

## Chapter 2

# Vulnerabilities and Potential Spillovers Stemming from Property Developer Financing



## Highlights

- The outlook for the real estate market in the ASEAN+3 region has generally deteriorated since the COVID-19 pandemic, with reduced prices and transaction volumes seen in several economies.
- The downturn, combined with higher interest rates in certain economies, has increased vulnerabilities among property developers, as shown by their worsening financial conditions.
- Potential spillover risks from the property market to the financial market appear to be mitigated by robust capital buffers in the banking sector.
- Nonetheless, hidden and/or less visible risks from smaller and local banks, along with shadow banking activities related to the property sector, warrant careful monitoring by the authorities.
- The authorities should establish a resilient framework to support viable property projects facing temporary liquidity shortages while improving fundamentals for overall soundness.

# I. Overview

Recent turmoil involving property developers in several ASEAN+3 economies exposed significant vulnerabilities and, highlighted their potential impact on the economy and financial markets. Notably, large developers such as Evergrande and Country Garden in China failed to meet their debt obligations. This triggered a wave of defaults among other developers that has led to a significant decline in investor confidence, with China's real estate stock index slumping (Box 2.1). The 2022 credit crunch in Korea after a property developer defaulted on paying debts further underscores the risks of property market distress spreading to financial markets, although these issues have not been widespread (Box 2.2). Developers in economies with sluggish property markets, such as Cambodia, Hong Kong, and Vietnam are struggling through severe liquidity constraints and rising financing costs, that could impact financial stability.

Historical examples also illustrate the significant risk to financial stability from real estate crises. The collapse of the subprime mortgage market in the late 2000s triggered the global financial crisis, while the bursting of Japan's property bubble in the early 1990s led to severe bank distress. The speculative activities and high leverage that preceded these past crises appear to characterize the real estate market in some ASEAN+3 economies today. Unique risks directly associated with property developers add to current challenges. Enhanced regulatory oversight and improved risk management practices are therefore crucial to preventing similar crises from reoccurring.

Risks from property developers have not yet escalated into systemic threats, but the situation is precarious. High interest rates and a property market downturn, combined with the financial vulnerabilities of developers, pose potentially significant risks to financial stability in some economies. Insolvency within the sector can heighten the vulnerability of financial

institutions and negatively impact related markets, creating a negative feedback loop.<sup>1</sup> For instance, financial institutions concerned about developer solvency may curtail new loans, while rising bond interest rates amid higher risk premiums and loss of access to capital markets could exacerbate liquidity risks. Recent increases in interest rates, stricter credit measures, the pandemic-induced decline in property demand, and property price downturns have strained developers, leading to significant declines in property investments and sales in economies like Cambodia, China, Hong Kong, Korea, and Vietnam.

Proactive supervision and risk mitigation measures are needed. Enhanced regulatory frameworks, greater transparency in property and financial markets, and comprehensive support measures may be necessary to stabilize the market and mitigate systemic risks. Measures could include tighter regulatory oversight of financing methods, targeted support for viable projects under temporary liquidity stress caused by adverse market sentiments and preemptive, responsive support against market stress to mitigate spillover to the entire financial sector.

In this context, this chapter will:

- Examine the financial conditions of property developers by assessing profitability, liquidity, creditworthiness, and leverage to gauge potential risks arising from them.
- Evaluate the property sector's impact on financial stability by analyzing its influence on financial market volatility and the soundness of financial institutions.
- Propose policy recommendations to mitigate property sector vulnerabilities and their impact on financial stability, based on selected ASEAN+3 case studies.

<sup>1</sup> Bank for International Settlements (2018) suggests that property developers' default rates are highly sensitive to house price developments, potentially amplifying procyclicality in the financial system.

## II. Assessing Vulnerabilities of the Property Development Sector in ASEAN+3

### Market context

The COVID-19 pandemic hit property markets across the ASEAN+3 economies, leading to widespread downturns. Residential property prices and transaction volumes declined sharply in the Plus-3 economies (Figures 2.1 and 2.2). The commercial real estate sector (including office space) in China and Hong Kong saw rising vacancy rates (Figure 2.3). ASEAN economies have been performing better, but in several, property prices and trading volumes remain lower than pre-pandemic levels. The high unsold inventory and delayed projects compound challenges faced by property developers, although to varying extents among different economies.

The property market downturn in the ASEAN+3 region is driven by several factors. Higher interest rates from policy tightening have increased borrowing costs, reducing the affordability and demand for property. Excess supply and large unsold inventory put further downward pressure on prices. Pandemic-induced economic disruptions in China have negatively impacted Chinese buyers' demand for property investments both domestically and in other economies. Instances, where homes were not delivered

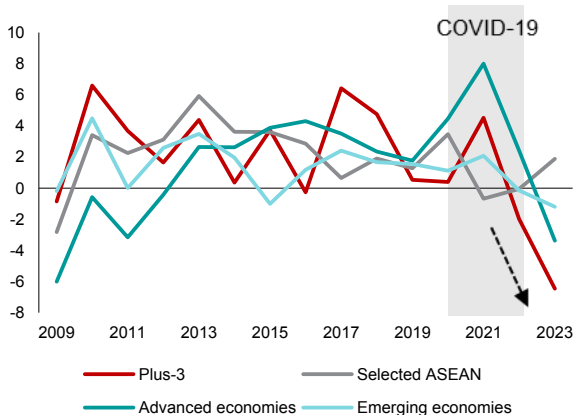
or were delayed due to developer defaults, have eroded buyer confidence. Many potential buyers delay purchases in anticipation of further price cuts, which exacerbates the slowdown in sales. Though to a lesser extent than the Plus-3 economies, ASEAN economies like Cambodia, Malaysia, the Philippines, Thailand, and Vietnam face similar issues with high unsold inventories and/or delayed projects. Structural factors such as aging populations also are gradually weakening long-term property demand across the region.

The property market downturn has accentuated the risks faced by developers. Many developers maintained high leverage during the prolonged period of low interest rates and ample liquidity before the pandemic. The subsequent rise in financial costs and refinancing risks because of elevated interest rates and stricter regulations on leverage have intensified the difficulties faced by property developers in certain economies. This strain is evident in the performance of stock indices and returns, with challenges in the ASEAN+3 region being particularly noticeable compared to the rest of the world (Figure 2.4).

**Figure 2.1. Selected Regions: Annual Growth in Real Residential Property Prices**

(Percent, year-on-year)

Residential property prices have declined since 2021, especially in Plus-3.

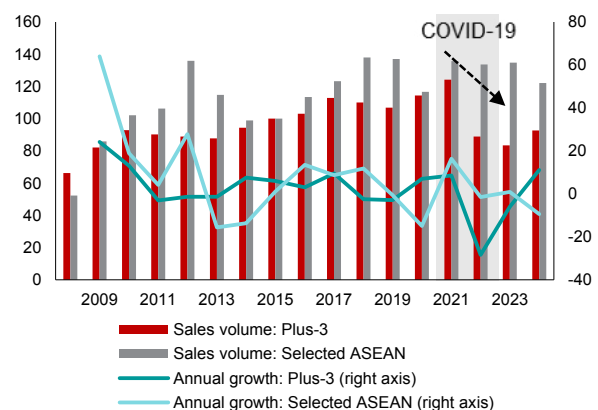


Source: Bank for International Settlements (BIS) residential property price database.  
Note: The growth rate is based on the real price index. Selected ASEAN includes Indonesia, Malaysia, Philippines, Singapore, and Thailand. The values for each group were calculated as simple averages.

**Figure 2.2. Selected ASEAN+3: Real Estate Sales Volume**

(Index, 2015=100; percent, year-on-year)

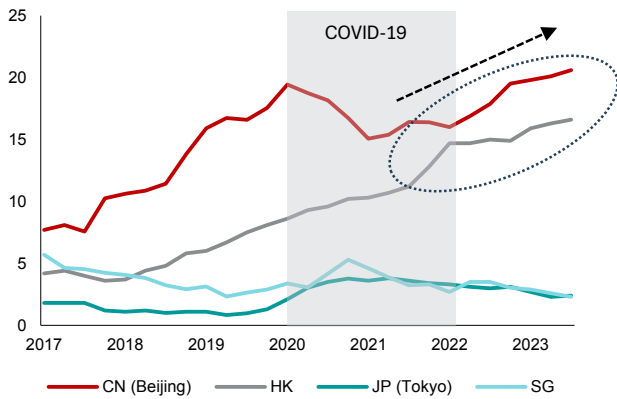
Real estate sales volumes have also decreased from their 2021 peak.



Source: Haver Analytics; AMRO staff calculations.  
Note: As the real estate sales volume data are not standardized (e.g., building square meters, units, residential units, etc.), a trading volume index based on 2015 was created. The values for each group were calculated as simple averages. The selected ASEAN countries include Indonesia, Malaysia, Philippines, Singapore, and Thailand. Data for 2024 is estimated by Q1 and Q2 2024 data.

**Figure 2.3. Selected Economies: Office Vacancy Rate (Percent)**

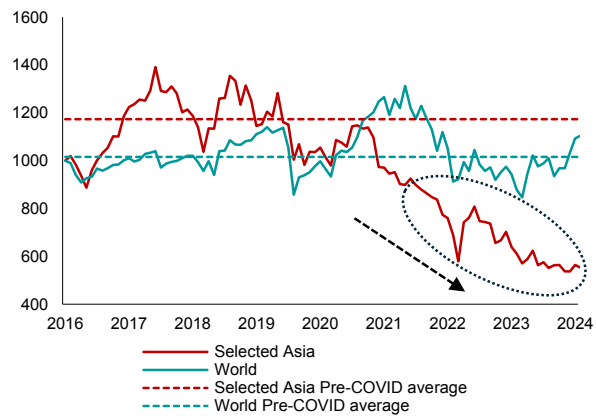
The commercial real estate markets in some economies are experiencing challenges.



Source: Colliers International via Bloomberg Finance L.P.  
 Note: The data is based on Grade A (highest quality) or prime office vacancy rate. CN = China, HK = Hong Kong, JP = Japan, SG = Singapore

**Figure 2.4. World and Selected Asia: Real Estate Stock Index (Index, August 2016=1000)**

The real estate stock index in the region has been sharply declining.



Source: MSCI Real Estate Indices via Bloomberg Finance L.P.  
 Note: The data are from August 2016 to 9 September 2024. For selected Asia, a proxy of ASEAN+3, MSCI AC Asia ex JP indices are used. Selected Asia indices include securities from eight ASEAN+3 economies (e.g. China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Philippines, and Thailand), India, and Taiwan Province of China. Pre-COVID is defined as August 2016 to December 2019.

## The scorecard—What is the current financial health of property sector companies?

Financial conditions in property companies in ASEAN+3 point to significant vulnerabilities. Their financial health, assessed through profitability, liquidity, debt servicing capacity, refinancing risks, and leverage, worsened from 2021 to 2023 compared with performance before the pandemic. ASEAN+3 economies have experienced more substantial declines in these indicators, especially in profitability and debt servicing capacity, than economies in other regions. While the Plus-3 economies exhibit more pronounced weaknesses, ASEAN countries witnessed a milder deterioration (Figure 2.5). Advanced economies and emerging market economies outside the ASEAN+3 region show relatively better performance, despite challenges in the commercial real estate market in some countries.

### Profitability

Profitability trends among property firms in ASEAN+3, as indicated by their return on assets, show a broad decline relative to pre-pandemic levels. This is attributed to falling property prices and sales volumes (Figures 2.1 and 2.2), rising input costs, and higher funding costs. However, variations can be seen between the Plus-3 and ASEAN economies. The Plus-3 economies, particularly China, experienced a sharper and earlier drop in profitability, with near-zero or negative returns on assets since 2021, indicating persistent challenges and heightened financial distress risks. Property firms in the ASEAN region saw declining profitability during the pandemic, but their profits have increased recently, albeit modestly (Figure 2.6). Meanwhile, although earnings have remained relatively strong in the advanced economies,

overall profitability continues to be weighed down by higher expenses, particularly due to increased payments in the tightening financial environment.

### Liquidity

Property firms in ASEAN+3 are under increasing liquidity risk. The current ratio, which exceeds 1 if current assets can meet short-term obligations, has declined steadily in both Plus-3 and ASEAN (Figure 2.7). While the industry average exceeds the threshold of 1, many firms are dealing with liquidity challenges. Property sales, the major source of liquidity, have fallen sharply, especially in China and Hong Kong, leading to reduced cash inflows. In China, regulatory tightening aimed at deleveraging has restricted access to funding, leading to a liquidity squeeze. Moreover, delays in project completion due to regulatory and financial pressures have exacerbated the issue. For example, pre-sale proceeds in China are held in escrow accounts in banks and released based on project progress, which, although being a good consumer protection measure, makes it difficult for developers to obtain liquidity when projects are delayed.

### Debt servicing capacity

Property firms in ASEAN+3 have increased solvency risks due to their declining ability to meet debt obligations. The Debt Service Ratio (DSR), which measures a firm's capacity to use operational profits to meet all debt payments for the year, falls below the critical threshold of 1 in ASEAN+3 economies, and is particularly low in the Plus-3 (Figure 2.8a).



This indicates that firms are not generating sufficient revenue to service their debts on schedule. The declining Interest Coverage Ratios (ICR) further underscores the solvency risks. The ICR, which measures the ability of earnings to cover interest expenses, has dropped sharply in both ASEAN and Plus-3 economies (Figure 2.8b). An ICR of 2.5 corresponds to an S&P rating of 'B', indicating significant default risk (Damodaran, 2024).<sup>2</sup>

### Refinancing risks

Property firms in ASEAN+3 have seen their refinancing risks rise, not only above pre-pandemic levels but also to levels higher than in other major economies. The weighted average of remaining maturities of property corporate bonds has decreased in 2023 from 2019, indicating higher refinancing risk (Figure 2.9a). Across most ASEAN+3 economies, over 20 percent of these bonds will mature by 2025 (Figure 2.9b). Access to offshore and onshore bond markets is still challenging, and funding costs are

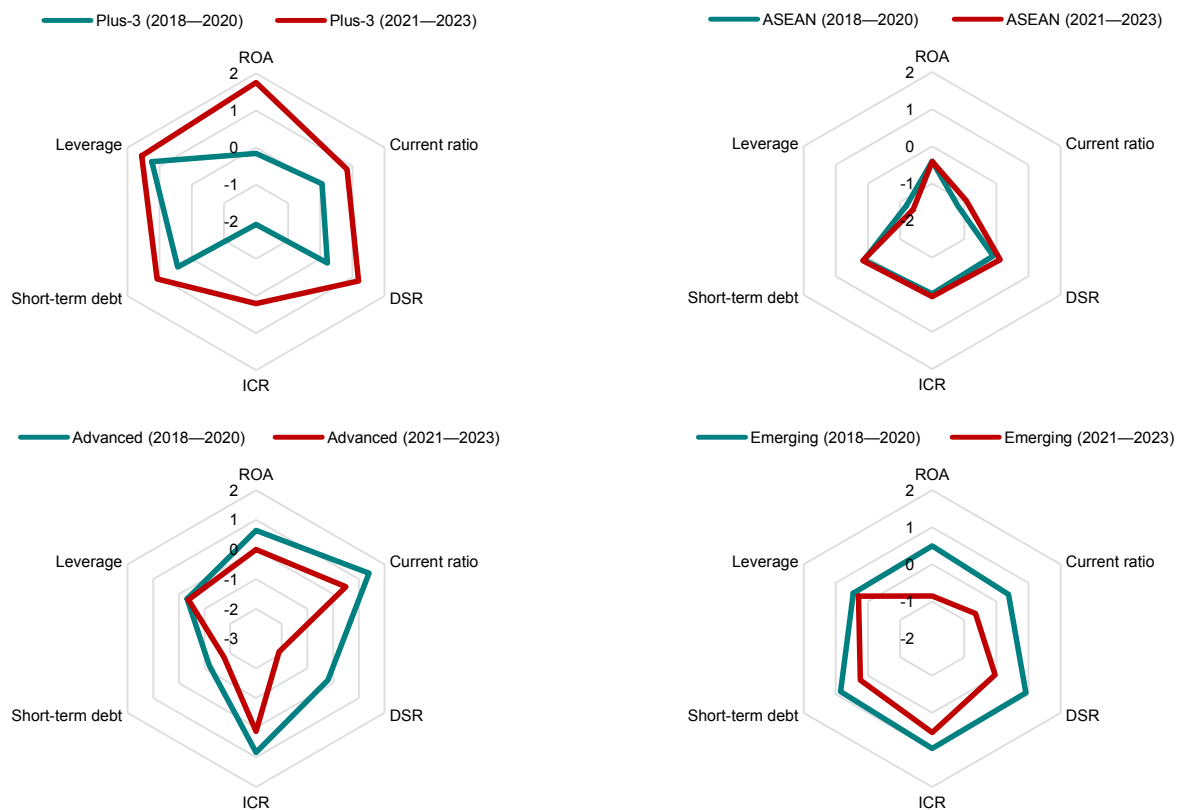
high because investors are cautious. Credit ratings for property firms are significantly worse than for other sectors, with a high share of bonds rated as "junk" (with C ratings). Indeed, credit rating agencies have downgraded many property firms, particularly in China, Hong Kong, Indonesia, and Vietnam, due to increased refinancing risks, limited funding access, and weak performance (Figure 2.10). Many firms that rely heavily on offshore funding, especially in China and Indonesia, have restructured or in the process of restructuring their offshore US dollar notes to avoid defaults (Fitch 2023; S&P 2024).

### Leverage

Property firms in the Plus-3 economies maintain particularly high leverage ratios (Figure 2.11). This is mainly due to their much higher ratio of non-financial institution liabilities<sup>3</sup> compared to firms in other regions. High leverage can enhance shareholder returns during favorable economic conditions, but it also exposes firms to increased financial risk, particularly when property prices fall.

**Figure 2.5. Selected Regions: Changes in Financial Conditions of Property-Related Companies**

Property companies' financial conditions, especially in Plus-3, have worsened in profitability, liquidity, debt servicing, refinancing risk, and leverage compared with pre-pandemic levels and other regions.



Source: Orbis; AMRO staff calculations.

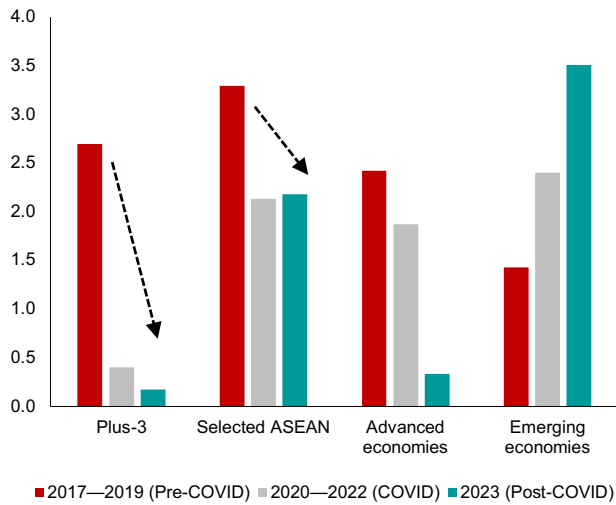
Note: The larger the shape, the greater the vulnerability in the financial conditions. The sample consists of publicly listed property construction, developers, and real estate firms. The indices were calculated based on the z-scores using the means and standard deviation of all available values for each financial condition indicator between 2018 and 2023. For ROA (return on assets), Current Ratio, DSR (debt service ratio), and ICR (interest coverage ratio), Z-scores are inverted (multiplied by -1) to denote higher values as riskier. Short-term debt and leverage are not inverted as higher values are already interpreted as riskier. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>).

<sup>2</sup> Meanwhile, for advanced economies, the DSR increased significantly during the pandemic as short-term debt plummeted from high-pandemic levels. It increased further after the pandemic as earnings improved. However, with the increase in total debt, interest expenses rose in the high interest rates environment, and the ICR remained low despite the increased earnings.

<sup>3</sup> The nonfinancial liabilities include trade payables to suppliers and contractors and 'other liabilities' such as intra-group debts and payables, accounts received in advance, and so on. The presale proceeds from the widespread use of pre-sale systems, as observed in China, Hong Kong, and Korea, likely contribute to their high liabilities. Furthermore, many property firms in the Plus-3 economies are part of large conglomerates, which may lead to substantial intra-group debts. As of end-2023, the ratios of trade payables to suppliers and contractors and other liabilities to total assets are 46 percent in Plus-3 economies, 37 percent in emerging market economies, 22 percent in advanced economies, and 20 percent in ASEAN economies, respectively.

**Figure 2.6. Selected Regions: Return on Assets (Percent)**

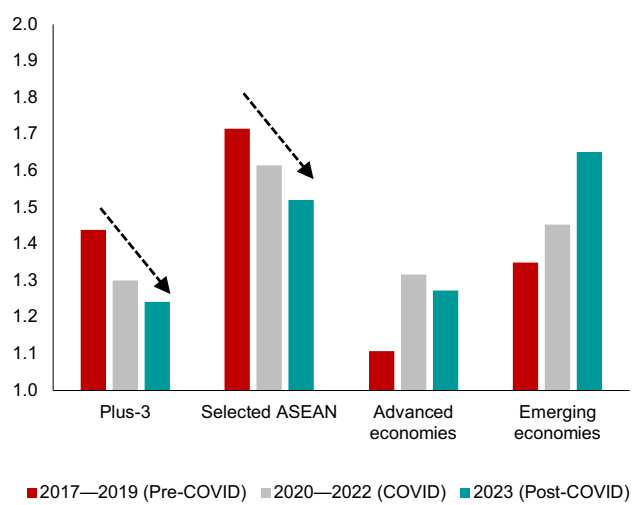
Profitability of ASEAN+3 property firms has decreased.



Source: Orbis; AMRO staff calculations.  
 Note: Return on assets = Net income / Total assets. The sample consists of publicly listed property construction, developers, and real estate firms. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>). The values for each group were calculated as simple averages.

**Figure 2.7. Selected Regions: Current Ratio (Ratio)**

ASEAN+3 property firms are facing increasing liquidity risk.

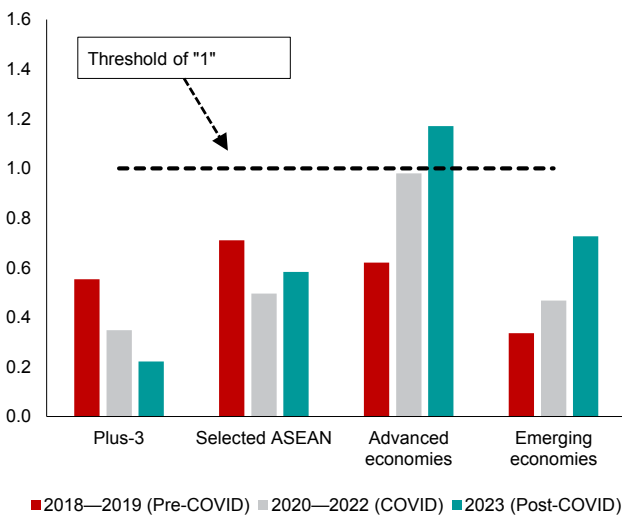


Source: Orbis; AMRO staff calculations.  
 Note: Current ratio = Current assets / Current liabilities. The sample consists of publicly listed property construction, developers, and real estate firms. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>). The values for each group were calculated as simple averages.

**Figure 2.8. Selected Regions: Debt Servicing Capacity (Ratio)**

Weakened debt servicing capacity is shown by a lower debt service ratio...

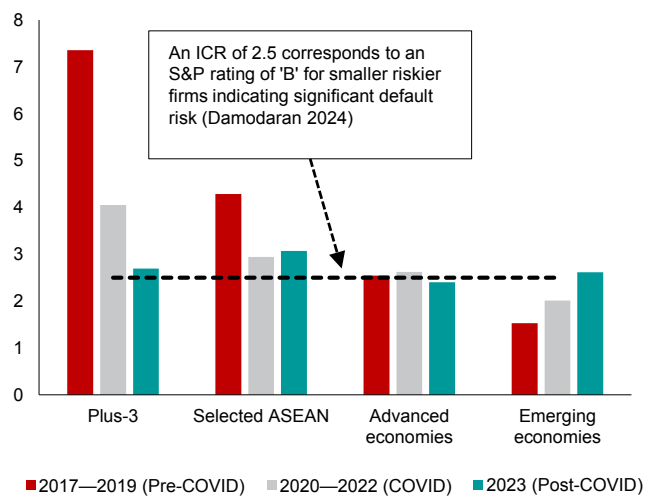
**a. Debt Service Ratio**



Source: Orbis; AMRO staff calculations.  
 Note: Debt Service Ratio = EBITDA (Earnings before interest, taxes, depreciation, and amortization) at time t / (Interest expense at time t + Principal on short-term debt at time t-1, due at time t). The sample consists of publicly listed property construction, developers, and real estate firms. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>). The values for each group were calculated as simple averages.

... and decreased interest coverage ratio.

**b. Interest Coverage Ratio**

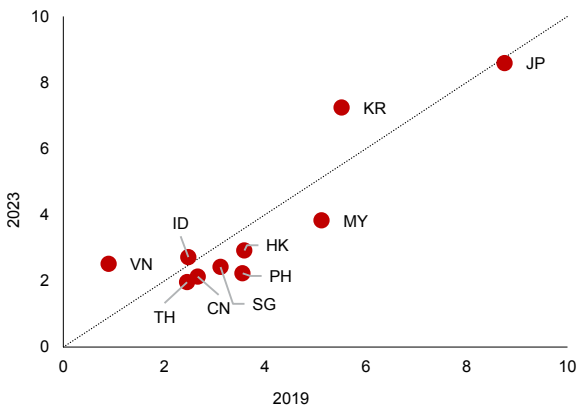


Source: Orbis; AMRO staff calculations.  
 Note: Interest Coverage Ratio = EBIT (Earnings before interest, taxes) at time t / Interest expense at time t. The sample consists of publicly listed property construction, developers, and real estate firms. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>). The values for each group were calculated as simple averages.

**Figure 2.9. Refinancing Risks**

Refinancing risks have increased, as indicated by shortened maturity...

**a. Selected ASEAN+3: Weighted Average Remaining Maturity of Property Corporate Bond (Number of years)**

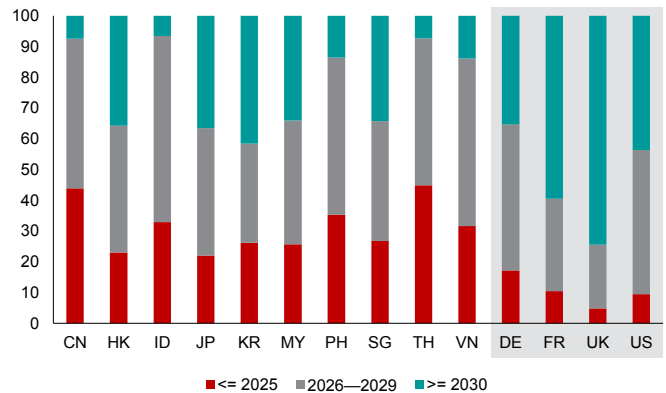


Source: Cbonds; AMRO staff calculations.

Note: The weighted average remaining maturity is calculated by weighting each bond's remaining maturity by its size relative to the total bonds outstanding in the property sector, and then summing these weighted maturities. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam. The data includes bonds issued by both state-owned and privately-owned firms.

... and a concentration of maturities in the near term for property corporate bonds.

**b. Selected Economies: Maturity Profile of Property Corporate Bond (Percent)**

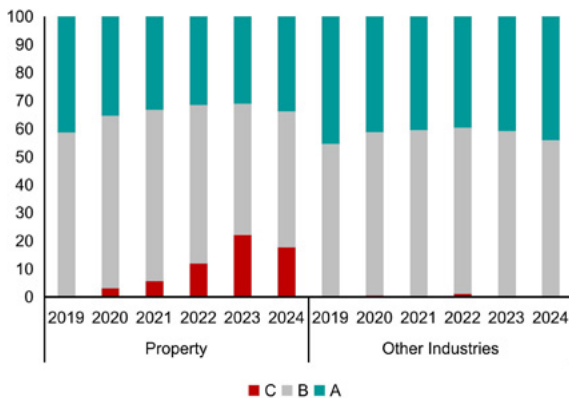


Source: Cbonds; AMRO staff calculation

Note: Data as of 9 September 2024. Bond outstanding ratios maturing by 2025, between 2026 and 2029, and in or after 2030. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = the Philippines; SG = Singapore; TH = Thailand; VN = Vietnam; DE = Germany; FR = France; UK = United Kingdom; US = United States. Countries with gray shade are non-ASEAN+3 countries. The data includes bonds issued by both state-owned and privately-owned firms.

**Figure 2.10. ASEAN+3: Credit Ratings Across Industries (Percent)**

The property sector faces a higher credit risk than other sectors in the region.

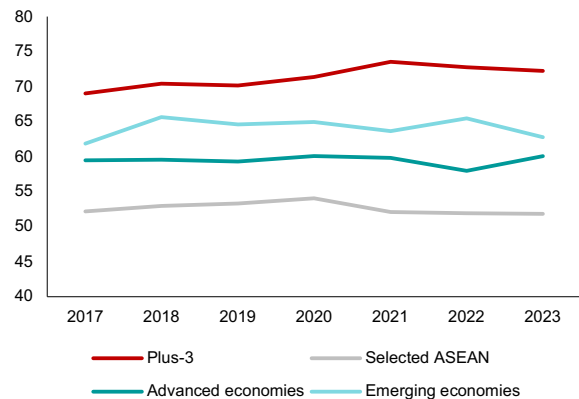


Source: Moody's CreditView; Staff calculations.

Notes: C= Very high credit risk; B= Moderate to high credit risk; A= Low to very low credit risk; This chart includes ratings of firms in China, Hong Kong, Indonesia, Japan, the Philippines, Malaysia, Singapore, Korea, Thailand, and Vietnam. The sample consists of 524 listed firms (122 from the property sector, and 402 from other industries). Data for 2024 is as of 15 August.

**Figure 2.11. Selected Regions: Leverage of Property Sector (Percent)**

Property firms in Plus-3 maintain higher leverage compared with other regions.



Source: Orbis; AMRO staff calculations.

Note: Leverage = Total liabilities / Total assets. The sample consists of publicly listed property construction, developers, and real estate firms. Selected ASEAN economies = Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Plus-3 economies = China, Hong Kong, Japan, and Korea. The benchmark advanced and emerging market economies are those with at least 20 listed real estate companies in the Orbis database and are grouped according to the IMF classification (<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>). The values for each group were calculated as simple averages.

## How do property firms fare during times of stress?

If difficulties persist, a significant share of property firms may struggle with debt payments and high insolvency risks. AMRO conducted a simulation to assess the impact of two shocks on property firms resulting in: (1) a further increase in funding costs, and (2) a further decline in earnings.

### Funding cost shocks

Property firms may encounter funding shocks for a variety of reasons. In recent years, central banks globally have raised interest

rates amid persistent above-target inflation. Property firms are also confronted with higher funding costs and widening credit spreads due to worsening investor sentiment toward the property sector. A 200-basis point (bp) increase in funding cost is simulated in a stress test for property firms, since it aligns with two standard deviations of bank lending rates in ASEAN+3. Furthermore, a 500-bp increase is considered to assess what would happen under an extreme scenario.

Simulation results indicate that a 200-bp increase in funding cost would push the share of debt at risk<sup>4</sup> in ASEAN+3 property firms from

<sup>4</sup> This refers to the debt of firms with an Interest Coverage Ratio (ICR) below 1.25, equivalent to a "CCC" rating by S&P.



29.5 percent at end-2023 to 36.9 percent (Figure 2.12a). Taking into consideration their cash buffers, the proportion of debt at risk would be reduced by almost half (Figure 2.12b). For comparison, the same exercise is conducted on property firms in advanced economies and emerging market economies outside the ASEAN+3 region. As of the end of 2023, the proportion of debt held by property firms with low capacity for debt service in ASEAN+3 was slightly better than that of emerging market economies but much worse than advanced economies. However, under the stress scenario, the additional increase in debt at risk in ASEAN+3 is smaller than in advanced economies. A large pool of cash buffers would help relieve the stress in every region.

**Earnings shocks**

A decline in property demand reduces property firms’ sales and earnings, impacting their ability to service debt. An earnings shock

scenario is considered here, which assumes a 25 percent decline in earnings, representing the largest median annual decline in a single economy across the region during 2021–2022. A 50-percent decline is considered in an extreme scenario.

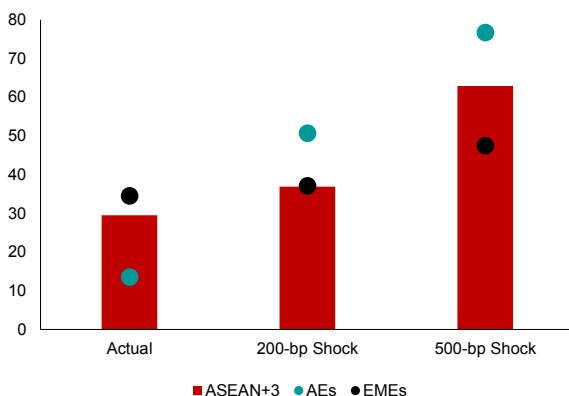
Results show that a 25 percent decline of earnings would increase the share of debt at risk in ASEAN+3 property firms from 29.5 percent to 32.8 percent (Figure 2.13a). Similarly, cash buffers would mitigate the impact, indicating their crucial role in absorbing losses and servicing debt (Figure 2.13b). The same stress test on property firms in advanced economies and emerging market economies demonstrates a similar trend to the funding cost shock scenario. Advanced economies, which have more property firms with ICRs slightly above the debt-at-risk threshold, are more sensitive to earnings shocks than those in ASEAN+3 and emerging market economies; their strong cash buffers could also save them from debt payment difficulties.

**Figure 2.12. Selected Regions: Share of Debt Under Stress by Funding Cost Shock, 2023 (Simulation Results)**  
(Percent)

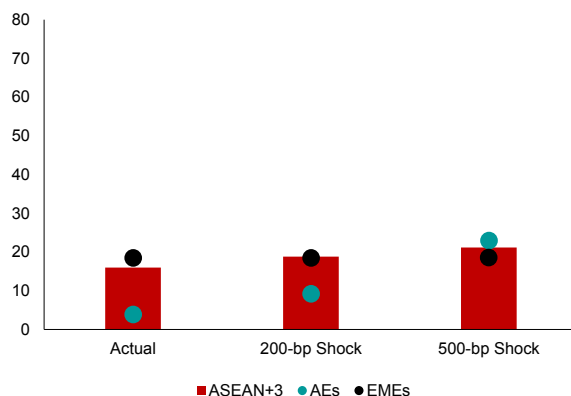
Funding cost shocks, like high-risk premiums, can sharply increase property firms’ solvency risk...

... but a robust cash buffer could mitigate this risk.

**a. Without Considering the Cash Buffer**



**b. Considering the Cash Buffer**



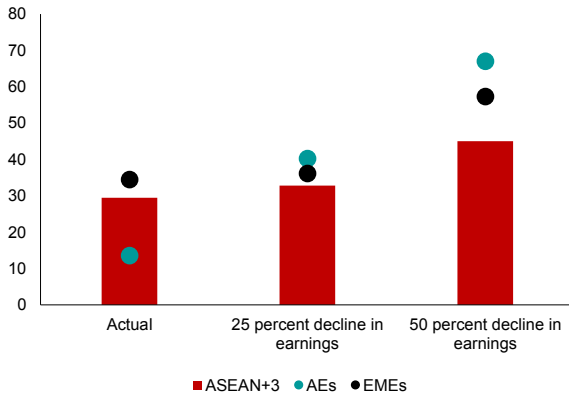
Source: Orbis; AMRO staff calculations.  
Note: AEs = Advanced economies; EMEs = Emerging market economies; Interest Coverage Ratio = EBIT (earnings before interest, taxes)/interest expense. A rise in funding cost is assumed to affect interest expense but not EBIT. 'Actual' refers to the real data in 2023. 'Shock' refers to a 200-bp or 500-bp increase in funding rate. The scenarios indicating "no cash buffer" consider only EBIT in servicing interest expense while the scenarios indicating "with cash buffer" also include cash and cash equivalents in servicing interest expense. Due to data availability, Brunei Darussalam, Cambodia, Lao PDR, and Myanmar are not included in the ASEAN+3. AEs refer to selected advanced economies in western Europe and North America. EMEs refers to selected emerging market economies in eastern Europe and Latin America.

**Figure 2.13. Selected Regions: Share of Debt Under Stress by Earning Shock, 2023 (Simulation Results)**  
(Percent)

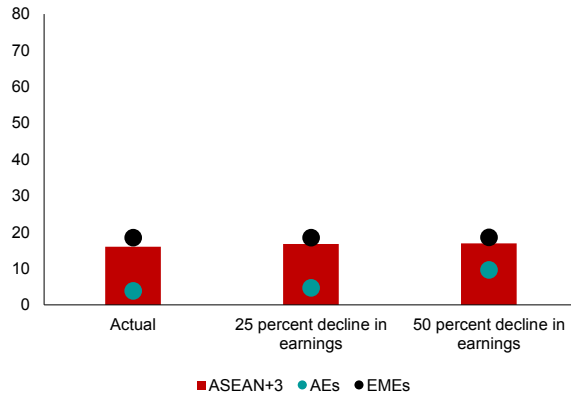
Earnings shocks from demand decline can reduce property firm’s debt servicing ability...

... but a robust cash buffer could mitigate this risk.

**a. Without Considering the Cash Buffer**



**b. Considering the Cash Buffer**



Source: Orbis; AMRO staff calculations.  
Note: AEs = Advanced economies; EMEs = Emerging market economies; Interest Coverage Ratio = EBIT (earnings before interest, taxes)/interest expense. A decline in earnings is assumed to affect EBIT but not interest expense. 'Actual' refers to the real data in 2023. 'Shock' refers to a 25 percent or 50 percent decline in earnings. The scenarios indicating "no cash buffer" consider only EBIT in servicing interest expense while the scenarios indicating "with cash buffer" also include cash and cash equivalents in servicing interest expense. Due to data availability, Brunei, Cambodia, Lao PDR, and Myanmar are not included in the ASEAN+3. AEs refer to selected advanced economies in western Europe and North America. EMEs refers to selected emerging market economies in eastern Europe and Latin America.

# III. Assessing the Spillovers from the Property Market to Financial Stability

## How significant is the impact of the property sector?

Understanding the relationship between real estate and the stability of the financial sector is crucial for managing credit and systemic risks. The literature identifies that shocks in the real estate market can undermine financial stability through different channels, including through bank solvency, collateral value, and the health of nonbank financial institutions (NBFIs). These shocks can also spill over into other sectors and asset classes (IMF 2021).

To assess how the financial market perceives risks across the property market, a market beta analysis was conducted.<sup>5</sup> The property market beta, which has risen globally, surpassing 1 in most regions, indicates that the property market is viewed as riskier than the broader economy. Before the pandemic, the property market beta in the ASEAN+3 region was significantly higher than in other regions. The beta dropped during the pandemic as the risk perception for the property market declined relative to the overall economy, coinciding with heightened risks in other industries. From late 2021, largely due to issues with large property developers, the beta increased again, with the average value surpassing 1 since 2023 (Figure 2.14a). Within the region, China's property market beta remains high, exceeding 1 (Figure 2.14b).

Empirical analysis reveals a close inverse relationship between the property market's robustness and financial market stress

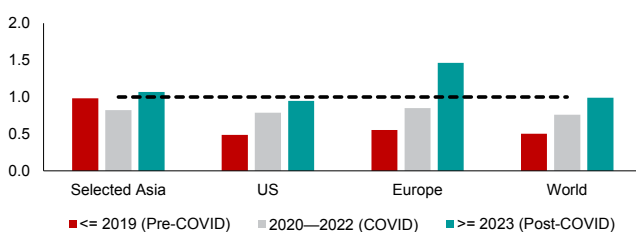
(Annex 2.1). Using monthly panel data of the changes in the Real Estate Price Index (REI), changes in the Purchasing Manager Index (PMI), and Financial Stress Index (FSI) from five ASEAN+3 economies (China, Hong Kong, Japan, Korea, and Thailand) covering from May 2008 to August 2023, a panel vector autoregression (PVAR) and Granger causality test were conducted.<sup>6</sup> This analysis aims to explore the dynamic relationship between the property sector, the real sector, and financial stability.

The findings suggest that negative shocks in the property market, such as declining property prices, would aggravate stress in the financial market, and vice versa. The impact of a property market disturbance on the financial market is persistent, lasting for over 10 months. Conversely, disruptions in the financial market negatively affect both the property market and the real economy for about 3 months but with more intensity. Real sector activity (proxied by PMI) positively impacts property prices, though the reverse is muted, and both PMI and REI negatively correlate with financial market stress (Figure 2.15). The Granger causality test demonstrates that past changes in the property market index predict subsequent changes in the financial stress index.<sup>7</sup> Conversely, past changes in the financial stress index also predict subsequent changes in the property market index.

**Figure 2.14. Property Market Beta (Coefficient)**

Financial markets perceive increasing risks in the property market globally, reflected in higher market betas...

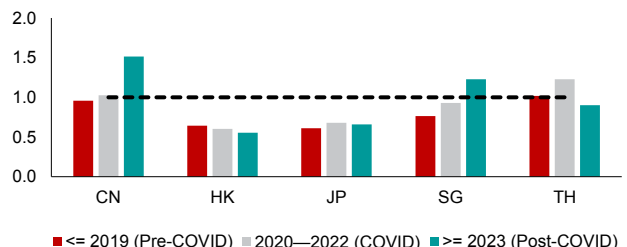
### a. Selected Economy Groups



Source: MSCI indices via Bloomberg Finance L.P.; AMRO Staff calculations. Note: For selected Asia, a proxy of ASEAN+3, MSCI AC Asia ex.JP indices are used. Selected Asia indices include securities from eight ASEAN+3 economies (e.g. China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Philippines, and Thailand), India, and Taiwan Province of China. The coefficients for the beta are calculated on a rolling basis for a period of six months. Data as of 15 Aug 2024.

... and China's property market beta remains high within the region.

### b. Selected ASEAN+3



Source: MSCI indices via Bloomberg Finance L.P.; AMRO Staff calculations. Note: The coefficients for the beta are calculated on a rolling basis for a period of six months. CN = China, HK = Hong Kong, JP = Japan, SG = Singapore, TH = Thailand. Data as of 15 Aug 2024.

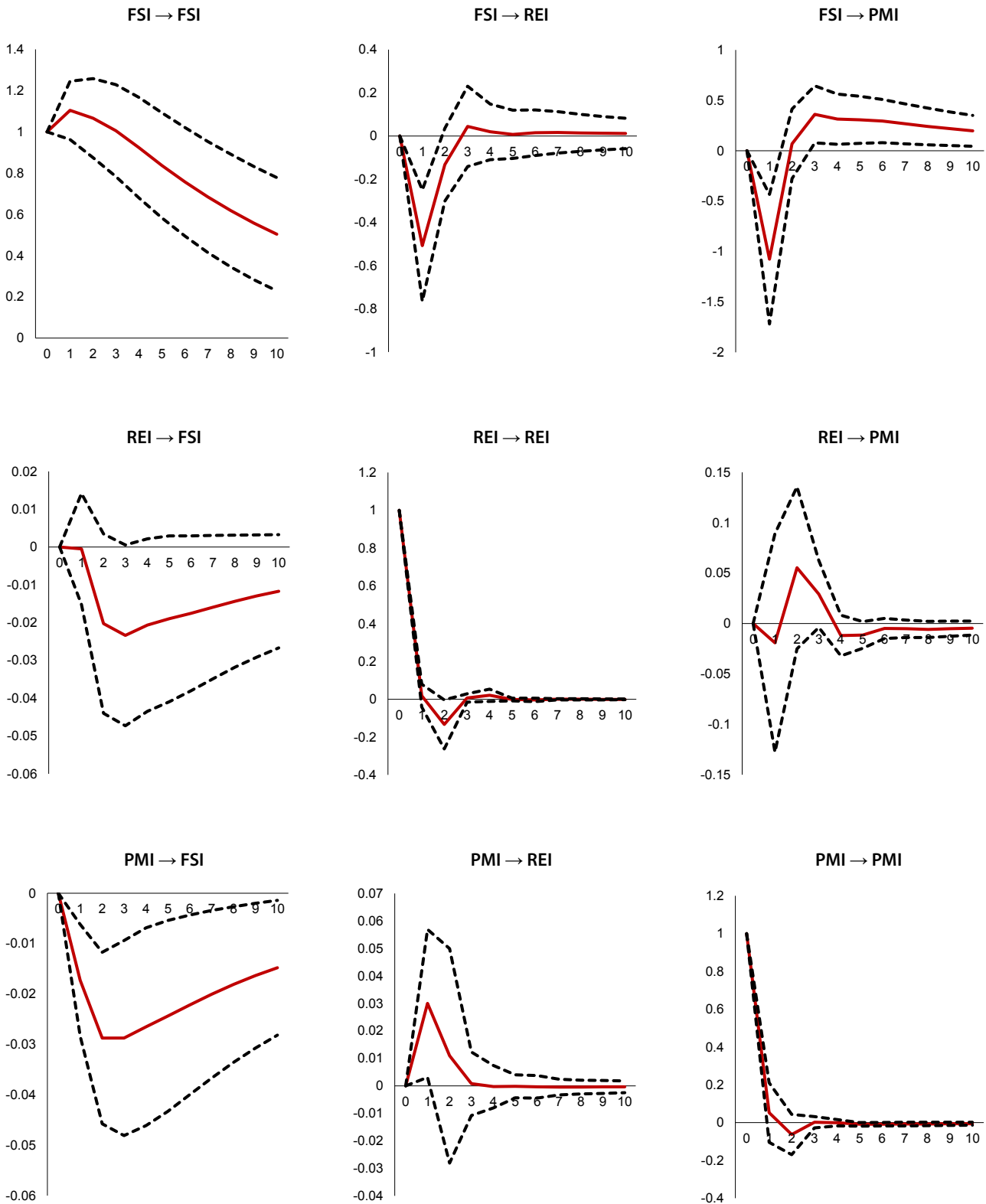
<sup>5</sup> The market beta is the coefficient of regression of the daily changes in a sector index to the daily changes in the benchmark index of the broader economy. It measures the perception of the risk associated with the sector compared to the broader economy. A market beta greater than 1 typically indicates that the sector is perceived as riskier than the broader economy. For more details, refer to AMRO (2023a).

<sup>6</sup> This analysis may have limitations, including the potential for omitted variables that could affect both the real estate market and financial stability, the simplified assumption of linear relationships, and the reliance on proxies.

<sup>7</sup> According to panel VAR-Granger causality Wald test, the null hypothesis (H0: Excluded variable does not Granger-cause Equation variable) is rejected with a p-value of 0.038 when the excluded variable is REI and the Equation variable is FSI. H0 is also rejected with a p-value of 0.000 when the excluded variable is FSI and the Equation variable is REI.

**Figure 2.15. Selected ASEAN+3: Impulse-Response Function (Impulse → Response)**

Stress in the real estate market negatively impacts the financial market, while increasing financial market stress, in turn, adversely affects the real estate market.



Source: Asian Development Bank; national authorities via CEIC; S&P Global via Have analytics; AMRO staff calculations.  
 Note: FSI = Financial Stress Index; REI = Real Estate Price Index; PMI = Purchasing Manager Index; The first variable is an impulse factor and the second variable is a response factor. An increase in FSI indicates heightened financial market stress, while an increase in REI indicates rising real estate prices and a higher PMI reflects a more favorable economic environment. The dotted lines are 95 percent confidence intervals. The x-axis represents months following a shock and the y-axis represents the magnitude of the response variable. The dotted lines are 95 percent confidence intervals. The magnitude of the shock corresponds to a one-unit increase in the impulse variable.

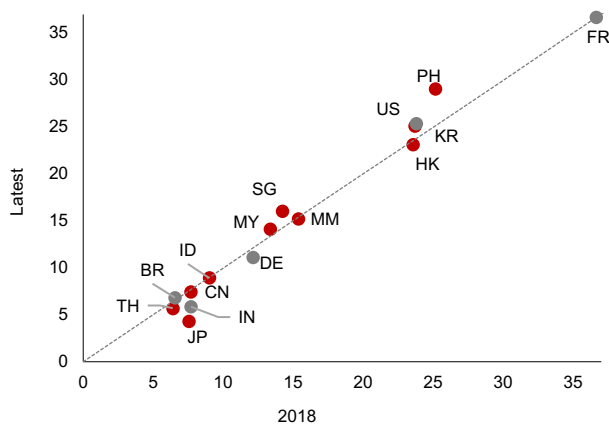
## How does property sector credit risk affect the soundness of banks?

In recent years, ASEAN+3 banks have shown relatively stable trends in exposure to property industry-related lending (Figure 2.16). Financial regulators and banks are increasingly aware of the risks associated with excessive concentration in any single sector. They have concentration risk measures to prevent excessive bank lending to property developers. Also, property developers have increasingly turned to alternative financing channels, such as bond issuances, direct investment, or other local financing mechanisms, and so have reduced their reliance on traditional bank financing. NBF financing to the property sector in Korea, for example, has increased rapidly.

The quality of property-related loans in ASEAN+3 varies, with asset quality remaining stable in selected ASEAN economies but deteriorating in some Plus-3 economies since 2021 (Figure 2.17). An empirical analysis by AMRO, employing a regression model, identifies that in economies witnessing dramatic rises in nonperforming loan (NPL) ratios, the contributing factors include conventional elements such as increased developer debt, rising interest rates, and declining real estate prices, as well as market sentiment indicators like a deteriorating expected business climate index and business performance index (Annex 2.2).

**Figure 2.16. Selected ASEAN+3: Share of Property-Related Loans in Total Loans**  
(Percent)

Banks in ASEAN+3 have kept their exposure to the property industry relatively stable.



Source: CEIC; Wind; Haver Analytics; AMRO staff calculations.

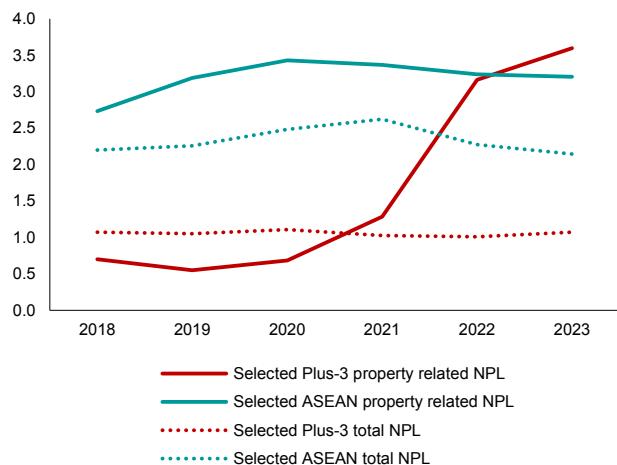
Note: Property-related sectors include commercial banks' loans to building and construction, property development and investment, and real estate activity sectors, which may have different coverages across different economies. For US, data for commercial real estate (including construction and land development) is shown. For "latest" data, 2023 data are used for CN, HK, ID, JP, PH, and US; and 2022 data are used for KR, MY, MM, SG, TH. BR = Brazil; CN = China; DE = Germany; FR = France; HK = Hong Kong; ID = Indonesia; IN = India; JP = Japan; KR = Korea; MM = Myanmar; PH = Philippines; SG = Singapore; TH = Thailand; US = United States.

As credit risk in the property sector rises, so does the risk of credit losses for banks exposed to this sector. The probability of default for property firms in the Plus-3 economies increased significantly in 2021 and 2022, leading to a sharp rise in the forward-looking credit loss rate,<sup>8</sup> which remains above pre-pandemic levels, while moderating in 2023 (Figure 2.18a).

However, the adjusted forward-looking credit loss rate suggests that banks in the ASEAN+3 region with property exposures are relatively resilient. This adjusted rate is calculated by multiplying the original forward-looking credit loss rate—which reflects the probability of default in the sector—by the economy-specific realized bank loan loss rate—the actual percentage of loans that banks have written off as uncollectible. This measure can provide insight into the banks' credit risk to the property sector reflecting the effectiveness of banks' risk management practices in the economy. The rates in Plus-3 and ASEAN economies are lower than in Europe and other countries except for the US (Figure 2.18b). The adjusted figures indicate that ASEAN+3 region banks are practicing strong risk management, including by increasing provisions or reducing exposure to risky sectors.

**Figure 2.17. Selected ASEAN+3: Property-Sector Related NPL Ratio and Total NPL Ratio**  
(Percent)

Property-related loan quality in Plus-3 deteriorated sharply.



Source: CEIC; Wind; Haver Analytics; national authorities; AMRO staff calculations.

Note: Economies selected based on data availability. Simply averaged. Selected Plus-3 includes China, Hong Kong, and Korea. Selected ASEAN includes Indonesia, Singapore, and Thailand. Property-related loans are commercial bank loans to construction and real estate activities (CN, ID, KR, TH); Construction, property development and investment (HK); and building and construction (SG). Property-related NPL ratios refer to property-related NPLs out of all property-related loans. Some missing data are replaced with interpolated values or the closest available value. NPL = nonperforming loan.

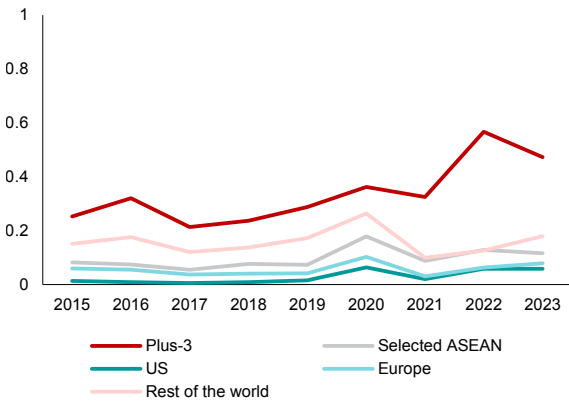
<sup>8</sup> The forward-looking credit loss rate in the property sector reflects the likelihood that banks will experience losses on their credit exposures to the property market over the next 12 months. This rate is calculated by multiplying the probability of default (PD) of firms in the property market by the loss given default (LGD). For more details on methodologies, refer to Ong and others (2023).

**Figure 2.18. Selected Regions: 1-Year Forward-Looking Market-Implied Credit Loss Rate in the Property Sector (Percent)**

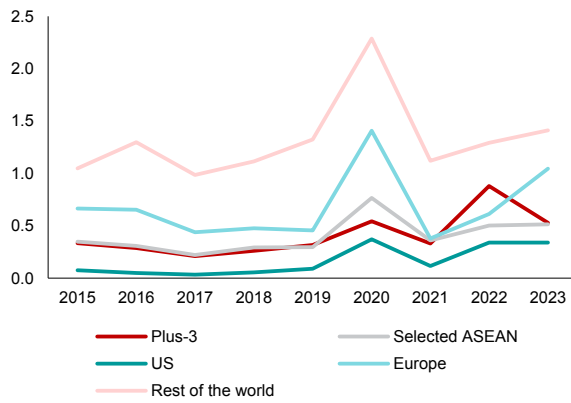
Rising default risks for property firms in Plus-3 sharply increased banks' forward-looking credit loss rates...

... however, banks are resilient to property exposure, given their strong risk management practices.

**a. Original Rate**



**b. Adjusted Rate Reflecting the Economy-Specific Level of Bank Loan Losses**



Source: AMRO (Global credit loss rates database); AMRO staff calculations. Note: Selected ASEAN includes Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Credit loss rate by region is a simple average of the rates of the individual countries in each region. ROW = rest of the world.

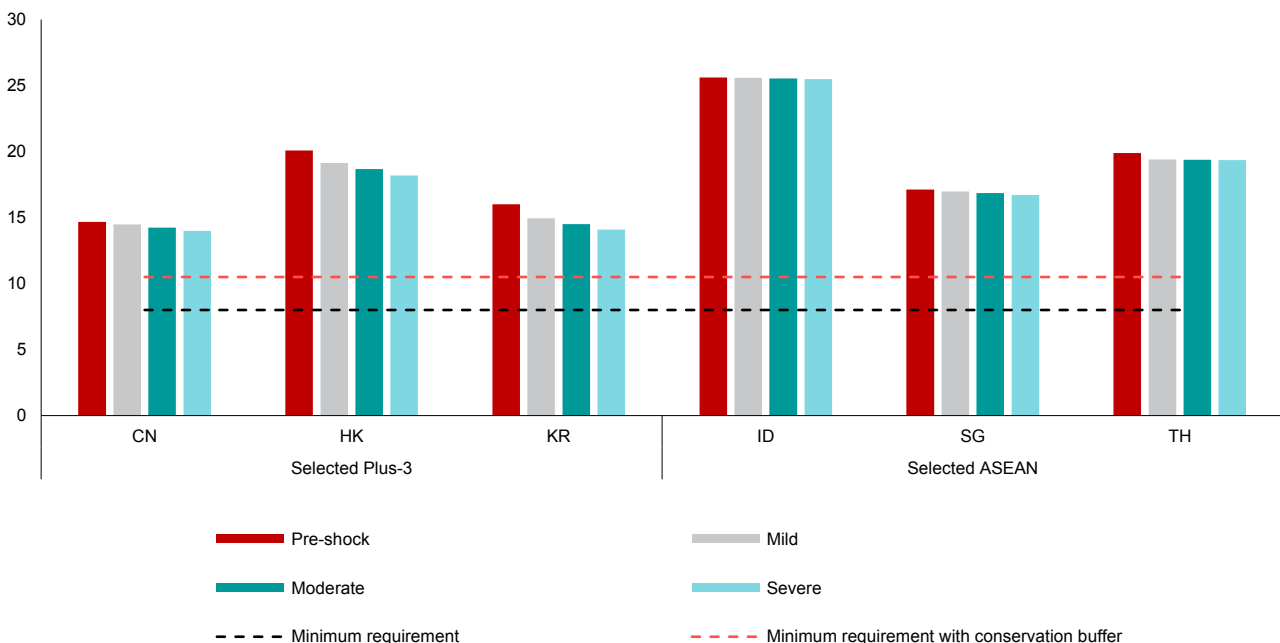
Source: AMRO (Global credit loss rates database); AMRO staff calculations. Note: Selected ASEAN includes Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Credit loss rate by region is a simple average of the rates of the individual countries in each region. ROW = rest of the world.

An AMRO stress test assessed the impact of a downturn in property developers' financial performance on ASEAN+3 banks' capital adequacy ratios (CARs) and found that banks would maintain sufficient capital under adverse conditions (Annex 2.3). A downturn in property developers' financial performance could erode banks' capital buffers due to increased provisions and reduced profits from lower interest income. Nevertheless, under mild, moderate, and severe scenarios (equivalent to one, two, and three standard

deviation shocks to NPLs), CARs in ASEAN+3 economies remained well above the Basel III minimum regulatory requirement. Even in the severe shock scenario, CAR levels stayed between 14 percent and 18 percent in the Plus-3 economies and 17 percent and 25 percent in the ASEAN economies, underscoring overall banking system resilience due to high capitalization levels and provisioning buffers, as well as their prudent approach to lending, with limited concentration in the property-related sectors (Figure 2.19).

**Figure 2.19. Selected ASEAN+3: Potential Impact of Property Developers' NPL Deterioration on Banks' CAR (Percent)**

AMRO's stress test shows that ASEAN+3 banks have sufficient capital buffers to manage potential risks from property developers.



Source: CEIC; Wind; national authorities; individual bank financial statements; AMRO staff estimates. Note: Economies selected based on data availability. CN = China; HK = Hong Kong; KR = Korea; ID = Indonesia; SG = Singapore; TH = Thailand. NPL = nonperforming loan.

However, despite overall banking sector resilience, small banks, regional banks, and savings banks are likely to be more vulnerable to property market shocks. The collapse of a few small banks may not add a significant risk to the financial system, but if multiple small banks fail simultaneously, this could develop into a systemic risk, necessitating caution.

- **China:** Small regional banks, such as city or rural commercial banks, have high exposure to local government debt.<sup>9</sup> As land revenue accounted for about 20 percent of local government revenue in 2021 (Huang 2023), the property market downturn has placed significant financial strain on many local governments. Consequently, small regional banks, with their high exposure to local government debt, face substantial credit risks and decreases in profitability.
- **Hong Kong:** Some small to mid-sized banks have higher exposure to small and mid-sized developers, whose repayment abilities are under greater pressure. Consequently, these banks are likely to face higher risks than large banks, albeit most of these loans are secured. Moreover, some small and mid-sized banks are more exposed to property developers in mainland China,<sup>10</sup> which indicates higher asset risk.

- **Korea:** Concerns are rising about the soundness of financial institutions with project financing (PF) exposure amid high interest rates and a sluggish property market. Savings banks increased the size of real estate PF loans during the low-interest-rate environment and the booming real estate market. Although their loans decreased somewhat after the interest rate increase, the amount reached KRW 9.6 trillion at the end of 2023, compared with KRW 6.9 trillion at the end of 2020, a 39.1 percent increase. As a result of the downturn in the real estate market, asset quality has decreased, and the delinquency rate has risen from 2.3 percent in 2020 to 6.9 percent in 2023.

The soundness of a bank exposed to the property sector is influenced by bank governance and lending practices. In Vietnam, for example, the appointment of property developers in key management positions in banks has brought the issue of cross-ownership to the forefront. Developers can bypass loan limits by using subsidiaries, affiliated businesses, or employees to secure extra funding, leading to banks unknowingly exceeding lending limits (Ho and others 2022). The opacity and complexity of this intricate web can further amplify the risks arising from the property sector and have adverse spillovers on the broader financial market (Box 2.3).

## What are the property market risks from nonbank financial intermediaries (NBFIs) and shadow banking activities?

The risks of financial institutions to the property sector extend beyond traditional bank loans. In several countries, NBFIs such as insurance companies, securities firms, trust companies, and entities offering wealth management products play a significant role in property development funding. These entities often operate under less stringent regulations than banks, and a lack of accurate data obscures their risks. NBFIs frequently cater to lower-quality borrowers because of easier regulations. Their expanding role in property sector financing could pose systemic risks through maturity mismatches, liquidity transformations, and increased leverage. Moreover, the informal nature of some lending practices adds another layer of complexity, potentially exacerbating financial instability during economic downturns (FSB 2023).

Specific risks are associated with NBFI lending to the property sector across ASEAN+3 economies, including in:

- **China:** The bankruptcy of the Zhongzhi Group in January 2024 was triggered by the default of its subsidiary trust company with significant property market exposure, highlights the risks associated with NBFIs. This event, while not escalating to systemic risk, significantly undermined investor confidence and market sentiment. The property market downturn is a challenge not only for investors in trusts which are like wealth management products but also for financial institutions such as banks, trust companies, and securities firms that provide implicit guarantees. Tighter regulations and heightened awareness of property sector risks by the Chinese government have sharply reduced the size of legacy shadow banking activities such as wealth management products and their exposure to property.<sup>11</sup>

<sup>9</sup> Official statistics on small banks' exposure to local government debt are limited, but estimates from various agencies provide a gauge of the size. According to Goldman Sachs, non-covered banks hold local government debt amounting to 48 percent of their total assets, compared to 18 percent for covered banks as of 2022. S&P global (Huang 2023) estimates that regional banks have around 25 percent of their loan portfolios exposed to local government financing vehicles based on the top regional banks' data.

<sup>10</sup> According to research, large banks have exposures to property developers in mainland China about 1–6 percent of their total loans but some small and medium-sized banks have over 10 percent of their total loans (Hung 2024).

<sup>11</sup> According to research, the size of legacy shadow banking activities such as wealth-management-like products decreased to CNY 3 trillion, nearly half its peak in 2020. The shadow banking industry's property exposure also has been reduced by 62 percent, falling to CNY 1.1 trillion as of July 2023 (Wu 2023).



- Korea: NBFIs, including securities firms, have increased their exposure to the real estate PF market. Securities firms increased their exposure to PF loans from KRW 5.2 trillion in 2020 to KRW 7.8 trillion in 2023, a 50 percent rise. The delinquency rates for PF loans provided by securities firms surged from 3.4 percent in 2020 to 13.7 percent in 2023. Securities firms not only provide PF loans but also issue debt guarantees for securities backed by PF loans. Small and mid-sized securities firms with contingent liabilities in high-risk PF-backed securities can exacerbate spillover risks in financial stability. The credit crunch in October 2022, which affected the money and corporate bond markets, underscores the need for specialized management to prevent PF insolvency from triggering broader systemic risks.
- Cambodia: Another form of shadow banking associated with property developers involves providing mortgage loans to homebuyers through installment plans. This method operates outside of the supervision of the authority and is popular due to less stringent credit evaluations. The size of this type of lending accounts for an estimated 60 percent–70 percent of the country's GDP (AMRO 2023b). However, heavy reliance on these schemes exposes developers to cash flow disruptions from homebuyers' late payments. Small developers, especially when not backed by conglomerates, are particularly vulnerable to credit crunches and default threats. Prolonged property market stagnation and deepening financial stress among developers can transmit credit risks from shadow banking to the official banking sector, impacting both the stability of financial system and the broader economy.

## IV. Policy Recommendations

### Implement measures to mitigate the impact of worsening market sentiment

Ongoing weakness in market confidence in the property sector can put even fundamentally healthy property firms at liquidity risk. It is crucial to implement measures that prevent companies with sound fundamentals from defaulting because of tight credit conditions caused by risk aversion in worsening market.<sup>12</sup> Some strategies worth considering include facilitating access to credit for firms with sound financial health, offering guarantees to viable projects, and reducing immediate debt redemption burdens, such as through bond maturity extensions.

Governments in ASEAN+3 have implemented measures to support liquidity in their property sectors:

- China: The government started a “whitelist” project, with local governments listing property projects eligible for financing support and coordinating with local financial institutions (The State Council, China 2024). In addition, the central government provided CNY 300 billion to support local governments' purchase of unsold properties which can then be converted into affordable housing (PBC 2024a).

- Korea: The authorities introduced a project finance guarantee program worth KRW 35 trillion to facilitate funding for development projects with solid financial fundamentals (FSC, Korea 2024).
- Vietnam: The government amended decrees to allow the extension of privately-issued corporate bond terms by up to two years and permit payment by assets other than cash through agreements with bondholders.

Successful policy implementation depends on accurately identifying sound companies and ensuring cooperation from regulatory authorities, government agencies, financial institutions, and the real estate industry. Support should be targeted at viable firms, while non-viable ones should undergo swift restructuring or liquidation, to avoid perpetuating “zombie firms”. Establishing robust and objective evaluation standards tailored to each country's unique circumstances through cooperation among financial institutions and regulatory authorities is essential. Additionally, for non-viable firms, strengthening and streamlining resolution and liquidation procedures is crucial to ensure the effective management of these processes.

<sup>12</sup> If liquidity support measures rely primarily on government funding, authorities should be cautious of the potential for these funds to become contingent liabilities, which could influence market perceptions of both financial and fiscal stability. It is crucial that countries ensure they have sufficient fiscal capacity before adopting such measures.

## Enhance the soundness of financial sectors with property market exposure

To address vulnerabilities in financial institutions with significant property exposure—particularly small regional banks, savings banks, and NBFIs—proactive measures and robust oversight are essential to strengthen their resilience. While it is accepted that systemically important financial institutions (typically large banks) warrant more stringent supervision due to their impact on financial stability, smaller institutions also require adequate oversight. Major banks have reduced exposure and built adequate provisions, but smaller institutions require tailored regulatory attention to prevent systemic risks because they lack diversification, transparent governance, and have not had to deal with strict regulations.

As such, ASEAN+3 countries should:

- Diversify business models: Smaller financial institutions, including regional banks and savings banks, and NBFIs should diversify beyond real estate investments to reduce risk. For example, in Korea, it is crucial for savings banks and securities firms to reduce reliance on real estate PF. Similarly, in China, reducing regional banks' dependence on the property sector and local government financing vehicles is essential. Governments can support this by promoting mergers and acquisitions to form financially healthier institutions and offering the necessary assistance to encourage diversification. Encouraging these smaller institutions to explore alternative business models and revenue streams will help mitigate these risks.
- Tightening regulatory oversight: Strengthening regulatory oversight of under-regulated shadow banking is crucial to mitigating systemic risks. China has improved supervision and regulation of shadow banking products and encouraged banks to bring off-balance sheet activities onto their balance sheets. Korea has announced measures for orderly soft-landing in real estate project finance, including actions targeting NBFIs. Authorities can further mitigate risks by encouraging financial institutions to conduct regular stress tests on property-related activities to identify and manage insolvency risks proactively.<sup>13</sup> For instance, institutions could measure expected loss in scenarios of sharp property price declines or interest rate increases, and set aside provisions accordingly.
- Implement prompt government action: When property sector stress begins to impact the financial sector, governments must act swiftly to prevent broader market spillover. For instance, the Korean government announced a KRW 50 trillion support package in response to the credit crunch triggered by a property developer's default in 2022, which promptly alleviated investor anxiety and prevented systemic risk.
- Address country-specific issues: Tailoring measures to unique challenges in different countries can enhance overall financial resilience. For instance, in Vietnam, tackling the issue of cross-ownership governance, where property developers can influence bank lending practices, is crucial. The government amended the law to lower ownership limits and impose stricter disclosure requirements. Furthermore, regulators need better information systems to track the ultimate ownership of commercial banks and mitigate ownership concentration. Enhancing bank governance by mandating board diversity to prevent ownership being concentrated in the hands of a few large shareholders, and empowering independent directors to challenge corrupt business practices, could also further address this issue.

<sup>13</sup> Given that regulatory stress tests may require substantial resources—including data and technical expertise—it may be challenging for small banks or NBFIs to conduct such exercises on a regular basis. Nevertheless, it is still warranted that proactive risk management practices be encouraged for these institutions, which can help them better prepare to identify and address potential vulnerabilities.

## Carefully utilize property demand stimulation policies tailored to each country's circumstances

To break the downward cycle of shrinking demand for property and deteriorating financial conditions for developers, countries can consider introducing demand-boosting measures. For example, lowering the burden of purchasing property through measures such as stamp duty waivers, reduced downpayment ratios, and tax reductions can help stimulate demand. The Hong Kong Government abolished all demand-side management measures for residential properties, including stamp duty and adjusted loan-to-value ratios to ease mortgage lending (HKMA 2024). In China, the government lowered the minimum downpayment ratio (PBC 2024b) and eased home buying restrictions to stimulate demand. In Indonesia, the government introduced a policy to reduce Value Added Tax for eligible properties and has relaxed loan-to-value and

downpayment policies for green property loans during 2024.

However, policies to stimulate property demand must be tailored to the circumstances of each country. For instance, in economies with excessive household debt ratios, caution is required as policies to boost property demand could increase debt levels. Moreover, it is crucial to consider that if the stagnant demand results from deeper issues, such as economic recession or lack of confidence in developers, then demand stimulation policies may have limited effect. By customizing demand-related policies to fit each country's unique circumstances, governments can more effectively deal with the distinct challenges of their property markets and promote economic stability.

## Improving property market practice and conduct

Once current property market difficulties subside, fundamental structural reforms are crucial to curb aggressive property developers from overleveraging. This requires joint efforts by authorities, creditors, and the industry itself. Strict regulation and monitoring are essential to prevent the misuse or diversion of funds from financial institutions and mortgage funds in escrow accounts raised through presales. Financial institutions must rigorously assess the creditworthiness

of developers and feasibility of projects when providing or extending loans and conduct regular audits of fund utilization. Authorities should ensure comprehensive oversight to maintain the stability and soundness of property and financial markets by setting stricter limits on the debt developers can take on, improving transparency requirements, and providing for financial institutions with clear guidelines on property sector exposure.

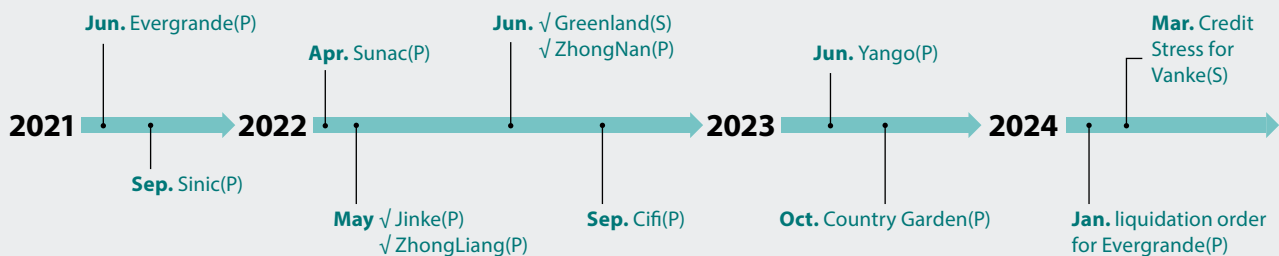
## Box 2.1:

## China: Recent Development and Prospect of Chinese Developers' Tribulations

Concerns regarding highly leveraged Chinese developers remain unresolved. Alarm surrounding these developers began to surface in 2021, triggered by Evergrande defaulting on payments to holders of its dollar-denominated bonds. The number of default cases among major real estate developers, including Evergrande, started to increase from then on (Figure 2.1.1). Default cases reached their peak in 2022, after which signs of stabilization began to emerge. The interest spread of high-yield bonds denominated in dollars, which reflects the credit anxiety for low credit-rating Chinese

corporations, widened significantly in 2022 but gradually decreased after.<sup>1</sup> The scale of defaults on offshore bonds issued by Chinese developers also declined after reaching its peak in 2022 (Figure 2.1.2). However, concerns resurfaced following a liquidation order issued by a Hong Kong court against Evergrande in January 2024. In March 2024, concerns spread about the ability of Vanke, a major state-owned Chinese developer, to repay upcoming dollar-denominated bonds. Although Vanke managed to meet its bond repayment obligations, Chinese developers remain under scrutiny.

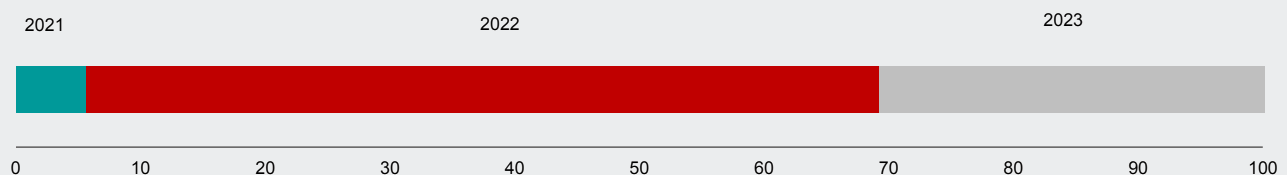
Figure 2.1.1. Timeline of Major Chinese Developer's Default Cases



Source: AMRO staff illustrations.

Note: 1) P denotes a private firm and S denotes enterprises owned or backed by the state.

Figure 2.1.2. US Dollar Bond Defaults by Chinese Developers (Billions of US dollars)



Source: Bloomberg Finance L.P.; AMRO staff calculations.

The difficulties of Chinese developers stem mainly from a downturn in the real estate market and tightened regulations. Property prices in China have been declining since 2022 (based on 70 cities), exacerbated by oversupply, and growing concerns among homebuyers about the delivery of pre-purchased homes. The downturn has led to a decline in sales, worsening developers' funding woes. Revenue from home presales represents a key source of financing for developers, alongside bank loans and bond issuance. Property sales in China have been falling since 2022, with a rapid increase in unsold completed inventory (Figure 2.1.3).<sup>2</sup> Analysis of the interest coverage ratio (ICR), a commonly used indicator to

measure solvency, reveals that an increasing proportion of developers face difficulties in repaying their debts (Figure 2.1.4). Borrowing restrictions imposed on developers by Chinese authorities in 2020 contribute to the liquidity crisis (Jing 2022).<sup>3</sup> The stricter credit policy<sup>4</sup> implemented in August 2020 to curb excessive leverage of developers, led to significant financing challenges for some developers unable to meet the stringent conditions. Tight US monetary policy increased the cost of offshore funding for developers and heightened their risk of default. The escalation in defaults on offshore bonds issued by Chinese developers after the US raised interest rates in 2022 corroborates this.

The author of this box is Jungsung Kim.

<sup>1</sup> According to Bloomberg Finance L.P., the interest rate spread on China's speculative-grade dollar-denominated bonds surged to 2,500 basis points in 2022 but significantly decreased to around 530 basis points in June 2024.

<sup>2</sup> Inventory increased by an average of 18 percent in 2023 (compared to the same period of 2022) and expanded by an average of more than 20 percent in the first quarter of 2024, based on the data from National Bureau of Statistics.

<sup>3</sup> Jing, Liu. 2022. "Series: China's Real Estate Problem 1. The Three Red Lines." CKGSB Knowledge, 5 July.

<sup>4</sup> Many media outlets and market participants refer to this policy as the "Three Red Lines."

**Figure 2.1.3. Residential Properties Sold and Housing Price**  
(Percent, year-on-year)

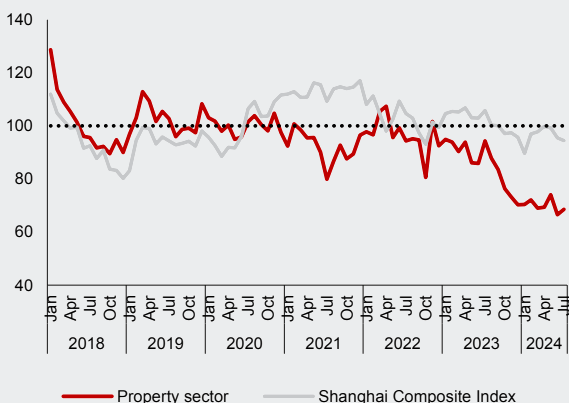


Source: National Bureau of Statistics, AMRO staff calculations.

That said, the risk from troubled property developers has not spilled over to an extent that compromises financial stability in China. Concerns had been raised about potential spillover into the banking sector, given that developers' rely on bank loans for a substantial part of their funding. However, banks have been managing nonperforming assets through sales and write-offs, maintaining a stable nonperforming loan (NPL) ratio. After peaking at 1.96 percent in September 2021, the NPL ratio continued to decline, reaching 1.59 percent by the end of 2023. The overall exposure of banks to developers, at 5.4 percent of total loans at the end of 2023, is manageable. Notably, the smaller rural banks exhibited higher NPL ratios of 3.34 percent and smaller city banks' NPL ratios were 1.75 percent at the end of 2023. In the stock market, concerns about developers have led to a roughly 30 percent decline in the real estate sector's stock prices since 2020 (Figure 2.1.5). Nevertheless, the Shanghai Composite Index exhibits a robust performance, buoyed by stock price increases in sectors other than real estate.

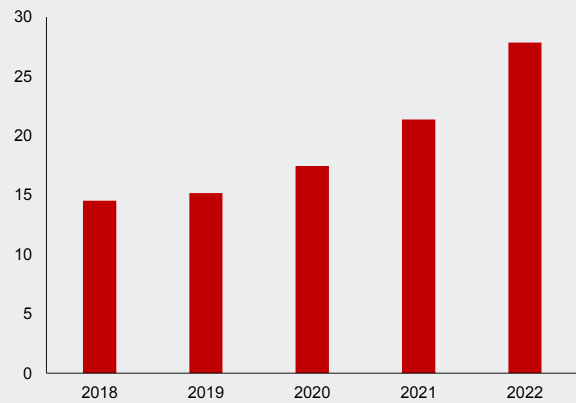
It is assessed that developer-related risk is unlikely to escalate significantly in the short term, although challenges remain. Authorities are implementing comprehensive measures encompassing both supply and demand initiatives to facilitate the recovery of the real estate market. Specifically, they are

**Figure 2.1.5. Shanghai Stock Market Index**  
(Index, 2020 = 100)



Source: Shanghai Stock Exchange; AMRO staff calculations.

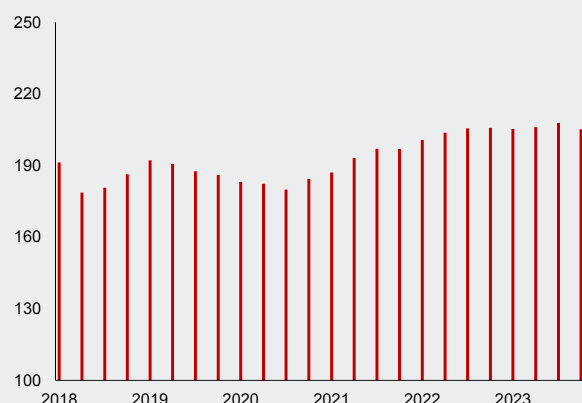
**Figure 2.1.4. Share of Debt at Risk for Property Sector**  
(Percent)



Source: Orbis of Moody's Analytics, AMRO staff calculations.  
Note: Debt at risk estimated based on share of developer debts that have ICR less than 1.25.

providing special loan support for the completion of pre-sold housing projects, and encouraging financial institutions to support viable construction projects. Also, authorities have introduced a scheme for state-owned enterprises to purchase unsold houses and convert them into public rental housing, to alleviate the oversupply problem in property market. These initiatives are expected to enhance the financial conditions of developers and aid in the recovery of the real estate market, thus containing the spillover of developer-related risks into other sectors or industries. Banks have built sufficient buffers to respond to possible asset deterioration with a provision coverage ratio of 205 percent at the end of 2023 (Figure 2.1.6). However, as the real estate market has yet to show significant recovery, the financial problems plaguing highly leveraged developers are unlikely to be resolved soon. Particularly, from Q3 2024 until the end of 2025, USD 49 billion worth of US dollar bonds of property developers will come due. Difficulties in refinancing these bonds might heighten insolvency risks for the more vulnerable firms. Authorities might need to continue providing support to highly leveraged developers until market stabilization is achieved. To prevent an excessive increase in financial leverage resulting from the ongoing supportive measures, these policies should be reviewed on a regular and timely basis.

**Figure 2.1.6. Provision Coverage Ratio for Commercial Banks**  
(Percent)



Source: China Banking Regulatory Commission

## Box 2.2:

## Korea: Vulnerabilities in Real Estate Project Financing and Implications for Financial Stability

In recent years, Korea's property market has faced significant challenges. The end of low interest rates and abundant liquidity, combined with stricter government regulations<sup>1</sup> aimed at reducing high household debt and preventing market overheating, has led to a decrease in property demand. Since the COVID-19 pandemic, housing prices and transaction volumes have sharply declined (Figure 2.2.1). Consequently, business conditions in the construction and real estate-related industries have worsened and their funding situations have deteriorated (Figure 2.2.2).

Amid the recent market downturn, real estate project financing (PF) has become a critical weak point for financial stability in Korea, linking the property and financial sectors. Real estate PF—characterized by high leverage, complex structures, and multiple stakeholders—becomes riskier as development projects become less profitable. This heightened vulnerability raises concerns about the soundness of financial institutions involved in real estate PF.

Historical instances of financial instability due to PF include the 2011 savings banks crisis and the 2022 credit market crunch following the default of the Legoland developer. In 2011, falling property markets amid real estate regulation tightening and the global financial crisis, led to the bankruptcy of over 30 savings banks heavily invested in real estate PF, which affected more than 100,000 consumers and subordinated bond investors. In 2022, the Legoland developer's default, coupled with the local government's refusal to honor a debt guarantee, eroded confidence in the corporate financing market, resulting in a credit crunch. In October of that year, corporate bond spreads reached their highest levels since the global financial crisis (Figure 2.2.3).

**Figure 2.2.1. Residential Property Price Index and Home Transactions**

(Index, 2010=100; number of transactions)



Source: Bank for International Settlements (BIS); Ministry of Land, Infrastructure and Transport, Korea via Haver Analytics.

The author of this box is Eunmi Park.

<sup>1</sup> The Korean government announced household debt management measures twice in 2021 (April and October), primarily focusing on tightening debt service ratio regulations.

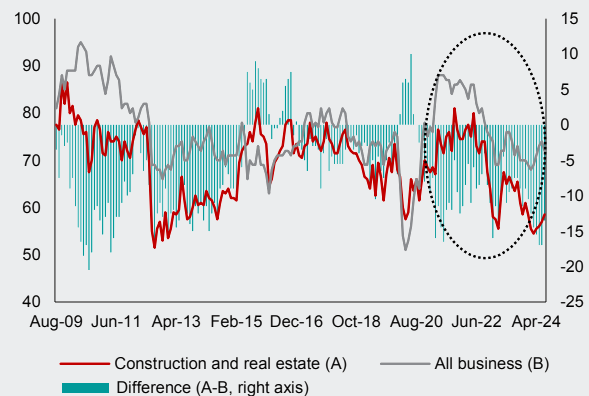
<sup>2</sup> Korea Institute of Finance. 2023. "Securities Firms' Contingent Liabilities Tied to Real Estate PF Loans." Financial Research Brief, 31 March.

PF loans continue to rise, particularly through nonbank financial institutions (NBFIs), although the overall growth rate slowed recently. Amid the property market downturn, the asset quality of financial institutions involved in PF has deteriorated (Figure 2.2.4). Delinquency rates for PF loans have surged, especially among NBFIs. Operating under less stringent regulations than banks, NBFIs often cater to lower-quality borrowers, who are more susceptible to delinquencies. By the end of 2023, the delinquency rate for banks' PF loans was 0.35 percent, whereas for securities companies it was 13.73 percent and 6.94 percent for savings banks, raising significant concerns.

There are vulnerabilities not only in the PF loan itself but also in PF loan securitization. Lending institutions often transfer their loan claims to a securitization special purpose corporation (SPC) to diversify risks and secure liquidity. Securities companies, acting on behalf of the SPC, issue securitized securities such as asset-backed commercial paper (ABCP) or asset-backed short-term bonds (ABSTB) using these loan claims as collateral. To attract demand for these, securities firms commonly provide guarantees, such as purchasing securities if refinancing fails or repaying PF loans if developers default (Figure 2.2.5). Since construction projects typically take two to five years, while securitized securities are short-term bonds maturing in less than one year, there is a refinancing risk. As of the end of 2022, the contingent liabilities from these guarantees amounted to KRW 20.9 trillion, or 37.1 percent of the average equity capital of securities companies (KIF 2023).<sup>2</sup> This risk is particularly acute for small and medium-sized securities firms with high exposure to risky securitized securities.

**Figure 2.2.2. Construction and Real Estate Business Conditions in Business Survey Index**

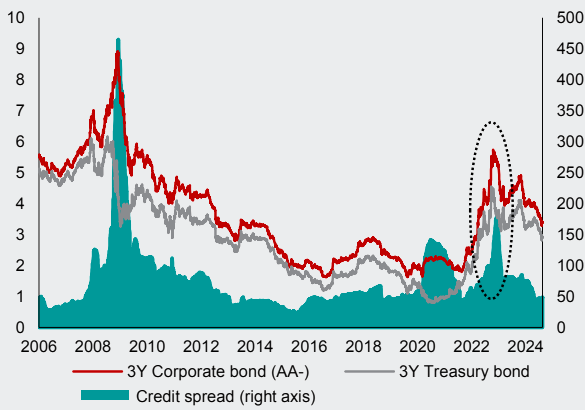
(Index)



Source: Bank of Korea; AMRO staff calculations

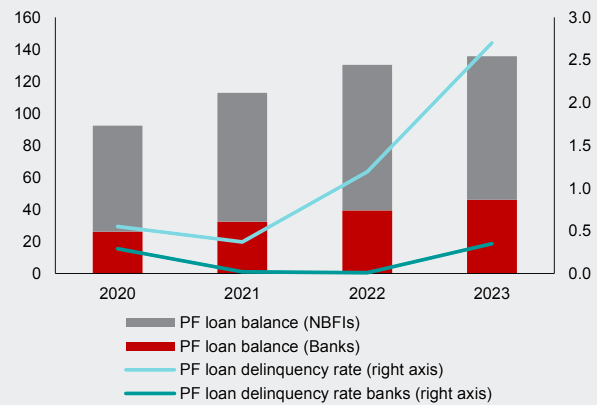


**Figure 2.2.3. Credit Spread Between 3-Year Treasury Bond Yield and 3-Year Corporate Bond Yield**  
(Basis point; percent)



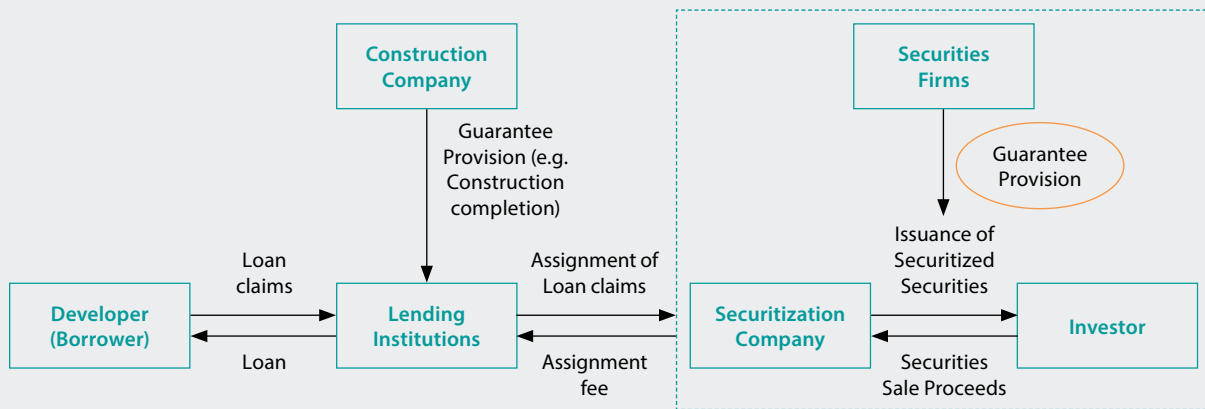
Source: Korea Financial Investment Association via CEIC; AMRO staff calculations. Note: Credit spread is calculated by subtracting 3-year Treasury bond yield from the 3-year corporate bond (AA-) yield.

**Figure 2.2.4. Project Financing Loan Balance and Delinquency Rate**  
(Trillions of Korean won; percent)



Source: Financial Services Commission, Korea; AMRO staff calculations. Note: NBFIs include securities firms, insurers, savings banks, specialized credit finance, and mutual finance. The delinquency rate is based on principal and interest delinquent for more than 1 month.

**Figure 2.2.5. Stylized Example of Real Estate Project Financing Securitization**



Source: Jang 2023; AMRO staff illustrations.

Since 2022, the Korean government has implemented measures to facilitate an orderly soft landing in the real estate PF market. Following the Legoland-triggered credit crunch, the government launched a market stabilization program worth more than KRW 50 trillion October 2022, which has since been increased to about KRW 94 trillion. This initiative stabilized financial markets, such as PF-ABCP and the bond market, and provided funding support to financially viable development projects while encouraging the restructuring and liquidation of projects that were not viable.

Korean government measures aimed at fostering an orderly soft landing of real estate PF include<sup>3</sup>:

- Improving evaluation standards to enable financial companies to strictly assess project feasibility by comprehensively considering risk factors specific to each project.
- Ensuring seamless support for projects with sufficient business feasibility through smooth funding from both public and private sectors.
- Encouraging systemic restructuring and liquidation of financially unviable projects, with funding and incentives provided.
- Continuously monitoring the provisioning status and encouraging capital expansion to manage soundness risks in financial institutions.

<sup>3</sup> Financial Services Commission, Korea. 2024. "FSC and FSS Announce Measures to Seek an Orderly Soft-landing in the Real Estate Project Finance Market." Press release, 13 May.

### Box 2.3:

## Vietnam: Challenges, Risks, and Policy Measures in the Real Estate Market

Vietnam's real estate sector is showing signs of recovery after significant challenges since late 2022. The sector experienced a decade of robust growth in 2013–2021 fueled by rapid urbanization and demographic expansion. However, it has faced significant challenges since the boom ended in late 2022 (Figure 2.3.1). Transactions decreased sharply in number and the absorption rate plummeted to about 33 percent in 2023, down from a 69 percent peak in 2019 (Figure 2.3.2). The market has also been polarized with an oversupply of high-end housing and an undersupply of social housing. However, transaction volumes and prices have increased in recent times. According to the Vietnam Association of Realtors, the number of transactions increased to 6,200 units in Q1 2024 from 2,700 units in Q1 2023. This nascent rebound hints at a modest stabilization as market conditions improve and policy measures start to take effect.

Several factors contributed to the downturn. First, legal issues related to licenses and land use have caused delays in real estate projects, leading to a decrease in supply. Alongside the misconduct of some property developers, the downturn has made homebuyers and investors lose confidence and adopt a wait-and-see attitude, leading to less demand. Second, tightening financial conditions since late 2022 have constrained developer financing. Third, an imbalance in the supply of housing, particularly oversupply in the high-end segment and undersupply in the affordable housing segment, has exacerbated the supply-demand mismatch. Fourth, external factors such as the tightening of monetary policy in the US, a slowdown in demand from major countries, and global supply disruptions have had indirect adverse impacts on Vietnam's macroeconomic performance. Amid weakening macroeconomic conditions, tighter household spending has decreased the demand for real estate.

These market conditions have increased default risks for property developers. Highly leveraged developers face significant refinancing stress, with many delaying bond payments. By October 2023, 69 companies, mostly property developers, had delayed bond repayments totaling VND 176.1 trillion, accounting for 17.8 percent of total corporate bonds outstanding (Thu Minh 2023).<sup>1</sup> Furthermore, most listed firms struggle with liquidity challenges and high debt-to-capital ratio (Figure 2.3.3), while their assets are tied up in illiquid unsold inventory, triggering an escalation of default risk.

Defaults in the real estate sector pose credit risks to the banking sector. The real estate sector relies heavily on bank lending, and about 20 percent of total loans in the banking system are allocated to the real estate sector. Credit to the real estate sector also showed an increasing trend during 2020–2022 (Figure 2.3.4). Although the current NPLs ratio is lower than during the 2008–2014 crisis, the ratio has increased since Q4 2022 (Figure 2.3.4). Furthermore, about 70 percent of collateral for bank loans is rooted in real estate assets, suggesting that a decrease in property values may further affect the quality of other loan portfolios (Van Son 2023).<sup>2</sup> According to the State Bank of Vietnam, 94 percent of outstanding real estate loans have terms spanning from 10 to 25 years (Nguyen Le 2022).<sup>3</sup> Loans with such extended repayment periods mean banks are exposed to these loans for a longer duration.

An intricate web of hidden cross-ownership across banks and real estate developers can magnify inherent credit risks. Major shareholders or senior executives in some real estate developers hold significant shares in commercial banks. Such entanglements raise concerns about potentially distorted lending practices that could be in breach of regulatory limits (An Phong 2022).<sup>4</sup> For instance, developers with influence in banks might exploit their positions to secure loans for their subsidiaries or affiliated businesses. In some cases, shell companies may be established in unrelated industries to facilitate bank loans for developers. The amended Law on Credit Institutions is expected to partly address the cross-ownership issue by tightening regulations on bank ownership.

The Vietnam government is supporting the real estate market by amending the legal framework and adopting a series of policy measures to support different market segments. Three amended laws, including the Law on Land, the Law on Real Estate Business, and the Law on Housing, are expected to address legal bottlenecks related to issues on land valuation and land acquisition. A notable policy initiative is the VND 120 trillion package aimed at developers and homebuyers of social housing, targeting 1 million social housing units by 2030. Efforts to implement this package underscore the government's commitment to addressing housing challenges. Furthermore, policy measures such as Resolution 33/NQ-CP/2023 and relevant circulars and decrees have been introduced to alleviate financial strains on developers and navigate legal complexities before the enactment of the new laws.

The authors of this box are Trung Thanh Vu and Eunmi Park.

This box is based on "Box C. Vietnam's Real Estate Puzzle: Facing Challenges" (2023 Annual Consultation Report for Vietnam, AMRO 2024).

<sup>1</sup> Thu Minh. 2023. "More than 176 Trillion VND Bond Repayment Delayed in Nine Months of 2023." *Vneconomy*, 5 October.

<sup>2</sup> Van Son. 2023. "Real Estate as a Collateral Assets at Banks." *Baotintuc*, 30 October.

<sup>3</sup> Nguyen Le. 2022. "94 percent of Loans on Real Estate are Medium and Long-term." *Baodautu*, 6 June.

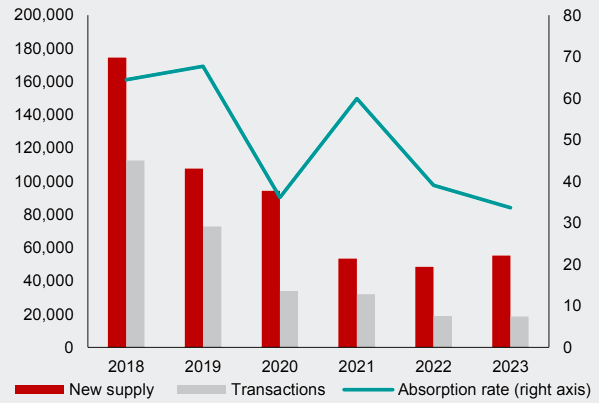
<sup>4</sup> An Phong. 2022. "Some Real Estate Business Circumvent the Law, Buy Shares, and Control Lending Activities of Commercial Banks." *Vneconomy*, 9 August.

**Figure 2.3.1. Equity Index of the Real Estate Sector (Index)**



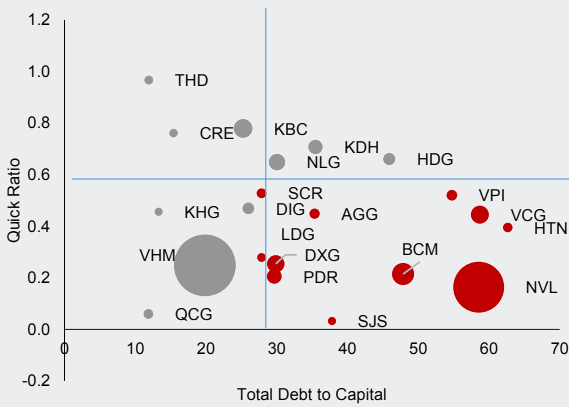
Source: Bloomberg Finance L.P.; AMRO staff calculations  
 Note: The index is calculated based on the equity price index of listed real estate developers. The index is rebased by 2009/02/01=100 and is a one-month moving average.

**Figure 2.3.2. New Supply and Transactions of Properties (Number of units; percent)**



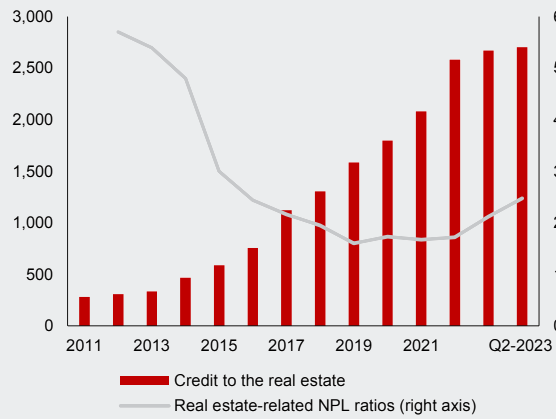
Source: Vietnam Association of Realtors.

**Figure 2.3.3. Real Estate Developers' Debt (Percent; percent)**



Source: Bloomberg Finance L.P.  
 Note: The quick ratio is an indicator of a company's short-term liquidity and measures a company's ability to meet its short-term obligations with its most liquid assets. The higher the ratio, the better the company's liquidity position. A quick ratio lower than 1 can mean that the company is relying heavily on inventory or other assets to pay its short-term liabilities. The bubble size represents the relative asset size of a developer to the total sample assets. The vertical and horizontal lines represent sample average. Data are as of Q1 2023. Red bubbles represent developers that have a quick ratio lower than the sample average and total debt to capital close to or higher than the sample average.

**Figure 2.3.4. Credit to Real Estate and Nonperforming Loans (Trillions of Vietnamese dong; percent)**



Source: State Bank of Vietnam.

## Annex 2.1. The Dynamic Relationship Between the Property Sector and Financial Stability<sup>14</sup>

This annex study examines the dynamic relationship between the property market and financial stability using panel VAR analysis. Recent property market downturns and developer difficulties have raised financial market concerns, while financial strains, such as credit crunches, can also impact the property market.

Key questions this study seeks to answer include:

- How do property market fluctuations and financial market stability interact?
- Does a property market shock increase financial market stress?
- How does financial market stress influence the property market?

### Data and methodology

Monthly panel data from May 2008 to August 2023 for five

ASEAN+3 economies (China, Hong Kong, Japan, Korea, Thailand) is used. The data includes:

- Financial Stress Index (FSI) – Sourced from the Asian Development Bank, measures the degree of financial stress covering four major sectors (e.g. banking, foreign exchange, equity, and debt market). A higher FSI indicates heightened financial stress.
- Real Estate Price Index (REI) – Sourced from national authorities via CEIC, reflecting property market conditions. A higher REI reflects favorable property market conditions.
- Purchasing Manager Index (PMI) – Sourced from S&P Global via Haver Analytics, a proxy for the real economy as a control variable. A higher PMI indicates positive economic conditions.

The equation is as follows:

$$FSI_{it} = \alpha_i + \beta_{1i} FSI_{it-1} + \beta_{2i} FSI_{it-2} + \beta_{3i} REI_{it-1} + \beta_{4i} REI_{it-2} + \beta_{5i} PMI_{it-1} + \beta_{6i} PMI_{it-2} + \varepsilon_{1it}$$

$$REI_{it} = \alpha_i + \beta_{7i} FSI_{it-1} + \beta_{8i} FSI_{it-2} + \beta_{9i} REI_{it-1} + \beta_{10i} REI_{it-2} + \beta_{11i} PMI_{it-1} + \beta_{12i} PMI_{it-2} + \varepsilon_{2it}$$

$$PMI_{it} = \alpha_i + \beta_{13i} FSI_{it-1} + \beta_{14i} FSI_{it-2} + \beta_{15i} REI_{it-1} + \beta_{16i} REI_{it-2} + \beta_{17i} PMI_{it-1} + \beta_{18i} PMI_{it-2} + \varepsilon_{3it}$$

Where

- $FSI_{it}$  = Financial stress index for country  $i$  at time  $t$ .<sup>15</sup>
- $REI_{it}$  = Change of house price index for country  $i$  at time  $t$ .
- $PMI_{it}$  = Change of purchasing manager's index for country  $i$  at time  $t$ .
- $FSI_{it-1}$ ,  $FSI_{it-2}$ ,  $REI_{it-1}$ ,  $REI_{it-2}$ ,  $PMI_{it-1}$ ,  $PMI_{it-2}$  = Lagged values of the respective variables for country  $i$  at time  $t-1$  and  $t-2$
- $\alpha_i$  = Dependent variable-specific panel fixed effects
- $\beta_{1i} \dots \beta_{18i}$  = Coefficients of the lagged variables for each country  $i$
- $\varepsilon_{1it}$ ,  $\varepsilon_{2it}$ ,  $\varepsilon_{3it}$  = Idiosyncratic error terms

Prior to conducting the panel VAR analysis, unit-root tests assessed the suitability of the time series data for analysis. In addition, a cointegration test evaluated the appropriateness of the VAR model compared to the vector error correction model (VECM). The results of these preliminary tests ensure the robustness and reliability of the subsequent panel VAR analysis.

### Main findings

The financial, property, and real markets are interconnected and influence each other. As expected, the FSI has a negative relationship with both the REI and the PMI. When REI and PMI increase due to favorable conditions, financial stress decreases, and vice versa (Figure 2.15, Table A2.1.1).

- FSI: Positively influenced by its own first-lagged value and negatively by its second-lagged value. Negatively impacted by REI's and PMI's both-term lags.
- REI: Negatively influenced by FSI's first lag and positively by its second lag, both significantly. Positively impacted by its own second-lagged value and PMI's first lag significantly.
- PMI: Negatively influenced by FSI's first lag and positively by its second lag, but not significantly affected by REI. Positively impacted by its own first-lagged value and negatively by its second-lagged value, with only the latter being significant.

<sup>14</sup> The author of this annex is Eunmi Park.

<sup>15</sup> Since the FSI already consists of first-difference elements such as changes in stock market returns compared to the previous period, the index itself is used rather than its changes.

Granger causality tests show that REI and PMI significantly Granger-cause FSI, meaning past values of REI and PMI

improve predictions of FSI's future values. Conversely, FSI also significantly Granger-causes REI and PMI (Table A2.1.2)

**Table A2.1.1. Panel VAR Results on FSI, REI, and PMI**

Dependent variable \ Independent variable	FSI	REI	PMI
FSI L1.	1.1042*** (0.07046)	-0.50742*** (0.13069)	-1.0758*** (0.31766)
FSI L2.	-0.17191*** (0.06197)	0.46952*** (0.15375)	1.3044*** (0.31554)
REI L1.	-0.00052 (0.00764)	0.01899 (0.03266)	-0.01916 (0.05576)
REI L2.	-0.02001** (0.00795)	-0.13307* (0.06805)	0.05619 (0.04272)
PMI L1.	-0.01729*** (0.00581)	0.03002** (0.01456)	0.05285 (0.07753)
PMI L2.	-0.00872 (0.00532)	0.00002 (0.02042)	-0.08382* (0.05074)

Source: AMRO staff estimates.

Note: Standard errors are reported in parentheses. Asterisks (\*, \*\*, \*\*\*) denote significance levels at 10 percent, 5 percent, and 1 percent, respectively.

**Table A2.1.2. Results of Granger Causality Test**

Equation variable	Excluded variable	Chi-squared	P-value(Prob>Ch2)
FSI	REI	6.565	0.038**
	PMI	12.761	0.002***
	ALL	17.757	0.001***
REI	FSI	15.897	0.000***
	PMI	4.255	0.119
	ALL	23.825	0.000***
PMI	FSI	19.431	0.000***
	REI	1.787	0.409
	ALL	19.706	0.001***

Source: AMRO staff estimates.

Note: H0 (Null hypothesis) — Excluded variable does not Granger-cause Equation variable. Asterisks (\*, \*\*, \*\*\*) denote significance levels at 10 percent, 5 percent, and 1 percent, respectively.

## Annex 2.2. Exploring the Drivers of Property Developers' NPL Ratio<sup>16</sup>

The objective of this analysis is to identify the drivers contributing to changes in the developer nonperforming loan (NPL) ratio within the ASEAN+3 region. Using regression analysis with panel data from six selected ASEAN+3 economies, the study finds developers' debt, interest rates, and housing prices are significant drivers of NPLs. For economies that have experienced dramatic NPL increases, unconventional factors such as failed debt-driven real estate models, overcapacity, and broader economic challenges like trade tensions also play a crucial role. The study highlights the importance of considering conventional and unconventional drivers to address the fluctuations in developers' NPL ratios.

### Data and methodology

Theoretical derivations, such as the association of increased developers' NPL ratio with declining repayment ability and escalating repayment burden, supported by economic theory (Vitek 2018; Debb and others 2022), help in the specification of the following regression equation. This equation encompasses both conventional and unconventional factors (ADB 2021; Moody's 2022; S&P Global Ratings 2022; IMF 2023a, 2023b; KPMG 2023; OECD 2023; World Bank 2023) that drive the developers' NPL ratio:

$$\begin{aligned} & \text{Developer NPL ratio}_{it} \\ &= \beta_1 * \text{Housing sales volume}_{it} + \beta_2 * \text{Housing price}_{it} + \beta_3 * \text{Construction and real estate development costs}_{it} + \\ & \beta_4 * \text{Developers' debt}_{it} + \beta_5 * \text{Interest rates}_{it} + [\beta_6 * \text{Expected business environment index}_{it} + \\ & \beta_7 * \text{Expected business performance index}_{it}] \text{ (incorporate only when conventional drivers lack explanatory power)} + \\ & \text{Economy fixed effects}_{it} + \text{Residual}_{it} \end{aligned}$$

The dataset comprises developer loan NPL time series data for China, Hong Kong, Indonesia, Korea, Singapore, and Thailand starting from 2001 to 2017 and up to 2023, sourced from Bloomberg, Refinitiv, Wind, and reports from commercial banks or authorities. Proxy data for five conventional and two unconventional drivers are obtained from national authorities or industry institutions via CEIC or Haver Analytics. The sample is segmented into three groups for comparative analysis: all selected regional economies, regional economies experiencing dramatic NPL increase (the NPL ratio has risen by more than 25 percent within one year), and regional economies not experiencing dramatic NPL increase.

### Regression and findings

The regression results in Table A2.2.1 reveal two key findings. First, the five conventional drivers analyzed are robust explanatory factors for regional economies that have

not experienced significant increases in NPLs, as indicated by higher R-squared values. In contrast, for economies that have experienced dramatic NPL increases, additional unconventional drivers, such as failures in debt-fueled real estate models and broader economic challenges, are likely more significant. Incorporating these unconventional drivers, such as the expected business environment and performance indices, significantly enhances the explanatory power for developers' NPL ratios in these economies. Second, developers' debt, interest rates, and housing prices are significant drivers of the NPL ratio in selected ASEAN+3 economies that have not experienced dramatic NPL increases, while housing sales volume and development costs are not significant.

However, housing sales volume shows weak significance in economies that have experienced drastic NPL changes, whereas the expected business environment index remains strongly significant.

<sup>16</sup> The author of this annex is Liyang (Alex) Tang.



**Table A2.2.1. Regression Results on Drivers of Developers' NPL Ratio in Selected ASEAN+3 Economies**

Variable \ Group	All selected regional economies	Regional economies not experiencing dramatic NPL increase	Regional economies experiencing dramatic NPL increase	Regional economies experiencing dramatic NPL increase
Housing sales	-0.354 (-0.550)	-1.279 (-0.604)	-2.149* (-0.751)	-1.976 (-0.589)
Housing price	-0.469 (-0.178)	-1.867* (-0.747)	-2.013 (-0.081)	-14.741 (-0.327)
Development costs	0.326 (0.187)	0.006 (0.008)	1.520 (0.141)	4.062 (0.376)
Developer debt	0.891* (0.760)	0.609* (1.068)	0.677 (0.097)	16.918 (0.570)
Interest rate	0.264 (0.606)	0.394** (2.028)	0.566 (0.138)	2.337 (0.497)
Expected business environment index				-9.938**** (-3.283)
Expected business performance index				-16.666 (-0.632)
Economy fixed effects	Yes	Yes	Yes	Yes
Observations	59	34	25	25
R-squared	0.67	0.96	0.20	0.72

Source: AMRO staff estimates.

Note: t-statistics are reported in parentheses. Asterisks (\* \*\* \*\*\* \*\*\*\*) denote significance levels at 50 percent, 10 percent, 5 percent, and 1 percent, respectively. The selected ASEAN+3 economies that have developer loan NPL data include China, Hong Kong (China), Indonesia, Korea, Singapore, and Thailand. Note that regional economies that have experienced dramatic NPL increases refer to those where developer loan nonperforming (NPL) ratio has increased by more than 25 percent within one year, either historically or currently. The development costs indicator ultimately adopts the ratio of the development cost price index to the housing price index. This ratio more accurately reflects whether the developers' profits have expanded or been squeezed, and whether their repayment ability has improved or deteriorated. This, in turn, can lead to a decrease or increase in developer NPL ratio.

## Annex 2.3. Assessing the Impact of Credit Risk within the Property Sector on Bank Asset Quality<sup>17</sup>

This simulation exercise estimates the impact of a property market downturn on banks' capital adequacy in six ASEAN+3 economies: China, Hong Kong, Indonesia, Korea, Thailand, and Singapore. These economies were selected based on the availability of industry-specific asset quality data.

Banks are assumed to have a procyclical bias in provisioning behavior: in a property market downturn and heightened credit risks, banks would anticipate future losses and increase provisions. The exercise assumes banks would raise their provisioning to maintain at least their historical average level of loan loss provision coverage ratio levels.

Drawing partially from the methodologies by Wezel and others (2014), this analysis evaluates ASEAN+3 banks' available capital buffers during a stressed environment through the following steps:

- Stress scenario application: A stress scenario is applied to the property-related sectors' nonperforming loans (NPLs), including all substandard, doubtful, and loss loans. Where data for these categories and corresponding provisions are
- Impact estimation on profits: The estimated impact from the increase in NPLs on banks' profits is calculated. This estimated impact is captured through two channels: the increase in provisioning and the reduction in interest income.
- Adjustment of profits: The change in profits is adjusted using the historical average profit retention rate to estimate the impact on retained earnings. Since retained earnings are a key component of banks' Tier 1 capital, changes in retained earnings directly affect banks' regulatory capital amounts.
- Estimation of new CAR: The adjusted capital is divided by the estimated post-stress risk-weighted assets (RWA) to estimate the new capital adequacy ratio (CAR).

unavailable, data on NPLs and corresponding provisioning amounts are used. Three scenarios—mild, moderate, and severe—are assumed, with one, two, and three standard deviation increases in NPLs or all substandard, doubtful, and loss loans.

$$CAR_{\text{post stress}} = \frac{CAR_{\text{pre stress}} + (\Delta \text{Profit}_{\text{post stress}} * \text{Profit retention rate})}{RWA_{\text{post stress}}}$$

where

$$\text{Profit}_{\text{post stress}} = \text{Net revenue} - \Delta \text{Provisioning}_{\text{post stress}} - \Delta \text{Interest income}_{\text{post stress}}$$

$$\Delta \text{Interest income} = \text{Implicit interest rate} * \Delta \Sigma(\text{Substandard, doubtful and loss loans})$$

$$\text{Implicit interest rate} = \left( \frac{\text{Interest revenue}}{\text{Loan balance}} \right)$$

<sup>17</sup> The author of this annex is Benyaporn Chantana.

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