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CF40 Policy Brief

Long Tail 2: A Cross-Country Observation of Real Estate Markets After the Bursting of the Real Estate Bubble

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Abstract: We conducted a comprehensive analysis of global data on actual housing prices, real estate investment, the number of newly started housing projects, and housing sales before and after 22 instances of real estate bubble bursts since 1970 to observe the changes in real estate markets following the bursting of real estate bubbles. The data revealed a long-tail feature: First, real estate markets take a considerable amount of time to recover after a crisis. On average, key indicators begin to rebound only after about 7 years, and within the following 10 years, they do not return to pre-crisis levels. Second, the impact of real estate crises on markets is profound. After the crisis, the maximum declines in housing prices, real estate investment, housing sales, and the number of newly started housing projects are 30%, 25%, 35%, and 60%, respectively. The real estate market, driven primarily by demand after the crisis, does not experience a price rebound despite decreases in sales and new construction. Third, Japan's real estate crisis is not representative and differs significantly from other real estate crises. Following the 1990 real estate crisis in Japan, the decline in various indicators was milder, but the downward trend persisted for a longer duration compared to other crises.

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One year ago, we released a report titled *'The Long Tail - A Cross-Country Perspective on the Bursting of the Real Estate Bubble.'* In that report, we observed that the international collapse of real estate bubbles has exerted a profound influence on the macroeconomic landscape, leaving enduring consequences and persistent 'scars' that may take a considerable amount of time to heal – a phenomenon we refer to as the long tail.

This year, we continued to employ the previous methodology and conducted a more detailed investigation into the changes and dynamics of the real estate market before and after the bursting of the bubble. The bursting of the real estate bubble is marked by a decline in housing prices, accompanied by fluctuations in core indicators such as real estate investment, the number of newly constructed housing projects, and housing sales. Do the changes in these variables demonstrate certain characteristics? After the bubble bursts, to what extent will the real estate market decline, and for how long will it persist? Is the widely discussed real estate crisis in Japan a typical example?

Overall, the real estate market has demonstrated a long-tail feature after the bursting of the bubble. Various core variables in the real estate market show a rapid upward trend in the five years leading up to the crisis, while the decline after the crisis tends to be more prolonged, taking approximately 7 years before showing signs of a renewed upward trend. Moreover, within the observed timeframe, these indicators generally do not recover to pre-crisis levels. Although the real estate crisis in Japan has garnered widespread attention, it is not a typical case. From the perspective of the real estate market's operation pattern, the Japanese real estate crisis is relatively mild but extends over a longer duration.

I. SAMPLE SELECTION AND BASIC METHODOLOGY

The sample selection and basic methodology employed in this paper remain consistent with those in the previous paper 'The Long Tail - A Cross-Country Observation on the Bursting of the Real Estate Bubble.' In terms of sample selection, following the definition of real estate bubble bursts by

Oust and Hrafnkelsson (2017), we use price changes as a criterion. A large real estate bubble is defined as a significant real price increase of at least 50% within a 5-year period or at least 35% within a 3-year period, followed by an immediate substantial decline of at least 35%. A small real estate bubble is defined as a notable real price increase of at least 35% over a 5-year period or at least 20% over a 3-year period, followed by an immediate substantial decline of at least 20%. In this paper, we selected 22 cases of real estate crises in 15 countries since 1970. For details, refer to Table 1.

In terms of data processing, this paper adopted a uniform approach to all variables. The starting year of the real estate crisis is considered as year 0, and the observation spans 10 years before and after, resulting in a total time span of 21 years. We opted for annual data with a relatively coarse granularity, which may blur some details but is sufficient to capture the overall trends in the changes in the real estate market. Scaling the data with the value of year 0 set at 100 allows for easy comparison across different samples and facilitates the calculation of variable averages, medians, and trimmed means. As the trends of these three statistical measures align closely, for the sake of clarity, the following discussion will primarily focus on the mean value.

As shown in Figure 1, taking the actual housing price level in the year of the crisis onset as 100, the trend in housing prices before and after the burst of the bubble can be divided into four stages. During the ten to five years before the crisis, housing prices exhibited a relatively slow increase, with a total rise of about 7% over the 5-year period. Starting from the 5th year before the crisis up to the outbreak of the crisis, housing prices rose sharply, with an accumulated 50% increase compared to the 5th year before the crisis. Following the burst of the real estate bubble, housing prices witnessed a protracted decline, reaching their lowest point in the 6th year after the crisis, with a decrease of 30% from the peak, roughly aligning with the level of the 5th year before the crisis. Subsequently, housing prices began a slow recovery, but by the 10th year, they had not fully returned to the pre-crisis peak, only hovering at around 85% of the highest value.

Table 1: Real estate crisis and timetable

Large Real Estate Bubbles	Time	Small Real Estate Bubbles	Time
Belgium	1979-Q3	Finland	1989-Q2
Denmark	1986-Q2	Ireland	2007-Q1
Denmark	2006-Q3	Netherlands	1978-Q2
Finland	1974-Q2	New Zealand	1974-Q3
Ireland	1980-Q4	Norway	1987-Q1
Italy	1981-Q2	South Africa	1984-Q1
Japan	1973-Q4	Spain	2007-Q2
Japan	1990-Q4	United Kingdom	1973-Q3
South Korea	1979-Q2	United States	2006-Q1
South Korea	1991-Q1		
Spain	1978-Q2		
Spain	1991-Q4		
Sweden	1990-Q1		

Source: Oust and Hrafnkelsson(2017).

Figure 1: Real house price index (the value of year 0 is 100)
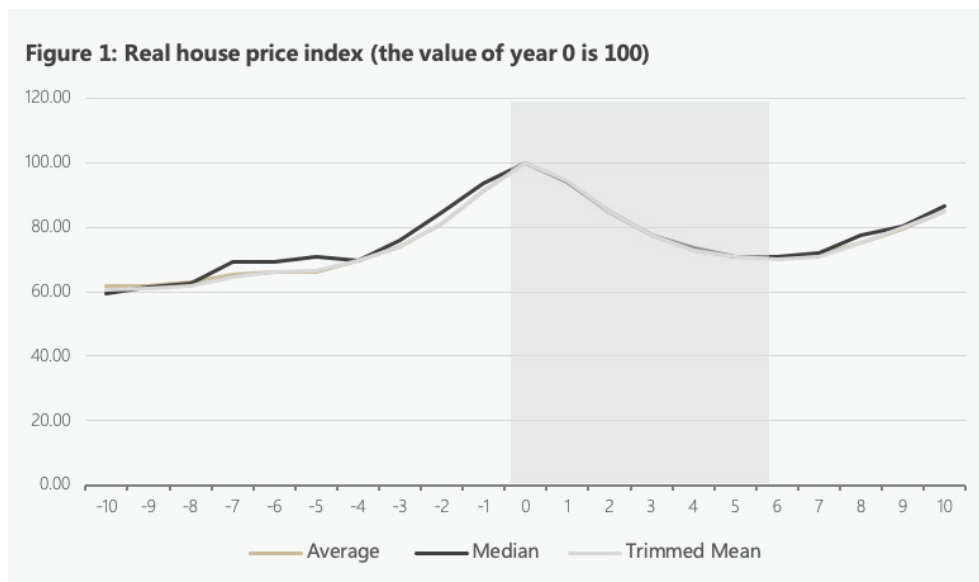
Sources: OECD, BIS, authors' calculations

II. REAL ESTATE INVESTMENT

The trend in real estate investment follows a pattern similar to that of housing prices. It experienced a gradual increase starting from 10 years before the crisis, accelerated in the 5 years leading up to the crisis, and witnessed an accumulated 40% increase by the year just before the crisis. However, real estate investment essentially peaked in the year just before the crisis, with 8 samples reaching their highest values in that year, while another 13 samples peaked during the crisis year. Subsequently, real estate investment experienced a rapid decline, down by 23% within 3 years, and then hovered at a low level for the following 4 years until a noticeable upward trend appeared in the 7th year after the crisis. By the 10th year after the crisis, real estate investment was able to recover to approximately 90% of the pre-crisis peak.

Figure 2: Fixed asset formation at constant price (the value of year 0 is 100)
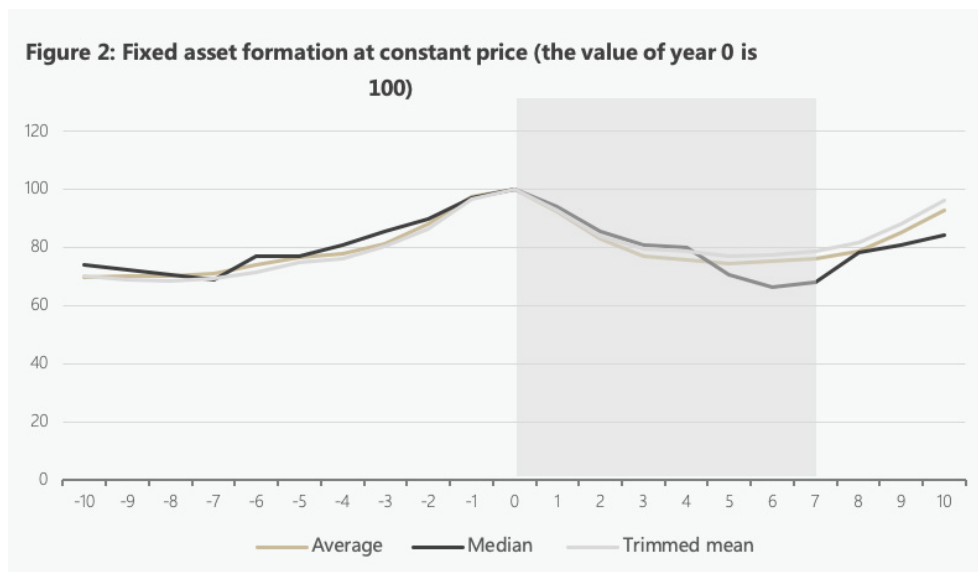
Sources: OECD, authors' calculations

There is great divergence in the changes in real estate investment during crises across different countries (Figure 3). We calculated the decline in real estate investment for each sample relative to its level at the onset of the crisis. Ireland and Sweden experienced substantial declines in real estate investment after the crisis in 2007 and 1990 respectively, reaching 81.6% and 69.1%, respectively, far exceeding other samples and the average level. The United States witnessed a significant slump in real estate investment

during the 2006 crisis, with a decline of 53.3%. However, in the two real estate crises of 1973 and 1990, Japan exhibited relatively smooth trends in real estate investment, with declines staying within 20%, specifically 15.6% and 19.0%, respectively.


Figure 3: Post-crisis decline in real estate investment
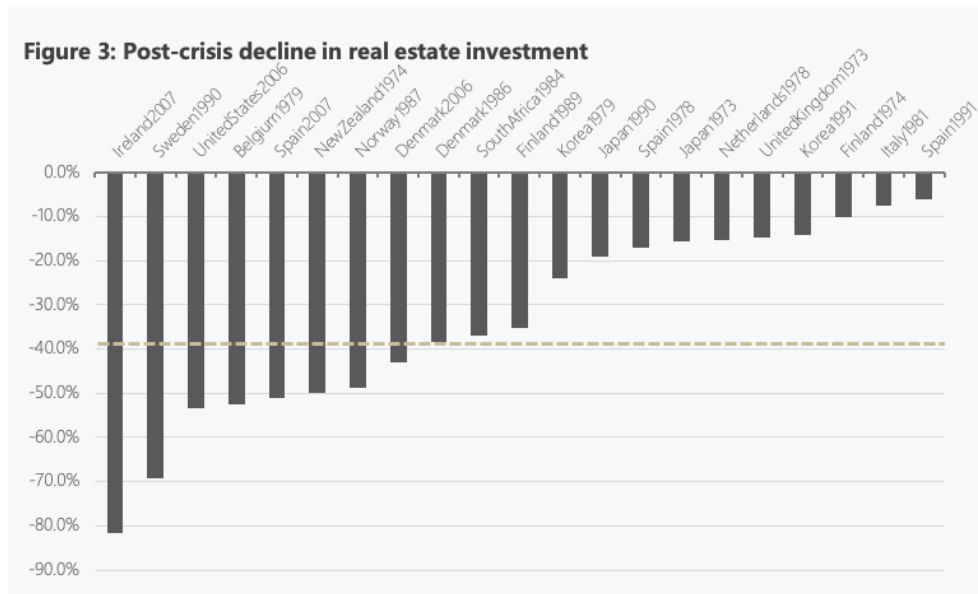
Sources: OECD, authors' calculations

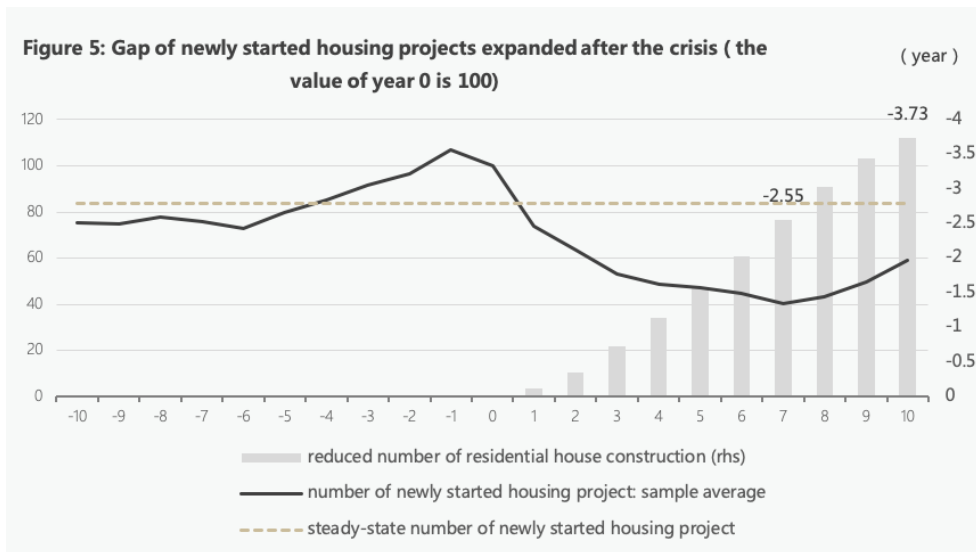## III. NEWLY STARTED HOUSING PROJECTS

The number of newly started housing projects is a more leading indicator. The number of newly started housing projects gradually accelerated before the crisis, reaching its peak in the year just before the crisis, with a cumulative increase of about 40%. However, the depth of decline and the duration of the downturn were more prolonged after the crisis. The decline in the first year after the crisis exceeded 25%, and it continued to decrease until the 7th year after the crisis, at which point the number of newly started housing projects was only 40% of the peak. Subsequently, a gradual recovery began, but by the 10th year after the crisis, it could only reach approximately 60% of the peak level.

Next, we examined the impact of the real estate crisis on newly started housing projects from a cumulative perspective.
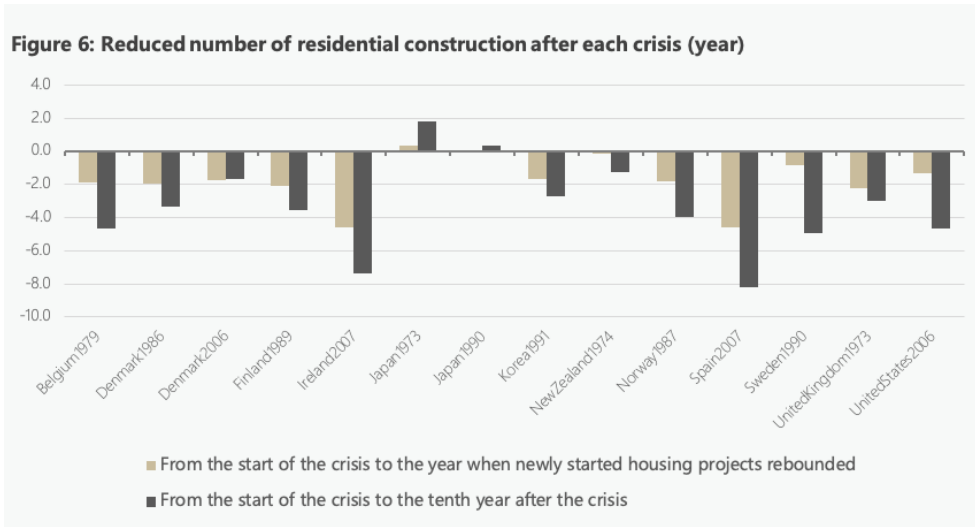
Figure 4: Number of newly started housing projects (the value of year 0 is 100)
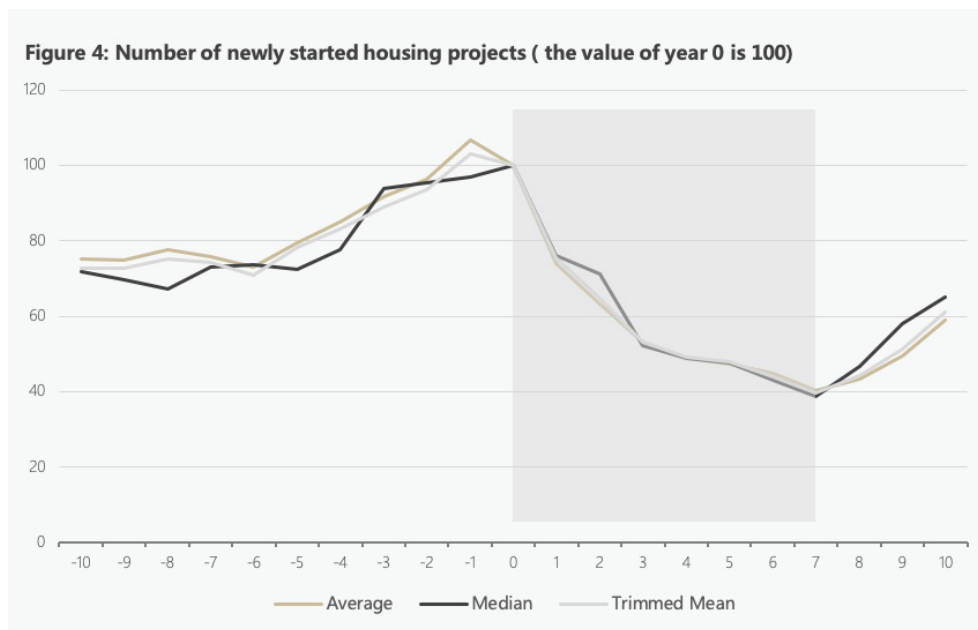
Sources: FRED， European Central Bank， Stats NZ， Ministry of Land,
Infrastructure, Transport and Tourism of Japan， WIND， authors' calculations

We used the average number of newly started housing projects in the ten years leading up to the crisis as a reference, which is 83.62 units (the value of year 0 is 100), to measure the steady-state level of newly started housing projects each year before the crisis. Following the onset of the crisis, the number of newly started housing projects rapidly declined below the pre-crisis steady-state value. This implies that, on average, the annual newly started housing projects in each post-crisis year were significantly lower than the pre-crisis steady-state value. Through calculation, from the year of the crisis (year 0) until the 7th year when the number of newly started housing projects begins to recover, the cumulative shortfall in residential house construction is equivalent to the steady-state level 2.55 years before the crisis. In other words, on average, it takes approximately 2.55 years of reduced construction before the number of newly started housing projects begins to rebound after the burst of a real estate bubble. However, even with a recovery, it cannot return to the perceived steady-state level before the bubble. By the 10th year after the crisis, the cumulative shortfall in residential house construction reached the volume of the steady-state 3.73 years before the crisis.

7

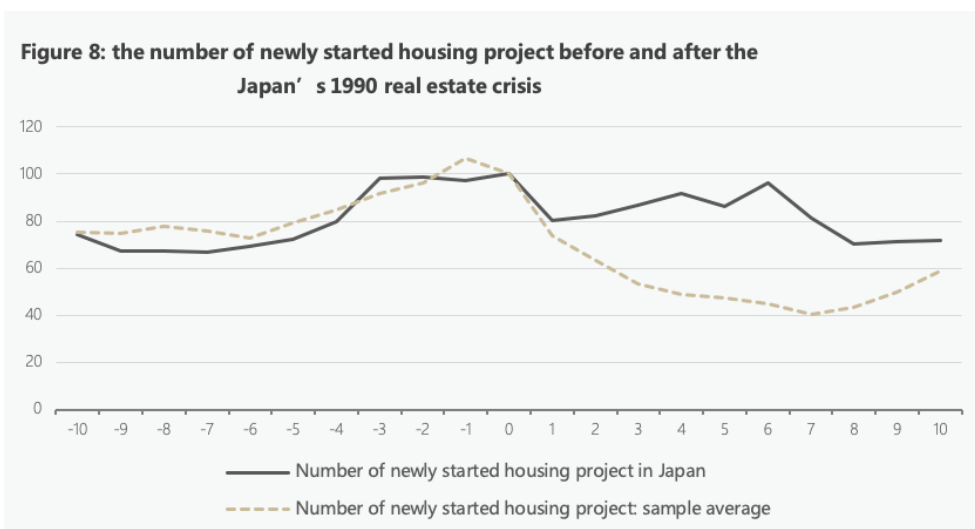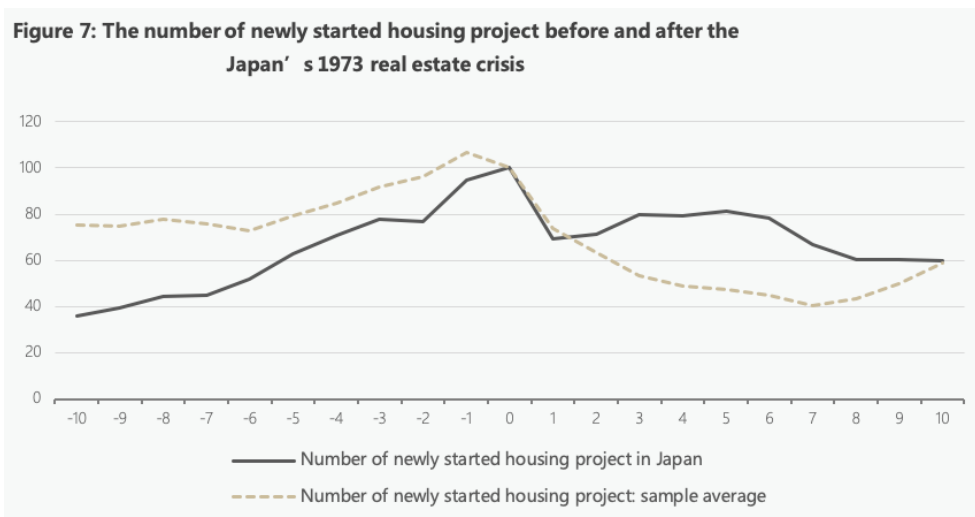Figure 5: Gap of newly started housing projects expanded after the crisis (the value of year 0 is 100)

Source: authors' calculations

We applied the same analysis to each crisis and calculated the cumulative shortfall in residential house construction from the year of the crisis until the year when newly started housing projects began to recover and the 10th year after the crisis. It is evident that the majority of samples exhibit substantial gaps. The most notable instances are Ireland and Spain, where in the 10th year after the crisis, the shortfall equates to approximately 7.4 and 8.2 years of pre-crisis construction, respectively. This essentially suggests that the newly started housing projects in these two countries were close to zero in the decade following the crisis. In contrast, the data for newly started housing projects in Japan after its two real estate crises show a different pattern. Combining Figures 7 and 8, unlike the average trend for newly started housing projects among samples, Japan's newly started housing projects rebounded around the 2nd and 3rd years after the crisis and remained relatively stable for a period. Although they eventually stabilized at levels below the pre-crisis peak, the lack of a significant decline means that there is essentially no shortfall in newly started housing projects in Japan after the crisis. In fact, by the 10th year after the crisis, the number of newly started housing projects in Japan exceeded that of the pre-crisis 10-year period, a unique trend among all the sampled countries.
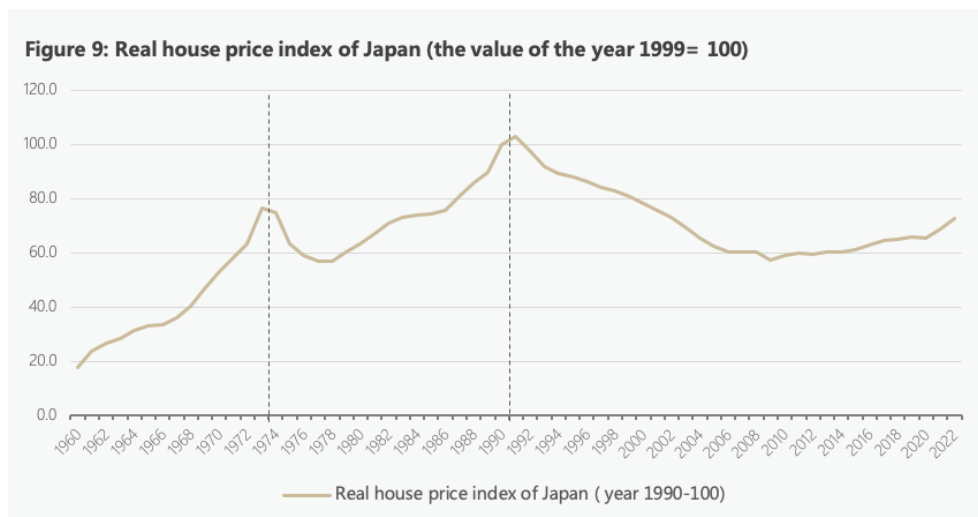
Figure 6: Reduced number of residential construction after each crisis (year)

- From the start of the crisis to the year when newly started housing projects rebounded
- From the start of the crisis to the tenth year after the crisis

Source: authors' calculations

Figure 7: The number of newly started housing project before and after the Japan's 1973 real estate crisis

—— Number of newly started housing project in Japan

----- Number of newly started housing project: sample average

Figure 8: the number of newly started housing project before and after the Japan's 1990 real estate crisis

—— Number of newly started housing project in Japan

----- Number of newly started housing project: sample average

Sources: Ministry of Land, Infrastructure, Transport and Tourism of Japan; authors' calculations

Indeed, Japan's crisis differs significantly from other sampled countries in many aspects. For example, following the 1991 real estate crisis in Japan, although the decline in housing prices was not steep for a considerable period, it continued to fall until gradually reaching a bottom and rebounding around 20 years later. Real estate investment and the number of newly started housing projects in Japan also continued to decline beyond the 10-year sample period we examined, with a true rebound only observed around 2010. In this sense, Japan's crisis was more prolonged, although the intensity was not exceptionally high.

Figure 9: Real house price index of Japan (the value of the year 1999= 100)

Real house price index of Japan (year 1990-100)

Sources: OECD, authors' calculations

IV. HOME SALES

The volume of home sales remained relatively stable in the 10 to 6 years leading up to the crisis, with almost no upward trend. However, it began to rise rapidly in the 5 years before the crisis, peaking in the last year before the crisis with a 35% increase over the 5-year period. The decline in sales volume also showed a certain leading characteristic, which occurred after reaching its peak in the year just before the crisis. **The decline in home sales after the crisis appears to be more abrupt,** with a direct 20% decrease in the first year after the crisis, and then maintaining a relatively stable level for the next 6 years until a gradual upward trend begins in the 8th year.

Figure 10: Home sales (year 0 = 100)
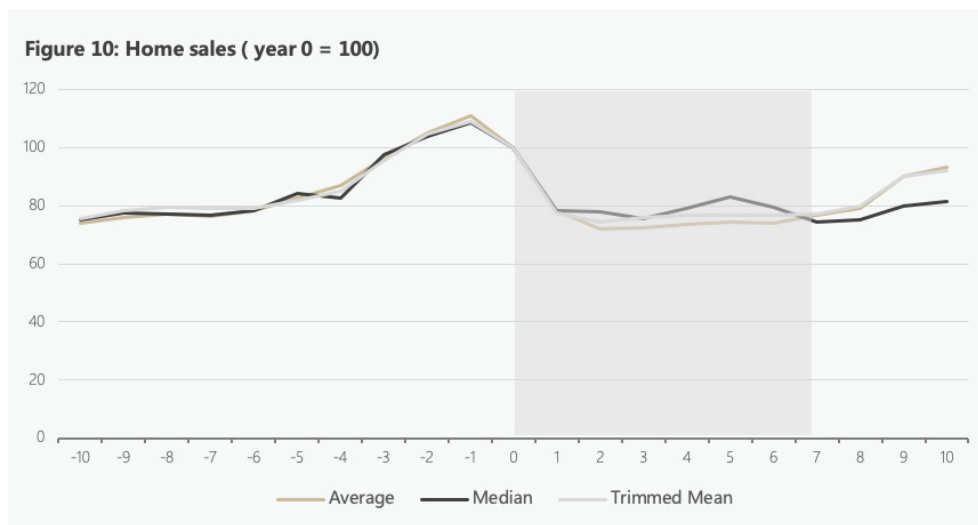
Sources: STATABEL, European Central Bank, FRED, Ortalo-Magné F and Rady S.(2004), Harano (2014), authors' calculations

Figure 11: The volume and price of home sales after crisis demonstrated a positive relation.
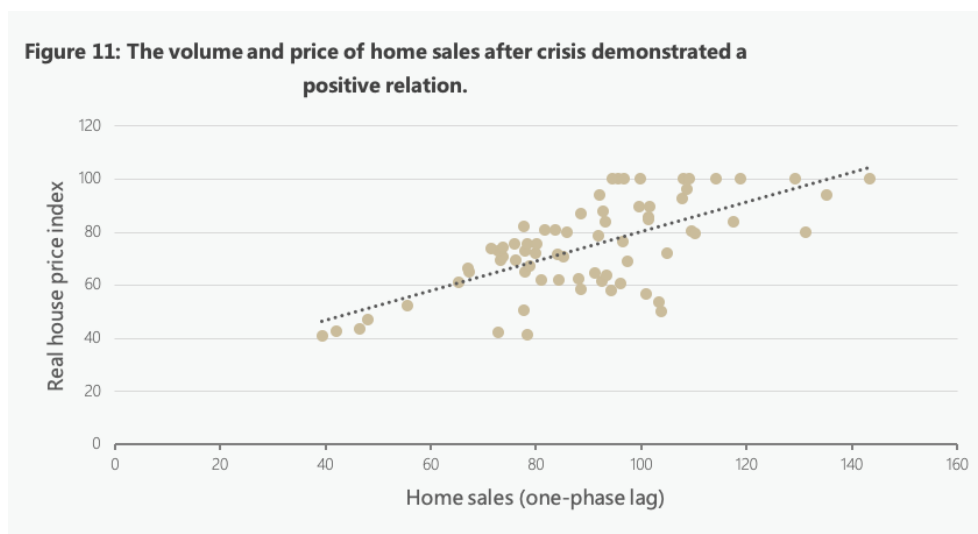
Source: authors' calculations

From the perspective of supply and demand dynamics, the fluctuations in the price and sales volume of a commodity can reflect the forces driving the quantity and price movements. If the price fluctuations of a commodity are mainly driven by the supply side, one can observe characteristics of falling prices and rising sales volume; when prices significantly decrease, transaction volume often synchronously increases. However, we did not see this negative relationship in the real estate market. On the contrary, as depicted in Figure 11, both before and after the crisis, housing prices maintained a positive correlation with the volume of home sales, and this

11

relationship was more pronounced in the lagged sales volume. This positive correlation was also observed in each sampled country, which implies that a decline in sales volume does not lead to a stabilization in prices; instead, it is accompanied by a continued decline in prices. This phenomenon of simultaneous decreases in both quantity and price, in a general sense, reflects that the fluctuations in the residential housing market caused by the real estate crisis are primarily driven by demand-side shocks.

V. SUMMARY

First, the real estate market takes a considerable amount of time to recover after a crisis. The impact of bubble bursting on the real estate market persists for an extended period. Following a crisis, key indicators such as housing prices, real estate investment, the number of newly started housing projects, and home sales volume tend to decline over a long period of time. On average, it takes about 7 years for these indicators to start recovering, and they often do not return to pre-crisis levels within a 10-year timeframe.

Second, the impact of the real estate crisis on the real estate market is profound. On average, after a crisis, the maximum decline in housing prices, real estate investment, and home sales volume is approximately 30%, 25%, and 35%, respectively, while the maximum decline in the number of newly started housing projects reaches 60%. This significant downturn typically occurs within 3 to 4 years after the crisis. Furthermore, in the aftermath of the crisis, the real estate market is primarily driven by demand-side factors, and the decline in sales volume and new construction does not lead to a stabilization in prices.

Third, the real estate crisis in Japan is not representative of typical crises and differs significantly from other real estate crises. Following the real estate crisis in Japan in 1990, the changes in various indicators exhibited a milder decline in both magnitude and speed, but the duration of the downward trend was more prolonged.

References

[1] Oust A, Hrafnkelsson K. What is a housing bubble?[J]. Economics Bulletin, 2017, 37(2): 806-836.

[2] Ortalo-Magné F, Rady S. Housing transactions and macroeconomic fluctuations: a case study of England and Wales[J]. Journal of Housing Economics, 2004, 13(4): 287-303.

[3] Harano, H. (2014). A Consideration of Existing House Volume of Transaction and Existing House Market Share in Japan. Urban Housing Studies, 2014(85), 124-132

Appendix: Comparison of China's and Global Statistics

The situation in the Chinese real estate market and China's national conditions differ significantly from the sampled countries, making them not comparable. Therefore, we have only processed and aligned the relevant data in a simple manner, serving as a reference.

Figure 12: Residential housing prices of China's 100 sampled cities (adjusted for inflation, the year 2021=100)

Sources: WIND, authors' calculations

We utilized the annualized average residential price data from a sample of one hundred cities and adjusted the nominal value of housing prices in China using the GDP deflator index to compare it with the sample mean of the actual housing price index. We scaled the data with a base year of 2021 set at 100. As shown in Figure 12, from 2011 to 2020, China's housing prices

witnessed a cumulative growth of 35.3%, demonstrating a stable upward trend. From 2021 to the present, housing prices in China have remained nearly unchanged at peak levels.

We employed data on real estate investment in residential properties, similarly adjusting with the GDP deflator index to maintain consistency with the sampled countries in terms of measurement. The real estate investment data for the year 2023 is estimated based on the cumulative value for the first ten months of the year to derive the monthly average investment, and then multiplied by 12 to estimate the annual data. (The data for the new construction area and the sales area of commercial housing in 2023 are also estimated using the same method as mentioned above.)"

Over the decade from 2011 to 2020, real estate investment in China doubled, demonstrating an overall rapid upward trend. However, in 2021, China's real estate investment swiftly entered a downward trajectory, with an accumulative decline of 23.4% by 2023. This figure has reached the lowest point compared to the sample mean of real estate investment.

Figure 13: China's real estate investment (adjust for inflation, the year 2021=100)
China: real estate investment in residential housing
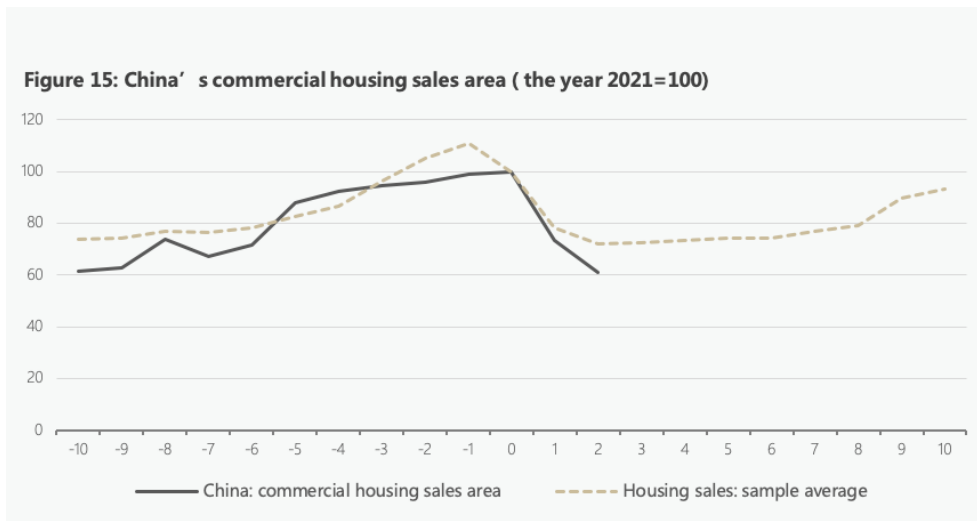
Sources: WIND, authors' calculations

The data for new construction in China is measured in terms of floor area, which introduces a certain difference in units compared to the sample mean of newly constructed housing units, but it is a relatively close indicator. As shown in Figure 14, the area of newly constructed houses in China began

to rise rapidly in 2015, reaching its peak in 2019 with a 57% increase. However, it started to gradually decline afterward, especially with an accelerated decline after 2021, experiencing a 40% decrease within a year. If we compare the decline in newly constructed housing area to the peak level, China's newly constructed housing area has cumulatively decreased by 58.7% in the four years since 2020, roughly equivalent to the level of the 6th year after the crisis in the sample mean. Prior to 2021, China maintained a high level of new construction area, with an average of 1.38 billion square meters. If 1.38 billion square meters is considered as the steady-state level of new construction, China undershot the construction by 1.20 billion square meters in 2022 and 2023, equivalent to approximately 0.86 years of construction. If we consider steady-state levels as 1.0 billion square meters and 1.3 billion square meters, China undershot construction by 0.43 and 1.03 billion square meters in 2022 and 2023, respectively, corresponding to approximately 0.42 and 0.79 years of construction.

Figure 14: China' s new housing construction area (the year 2021=100)
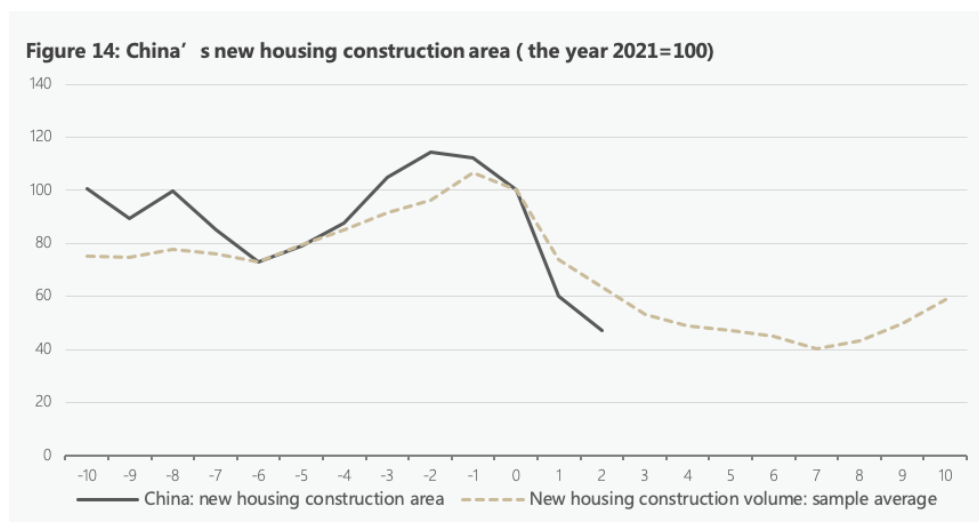
Sources: WIND, authors' calculations

The sales data for commercial housing in China is also measured in terms of floor area. As illustrated in Figure 14, the volume of commercial housing sales in China has exhibited a fluctuating upward trend since 2011, reaching its peak in 2021. After 2021, there has been a significant decline in the sales area of commercial housing in China, down by about 40% by 2023. The average decline in the sales volume of housing in foreign crisis samples from peak to bottom is 35%.

Figure 15: China's commercial housing sales area (the year 2021=100)

China: commercial housing sales area — — — Housing sales: sample average

Sources: WIND, authors' calculations

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