system, along with their interlinkages and risk transmissions. The regulators also need to prepare for the supervision of new forms of financial businesses, which aims to strike a balance between promoting financial innovations and preserving financial stability.

3.1 Key supervisory developments in 2018

3.1.1 Regulations related to financial institutions

(1) Regulation on the supervision of mortgage loans

The increased competition in the mortgage loan market reflected limitations of the existing regulations on mortgage loans. Such intense competition led to the loosening of credit underwriting standards by financial institutions. This included, for instance, the practice of giving out loans in excess of collateral values or "cash-back" loans. Thus, the BOT has revised the regulation regarding the supervision of mortgage lending to: (1) enhance financial institutions' credit underwriting standards of mortgage loans; (2) ensure that homebuyers can purchase housing at a reasonable price; and (3) serve as a preventive measure to contain systemic risks and strengthen the overall financial system.

Key changes to the regulation on the supervision of mortgage lending are as follows:

(A) The loan-to-value (LTV) ratio of the first mortgage loan contract to purchase a property valued below 10 million baht, is capped at 100 percent of collateral values without minimum down payment. However, the minimum down payment and LTV limit would be applied to the second mortgage loan contract or for purchase of a property valued at 10 million baht or above.

(B) The loan value used in the LTV calculation must include all loans related to the mortgage loan (i.e. top-up loans) that are linked to the same collateral. The calculation excludes loans for mortgage-reducing term assurances (MRTA) and non-life insurances, as well as loans for SMEs **(Further details in Box 4)**.

(2) The net stable funding ratio (NSFR) requirement

On 12 January 2018, the BOT issued the regulation on NSFR for commercial banks, effective from 1 July 2018 onwards. NSFR is the ratio that measures the adequacy of liquidity over a one-year horizon. This measure is aimed to ensure that commercial banks maintain stable funding sources in form of deposits, borrowing, and shareholders' equity, in order to match their funding needs for investing, lending, and contingent claims. This would, in turn, allow commercial banks to better cope with a prolonged liquidity squeeze, so that they could provide support for economic activities in a sustainable manner.

(3) The recovery plan requirement for commercial banks, where they were required to prepare contingency plans to ensure stability and resolution

To enhance commercial banks' risk management practices, the BOT required commercial banks to prepare a recovery plan so that they are ready to handle any potential financial distress in the future. Moreover, commercial banks should be equipped with a systematic operating framework that can be adapted to suit different circumstances and environments. At the same time, the framework should also be able to handle financial distress in an effective and timely manner, so as to limit the impact on the financial system and preserve confidence of the public, depositors, investors, and businesses.

Key components of the recovery plan include: (1) the specification of the problem-solving tools that are suitable for banks' business operations and risks; (2) the specification of scenarios used for testing the readiness and effectiveness of the problem-solving tools; and (3) the preparation of communication guidelines after the plan is carried out, so as to ensure an accurate public understanding of the situation via appropriate communication channels.

The BOT requires commercial banks that are domestic systemically important banks (D-SIBs) to submit a recovery plan to the BOT for the first time by June 2019, and requires other commercial banks (except branches of foreign commercial banks) to do so by June 2020. All these banks are also required to revise their plans on an annual basis, in order to ensure that the plans remain up-to-date, ready to be used, and robust to changing circumstances.

(4) Guidelines for the conduct of digital asset businesses by financial institutions and companies within their financial groups

The Emergency Decree on Digital Asset Businesses B.E. 2561, effective since 14 May 2018, empowered the Ministry of Finance and the Office of the Securities and Exchange Commission (SEC) to supervise digital token issuers (initial coin offering issuers: ICO issuers), digital token portal service providers (ICO portals), as well as digital asset businesses including (1) digital asset exchanges, (2) digital asset brokers, (3) digital asset dealers, and (4) other businesses related to digital assets, as prescribed by the Minister of Finance following the recommendation of the SEC.

To ensure a clear understanding among financial institutions and companies in their financial groups regarding the business conduct under the Emergency Decree on Digital Asset Businesses, the BOT has issued guidelines specifying the eligible types of business operations, as well as the transactions related to digital assets that are undertaken by financial institutions and companies in their financial groups. According to the regulation, companies in these financial groups are allowed to conduct transactions or business operations related to digital assets, as prescribed by the relevant regulatory body. Moreover, financial institutions are allowed to invest in digital assets, given that the underlying purpose is to develop financial innovation or enhance the efficiency of their financial service provision to clients. It should be noted that the BOT is currently in the process of developing guidelines to supervise and manage risks that could arise from digital assets.

(5) Cyber resilience measures

Nowadays, financial businesses rely heavily on technology to drive many of their services, such as digital banking, both to cater to the needs of customers and to enhance their competitiveness. The use of technology, however, comes with higher risks from cyber threats, which could potentially destabilize the financial institutions system and the Thai financial system as a whole. The BOT considered this to be an important issue, and has developed a three-year strategic plan for cyber resilience (2018-2020) in order to ensure that financial institutions are adequately prepared to handle cyber threats. Key developments in 2017 and 2018 are as follows.

(5.1) Enhance the preparation of individual financial institutions in dealing with cyber threats, by developing a cyber resilience assessment framework based on key international standards such as the National Institute of Standards and Technology (NIST) Cybersecurity Framework and the ISO 27001 standard, which have been adopted by regulators in other countries. The BOT used these frameworks to assess the readiness of 22 financial institutions, including Thai commercial banks, specialized financial institutions, as well as payment agents. Following the assessment, the BOT then urged financial institutions to close the gaps that were found. The common gap across institutions was found to be in developing concrete knowledge and awareness among financial institutions' board members who were responsible for this area, as well as strengthening the response measures.

(5.2) Provide an IT risk assessment framework that accommodated existing risks, by issuing statements and guidelines regarding the regulation on the supervision of IT risks of financial institutions in January 2018. Moreover, an examination was undertaken to assess the readiness of financial institutions in managing IT risks. A thematic examination was also carried out on the issue of mobile banking, in order to enhance security of the services provided by financial institutions, as well as the e-wallet services of key e-payment providers. In addition, the BOT is currently in the process of revising the regulations on IT risk management and IT outsourcing, so that they address emerging risks without hindering financial institutions' operations.

(5.3) Strengthen cooperation in tackling cyber threats in the financial system. The BOT has signed a memorandum of understanding (MoU) on collaboration in the area of cybersecurity with the SEC, the Office of Insurance Commission (OIC), the Electronic Transactions Development Agency (ETDA), and the Thai Bankers Association. The objective of the MoU was to strengthen the responses to cyber threats in the following aspects: (1) ensure consistency in the regulatory framework for managing cyber threats of the BOT, the SEC, and the OIC, as well as develop the necessary guidelines with stakeholders; (2) encourage the exchange of information regarding cyber threats;

(3) strengthen the response and recovery measures; and (4) develop knowledge, readiness, and capability in the area of cybersecurity among the financial sector workforce, as well as foster cybersecurity knowledge among businesses and the general public **(Further details in Box 5).**

3.1.2 Regulations related to capital markets

(1) The revision of the regulation regarding the sale of newly issued debt securities. In 2018, the SEC issued a notification on the issuance and offering for sale of debt securities, with an aim to enhance the protection for each type of investor. The notification came into effect on 1 April 2018, with key changes as follows:

(1.1) Restrict the offering for sale of bills of exchange (B/E). B/Es are allowed to be offered for sale only (i) via a private placement to a limited number of investors (PP-Limited Offer) or (ii) to institutional investors (IIs).

(1.2) Supervise the offering for sale of debt securities to ensure appropriate practices for each type of investor, as follows:

(a) Introduce additional qualifications for the issuers offering securities for sale in a public offering (PO), which would disqualify those with poor governance records from engaging in a PO.

(b) Separate the supervision of the offering for sale of securities to high net worth (HNW) investors and to IIs, as the former need more protection. In the process, the SEC would assess issuers' qualifications and demand disclosures of information as required. Moreover, the regulation requires that in an offering for sales of short- and long-term bonds, both via a PO and to HNWs, the issuer must appoint a bondholders' representative and disclose key financial ratios.

(c) Restrict the types of investors who are allowed to participate in a bond sale via a PP-Limited Offer. The offering for sale is allowed only to those related to the issuer, IIs, or HNWs. Any offer for sale to HNWs who are not related to the issuer must be conducted via arrangers.

(1.3) Enhance the functioning of arrangers. For arrangers who also service issuers, there must be a clear separation between the department that liaises with the issuers and the sales unit. This is to ensure checks and balances between the interests of issuers and investors.

(2) Revise the regulation on data disclosure regarding the offering for sale of bonds, to be consistent with the IOSCO objectives and principles for securities regulation (IOSCO standards). The objective is to enhance the quality of data disclosed to investors and supervision to be on par with the international standard, as well as to boost confidence of both domestic and foreign investors. The new regulation will be effective from 1 April 2019 onwards.

(3) Revise the regulation on the supervision of mutual fund businesses. Retail mutual funds were required to abide by the single entity limit, which would help mitigate concentration risks for investors and be on par with the international standard. Moreover, revisions were also made to enhance the clarity of mutual funds' risk disclosures. For instance, mutual funds were required to issue warnings to investors in the case that investment is concentrated in any particular issuer, sector, risky bond (i.e. non-investment grade and unrated bond), or country. On top of this, mutual funds were also required to disclose their risk spectrum. All these efforts were aimed at improving investors' understanding of the characteristics and risk profiles of mutual funds before making investment decisions.

(4) The issuance of the Emergency Decree on Digital Asset Businesses B.E. 2561

The Emergency Decree on Digital Asset Businesses B.E. 2561 (henceforth the Emergency Decree on Digital Asset) came into effect on 14 May 2018, with an aim to protect investors from fraud or deception by dishonest persons, and to prevent the use of untraceable digital assets for funding terrorism, money laundering, or illegal transactions. In addition, the Decree also aimed to establish mechanisms for maintaining stability of the financial system and the overall economy. The supervisory scope of the Decree encompassed the offering of digital tokens and business operations related to digital assets - including digital asset exchanges, digital asset brokers, digital asset dealers, and other businesses relating to digital assets as prescribed by the Minister of Finance ("Minister") under the recommendation of the SEC. The digital assets under this Decree included cryptocurrencies, digital tokens, and any other electronic data unit as specified by the SEC.

Under this Decree, the SEC was empowered to issue additional regulations for each type of activities related to digital assets. Moreover, the SEC had the power to enforce laws, in order to prevent fraud and ensure adequate disclosure of information. With regard to initial coin offerings (ICOs), the issuer must be limited companies or public limited companies established under the Thai laws. The offering may be carried out only after the issuer has obtained an approval from the SEC and the registration statement and draft prospectus filed to the SEC have become effective. In addition, such offering must be carried out through an ICO portal that has been approved by the SEC.

After the offering, the issuers had an ongoing duty to prepare and submit reports with regard to their business performances, financial positions, actual uses of proceed, as well as any other information that may have an impact on the rights and interests of digital token holders or the decision-making of investors regarding the management of their digital assets. To foster a fair and transparent market for digital assets, while preventing the use of digital assets in illegal transactions, any entity wishing to operate a digital asset business must obtain an approval from the Minister, upon the recommendation of the SEC. The operator must meet all requirements and observe the guidelines and regulations as specified by the SEC. For instance, the operator must have adequate sources of capital, reliable business operating systems, appropriate risk management measures, data security systems, as well as accounting and custodian services for customers. Moreover, the entity must also conduct Know Your Customer (KYC) and Customer Due Diligence (CDD) and set up preventive measures against money laundering in line with anti-money laundering laws.

3.2 Maintaining financial system stability going forward

To ensure the appropriateness and timeliness of financial stability policies, financial stability oversight must consider the risk assessments that encompass all sectors in the financial system, as well as the adverse scenarios. During 2018 and 2019, the BOT and other relevant organizations thus participated in the Financial Sector Assessment Program (FSAP) in order to assess the supervision of the Thai financial system and the risk assessment process, as well as to conduct stress-testing exercises according to the international standard.

3.2.1 Participation in the FSAP program and the macro stress test

Financial regulators in many countries around the world recognized the importance of the participation in the FSAP program, as the assessment results can be used to develop more targeted and efficient monitoring of the financial system. **In the FSAP assessment, the main topics related to financial stability were the assessment of risks in the financial system, the introduction of macro-prudential policy, and the macro stress test.**

Regarding the macro stress test, the BOT, together with the SEC and the OIC, started conducting the stress testing exercise for the first time in early 2018, and will continue the practice annually. This should ensure that the assessment of risks to financial institutions and the identification of pockets of vulnerabilities were more targeted, which should in turn result in appropriate and timely responses.

3.2.2 The issuance of the regulation on countercyclical capital buffer (CCyB)

The regulation on countercyclical capital buffer (CCyB) is a macroprudential policy that was aimed at building the resilience of the financial institutions system. Financial institutions were required to maintain additional capital of 0 to 2.5 percent of the total risk-weighted assets during the upturn of the credit cycle. This would be when credit growth exceeds GDP growth, to the extent that might lead to a build-up of systemic risks and weigh on the stability of the economy going forward. In this case, the additional capital should help strengthen financial institutions' capacity to withstand potential losses during an economic downturn, and mitigate the effect on credit contraction before it dampens economic activities and affects the overall economy.

In this initial stage, the BOT has already conducted a market hearing to obtain information and opinions from the commercial banks with regard to the assessment framework as well as the guidelines, with the regulatory impact analysis (RIA) currently underway. The BOT planned to issue a regulation on CCyB in 2019, with an aim to provide a clear guideline consistent with the international supervision standards, and to prepare policy tools to cope with systemic risks.

Box 5: Enhancing the readiness for coping with cyber threats in the financial sector

Nowadays, financial service providers employ technology as a key driver of their businesses, as it enables their services to be fully digitized and reach consumers more quickly and conveniently. At the same time, technology helps lower costs and therefore boosts their competitiveness. However, the use of technology is often subject to cyber-attacks, which have been increasing rapidly and have diverse and complex characteristics. These attacks could potentially inflict damage to financial institutions and their customers very quickly on a large scale, and thus considered to be one of the key risks to the Thai economic and financial system.

Financial institutions play a key role in maintaining the stability of the economic and financial system. In helping them prepare for cyber threats, the Bank of Thailand (BOT) has continued to strengthen the supervision of cyber resilience of the financial sector, as outlined in the three-year strategic plan (2017-2019). The two key actions are the following;

1. Enhance the preparation of financial institutions in dealing with cyber threats and managing IT risks, by developing a cyber resilience assessment framework **(Chart 5.1)** that is consistent with the international standard. Financial institutions can then use this as a guideline in the assessment of their readiness in coping with cyber threats. In 2017, the draft of such framework was used to assess the readiness of financial institutions in handling IT security issues and responding to cyber attacks based on the cyber risk level of each financial institution. Financial institutions were then required to close the gaps found in the assessment by 2018. After that, the BOT will circulate the assessment framework, which financial institutions can use in their periodic self-assessment.

2. Enhance collaboration in responding to cyber threats in the financial sector. Collaboration is one of the key aspects that the BOT has been encouraging in order to reach a concrete outcome across all stakeholders. These include financial institutions, supervisors, the government, the education sector, cybersecurity experts, as well as relevant organizations both at home and abroad. The four key developments are as follows:

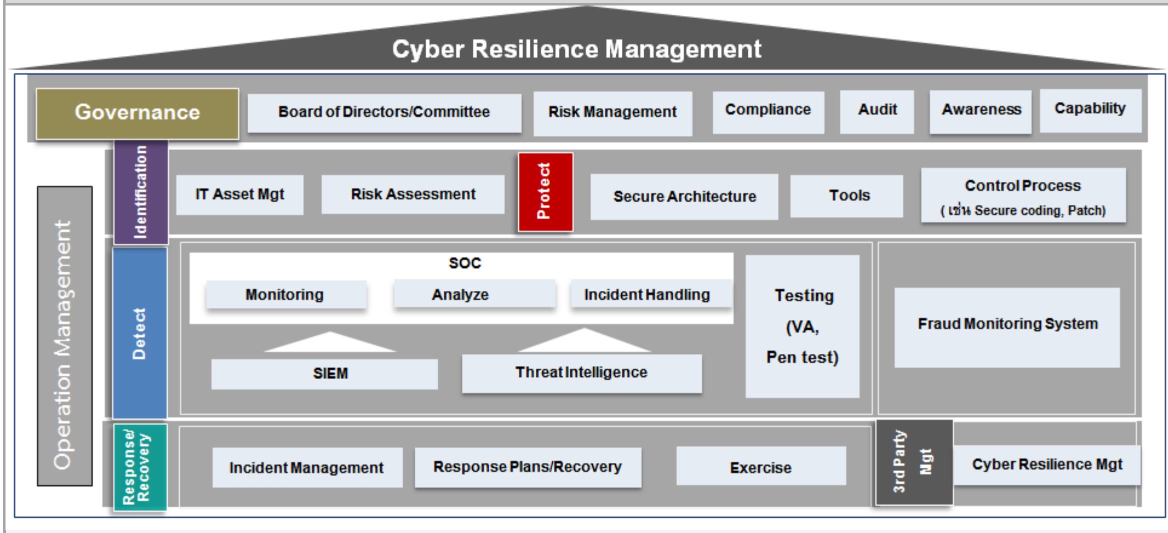
2.1 Establish a supervisory framework for managing IT risks and cyber resilience in the financial sector. The framework was designed to be consistent with the supervisory guidelines of the SEC and the OIC, and therefore would not hinder the business operations of financial institutions. Moreover, the BOT has jointly developed the guideline on penetration testing with the Thai Bankers' Association (TBA), to be released by 2019.

2.2 Encourage information sharing on cyber attacks. In 2018, the BOT and the TBA have jointly established Thailand Banking Sector Computer Emergency Response Team (TB-CERT), to serve as a platform for more systematic and efficient information sharing in the banking sector, including details of cyber threats and remedy guidelines as well as safety standards. At the same time, the information is shared to ThaiCERT and CERT of capital markets and insurance businesses. Moreover, the BOT has joined the Central Banks, Regulators and Supervisory Entities Forum (CERES Forum) in order to strengthen collaboration with regulators abroad. CERES is the first forum that brings together financial regulators from all over the world to systematically exchange information on cyber threats, cyber attack incidents, policy-oriented data, as well as supervisory frameworks for systematic management of cyber risks.

2.3 Strengthen response and recovery measures, which were indicated as a common gap among financial institutions according to the cyber threat readiness assessment. To close this gap, the BOT has arranged a workshop to help financial institutions establish procedures and plans in dealing with cyber threats. A test was also undertaken to assess the responses to cyber threats in the banking sector, followed by a session where experts on cybersecurity were invited to share their views on the management of cyber risks. In addition, the BOT has developed the financial sector crisis management flow together with the SEC, the OIC, and the ETDA, and conducted an assessment test on cyberattack responses for the entire financial sector. In 2019, further attempts will be made to strengthen financial institutions' operating responses, via hands-on cyber responses and simulations at the banking sector level and table-top exercises at the financial sector level.

2.4 Develop the knowledge, the readiness, and the capability of cybersecurity workforce. The BOT has played a role in training human resources from all levels including board members, senior executives, and staff. For instance, the BOT organized a seminar to raise awareness on cyber resilience among the board members of financial institutions. Moreover, the BOT, in collaboration with the Institution of Directors (IOD), has developed a curriculum on IT governance and cyber resilience in order to further strengthen the knowledge and awareness of cybersecurity in the long term. Together with the TB-CERT, executives and staff in the IT and security departments also received regular trainings on technical knowledge. In addition, the BOT has coordinated with the SEC, the OIC, the TBA, the ETDA, and the education sector in organizing the financial cybersecurity boot camp, in order to strengthen the network between the financial sector and university students and contribute to the cybersecurity workforce of the future. With regard to the general public, the BOT has played a role in educating and communicating to the public on the issues of cybersecurity via various channels including seminars, as well as providing them with guidelines in dealing with cyber threats and making secure financial transactions. In 2019, the BOT plans to further enhance the awareness and the practical aspect of cyber resilience in three ways: (1) at the committee level, board members will participate in cybersecurity simulations; (2) at the staff level, the BOT will continue to collaborate with the TB-CERT to build technical knowledge; and (3) the BOT will collaborate with the education sector expanding the network to include vocational students, in order to provide additional workforce for the financial sector.

Chart 5.1 Cyber Resilience Assessment Framework
Cyber Risk Management according to the international standard



The preparations for cyber risk management consist of 6 key dimensions

1) Governance: The supervision of the organization is the duties and responsibilities of board members and senior executives. Together, they would specify the risk tolerance level, have clear policies and strategies in managing risks, as well as ensure a proper organization structure with adequate human resources and tools.

2) Risk identification: The organization should be able to specify cyber risks and have proper management of its IT assets and data, in order to identify and manage risks properly and cover all the associated risks.

3) Protection: The organization should establish a structure to ensure protection, with the controlling and testing procedures to constantly detect any gaps in the system.

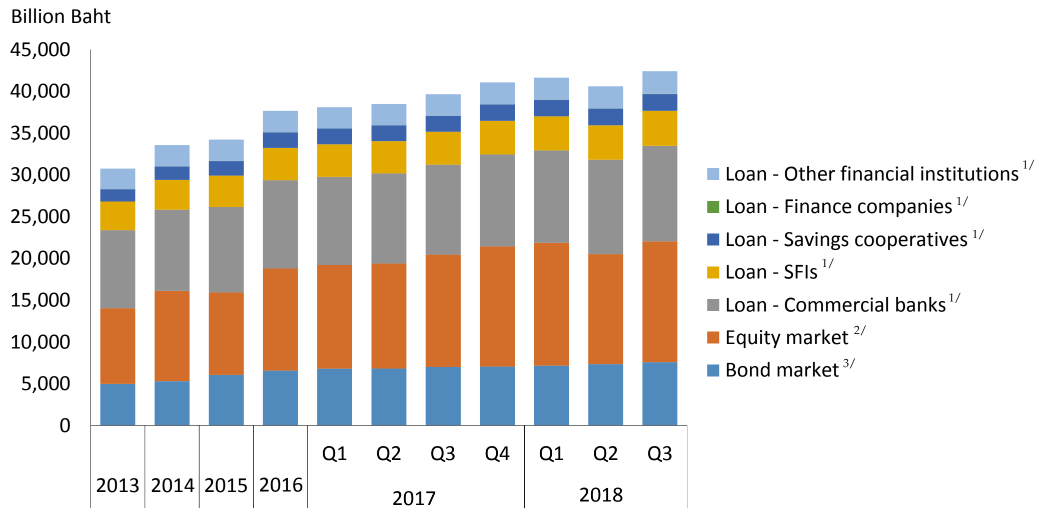
4) Detection: The organization should be equipped with the procedures and tools to detect any threats in a timely manner, use threat intelligence in supporting the detection process, and have capable workforce who can conduct a detailed and timely analysis.

5) Response and recovery: The cybersecurity response plan should be linked to the business continuity plan of the organization, and should be tested on a regular basis.

6) Third-party risk management: The organization should arrange for an assessment of cyber threats coming from external entities, specify preventive measures and detection, and assess external entities' cybersecurity response plan in the part that is linked to the organization's internal system.

Annex

1. Thai financial system: Types of funding



1/ Loans given to households and non-financial corporations.
2/ Market values of equities listed in SET and mai, excluding equities issued by issuers in the financial sector.
3/ Par values of bonds issued in Thailand, excluding bonds issued by issuers in the financial sector and non-residents.

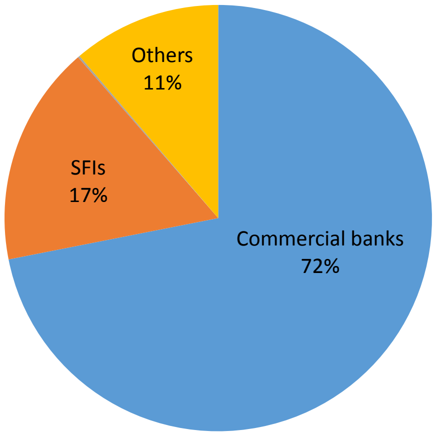
2. Financial institutions system: Number and asset size of major financial institutions

Types of financial institutions	2018 Q3 P	
	Number	% of total assets of financial institutions
Depository corporations		
Commercial banks	30	45.52
Specialized financial institutions (SFIs)	6	15.28
Savings cooperatives 1/	1,419	6.77
Finance companies	2	0.06
Money market mutual funds (MMFs)	37	0.56
Other financial corporations		
Mutual funds (excluding MMFs)	1,376	11.15
Insurance companies	83	9.03
Leasing companies	851	1.93
Credit card, personal loan and nano finance companies under regulation 3/4/	39	2.38
Provident funds	380	2.67
Government pension fund	1	2.02
Asset management companies	52	0.71
Securities companies	47	0.95
Agricultural cooperatives 2/	3,426	0.60
Pawnshops	660	0.22
Non-depository specialized financial institutions 5/	2	0.15

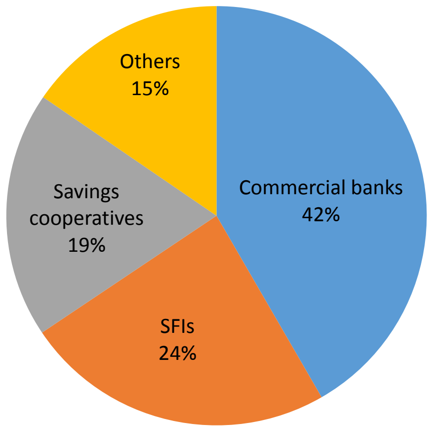
P/ Preliminary data.
1/ Savings cooperatives data do not include credit union cooperatives.
2/ Agricultural cooperatives data are as of end-2017.
3/ Credit cards and personal loans under regulation include only financial institutions that operate with licenses issued by the Bank of Thailand and satisfy the definition of financial institutions according to the IMF Monetary and Financial Statistics Manual (2000).
4/ There were 29 nano-finance operators as of 2018Q3.
5/ Secondary mortgage corporation (SMC) and Thai credit guarantee corporation (TCG)

3. Loan: Corporate and consumer loans (as of 2018 Q3)

Share of corporate loan providers

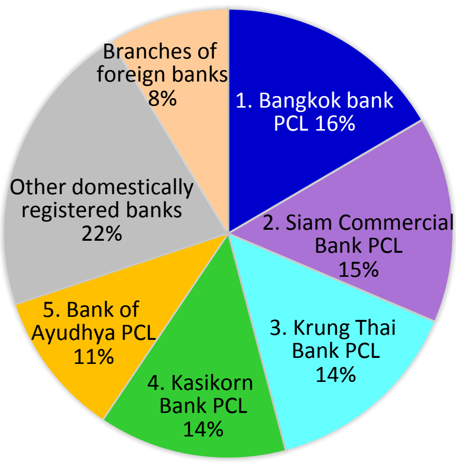


Share of consumer loan providers

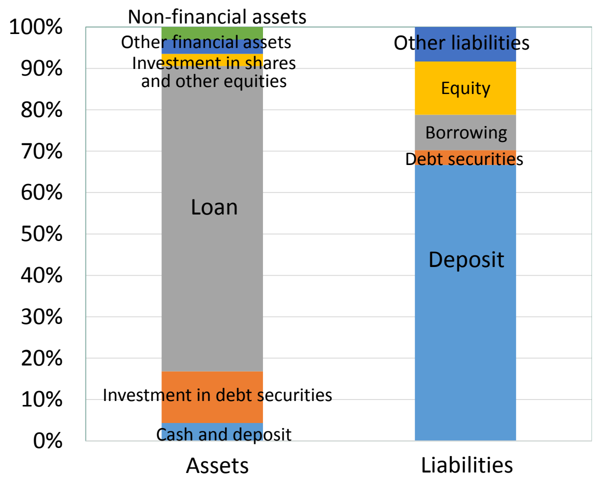


4. Structure of the commercial banking system (as of 2018 Q3)

Share of commercial banks by asset size

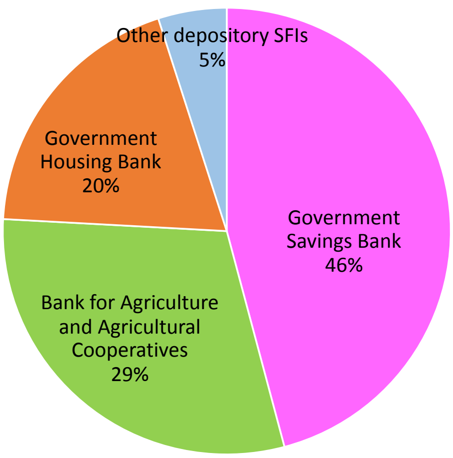


Asset and liability structure of commercial banking system

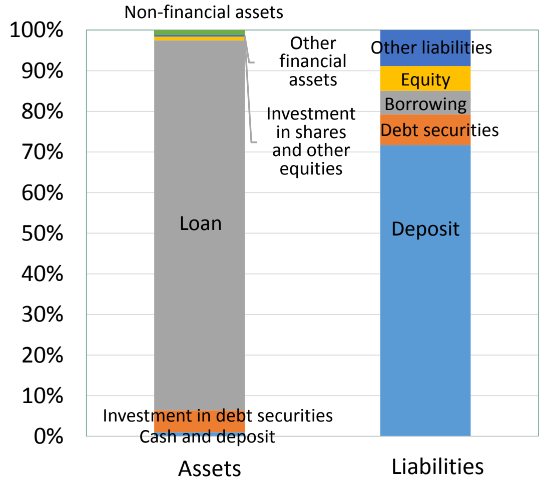


5. Structure of the depository specialized financial institutions (SFIs) (as of 2018 Q3)

Share of depository SFIs by asset size



Asset and liability structure of depository SFIs



Indicators for financial condition and assessing risk to financial stability

Indicators	2013	2014	2015	2016	2017	2018		
						Q1	Q2	Q3
Overall financial system								
Nominal GDP (million baht)[1/]	12,915,162	13,230,301	13,747,007	14,533,475	15,452,882	15,679,963	15,928,348	16,139,430
Funding structures								
Private credit to GDP (times)	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3
Stock market capitalization to GDP (times)	0.7	0.9	0.8	0.9	1.0	0.9	0.8	0.9
Bonds market capitalization to GDP (times)	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
1. Financial institutions								
1.1 Commercial banks								
Total asset (billion baht)	16,182	16,746	17,315	17,722	18,387	18,774	18,790	18,595
% YoY	9.5	3.5	3.4	2.4	3.8	6.3	5.4	3.7
Deposit (excluding Interbank)	10,930	11,693	12,027	12,346	12,967	13,153	13,219	13,143
% YoY	9.3	7.0	2.9	2.7	5.0	5.9	5.5	4.5
Loan (excluding Interbank)	10,700	11,240	11,729	11,959	12,488	12,516	12,821	12,929
% YoY	11.0	5.0	4.3	2.0	4.4	4.7	5.4	6.3
Corporate loan	7,473	7,774	8,022	8,070	8,362	8,349	8,557	8,571
% YoY	11.2	4.0	3.2	0.6	3.6	3.6	4.1	5.2
- Small and medium-sized enterprises (SMEs)	14.0	7.5	5.7	1.4	6.3	7.1	7.1	7.2
- large corporate	8.1	0.1	0.1	-0.4	0.2	-1.1	0.3	2.5
Consumer loan	3,228	3,467	3,707	3,889	4,125	4,168	4,264	4,358
% YoY	10.8	7.4	6.9	4.9	6.1	7.1	8.0	8.4
- Housing loan	12.5	12.1	9.3	6.9	5.5	5.8	6.2	6.4
- Car loan	8.4	-3.4	0.5	1.4	8.4	10.6	12.4	12.5
- Credit card and personal loan under regulation	14.6	5.0	2.8	3.0	1.8	3.3	4.7	6.5
- Other personal loan	7.3	14.2	12.2	5.0	7.2	8.3	9.3	9.8
Liquidity (%)								
Loan to deposit	97.9	96.1	97.5	96.9	96.3	95.2	97.0	98.4
Loan to deposit and B/E	96.6	95.7	97.0	96.3	96.1	95.0	96.8	98.2
Asset quality								
NPL Ratio (%)	2.15	2.15	2.55	2.83	2.91	2.92	2.93	2.94
SM Ratio (%)	2.40	2.61	2.38	2.63	2.55	2.32	2.36	2.42
Actual/Regulatory loan loss provision (%)	168.3	169.4	156.3	159.6	171.9	176.0	182.1	190.7
NPL coverage ratio (%)	143.7	142.8	131.0	136.5	139.5	139.7	143.4	146.5
Profitability								
Operating profit (billion baht)	338	355	370	383	394	98	102	103
Net profit (billion baht)	204	214	192	199	187	50	56	51
Return on asset (ROA)	1.3	1.3	1.1	1.1	1.0	1.1	1.2	1.1
Net interest margin (%)	2.7	2.8	2.7	2.8	2.8	2.7	2.7	2.8
Capital adequacy								
Regulatory capital to risk-weighted asset (%)	15.7	16.8	17.4	18.0	18.2	18.1	17.9	18.4
Tier-1 Ratio (%)	12.6	13.7	14.6	15.1	15.6	15.4	15.3	15.8
Common equity tier 1 Ratio (%)	12.4	13.6	14.5	15.1	15.6	15.4	15.3	15.8
Interest rates								
Minimum loan rate (MLR)	7.6	7.5	7.4	7.3	7.3	7.3	7.3	7.3
12-month fixed deposit	2.4	2.1	1.5	1.3	1.2	1.2	1.2	1.2

[1/] Nominal GDP (or GDP at current price) data have been revised from 2012 onward. Quarterly data presented are calculated from four-quarter moving average.

Indicators for financial condition and assessing risk to financial stability

Indicators	2013	2014	2015	2016	2017	2018		
						Q1	Q2	Q3
1.2 Specialized financial institutions[2/]								
Total asset (billion baht)	4,492	4,678	5,006	5,370	5,718	5,800	5,876	5,772
% YoY	8.5	4.1	7.0	7.3	6.5	7.7	6.3	4.9
Deposit (excluding Interbank)	3,692	3,867	4,181	4,421	4,663	4,751	4,745	4,750
% YoY	10.3	4.8	8.1	5.7	5.5	6.8	5.6	5.3
Loan (excluding Interbank)	3,523	3,717	3,979	4,062	4,407	4,520	4,554	4,696
% YoY	3.4	5.5	7.1	2.1	8.5	7.8	7.4	8.8
Asset quality								
NPL Ratio (%)	4.9	5.1	4.9	5.0	4.2	4.0	4.1	4.4
SM Ratio (%)	2.3	3.2	2.9	3.3	4.4	4.3	4.6	4.5
Profitability								
Operating profit (billion baht)	80	79	91	100	107	36	29	28
Net profit (billion baht)	44	34	38	46	53	19	13	10
Return on asset (ROA)	1.0	0.7	0.8	0.9	1.0	1.3	0.9	0.7
Net interest margin (%)	2.9	2.8	2.9	2.7	3.0	2.9	2.8	2.9
Capital adequacy								
Regulatory capital to risk-weighted asset (%)	11.3	10.8	11.3	12.2	12.3	12.7	12.8	13.0
2. Financial markets								
Government bond market								
Bond spread (10years-2years)	1.0	1.3	1.1	0.6	0.9	1.0	0.9	0.9
Non-Resident holdings (%)	10.3	10.0	7.8	8.1	10.6	10.9	10.0	11.0
Stock markets (SET and mai)								
SET Index (End of period)	1,298.7	1,497.7	1,288.0	1,542.9	1,753.7	1,776.3	1,595.6	1,756.4
SET Actual volatility (%)	20.9	13.0	13.9	14.2	6.5	9.4	12.3	11.6
SET Price to earning ratio (times)	14.6	17.81	22.6	18.6	19.1	18.3	16.2	17.3
mai Index (end of period)	356.8	700.1	522.6	616.3	540.4	490.7	416.6	456.4
mai Actual volatility (%)	26.4	19.0	21.2	18.9	10.8	9.6	12.0	10.8
mai Price to earning ratio (times)	28.3	69.6	52.9	63.3	106.1	93.5	77.1	70.6
Foreign exchange market								
Exchange rates (End of period) (USD/THB)	32.9	32.9	36.0	35.8	32.6	31.2	33.1	32.3
Actual volatility (%annualized)	5.9	4.0	5.1	4.4	3.3	4.6	4.5	4.5
Nominal effective exchange rate (NEER)	107.0	104.3	108.5	106.2	110.6	114.8	115.2	115.2
Real effective exchange rate (REER)	106.5	103.1	104.3	100.7	103.7	103.6	107.1	107.1
3. External sector								
Current account to GDP[3/]	-1.0	3.8	8.0	11.7	11.0	11.7	5.3	3.4
External debt to GDP[4/]	35.8	34.7	32.0	32.5	36.7	36.6	35.1	35.6
Foreign currency external debt to GDP	25.8	24.6	23.6	23.1	24.9	23.9	23.8	23.6
External debt (million USD)	141,933	141,715	131,078	132,158	155,225	157,851	154,162	159,311
Short-term (%)	43.6	40.2	40.1	41.2	44.3	43.1	43.0	41.3
Long-term (%)	56.4	59.8	59.9	58.8	55.7	56.9	57.0	58.7
International reserves								
Net reserves (million USD)	190,239	180,238	168,164	197,613	239,307	251,400	239,776	236,362
Gross reserves to short-term debt (times)	2.7	2.8	3.0	3.2	2.9	3.2	3.1	3.1

[2/] Specialized financial institutions 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.

[3/] Current account to GDP ratio is calculated using quarterly nominal GDP in the same period.

[4/] External debt to GDP ratio is calculated as the ratio of external debt to three-year average of nominal GDP.

Indicators for financial condition and assessing risk to financial stability

Indicators	2013	2014	2015	2016	2017	2018 Q1	2018 Q2	2018 Q3
Capital flow								
Net capital flow (million USD)	-2,488	-15,955	-16,799	-20,840	-12,429	-3,654	-5,059	-1,407
Direct investment (flow)								
Thailand direct investment abroad	-12,121	-5,742	-4,991	-13,362	-18,632	-5,081	-2,369	-4,519
Foreign direct investment in Thailand	15,936	4,975	8,928	2,810	8,046	4,648	2,264	2,479
Portfolio investment (flow)								
Thailand portfolio investment abroad	-3,399	-7,318	-3,817	-4,279	-11,551	-2,068	1,549	-1,533
Foreign portfolio investment in Thailand	-1,368	-4,695	-12,691	1,481	9,401	-882	-5,628	4,828
4. Households								
Household debt to GDP (%)	76.6	79.7	81.1	79.7	78.3	77.9	77.7	77.8
%YoY	11.5	6.6	5.7	3.9	4.5	5.2	5.7	5.9
Financial asset to debt (times)	2.3	2.5	2.5	2.6	2.6	2.6	2.6	n.a.
Commercial banks NPL and SM ratio (%)								
- Housing loan	3.9	3.8	4.1	4.7	5.1	5.1	5.2	5.1
- Car loan	9.7	10.8	10.1	9.2	8.7	8.5	8.8	8.9
- Credit card and personal loan under regulation	6.0	6.8	7.1	6.5	5.2	5.5	4.9	5.0
- Other personal loan	3.7	4.0	4.2	4.7	4.6	4.7	4.7	4.6
5. Corporates								
Corporate debt to GDP (%)	75.5	76.7	78.2	77.8	75.6	75.0	75.6	n.a.
Commercial banks NPL and SM ratio (%) :								
- Small and medium-sized enterprises (SMEs)	5.5	5.5	5.7	6.8	7.1	7.1	7.1	7.3
- Large corporate	3.0	3.3	3.5	3.8	3.6	3.2	3.2	3.1
Performance of non-financial listed companies								
Net profit margin (%)	8.4	7.0	7.4	8.2	8.0	7.9	7.8	8.0
Debt to equity ratio	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.8
Interest coverage ratio (times)	6.4	5.6	5.6	6.4	6.5	7.1	6.5	6.5
Current ratio (times)	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.6
6. Real estates								
Number of approved mortgages from commercial banks (Bangkok and vicitnity)								
Single-detached and semi-detached house (unit)	18,353	15,694	13,152	13,409	13,907	3,162	3,365	3,794
Townhouse and commercial building (unit)	25,261	21,764	19,210	20,187	20,536	4,248	4,922	5,955
Condominium (unit)	28,087	25,381	27,305	28,126	28,222	5,449	6,943	8,170
Number of new housing units launched for sale (Bangkok and vicinity)								
Single-detached and semi-detached house (unit)	17,226	18,933	17,637	19,433	14,280	3,797	2,790	6,143
Townhouse and commercial building (unit)	30,074	26,980	27,518	32,792	36,571	6,435	6,522	8,562
Condominium (unit)	84,250	65,298	62,833	58,350	63,626	16,011	10,315	25,951
House price index (January 2009 = 100)								
Single-detached house (including land)	119.0	125.8	129.0	130.8	130.9	137.7	137.8	139.8
Townhouse (including land)	117.8	129.4	135.0	137.6	141.2	145.9	149.5	151.7
Condominium	132.1	143.8	155.6	165.3	169.7	179.8	176.7	180.4
Land	129.2	141.4	157.2	171.2	171.7	175.7	177.2	172.7
7. Fiscal sector								
Public debt to GDP (%)	41.2	42.5	43.7	40.8	41.2	41.2	41.0	41.7

Pursuing Sustainable
Economic Well-Being

273 Samsen Road, Watsamphraya,
Phra Nakhon District, Bangkok 10200
Tel. +66 2283-5353, Fax, +66 2280-0449, +66 2280-0626

Bank of Thailand Channel
Hotline1213 Channel

www.bot.or.th

@bankofthailand

bankofthailand
Hotline1213