AMRO
ASEAN +3 MACROECONOMIC RESEARCH OFFICE

Analytical Note

China Economic Insights

Understanding the Real Estate Market Cycles in China[1]

September 18, 2024

" The fear of business cycles which rules economic thinking is a fear of severe depressions."

- Arthur F. Burns
New Facts on Business Cycles, 1969

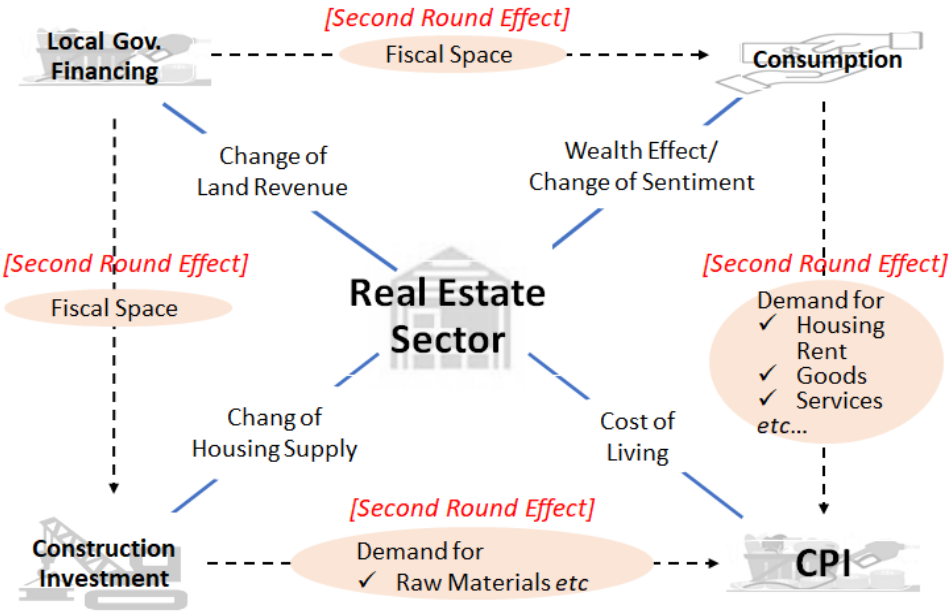
I. Introduction

1. **Understanding the real estate market within the framework of cycle analysis is crucial for economic assessments and projections in China due to its significance in the economy.** The real estate market in China exerts a considerable influence on inflation, investment, local government financing, and consumer spending through both direct and indirect channels (Figure 1). Indeed, according to AMRO (2024), the real estate sector not only constitutes a substantial portion of household assets in China but also accounts for a significant share of the GDP (approximately 13 percent of the nominal GDP in 2023[2]). A prolonged downturn in the real estate sector is likely to have negative spillovers on economic activities such as consumption and investment, through mechanisms like adverse wealth effects and deflationary spirals. Thus, analyzing whether the current state of the real estate market is a temporary adjustment or part of a more prolonged downturn is essential. Above all, understanding the real estate market within the context of its cycle is crucial for making rational predictions about future its trajectory, highlighting the importance of cycle analysis.

[1] Prepared by Jungsung Kim (Jungsung.kim@amro-asia.org) from Country Surveillance Group, and cleared by Jaeyoung Lee, Group Head, Country Surveillance; authorized by Hoe Ee Khor, Chief Economist. The views expressed in this note are the author' and do not necessarily represent those of the AMRO or AMRO management. Unless otherwise indicated, the analysis is based on information available up to July 2024.

[2] Furthermore, when industries indirectly related to the real estate sector are included, this share surpasses 25 percent.

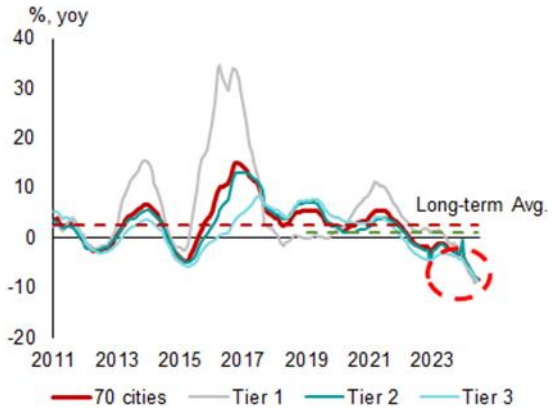
Figure 1. Structure of Real Estate Sector's linkage with Other Segments of Economy



Sources: AMRO staff illustrations.

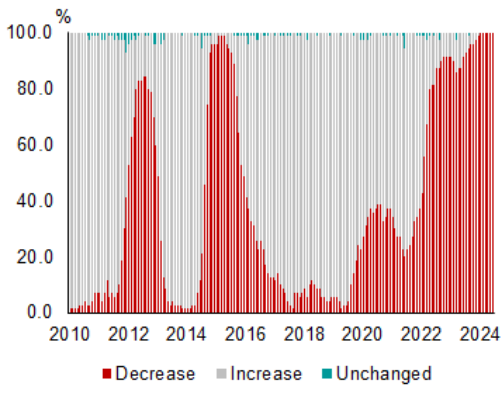
2. **Concerns are growing over China's prolonged real estate downturn, with prices in 70 cities declining since May 2022, raising fears of economic stagnation.** Despite successive stabilization measures by Chinese authorities, real estate prices in 70 cities have continued to decline since May 2022. Recent price adjustments seem excessive, as the current price changes fall below both the long-term and the recent 5-year average (Figure 2). Furthermore, it has been observed that since January 2024, real estate prices in all 70 cities surveyed have declined compared to the same month in the previous year (Figure 3). Accordingly, there are rising concerns that if the downturn in the Chinese real estate market persists, the Chinese economy could enter a prolonged stagnation similar to Japan's "lost decades[3]."

Figure 2. Residential Real Estate Price



Sources: National Bureau of Statistics of China via Haver Analytics, AMRO staff calculations.
Note: 1) Resale price basis. 2) The latest data is as of June 2024.3) Green dotted line represents recent 5-year average.

Figure 3. Share of Cities for Existing Residential Real Estate by Price Changes from a Year Ago



Sources: National Bureau of Statistics of China via Haver Analytics.
Note: 1) Resale price basis. 2) The latest data is as of June 2024.

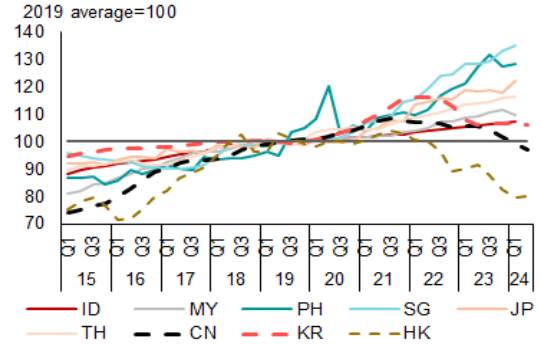
[3] The Japan research institution raised related concern in September 2023 ("The Japanization of Chinese Economy and Fears of Prolonged Stagnation", Minoru Nogimori)

3. **This paper examines the current Chinese real estate cycle and future trends, comparing with ASEAN+3 and major economies, and concludes with policy considerations.** A critical question is where the Chinese real estate sector currently stands in the cycle and how it is likely to evolve moving forward. For this purpose, this analytical note aims to study the current state of China's property market by analyzing real estate market cycles. Section II provides a comparison between the recent trends in Chinese real estate prices and those in ASEAN+3 as well as major developed economies. Section III estimates the real estate cycles in China, and the extent of price adjustments is compared with past crisis periods in Korea and Japan using the cycle severity index. Section IV analyzes the relationship between the real estate cycle and other economic cycles, and section V forecasts the future path of the real estate sector. Section VI concludes with some policy considerations.

II. Comparison of Recent Real Estate Price Development

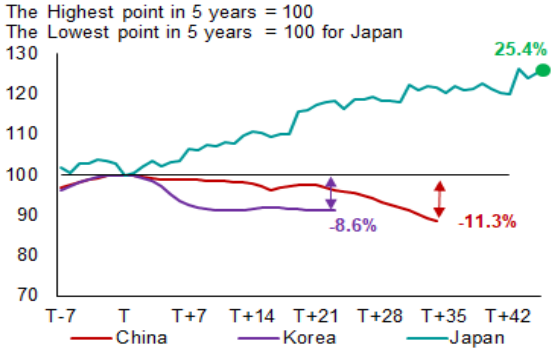
4. **As of June 2024, China has seen an 11.3 percent decline in real estate prices from the previous peak, contrasting with steady prices in major developed economies like the U.S. and Canada.**[4] Among the selective ASEAN+3 economies, China, Korea, and Hong Kong[5] have recently experienced a decline in real estate prices (Figure 4). In Korea, sluggish economic growth and high interest rates are affecting real estate prices (Daeyoung Kim et al., 2022). A comparison of the declines in China and Korea shows that, as of June 2024, prices have decreased by 11.3 percent in China and 8.6 percent in Korea from their peaks in 2021 and 2022, respectively. In contrast, housing prices in Japan, which had been in a prolonged slump, have risen more than 20 percent from their nadir in the last five years as of March 2023 (Figure 5). In major developed countries, including the U.S. and Canada, real estate prices have continued to rise steadily despite tighter monetary policies (Figure 6). In the U.S., a reduction in existing home listings and a shortage of new housing supplies were identified as the primary drivers of rising housing prices[6] (Jim and Mark, 2021). In Canada, similar issues with housing supply shortages, alongside increased housing demand due to rising immigration (Figure 7), are supporting housing prices (Pasalis, 2023).

Figure 4. Housing Price among Selective ASEAN+3 Economies



Source: National authorities via Haver Analytics.
Note: 1) ID = Indonesia, MY = Malaysia, PH = the Philippines, SG = Singapore, JP = Japan, TH = Thailand, CN = China, KR = Korea, HK = Hong Kong. Some of ASEAN countries do not have national wide housing price data provided by authorities.

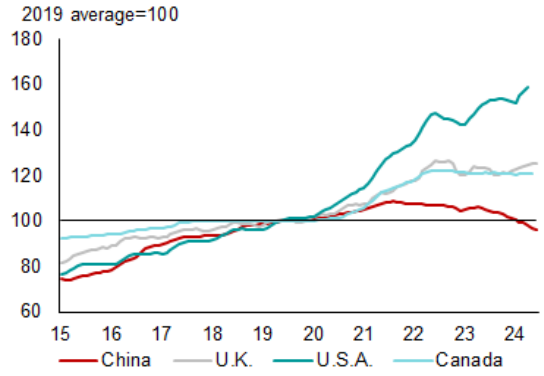
Figure 5. Degree of Price Change of ASEAN-3 Economies



Source: National authorities via Haver Analytics, AMRO staff calculations.
Note: 1) T = the highest point in 5 years both for China and Korea.

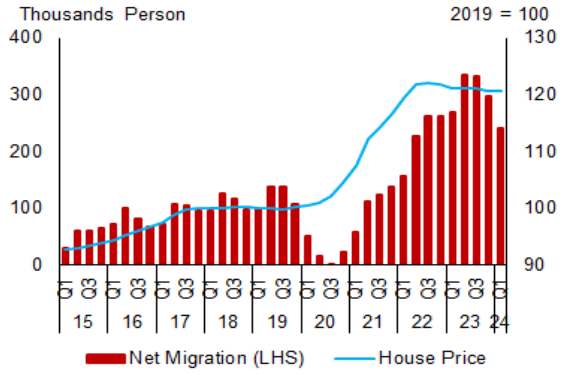
[4] Unless specified otherwise, the term "real estate prices" or “house price” herein refers to the prices of existing residential property prices based on the average of 70 cities in China.
[5] Hong Kong, China will be referred to as Hong Kong in the text.
[6] A significant factor in the shortage of available properties is that individuals who purchased homes at lower interest rates before they rose are not re-listing their homes. If homeowners wish to sell their existing homes and purchase new ones, they must secure new mortgage loans, which would increase their interest burdens.

Figure 6. Housing Price among Selective Advanced Economies



Sources: National authorities via Haver Analytics, AMRO staff calculations.

Figure 7. Net Migration in Canada



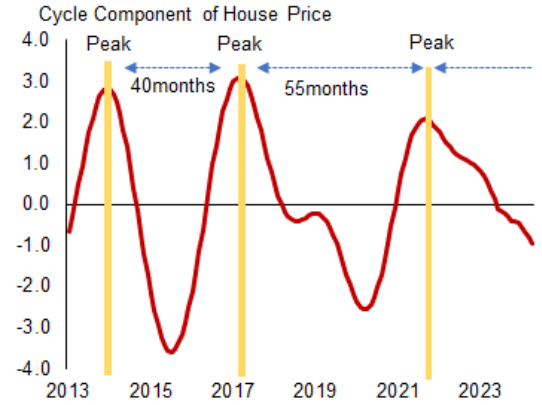
Sources: Statistics Canada, AMRO staff calculations.

III. Real Estate Cycle

5. **Analysis of the real estate price cycle in China suggests that the Chinese real estate market has entered a recession phase.** This analytical note employs the CF filtering method proposed by Christiano and Fitzgerald (2003), which is widely used in asset price cycle analysis, including commodities, for real estate cycle analysis.[7] The dataset consists of the year-over-year change rates of existing residential real estate prices in 70 Chinese cities from 2011 to the present. Findings reveal that, since 2013, the Chinese real estate market has undergone two distinct cycles, with a nascent cycle initiated in 2021 (Figure 8). The first cycle featured a dual-phase span of 20 months each for recession and expansion, whereas the second cycle exhibited a 36-month recession followed by an 18-month expansion. The ongoing recession phase, which began in the second half of 2021 has persisted for 33 months as of June 2024. The cyclical movements are predominantly influenced by government policies and economic fluctuations (Table 1). For example, the downturn spanning from 2017 to 2020 was primarily driven by regulatory restrictions on purchases and borrowing (Qu Yuanyuan and Aza Azlina Md Kassim, 2018). The current downturn is propelled by an accumulated oversupply, worsening sentiment in the real estate market due to concerns about developers' insolvency, the stricter credit policies implemented in August 2020 as well as COVID related lockdowns.

[7] CF filtering offers an advantage over the HP filter by improving the issue of excessive endpoint estimation and allowing researchers to flexibly set the frequency based on a priori beliefs (Christiano-Fitzgerald, 2003). The use of CF filtering in estimating real estate cycles is increasingly being adopted in various countries, including Korea. Related research includes a recent study by Kwon and Choi (2019), who utilized CF filtering to estimate the overall real estate cycle in Korea as well as regional cycles within the country.

Figure 8. Real Estate Price Cycle in China



Sources: AMRO staff estimations.

Table 1. The Duration of Each Cycle and Drivers

Phase	Duration (Main Drivers)
2013-2015 Downcycle	20 months (Borrowing Restrictions)
2015-2017 Upcycle	20 months (Speculative Investments)
2017-2020 Downcycle	36 months (Borrowing Restrictions, Covid)
2020-2021 Upcycle	18 months (Easing Monetary Policy)
2021-2024 Downcycle	33 months (Oversupply, Worsened Sentiment *etc.*)

Sources: AMRO staff summarizes.

6. **China's recent property market adjustments are less severe than those experienced by Korea and Japan during past crises.** The Severity Index is utilized to quantify the extent of price adjustments in the real estate market, calculated from the area of a triangle formed by the amplitude and duration of the real estate price cycle. A higher absolute value of the index indicates greater fluctuations in prices. For the recent downturn in China, the Severity Index is calculated as 58 (Figure 9). To facilitate comparisons with past cycles in Korea and Japan, the Severity Index for these nations is estimated using CF filtering. The results show that during the 1997 Asian Financial Crisis (AFC), the Severity Index for Korea stood at 108.9, significantly higher than recent figures in China (Figure 10). Additionally, Japan's index value during the 'Lost Decades' is estimated at 237.8, indicating an extremely high level of severity (Figure 11). In light of this, despite the continuous decline in real estate prices in China, it is difficult to conclude that the situation in the real estate market is as severe as major crises experienced in other countries.

Figure 9. Severity Index in recent China

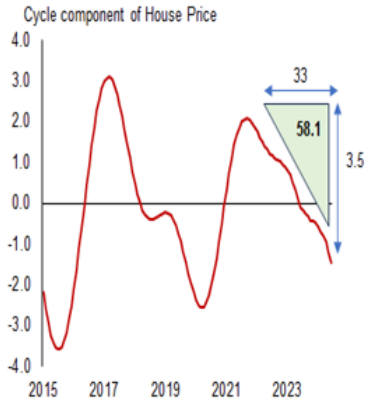


Figure 10. Severity Index during AFC in Korea

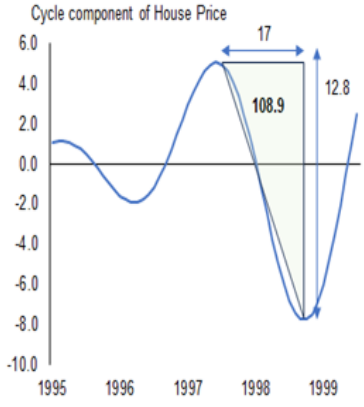
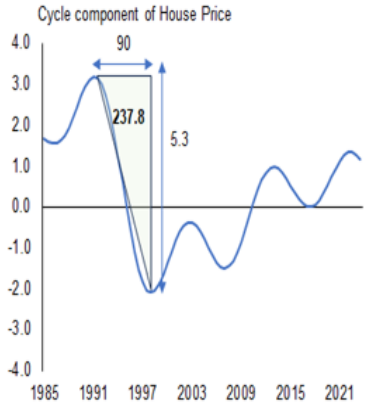


Figure 11. Severity Index past in Japan

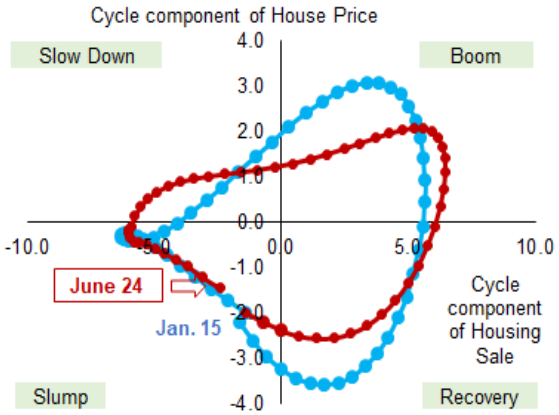


Source: AMRO staff estimations.
Note: 1) Cycle estimated using CF Filtering

7. **Using data on real estate prices and sales volumes to estimate the cyclical phases of China's real estate market, the analysis indicates that the market is currently in a recession phase.** According to Janssen et al. (1994), the real estate market cycles through recovery, boom, slowdown, and recession in a counterclockwise direction, influenced

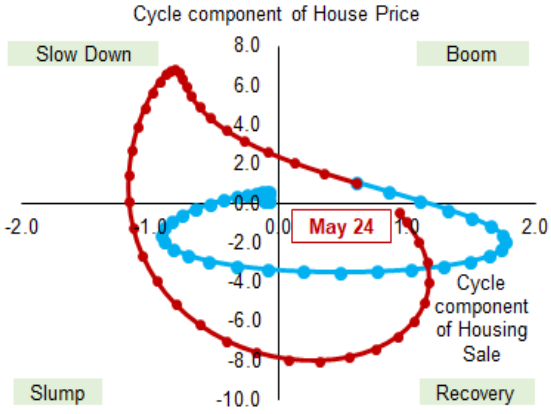
by changes in prices and sales volumes. During a boom, both sales and prices rise, while in a slowdown, sales decrease but prices remain robust. In a recession, both prices and sales decline, and during recovery, while prices continue to fall, sales increase. Applying the CF filter to both real estate prices and sales volumes and plotting them on the XY plane allows for an intuitive visualization of the market's current position in the cycle. To estimate the combined cycle of real estate prices and sales, data on these variables from 2011 to the present have been utilized. The estimation reveals that the Chinese real estate market has undergone three cycles. The second and third of these cycles started in 2015 and 2020, respectively (Figure 12). Recently, the Chinese real estate market has transitioned from recovery, through boom and slowdown phases, into recession. This contrasts with the situation in Korea, another ASEAN+3 country experiencing a downturn in real estate prices. In Korea, the market has also exhibited two cycles since 2015, with the second cycle beginning in the second half of 2020 (Figure 13). As of May 2024, while the Korean real estate market's prices are in a recession, its sales volumes have recovered, indicating that, unlike China, it has entered a recovery phase.

Figure 12. Real Estate Cycle combined with Sales in China



Source: AMRO staff estimations.
Note: 1) Cycle estimated using CF Filtering

Figure 13. Real Estate Cycle combined with Sales in Korea



Source: AMRO staff estimations.
Note: 1) Cycle estimated using CF Filtering

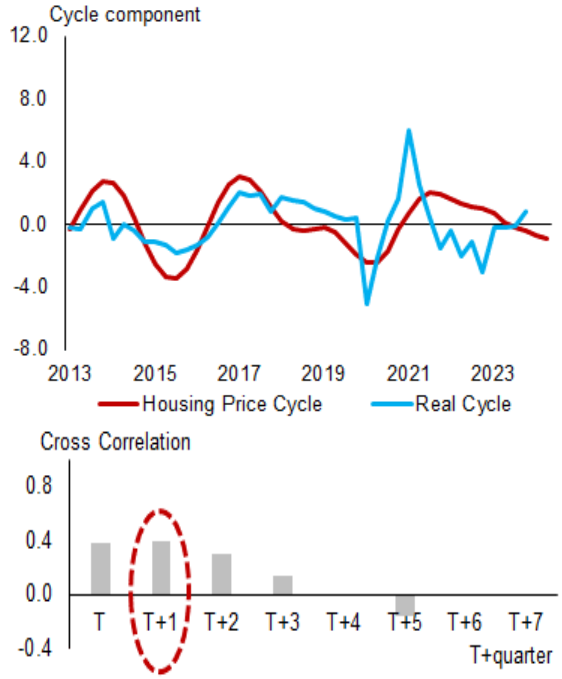
IV. The Relationship between Real Estate Price Cycle and Other Cycles

8. **The price cycle of real estate in China tends to synchronize with the real business cycle.** The real business cycle is extracted through principal component analysis of data covering the period from the first quarter of 2013 to the fourth quarter of 2023. In this paper, 10 data series, including industrial production, imports, exports, and consumption are utilized to estimate the real business cycle of China.[8] Comparing China's real business cycle with the real estate cycle reveals a distinct trend of synchronization between the two cycles (Figure 14). Calculating the cross-correlation coefficients between the two cycles, it is noted that the real business cycle either leads the real estate cycle by one quarter or synchronizes with the real estate cycle. Notably, although both cycles exhibited a slowdown post-2021, the real business cycle showed signs of recovery from the second quarter of 2023.

[8] All series are detrended year-over-year growth rates, measured in normalized values (mean zero, unit standard deviation) as suggested by John Fernald, Neil Gerstein, and Mark Spiegel (2019)

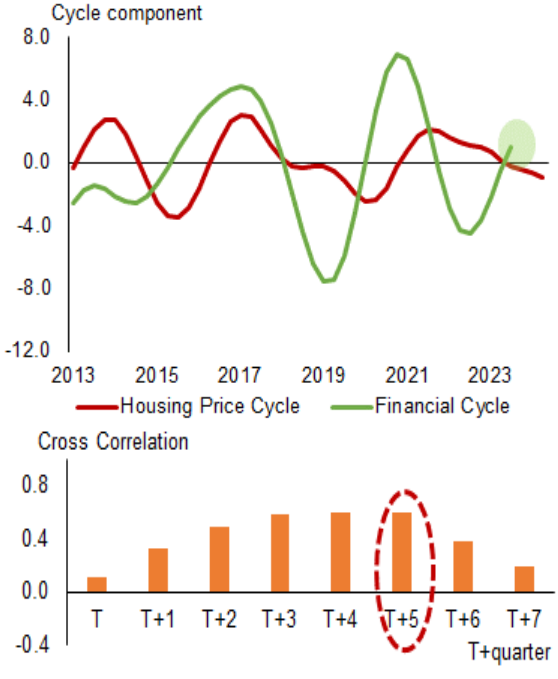
9. **The financial cycle in China, which precedes the real estate price cycle, has recently shown signs of a turnaround.** This financial cycle was estimated utilizing the CF filter, similar to the method used for analysing the real estate price cycle and used private credit relative to GDP data provided by the Bank for International Settlements (BIS). The period for estimation spans 75 quarters, from the first quarter of 2005 to the third quarter of 2023. Private credit encompasses financing provided by financial institutions to non-financial corporations and households, recognized as a key indicator for assessing the overall leverage level in the economy. The estimated financial cycle in China exhibited a downturn post-2021, reached a trough in the second half of 2022, and recovered, entering an expansion phase by the third quarter of 2023 (Figure 15). Comparing the financial cycle with the Chinese real estate price cycle, it is observed that, like in the 2019 case, the trough in the real estate price cycle follows the financial cycle's low point, suggesting the financial cycle's lead over the real estate cycle. Calculating the cross-correlation coefficients between the two cycles reveals that the financial cycle precedes the real estate price cycle by five quarters, substantiating the leading role of the financial cycle. Due to this precedence, recent studies, such as those by Lin Zilin (2023), have analysed the potential of the financial cycle to serve as an early warning indicator for the real estate cycle.

Figure 14. Real Estate Cycle and Real Business Cycle in China



Source: AMRO staff estimations.
Note: 1) Real Business Cycle estimated using principal components analysis.

Figure 15. Real Estate Cycle and Financial Cycle in China



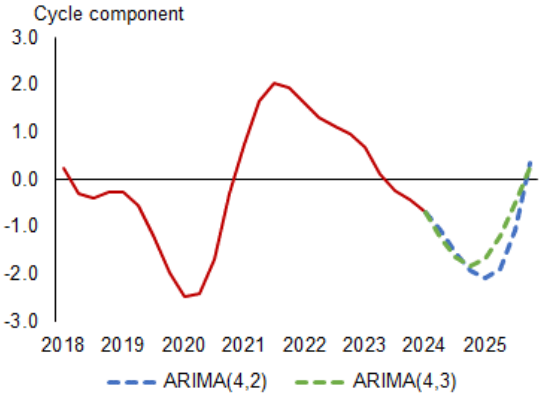
Source: AMRO staff estimations.
Note: 1) Financial Cycle estimated using CF Filtering.

V. Real Estate Cycle Forecasting

10. **This cycle analysis predicts a recovery of real estate prices next year, potentially signalling a turnaround in the market dynamics following recent declines**. For forecasting the cycle over the next two years, the widely used ARIMA (Autoregressive

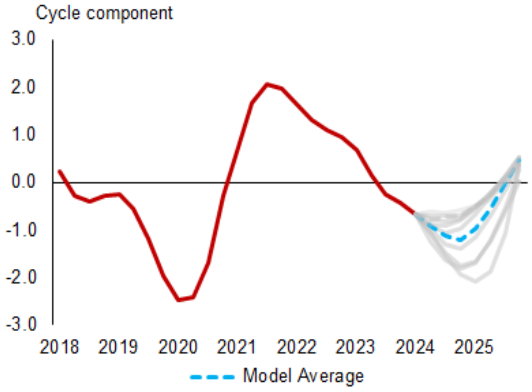
Integrated Moving Average, Appendix) model is applied. The model selection involved specifying the order of AR and MA up to a maximum of 4, and the two models with the highest fit based on the Akaike Information Criterion (AIC) are employed for the forecasts. The ARIMA (4,2) model exhibits the best fit and ARIMA (4,3) shows the second-best fit among 20 candidate models, suggesting that the real estate cycle is expected to recover from the first half of next year (Figure 16). Moreover, the result of averaging the forecasts of all 20 candidate models also showed that the real estate price cycle will recover next year (Figure 17).

Figure 16. Model based Real Estate Cycle Forecasting



Source: AMRO staff estimations.
Note: 1) Dotted lines represent forecast.

Figure 17. Model averaged Forecast for Real Estate Cycle



Source: AMRO staff estimations.
Note: 1) Dotted lines represent forecast.

VI. Conclusion

11. **The Chinese real estate market is currently in a recession phase.** Unlike most ASEAN+3 countries, property prices in China continue to decline. A cycle analysis of the Chinese real estate market, utilizing price and sales data, indicates that the market is in a state of recession**.** Although the recent declines in Chinese real estate prices are distinct from other countries, its severity is not considered serious. Based on the Severity Index, the adjustment in China's real estate market is much less significant compared to the crises experienced in Japan or Korea. The financial cycle, which precedes the real estate cycle, is analysed as having entered an expansion phase in the latter half of last year. Time series analyses also suggest that the real estate market could recover next year.

12. **That said, the likelihood of China's real estate market entering a prolonged downturn appears low.** It should be emphasized that the cycle analysis presented in this analytical note provides only an implication of the potential evolution of real estate prices in the future. The pace at which the recent downturn is reversed would depend on the intensity of policy responses and changes in public sentiment towards the real estate market. Chinese authorities have recently lowered interest rates and down payments for real estate purchases. In addition, they have enhanced liquidity support for profitable real estate projects and begun addressing oversupply problem to stabilize market sentiment. It is expected that these comprehensive policy responses would take effect, leading to a potential recovery in the real estate market by early next year, as indicated by the cycle analysis.

13. **Chinese authorities must remain vigilant as the real estate market is still in a recessionary phase.** If this downturn in China's real estate market becomes protracted, it could intensify deflationary perceptions among the populace, which in turn could delay the market's recovery through self-fulfilling expectations. Therefore, Chinese authorities should assess the effectiveness of the recent series of measures implemented to stabilize the real estate market and, if necessary, introduce additional actions. Purchasing existing housing stock to convert into public housing could be a short-term policy option to address the issue of excess inventory and developers' liquidity constraints. In this respect, the policy announced by the Chinese authorities last May to have socially owned enterprises purchase unsold housing and convert them into public rental housing can be considered a positive step forward.

Appendix. Procedure to Forecast using ARIMA Model

Following Box and Jenkins (1976), the series y_t follows ARIMA (p, d, q) model if:

$$D(\boldsymbol{y_t}, \boldsymbol{d}) = \boldsymbol{\beta x_t} + \boldsymbol{v_t}$$

$$\boldsymbol{v_t} = \boldsymbol{p_1 v_{t-1}} + \boldsymbol{p_2 v_{t-2}} + \cdots + \boldsymbol{p_p v_{t-p}} + \boldsymbol{\theta_1 e_{t-1}} + \boldsymbol{\theta_2 e_{t-2}} + \cdots + \boldsymbol{\theta_q e_{t-q}}$$

The ARIMA model prioritizes determining the order and the form of variable transformation to achieve stationarity by differentiating the variables. Therefore, the following procedure is undertaken to estimate the ARIMA model:

1. Selecting any transformations or the level of differencing of the dependent variable.
2. Parameters are estimated.
3. Forecasting

In the first stage, various orders of p and q are compared to determine which values best fit the model. This note employs the Akaike Information Criterion (AIC) as the standard for evaluation. Additionally, it should be noted that the Bayesian Information Criterion (BIC) or the Hannan-Quinn criterion (HQ) can also be utilized as supplementary measures. In this note, the orders of AR and MA are assigned up to a maximum of 4, after which the top 20 models fitting the Akaike Information Criterion (AIC) standard are extracted.

In the second stage, the values of the parameters are estimated using methods such as maximum likelihood estimation or least squares estimation. This note applies the maximum likelihood estimation method.

Use the fitted model to make forecasts. The ARIMA model can generate forecasts for the specified number of future periods, and these forecasts can be plotted to visualize performance. The model's efficacy is evaluated by comparing these forecasts against actual values in the test dataset, using metrics such as the Mean Absolute Error (MAE) or Root Mean Squared Error (RMSE). This note forecasts real estate price cycle up to eight quarters from the second quarter of 2024, utilizing twenty ARIMA models.

For simplicity, consider forecasting a stationary and invertible ARMA(p,q) process:

$$(1 - \boldsymbol{\phi_1 L} - \boldsymbol{\phi_1 L^2} - \cdots - \boldsymbol{\phi_p L^p})(\boldsymbol{y_t} - \mu) = (1 + \boldsymbol{\theta_1 L} + \boldsymbol{\theta_2 L^2} + \cdots + \boldsymbol{\theta_q L^q})\, \boldsymbol{e_t}$$

Then,

$$(\widehat{Y_{t+1|t}} - \boldsymbol{\mu}) = \boldsymbol{\phi_1}(\boldsymbol{Y_1} - \boldsymbol{\mu}) + \boldsymbol{\phi_2}(\boldsymbol{y_{t-1}} - \mu) + \cdots + \boldsymbol{\phi_p}(\boldsymbol{y_{t-p+1}} - \mu) + \boldsymbol{\theta_1}\widehat{\boldsymbol{e_t}} + \boldsymbol{\theta_2}\widehat{\boldsymbol{e_{t-1}}} + \cdots$$

The s period ahead forecasts would be

$$(\widehat{Y_{t+s|t}} - \boldsymbol{\mu}) = \boldsymbol{\phi_1}(\widehat{\boldsymbol{Y}}_{\boldsymbol{t+s-1|t}} - \boldsymbol{\mu}) + \boldsymbol{\phi_2}(\widehat{\boldsymbol{Y}}_{\boldsymbol{t+s-2|t}} - \boldsymbol{\mu}) + \cdots + \boldsymbol{\phi_p}(\widehat{\boldsymbol{Y}}_{\boldsymbol{t+s-p|t}} - \boldsymbol{\mu}) + \boldsymbol{\theta_s}\hat{\boldsymbol{e}}_{\boldsymbol{t}} + \boldsymbol{\theta_{s+1}}\hat{\boldsymbol{e}}_{\boldsymbol{t-1}} + \cdots + \boldsymbol{\theta_q}\hat{\boldsymbol{e}}_{\boldsymbol{t+s-q}}$$

For s = 1, 2, 3, ……., q

References

Daeyoung Kim, Chanu Kim, Heakyung Lee, Jungheak Lee, Kyunghoon Par, and Jongwong Lee. 2022. “Evaluation for Real Estate Market Risk.” BOK issue note 2022-29. https://www.bok.or.kr/portal/bbs/P0002353/view.do?nttId=10072075&searchCnd=1&searchKwd=&depth2=201156&depth3=200433&date=&sdate=&edate=&sort=1&pageUnit=10&depth=200433&pageIndex=8&programType=newsData&menuNo=200433&oldMenuNo=200433

James H. Stock and Mark W. Watson. 2003. “Forecasting Output and Inflation: The Role of Asset Prices.” Journal of Economic Literature, 41 (3): 788-829. https://www.jstor.org/stable/3217532

Janssen, Jos, Bert Kruiit, and Barrie Needham. 1994. “The Honeycomb Cycle in Real Estate.” The Journal of Real Estate Research, Vol. 9 No. 2, pp. 237-251. https://www.jstor.org/stable/44095493

Jim Parrott and Mark Zandi. 2021. “Overcoming the Nation’s Daunting Housing Supply Shortage.” Moody’s Analytics.

John Pasalis. 2023. “Canada’s Immigration Policies are Driving up Housing Costs.” The Hub. https://thehub.ca/2023/02/03/john-pasalis-canadas-immigration-policies-are-driving-up-housing-costs/

John Fernald, Neil Gerstein, and Mark Spiegel. 2019. “How Severe Is China’s Slowdown? Evidence from China CAT.” FRBSF Economic Letter 2019-26. https://www.frbsf.org/research-and-insights/publications/economic-letter/2019/10/how-severe-china-slowdown-evidence-china-cat/

Lawrence J. Christiano and Terry J. Fitzgerald. 2003. “The Band Pass Filter.” International Economic Review Vol. 44. https://onlinelibrary.wiley.com/doi/abs/10.1111/1468-2354.t01-1-00076

Lin Zilin. 2023. “Comparative study on the influence of business cycle and financial cycle on real estate price in China.” Financial Engineering and Risk management Vol. 6: 123-133. https://clausiuspress.com/article/8107.html

Minoru Nogimori. 2023. “The "Japanization" of Chinese Economy and Fears of Prolonged Stagnation.” JRI Research Journal; Vol. 6 No. 8. https://www.jri.co.jp/en/reports/jrirj/2023/nogimori/09/

Qu Yuanyuan and Aza Azlina Md Kassim. 2023. “The Effect of Economic Policy Uncertainty on Housing Price of China before and after Covid 19: A Literature Review.” International Journal of Multidisciplinary Research and Publications, Vol. 6, Issue 2, pp. 106-110.

Soonshin Kwon and Seongho Choi. 2019, “Relations among Regional Housing Price Business Cycles” Journal of Real Estate Analysis, Vol.5, No.2, pp. 1-15. https://www.ejrea.org/archive/view_article?pid=jrea-5-2-1