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A Tale of Two Countries: The Real Estate Crises in 1990s Japan and Contemporary China

Kenneth Rogoff (Harvard University)

Yuanchen Yang (International Monetary Fund)

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The Real Estate Crises in 1990s Japan and Contemporary China

Kenneth Rogoff and Yuanchen Yang*

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Abstract: Real estate has long been central to China's growth model, yet since 2018 its contribution has declined sharply, turning the sector from a key engine of expansion into a major drag on economic activity. While policy tightening triggered the downturn, it reflects deeper structural imbalances in a sector that, together with its upstream and downstream linkages and infrastructure, accounts for nearly one-third of aggregate demand. With housing comprising nearly 70 percent of household wealth, the ongoing price correction has generated sizable negative wealth effects, amplifying the contraction through depressed consumption, investment, and sentiment. We document the macroeconomic propagation of China's real estate downturn and assess the risks of prolonged stagnation should the sector continue to deteriorate. To provide perspective, we compare China's experience with Japan's real estate collapse in the 1990s, uncovering striking parallels in investment dynamics and consumption responses despite profound institutional differences. Our findings highlight the importance of real-side channels, including alternative amplification mechanisms (in addition to banking), in generating persistent output losses following real estate busts.

JEL Codes: Housing Cycles, International Financial Crises, Real Estate

Keywords: F39, G01, R3

* Kenneth Rogoff, krogoff@harvard.edu, Maurits C. Boas Professor at Harvard University; Yuanchen Yang, yyang6@imf.org, economist at the International Monetary Fund. We thank the IMF China and Japan teams, Janice Eberly, Anil Kashyap, and Amir Kermani for their helpful comments. The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

I. Introduction

Real estate has long been a cornerstone of China's economic development. Since 2018, however, its contribution to growth has declined sharply, transforming from a primary driver of growth into a major drag on the economy. While this shift was initially triggered by policy tightening, it fundamentally stems from longstanding structural imbalances in the sector (Rogoff and Yang, 2020), including not only real estate narrowly but its direct and indirect inputs, which together with infrastructure accounts for almost of third of total demand in China. In the context of escalating global tensions over China's export juggernaut, the outlook for the real estate sector has become even more critical—not only due to its historical importance as a catalyst for investment demand, but also because with real estate constituting around 70 percent of private wealth,[2] recent sharp house price declines across large swathes of the country are likely having pronounced wealth effects on household consumption.

As China's real estate sector enters its sixth year of adjustment, we seek to understand why it has exerted such substantial contractionary effects on the broader economy and to consider the potential macroeconomic implications if the real estate sector continues to flounder. To help provide context and a benchmark for comparison, we will also compare China's experience so far with that of Japan in the 1990s and 2000s, which has the advantage of giving perspective on the full cycle, whereas China may only be in the middle. Japan and China are of course, very different in many ways, starting from the fact that individuals cannot own land in China, to that Japan entered its crisis as one of the couple wealthiest major economies (Rogoff, 2025), to that Japan is a democracy. Yet, as we shall document, there are nevertheless some striking parallels, from the impact of real estate on investment and growth over the cycle, to the effects of price collapse on consumption.

A comparison of the Japanese and Chinese experiences may also be of broader interest to understanding the impact of financial crises. Until a few years ago, it was almost considered heresy to argue that China could have a real estate growth recession of anywhere near the depth of the major post-war systemic real-estate related financial crises. After all, the modern literature following Bernanke (1983) has largely emphasized how the ensuing financial paralysis is a key element of why economies take so long to recover when a real estate bubble bursts. Unlike equity shares, where the allocation of losses after a market collapse is largely immediate, when debt creates problems, it can take years to distribute the burdens, with slow-moving legal systems playing a key role. In China, it was presumed, the central government could and would quickly allocate losses, allowing the economy to bounce back from any recession rather quickly rather than suffer the slow grinding recovery that characterizes the typical recovery from financial crises (Reinhart and Rogoff, 2009).

Yet, here we are. Of course, part of the issue is that allocating the losses from the real estate collapse is not proving so easy in China, particularly for example, due to losses from local government financing vehicles (LGFVs), as well as losses suffered by smaller regional banks. But China's experience, as well

[2] The *2019 Survey on the Assets and Liabilities of Urban Households in China*, conducted by the People's Bank of China, reported that housing represented around 70 percent of total household assets and 74.2 percent of their physical assets, while home ownership in China stood at 96 percent.

as a re-evaluation of Japan's lost decade (which arguably lasted longer than a decade), suggest that broader real factors, including diminishing returns to investment, as well as consumption and negative sentiment about house prices and income (and future economic prospects in general), can also lead to years of well-below-trend growth, and that amplification mechanisms other than banking can also be important.[3]

[3] The financial channel intensified markedly in Japan during 1997-1998. (Hoshi and Kashyap, 2000; Bank of Japan, 2001)

II. An Overview of Real Estate Crises in Contemporary China and 1990s/2000s Japan

In this section, we provide context and backdrop for our statistical analyses in sections IV and V. There we build on our previously-developed detailed city-level database for China (Rogoff and Yang, 2024a), which includes city-level real estate investment and housing stock. In this study, we complement this database with data on household consumption and housing market sentiment—two central variables in our analysis—alongside an extensive set of social and economic fundamentals. We also compile a closely-related database for Japan, which has the advantage of covering a much longer time period, and gives perspective on how a full housing cycle can unfold.

In the case of China, today, we do not pretend that real estate and infrastructure are the only areas of challenge, although they remain quite severe, and the direct challenges are formidable. Real estate–related industries—including notably construction, building materials, furniture, and utilities—are experiencing pronounced declines. (Rogoff and Yang, 2021) This contraction reduces both output and employment, generating significant spillovers to upstream and downstream sectors due to the sector's large footprint in the Chinese economy. Highly leveraged developers face liquidity and refinancing pressures, resulting in a growing stock of unfinished projects and a significant erosion of confidence in the pre-sale model, which has led to very low overall market sentiment. Large housing stock—particularly in lower-tier cities—stands in sharp contrast with weak demand reflecting aging demographics and population outflows. The long-term mismatch between supply and demand implies that the sector must shift from growth driven by new construction to a phase of stock adjustment, requiring a fundamentally different approach to resource allocation.

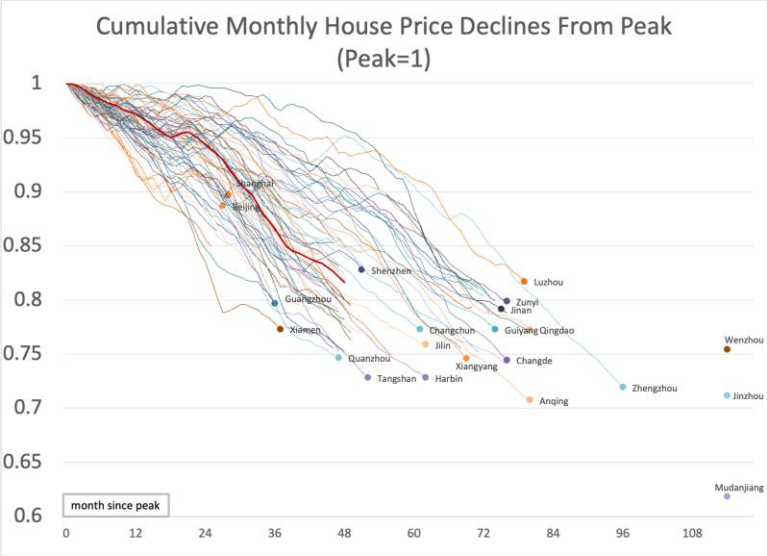
But there are also broader challenges. Sharply falling housing valuations trigger negative wealth effects that suppress consumption (Figure 1), particularly given the high concentration of household wealth in housing assets in China.[4] (Figure 2) These effects are amplified by elevated household debt, much of which consists of mortgage obligations,[5] and weaker income expectations which stem from broad economic slowdown. Together, these factors suppress domestic demand not only for housing but also across a wide range of goods and services. Moreover, there is fiscal strain. Declining land-sale revenues have severely constrained local government budgets, limiting their capacity to finance developmental projects and maintain existing public infrastructure. These fiscal pressures also weaken their overall ability to deliver essential public services, with implications for the broader promotion and incentive structures within the Chinse political system. Indeed, there are arguably parallels between the so-called zombie banks of the Japanese experience and the cash-strapped local governments in that both became constraints after having previously supported growth. And although our work highlights non-financial factors, there is little question that financial risks are rising. Increasing non-performing loans associated

[4] Even at the height of its housing boom in 1990/1991, Japan's housing market valuation, estimated at roughly USD 20 trillion, remained less than four times the contemporaneous stock market capitalization of approximately USD 5 trillion.

[5] China's housing-related lending standards typically require a 20 percent down payment, though the requirement for second homes varies across cities and has frequently been tightened or relaxed in response to local housing market conditions. It is worth noting that China's household leverage ratio has been rising rapidly and is now at the higher end among emerging market economies, according to the BIS data (Rogoff and Yang, 2020).

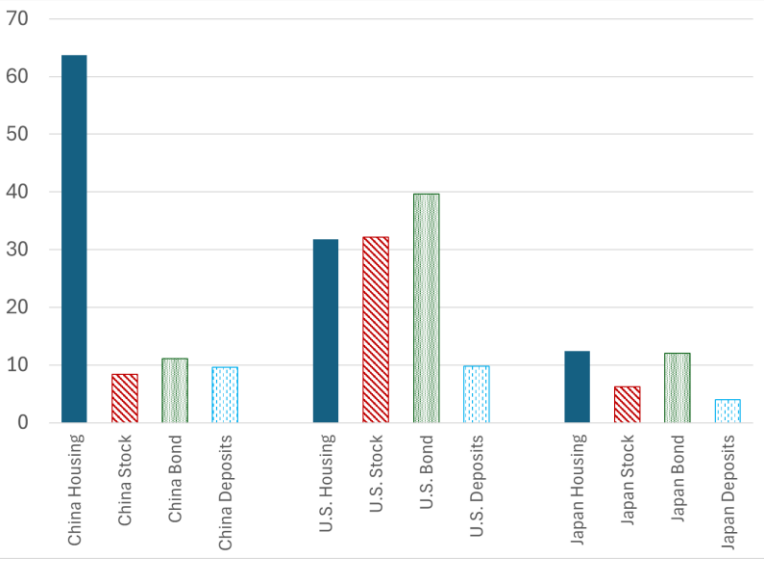
with developers and mortgages weaken bank balance sheets and tighten credit supply. Meanwhile, heightened uncertainty and household expectations of persistently falling prices reduce credit demand.

Figure 1. House Price Decline by City in China



Sources: National Bureau of Statistics of China and authors' calculations
Notes: The price index is constructed using the National Bureau of Statistics' monthly residential property resale price index for 70 large and medium-sized Chinese cities. For each city, the index is normalized to its historical peak (the series begins in 2011, with peaks occurring between 2017 and 2023 depending on the city). All other monthly observations are then expressed relative to this benchmark.

Figure 2. Valuation of Different Asset Classes in Trillion Dollars (2017)



Sources: World Bank, BIS, National Bureau of Statistics of China, Bank of Japan, FRED, Zillow, and authors' calculations

While China's challenges are unique, the combination of a housing boom-to-bust transition, a slowing economy, an aging population, and growing external pressures echoes Japan's experience in the 1980s. Back then, Japan faced the bursting of a real estate bubble and a difficult external environment, particularly following the 1985 Plaza Accord, which forced the yen to appreciate and eroded the country's export competitiveness. (Of course, there were many other policy miscues in the bubble years, some connected with the U.S. pressures; some not;) Notably, the fallout from Japan's housing market collapse was not a short-term correction—it marked the beginning of an adjustment process that took nearly a decade to fully unfold. We are interested in the mechanisms that underpinned Japan's post-bubble stagnation, which offer valuable insights for understanding China's ongoing real estate challenges. To this end, we construct a comprehensive historical dataset for Japan, dating back to the 1970s, that comprises subnational data across all 47 prefectures as well as input and output data at granular industry levels. This rich historical dataset allows a detailed examination of the full evolution of Japan's real estate boom-and-bust cycle and its broader macroeconomic implications.

Despite broad consensus that Japan experienced a "Lost Decade"—a prolonged period of economic stagnation triggered by the asset price collapse in the late 1980s and early 1990s—the underlying reasons for the length of the adjustment period remain debated. Some studies highlight the financial channel. In the aftermath of the crash, banks were burdened with large volumes of non-performing loans. Rather than writing them off, many banks continued to support failing firms, or "zombie firms", to avoid recognizing these losses. This practice contributed to a credit crunch, constraining lending, exacerbating misallocation, and stifling business growth (Ueda, 1999; Hoshi and Kashyap, 2000; Caballero et al., 2008; Amiti and Weinstein, 2018). Meanwhile, the sharp decline in land and house prices significantly eroded collateral values and further suppressed firm investment (Shiratsuka, 2005; Gan, 2007). Other explanations focus on structural factors, including a slowdown in productivity growth (Hayashi and Prescott, 2002) and diminishing returns to investment (Young, 1995).

While existing explanations for Japan's protracted stagnation are well-founded, we argue that even in the absence of traditional financial multipliers, a housing bust can generate substantial adverse effects on the economy via real channels. For instance, Rognlie, Shleifer and Simsek (2018) argued that housing overbuilding during the boom can trigger a demand-driven recession with limited reallocation and low output. Unlike financial channels, which amplify shocks through leverage, bank balance sheets, credit constraints, or fire sales, real channels operate directly through investment, consumption, labor markets, or productivity. In Japan's case, the housing market collapse depressed activity through three key real channels: investment, consumption, and sentiment.

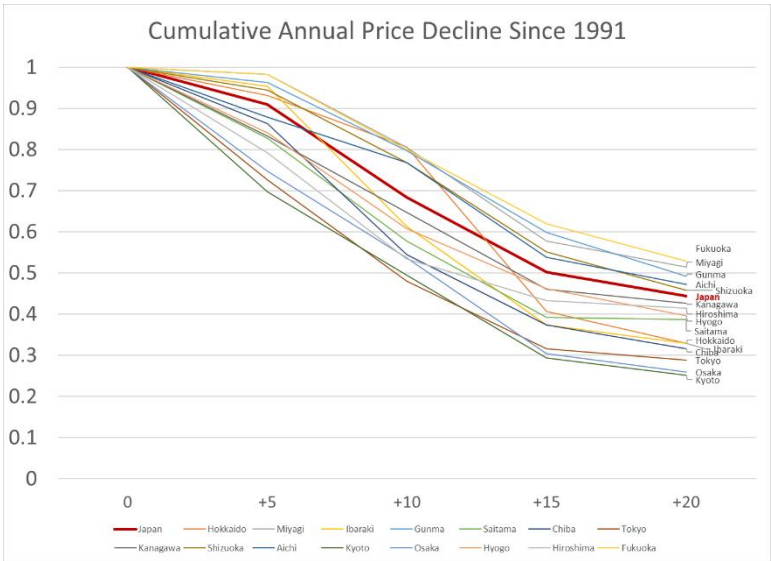
First, the **investment** channel. The collapse of the housing market triggered a sharp contraction in residential investment, one of the most cyclical components of GDP, with significant spillovers to construction and related industries. The Japanese boom of the 1980s was characterized by rapid expansion in residential and commercial real estate, as well as infrastructure. Using historical city-level data, we document clear evidence of declining returns to real estate investment, measured by the time-varying relationship between real estate investment and economic growth. This relationship deteriorated

in the late 1980s, reached its trough around mid-1990s—the nadir of the downturn—and only began to recover after 1998–1999, taking yet nearly two decades to return to pre-crisis levels. We establish causality using a shift-share instrumental variable design (Rogoff and Yang, 2024a), and find cities that accumulated larger housing and infrastructure stocks during the bubble experienced deeper and more persistent downturns.

Second, the **consumption** channel. Household consumption declined substantially as falling house prices generated negative wealth effects, even absent a full-fledged credit crunch. Indeed, evidence suggests that Japanese banks continued lending through much of the 1990s, albeit at reduced levels due to regulatory forbearance and the survival of “zombie banks.” (Kanaya and Woo, 2000; Nakaso, 2001) Using a sensitivity instrument (Guren et al., 2021), we estimate the elasticity of Japanese households’ elasticity to house price changes, a standard methodology for measuring wealth effects, and find that Japan’s housing wealth effects were strong. As Figure 3 illustrates, the decline in Japan’s house prices was very long lasting, causing the fall in household wealth to translate into sizable reductions in consumption.

Third, the **sentiment** channel. Yet another, often overlooked, mechanism was the deterioration of housing market sentiment. Sentiment reflects the emotional, psychological, or qualitative "tone" (optimism or pessimism) surrounding the housing market, which can influence households’ confidence about future economic conditions and shape their economic decisions (see Benhabib and Spiegel, 2019; Constantinides et al., 2025). When housing sentiment turns pessimistic, households tend to extrapolate recent price declines and internalize a more negative outlook, even beyond what fundamentals alone would imply. Using Japan’s prefecture-level data on land prices and consumption, we show that post-bubble consumption growth was strongly and positively correlated with housing market sentiment. In regions where sentiment deteriorated more sharply, households reduced spending more aggressively, amplifying the macroeconomic contraction triggered by the real estate downturn.

Figure 3. House Price Decline by Prefecture in Japan



Sources: Statistics Bureau of Japan and authors' calculations.
Notes: The price index is constructed using the Statistics Bureau of Japan' annual house land price per 3.3 m2 of Japanese prefectures. For each city, the index is normalized to its historical peak. All other observations are then expressed relative to this benchmark.

Japan's experience illustrates that, while financial frictions played an important role, housing busts can also depress economic activity through real channels of investment, consumption, and sentiment. The interaction of these mechanisms produced a deeper and more persistent stagnation than conventional financial-multiplier models would predict. Young (1995) famously argued that diminishing returns to investment played a fundamental role in the East Asian growth experience.

A similar dynamic appears to be unfolding in China. While many attribute China's real estate slowdown to the "three red lines" policy[6] and the associated tightening financial conditions, our analysis, based on recent city-level and household-level data, suggests that broader channels related to investment, consumption, and sentiment are equally, if not more, important. In our earlier work (Rogoff and Yang, 2020; 2021; 2024b), we emphasize that the legacy of decades-long investment expansion, or investment overhang, represents a key mechanism underlying the protracted nature of the recovery. Cities that accumulated disproportionately large stocks of real estate investment are experiencing sharper market corrections and facing more severe macroeconomic repercussions. This is mainly because housing capital is durable, and it takes substantial time to scale down excessive development, particularly in areas with declining populations and insufficient effective demand. As the investment overhang continues to suppress new construction, large volumes of unfinished housing remain, while new investment, completions, and sales drop to new lows. Due to institutional inertia and possibly the difficulty of reallocating resources to other sectors, the footprint of China's real estate-related sectors remains considerably larger than Japan's, despite being more than five years into the adjustment. Using the same shift-share instrument, which combines national-level real estate investment growth with past local investment exposure, we show that real estate investment was already exhibiting declining returns to scale before the Evergrande crisis—an event that marked the onset of the broader real estate downturn—and that this downward trend has continued since.

The consumption drag is unsurprisingly pronounced in China, which has proven to be good at fueling investment but has not yet shown enough capacity to promote consumption despite years of policy emphasis on consumption as an alternative growth engine. Most directly, household wealth effects are likely larger in China, as Chinese households allocate 70 percent of their wealth to housing—a share far exceeding that of other countries, due to limited alternative investment opportunities. Using the same sensitivity instrument, which leverages regional price changes to predict local price changes, as well as the widely used Saiz instrument that exploits geographic constraints on land supply, we find that Chinese

[6] The "three red lines" refer to financial regulatory thresholds introduced in China in August 2020. Designed to curb excessive borrowing in the highly leveraged real estate sector, the policy established explicit limits on property developers' leverage, based on ratios of debt to cash, equity, and assets. Evergrande's failure to meet these metrics accelerated its default crisis, as it could no longer obtain new financing. Reference: Bloomberg News, *What China's Three Red Lines Mean for Property Firms*, October 8, 2020.

households exhibit a much stronger consumption response to house price changes (elasticities being 0.15–0.23, depending on the specification) than their counterparts in Japan and the United States.

During downturns, the negative wealth effects can be amplified by market sentiment. The collapse in asset prices undermined household and firm confidence, leading to delayed purchases of durables and postponement of investment. As housing wealth erodes and households grow more pessimistic about the housing market (and plausibly about their economic future in general), spending is curtailed even further. In the absence of comprehensive social safety nets, housing wealth is a form of precautionary savings; when housing values decline, households tend to scale back spending to offset losses and driven by caution amid a gloomy economic outlook, they try to build up savings even more, via alternative financing instruments. Reflecting these trends, the gap between new loans and new deposits in China has widened to levels exceeding those observed in the country during the Global Financial Crisis (GFC).

To capture this channel, we use state-of-the-art large language models to gauge market perceptions of the housing market, weighting these measures by each city's exposure to the national housing sentiment. Incorporating these perceptions nearly doubles the estimated effect of house price changes on consumption.

Based on the empirical results in section IV, we find that a 40 percent decline in house prices (see Figure 1 on the national decline in housing prices) would translate into an estimated (mean) total consumption loss of 2-4 percent of GDP, with a standard error of 0.7 percent. The magnitude far exceeds current policy measures aimed at boosting consumption—whether consumption vouchers (less than 10 billion RMB) or trade-in subsidies (about 150 billion RMB). In Japan, home prices eventually declined by roughly 60 percent from their peak. In China, official data report a more modest 20 percent drop, although alternative sources, for example realtor data, point to a substantially deeper correction.[7] Real estate adjustments of this magnitude often span many years, although with considerable variance (Reinhart and Rogoff, 2009). If China's adjustment unfolds in a similar way as Japan's, it would mean China has not gone half way through the transition. By contrast, if China's path is eventually comparable to the United States, it appears to have already covered roughly two-thirds of the adjustment before reaching the bottom.

Similar to Japan, credit supply in China did not collapse immediately, nor does it show obvious signs of weakness, largely due to strong state control over the sector and widespread debt evergreening. Nonetheless, real-side adjustments—particularly reductions in consumption and investment—continue to impose a significant drag on economic activity.

Despite certain structural similarities between China and Japan, significant differences remain. In Japan, borrowing was high in the corporate sector, whereas in China, public entities, particularly LGFVs, have been a key channel through which real estate-related credit flows, reflecting differences in the structure of

[7] Source: Bloomberg News, *China's Housing Slump is Much Worse Than Official Data, According to Property Agents*. August 16, 2023.

real estate finance. Moreover, enabled by a financial sector dominated by state-owned enterprises (SOEs), the Chinese government has so far leveraged its strong administrative capacity to contain the crisis, by deferring loss recognition while avoiding immediate shocks. Nevertheless, China faces a demographic challenge similar to Japan's aging society, but the pace of its population aging is considerably faster. Moreover, whereas being a developing country may mean more room for urban expansion, it also implies a lack of social safety nets to cushion the economy from the pains associated with structural adjustment.

The remainder of the paper is organized as follows. Section III describes our database, which contains detailed, parallel data for China and Japan. Sections IV and V analyze the investment, consumption, and sentiment channels, drawing comparisons between the two countries while highlighting their key structural, cyclical, and policy similarities and differences. An appendix provides robustness test results and Section VI concludes.

III. Data

This section gives a broad overview of the data, with more details provided in the online appendix.

3.1 A Prefecture City-Level Dataset for China

The unit of analysis for both China and Japan is the prefecture. In the case of China, this corresponds to a prefecture-level city, of which there are approximately 300. We collect social and economic data from multiple sources, including the National Bureau of Statistics of China, China Statistical Yearbooks, China Population Census Yearbooks, and CEIC. The key variables are described as follows:

Real Estate Investment: Investment in real estate development refers to the investment made by real estate development enterprises in the development of land and construction of buildings.

Cumulative Real Estate Investment: Cumulative investment is calculated by aggregating real estate investment over time, expressed in real terms.

Consumption: Consumption is measured using per capita expenditure. For 2013 onward, data are obtained from the Household Survey on Income, Expenditure, and Living Conditions. Data from 1978 to 2012 are estimated using historical Urban and Rural Household Surveys, adjusted to ensure comparability with the definitions and coverage of the post-2013 survey.

House Prices: We focus on residential property prices, drawn from the CEIC database, which compiles data reported by municipal statistical bureaus.

Other Variables: These include GDP growth—defined as nominal GDP growth minus inflation, population—measured as the usual residence population (as opposed to population under household registration), population growth, and urbanization rate—defined as the ratio of urban population over total population.

The full sample consists of 298 prefecture-level cities, spanning from 2000 to 2024.

3.2 A Prefecture-Level Dataset for Japan

Similarly for Japan, we compile a detailed historical database for all 47 prefectures, or in Japanese as *to-dō-fu-ken* (都道府県). These include one metropolis (Tokyo, 都), one circuit (Hokkaido, 道), two urban prefectures (Osaka and Kyoto, 府), and 43 ordinary prefectures (県).

The primary source is the Prefectural Economic Accounts compiled by the Economic and Social Research Institute under Japan's Cabinet Office. This dataset provides national accounts statistics

(System of National Accounts, SNA) The SNA data covers the period 1955-2022, across three SNA versions and seven base years. To harmonize the series, we recalculate real GDP indices using a consistent base year, allowing for cross-temporal comparability.

Real Estate Investment: The real estate investment variable is defined as total residential fixed capital formation as provided in the prefectural total expenditure table.

Cumulative Real Estate Investment: Cumulative investment is calculated by aggregating real estate investment over time, expressed in real terms.

Consumption: The variable for consumption is defined as private final consumption expenditure in the prefectural total expenditure table.

Also included is real GDP, defined as nominal GDP minus inflation. The dataset is then augmented with key demographic and housing indicators obtained from e-Stat, Japan's official statistics portal. These variables include inflation, population, population growth, house land price, number of total and occupied dwellings, vacant housing units, dwellings under construction, and average floor space per dwelling. Most crucially, we are interested in the house land price series.

House Land Price: We use the house land price per 3.3 square meters (1 tsubo, 坪) from the System of Social and Demographic Statistics in the regional statistics database. Land prices are reported per tsubo and are used as a proxy for housing values in Japan, as land is the primary driver of house prices. Annual data are available from 1975 to 2004.

Diffusion Index: To measure housing market sentiment, we use the diffusion index compiled by the Land Institute of Japan. This quarterly survey captures the sentiment of homebuilders, developers, real estate agents, and office leasing companies at the regional level. The index reflects the current conditions and outlook of the housing market and is calculated as: (Number of good responses*2 +Number of somewhat good responses-Number of somewhat bad responses-Number of very bad responses*2) divided by total number of respondents*100. The index ranges from –100 to +100, with 0 representing a neutral baseline. Positive values indicate generally favorable conditions, while negative values indicate unfavorable conditions.

3.3 A News-Based Database for Measuring Housing Market Sentiment

To measure housing market sentiment in China, we adopt a news-based approach. News data has been increasingly used for gauging market sentiment, which has proven to be a good indicator of market expectations. (Armantier et al., 2016). Soo (2018) constructs indicators of sentiment in 34 urban housing markets using textual analysis of the tone of local newspaper articles about housing. This housing sentiment index, validated against data from the Michigan and Case–Shiller surveys, is strongly predictive of future growth in house prices.

In the context of China, we construct a measure of housing market sentiment using OpenAI's GPT-4o model, with inputs from daily economics- and finance-related articles from major Chinese newspapers.[8] GPT-4o is prompted to evaluate each news article for sentiment specifically related to the Chinese housing market, and assign a score ranging from 0 (most pessimistic) to 100 (most optimistic). The model captures the context and nuances of each article, and the resulting scores are validated through human assessment.[9] (Chen and Zhao, 2024) These scores are aggregated at the national level and adjusted by city-level news exposure, using the Baidu search index as a proxy for the attention of potential homebuyers and other local market shocks, to generate a measure of city-level housing market sentiment. This localized sentiment metric is then integrated into our empirical framework, allowing us to systematically capture variations in housing market optimism or pessimism across cities and over time, and to examine how such sentiment influences key housing outcomes and consumption behavior.

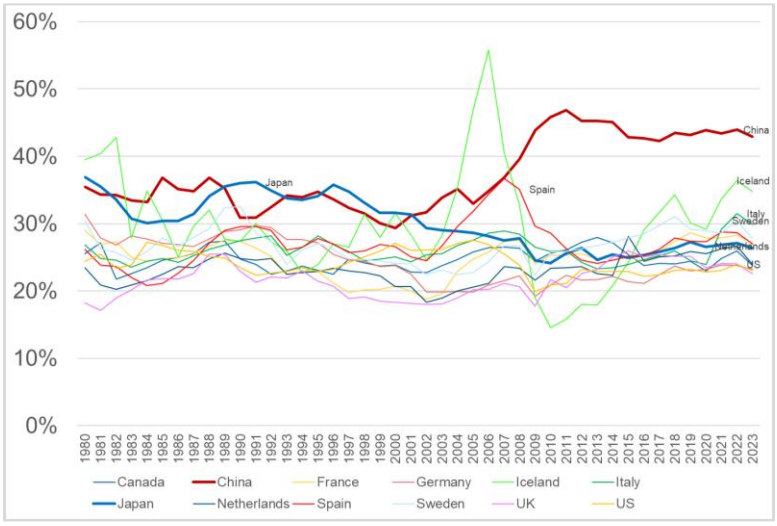
[8] The news articles are obtained from the CSMAR (China Stock Market and Accounting Research) database.

[9] We thank the authors for sharing the data.

IV. Investment Returns Experienced a Prolonged Recovery

In this section, we analyze the investment channel. Investment has been a central driver of China's economic growth over the past three decades, constituting at times as much as 40% of GDP, a share that is substantially higher than in other major economies worldwide (Figure 4) and second only to Iceland prior to the Global Financial Crisis. Japan, of course, also experienced a broad investment boom during its real estate bubble, spanning both housing and infrastructure. According to the investment overhang theory, investment accumulated during boom periods is absorbed only slowly during the bust because housing capital is highly durable. As a result, excess housing stock lingers, weighing on the market and discouraging new investment (Rognlie et al., 2018; Yang and Liu, 2020). This mechanism constitutes an important real channel through which real estate dynamics affect the broader economy and contribute to a prolonged recovery.

Figure 4. Investment Over GDP Ratio by Country



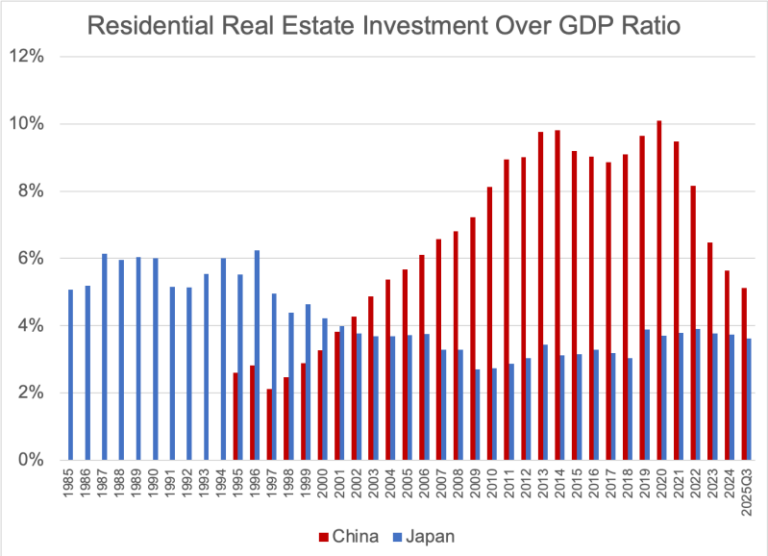
Sources: Penn World Tables 11.0 and authors' calculations
Notes: Investment includes both public and private investment, measured as a percentage of GDP.

4.1 The Sharp Real Estate Investment Slump

Both China and Japan experienced periods in which real estate investment, as a share of GDP, rose well above historical averages prior to their respective real estate crises. During these phases, returns to real estate steadily declined as investment became increasingly excessive and overinvestment emerged. Following the investment boom, both economies entered a prolonged period of running down the accumulated investment stock, accompanied by a very slow recovery before real estate investment

converged to a new equilibrium at levels substantially below those prevailing before the crisis. In Japan, this adjustment process lasted over a decade, whereas in China it is still ongoing (Figure 5).

Figure 5. Real Estate Investment in China and Japan[10]



Sources: National Bureau of Statistics of China, Cabinet Office of Japan, and authors' calculations

In the empirical section, we formally analyze how returns on real estate investment evolve over time and how that plays a role in explaining the prolonged nature of the crisis.

4.2 Empirical Strategy

We argue that changes in real estate investment returns could be a significant driver of macroeconomic dynamics during the crisis period, particularly in cities with a large cumulative stock of investment.

[10] For Japan, residential real estate investment is defined as residential fixed capital formation sourced from the National Accounts. China's official statistics report only aggregate fixed capital formation and do not provide a separate breakdown for residential fixed capital formation. Therefore, in the case of China, residential real estate investment refers to the residential component of fixed asset investment, which covers residential construction, land development, and land purchases.

The gap between China's fixed capital formation (FCF) and fixed asset investment (FAI) is well documented by the National Bureau of Statistics. Specifically, FCF includes: projects below 5 million yuan, appreciation from commercial real estate sales, and unofficial land improvement expenses, whereas FAI excludes the above items but includes land sales fees. A simplified reconciliation can be expressed as: $FAI + projects\ under\ 5m\ yuan + real\ estate\ sales\ appreciation + unofficial\ land\ improvement\ expenses - land\ sales\ fees = FCF$.

Although the fixed asset investment and fixed capital formation series differ conceptually, the quantitative gap between them is small. Over the period 2000–2024, the average difference between the two measures is less than 2 percent, suggesting that they are largely comparable for the purposes of our analysis.

However, exploring how real estate development affects growth around the crisis is challenging, as key factors such as investment are inherently correlated with and jointly determined by growth outcomes. To address this endogeneity issue, we construct a shift-share instrumental variable for real estate investment, combining national-level real estate investment growth in China (Japan) with the lagged city-level (prefecture-level) real estate investment ratio.

As the shock or 'shift' (in this case, national real estate investment growth) is uniform across cities, differences in exposure to the shock arise from variations in the 'shares' among prefectures. Those that have higher real estate investment to GDP ratios are typically more reliant on real estate. Consistent with other shift share measures in the literature (Goldsmith-Pinkham et al., 2020), our instrument, defined as the period t increase in national real estate investment times the period t-1 prefecture level real estate investment ratio, can be interpreted as the predicted exposure to real estate development in period t in each prefecture. To further mitigate endogeneity, we implement leave-one-out shifts when constructing the instrument. By excluding each observation from the computation of the aggregate shift that affects it, this approach reduces the mechanical correlation between the variable of interest and the outcomes, thereby improving identification.

With close to 300 Chinese prefecture-level cities within the sample, the growth in real estate investment at the national level is unlikely to be influenced by the GDP growth of any specific city. Therefore, it can be regarded as relatively exogenous for any individual prefecture. We examine the growth returns of real estate investment more formally, using the following regression framework.

$$RE_{i,t} = \alpha + \beta \times v_{i,t} + \Gamma \times v_{i,t} \times S_{i,t} \left(\sum_{h=1}^{k} T_h\right) + \Pi \times R_{i,t-1} + \omega_i + \delta_t + \varepsilon_{i,t} \quad (1)$$

$$y_{i,t} = a + b \times \widehat{RE}_{i,t} + \Gamma_1 \times \widehat{RE}_{i,t} \times S_{i,t} \left(\sum_{h=1}^{k} T_h\right) + \Pi_1 \times R_{i,t-1} + \omega_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

In stage I, we regress the real estate investment to GDP ratio $RE_{i,t}$, defined as annual residential real estate investment[11] divided by GDP, of city i in year t on observables and the instrument $v_{i,t}$. R is a vector of control variables, including lagged real GDP growth, population growth, population size, and per capita GDP.[12] ω and δ are city and time fixed effects, respectively, and ε is the error term. To examine how cumulative investment affects growth, we interact the instrument with the cumulative investment stock in a given city, expressed as $S_{i,t}$. A positive and statistically significant coefficient on this interaction term would indicate that higher cumulative investment constrains growth, consistent with an investment overhang mechanism (Rognlie et al., 2018; Gao et al., 2020).

[11] Real estate investment refers to the investment made by both public and private sectors in the construction of residential buildings. Data on prefecture-level real estate investment is collected from Japan's Cabinet Office. The series, compiled from input-output tables, dates back to 1955.

[12] Real GDP growth is calculated as nominal GDP growth minus CPI inflation. Population growth rate refers to the growth rate of population. Population size is the total population of a given prefecture, and Per Capita GDP is defined as GDP divided by population.

In the second set of specifications, we explore how the relationship between real estate investment and growth evolves over time, allowing us to capture dynamic effects and potential shifts in the investment-growth linkage around the crisis period. We include the interactions between our main variable and time-period dummies T_{h}. More specifically, T_1 equals one if time falls between 2009 and 2014, and zero otherwise. T_2 is a dummy variable for the period from 2015 through 2018, and T_3 representing the period from 2019 to 2024. These cutoff years are chosen because they likely correspond to structural breaks in real estate development. In particular, 2009 marks the launch of the RMB 4 trillion stimulus package in response to the GFC—equivalent to about 14 percent of China's GDP at the time—which triggered a major housing boom. The year 2015 coincides with the start of a multi-year shantytown reconstruction program totaling more than RMB 6 trillion, or roughly 9 percent of GDP, representing another significant structural shift. Finally, 2018-2019 is estimated to be the peak of China's housing production (Rogoff and Yang, 2020).

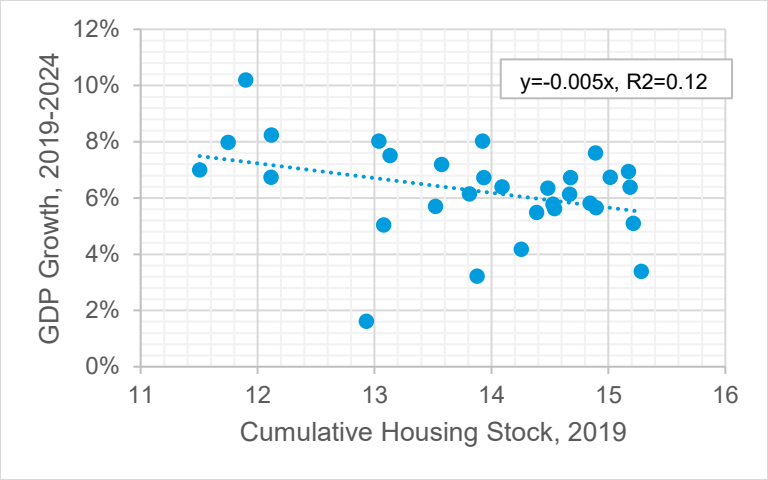
Similarly for Japan, $S_{i,t}$ symbolizes cumulative real estate capital accumulation, adjusted for inflation. Each T_{h} represents three consecutive years. T_1 equals one if time falls between 1985 and 1987, and zero otherwise. T_2 is a dummy variable for the period from 1988 through 1990, and so on, with k equal to 10 and T_{10} representing the period from 2008 to 2010. With 47 Japanese prefectures within the sample, the growth in real estate investment at the national level is unlikely to be influenced by the GDP growth of any specific prefecture. Therefore, it can be regarded as relatively exogenous for any individual prefecture. That said, given the outsized share of Tokyo and Osaka in the Japanese economy, we exclude these cities from the main regression.

In stage II, $y_{i,t}$ stands for the real GDP growth of prefecture i in year t, and $\widehat{RE}_{i,t}$ symbolizes the instrumented real estate investment ratio. Similarly, we include interaction terms. If the coefficients associated with the interaction terms differ significantly from zero, it provides evidence that the contribution of real estate investment to growth does change over time.

4.3 Investment Overhang Channel

The impact of investment overhang depends on the degree to which a city is overbuilt. We first provide suggestive evidence using a visual chart: cross-sectional patterns indicate that regions with larger cumulative housing stocks prior to 2019 tend to experience slower GDP growth in the subsequent period (Figure 6).

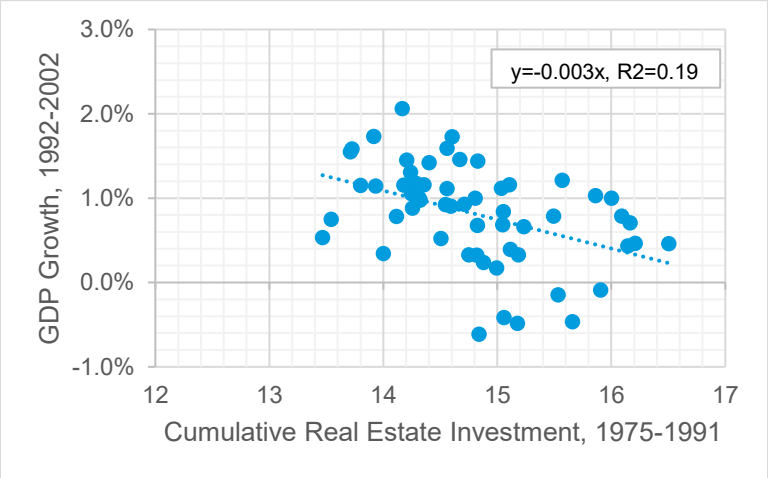
Figure 6. Cumulative Housing Stock and Subsequent GDP Growth: China



Sources: Bureau of Statistics of China and authors' calculations
Notes: The figure plots province-level cumulative housing stock in 2019 against average GDP growth from 2019 to 2024. Each point represents the aggregation of all prefecture-level cities within a province.

Similarly for Japan, we find a negative correlation between boom-period cumulative real estate investment, a close proxy for cumulative housing stock, and subsequent GDP growth during the housing bust (Figure 7).

Figure 7. Cumulative Real Estate Investment and Subsequent GDP Growth: Japan



Sources: Cabinet Office of Japan and authors' calculations
Notes: The figure plots prefecture-level cumulative investment stock from 1975-1991 against average GDP growth from 1992-2002. Each point corresponds to a prefecture in Japan.

We then formally test this relationship within a regression framework. In the first set of regressions, we include an interaction between the instrument and the level of cumulative real estate investment (Table 1). The negative coefficient on this interaction indicates that cities with higher cumulative investment, and consequently larger housing stocks, tend to grow more slowly relative to comparable cities over the sample period.[13]

Table 1. Cumulative Real Estate Investment and Growth: China

Variables	(1) Real GDP Growth
Instrumented Real Estate Investment Ratio	0.602***
	(0.156)
Instrument × Cumulative Real Estate Investment	-0.059***
	(0.020)
Lagged GDP Growth	0.215***
	(0.026)
Per Capita GDP	-0.096***
	(0.007)
Population Growth	0.012
	(0.036)
Urbanization Rate	0.002***
	(0.000)
Constant	0.300***
	(0.072)
Year Fixed Effects	Yes
City Fixed Effects	Yes
Number of Observations	5,980
R-squared	0.366

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

This finding is consistent with the notion that accumulated housing supply can generate an investment overhang that dampens subsequent economic performance. Taken together, these results suggest that the legacy of past real estate investment—reflected in the size of the cumulative investment stock—significantly affects local growth during downturns. This could also suggest that cities less burdened by an investment overhang may be better positioned to transition more quickly to a new growth model. Similar patterns are observed in Japan. (Table 2)

[13] We focus on reduced-form regressions and recognize that, within this framework, explicitly capturing the general equilibrium effects typically modeled in a structural or macro framework is challenging. Nonetheless, we hope to explore this avenue in future work.

Table 2. Cumulative Real Estate Investment and Growth: Japan

Variables	(1) Real GDP Growth
Instrumented Real Estate Investment Ratio	2.705***
	(1.094)
Instrument × Cumulative Real Estate Investment	-0.146**
	(0.069)
Lagged GDP Growth	-0.057**
	(0.026)
GDP Level	-0.115***
	(0.010)
Population Growth	-0.806***
	(0.296)
Constant	3.630***
	(0.349)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	1,931
R-squared	0.638

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

We proceed to examine the growth dynamics during housing boom-bust cycles and the results for China are presented in Table 3.[14] We find that a larger scale of real estate investment is associated with a significantly higher rate of growth, consistent with the fact that over the 21st century, real estate has served as a core component of China's investment-driven growth model. However, its positive effect on the economy has decreased remarkably over time, as suggested by the negative coefficients on the interaction terms. In other words, increased investment in the real estate sector, which historically drove growth, now contributes to slower growth over time.

More specifically, the returns on real estate investment fell by about a third in the post-GFC era, as indicated by the negative and statistically significant coefficient on the interaction term between real estate investment and the 09-14 period dummy. Quantitatively, when the real estate investment ratio rises by one standard deviation, the annual real GDP growth in that city is reduced by 0.8 percent, with a standard error of 0.3 percent, compared to the pre-GFC period. The returns flattened after the monetized settlements of shanty towns in 2016, as suggested by the small and insignificant coefficient on the interaction term with the 15-18 period dummy. Following the pandemic, the net growth effect of real

[14] Table 1-4 display the second-stage regression results. The first-stage F statistics, presented in Appendix II Tables 1-4, are greater than 10, indicating the appropriateness of the instrumental variable selection.

estate investment becomes negative, as shown by the negative coefficient on the interaction term with the 19-24 dummy. More specifically, when a city's real estate investment increases by one standard deviation, its annual real GDP growth declines by 2.3 percent, with a standard error of 0.6 percent, in comparison with the pre-GFC period.

Table 3. Real Estate Investment Returns in China

Variables	(1) Real GDP Growth
Instrumented Initial Real Estate Investment Ratio	0.381***
	(0.070)
Instrument × Period Dummy 2009-14	-0.143**
	(0.057)
Instrument × Period Dummy 2015-18	-0.008
	(0.089)
Instrument × Period Dummy 2019-24	-0.442***
	(0.097)
Lagged GDP Growth	0.215***
	(0.025)
Per Capita GDP	-0.096***
	(0.008)
Population Growth	0.008
	(0.036)
Urbanization Rate	0.002***
	(0.000)
Constant	0.313***
	(0.072)
Year Fixed Effects	Yes
City Fixed Effects	Yes
Number of Observations	5,994
R-squared	0.366

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

As China's real estate sector continues to undergo adjustment, Japan provides a benchmark case of a full boom–bust cycle. We therefore turn to an examination of the evolution of real estate returns during Japan's crisis to gain insight into the mechanisms through which real estate dynamics shape the subsequent recovery process. We re-estimate the regression models in Equations (1) and (2) using Japanese data, with the results reported in Table 4.

Table 4. Real Estate Investment Returns During Japan's Real Estate Boom and Bust

Variables	(1) Real GDP Growth
Instrumented Real Estate Investment Ratio	0.554*
	(0.304)
Instrument × Period Dummy 1985-87	0.641*
	(0.368)
Instrument × Period Dummy 1988-90	0.249
	(0.297)
Instrument × Period Dummy 1991-92	-1.271***
	(0.441)
Instrument × Period Dummy 1993-94	-1.372**
	(0.595)
Instrument × Period Dummy 1995-96	-0.823
	(0.636)
Instrument × Period Dummy 1997-98	-1.550***
	(0.582)
Instrument × Period Dummy 1999-01	-1.120*
	(0.675)
Instrument × Period Dummy 2002-04	-0.004
	(0.396)
Instrument × Period Dummy 2005-07	-0.470
	(0.501)
Instrument × Period Dummy 2008-10	0.967
	(0.767)
Lagged GDP Growth	-0.058**
	(0.027)
Per Capita GDP	-0.154***
	(0.015)
Population Growth	-0.733**
	(0.351)
Population Size	-0.077***
	(0.013)
Constant	2.993***
	(0.409)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	1,931
R-squared	0.636

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

With the rich set of interactions, Table 4 shows results on the evolving impact of real estate investment on economic growth during Japan's real estate boom and bust.

Following the burst of the bubble in the early 1990s, the interaction terms turn negative and statistically significant. The 1991–92 and 1993–94 subperiods show large and significant negative coefficients (−1.271 and −1.372, respectively), indicating that real estate investment became a drag on economic growth. This pattern continues through the late 1990s and early 2000s, with a further statistically significant decline observed in 1997–98 (−1.550, $p < 0.01$). These results suggest that not only did returns to real estate investment decline, but the sector became a significant impediment to recovery during the post-crisis adjustment phase.

Overall, the results provide strong empirical support for the hypothesis of declining and eventually negative returns to real estate investment around the time of Japan's housing bubble. This declining pattern—especially the prolonged negative contribution in the years following the crisis—underscores the long-lasting drag that real estate misallocation can exert on macroeconomic performance.

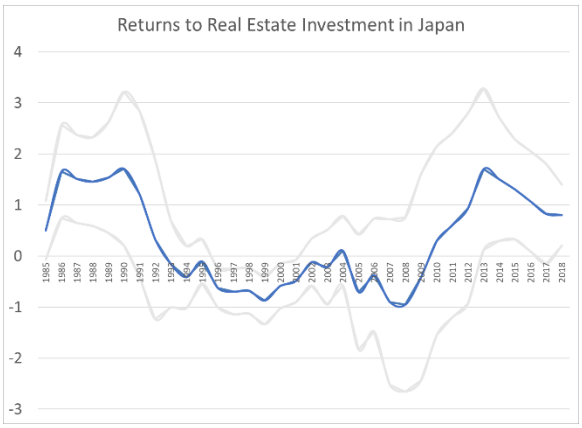
While we use a time-interaction framework to examine how the relationship between real estate investment and growth evolves over time, an alternative approach is to employ a rolling window structure. Following Guren et al. (2021), we estimate time-varying coefficients on the real estate investment variable using 10-year rolling window regressions. The resulting time-varying coefficients, shown in Figure 8 with 95 percent standard error bands, are consistent with our baseline results: returns to real estate investment have declined over time, slipping into negative territory in recent years.

Figure 8. Rolling Window Analysis of Real Estate Investment Returns in China

Sources: National Bureau of Statistics of China, CEIC, and authors' calculations

Likewise, for Japan, we implement the rolling window approach, and the results shown in Figure 9 are in line with our baseline regressions that use interaction terms with time period dummies, namely, the positive association observed in the pre-crisis years steadily weakens, turning negative during the early 1990s and stays at persistently low levels over the early 2000s, highlighting the prolonged and persistent nature of the real estate sector's drag on the broader economy. This lag in the rebound of returns to real estate investment relative to overall GDP recovery underscores the structural overhang created by the misallocation of resources during the boom years, which takes times to absorb and slows the recovery.

Figure 9. Rolling Window Analysis of Real Estate Investment Returns in Japan

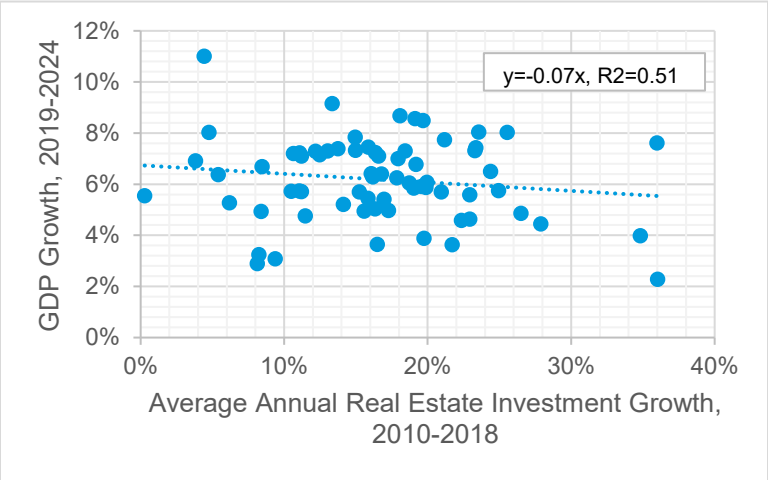


Sources: Cabinet Office of Japan, Statistics Bureau of Japan, and authors' calculations

4.5 Boom-Period Investment Indicative of Bust-Period Growth and Prices

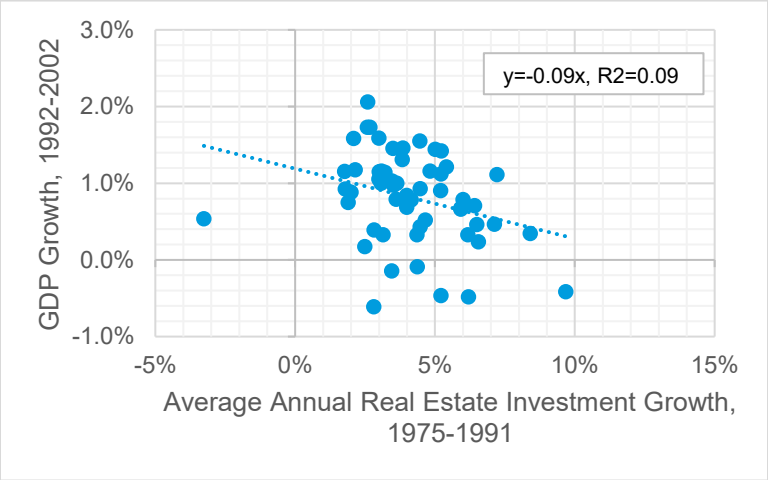
Rapid real estate investment during the boom not only hinders subsequent growth (Figures 10-11) but also exerts downward pressure on house prices. (Figures 12-13) We find that a 1 percent increase in real estate investment growth during the boom period (2010–2018) is associated with a 0.52 percent larger decline in house prices during the current bust in China. In part, the current fall in house prices reflects a correction following the unusually rapid expansion of the sector in preceding years (Chodorow-Reich et al., 2024). These price pressures may in turn affect consumption through sizable housing wealth effects (Mojon et al., 2025), given that housing wealth constitutes a lion's share of Chinese household savings, a channel which we examine more formally in the following section.

Figure 10. Real Estate Investment Growth and Subsequent GDP Growth: China



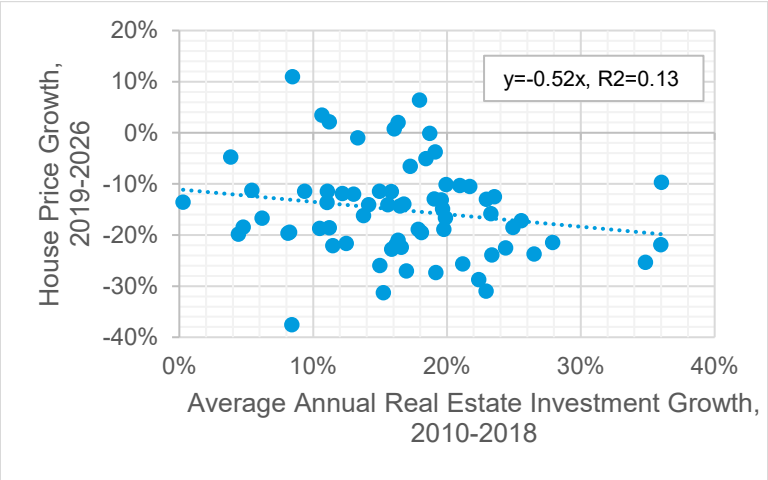
Sources: Bureau of Statistics of China and authors' calculations
Notes: The figure plots city-level average annual real estate investment growth rate in the period of 2010-2018 against average GDP growth from 2019 to 2024. Each point corresponds to one of the 70 large and medium-sized cities in China.

Figure 11. Real Estate Investment Growth and Subsequent GDP Growth: Japan



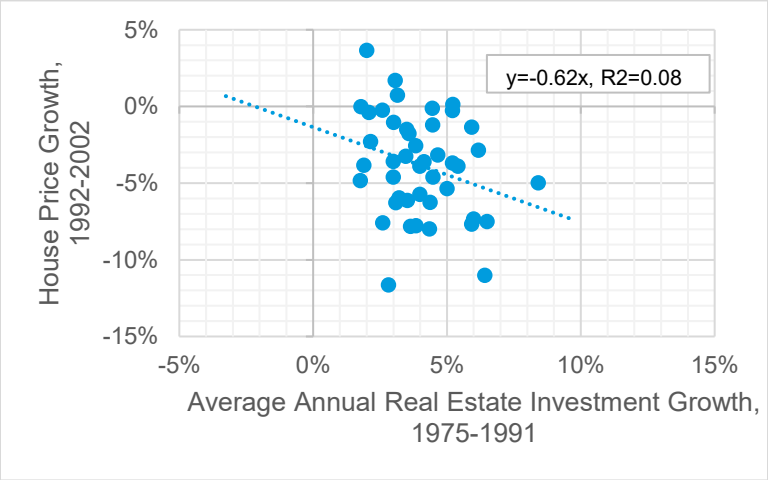
Sources: Cabinet Office of Japan and authors' calculations
Notes: The figure plots city-level average annual real estate investment growth rate from 1975-1991 against average GDP growth from 1992-2002. Each point corresponds to a prefecture in Japan.

Figure 12. Real Estate Investment Growth and House Price Changes: China



Sources: Bureau of Statistics of China and authors' calculations
Notes: The figure plots city-level average annual real estate investment growth rate in the period of 2010-2018 against house price growth from 2019 to January 2026. Each point corresponds to one of the 70 large and medium-sized cities in China.

Figure 13. Real Estate Investment Growth and House Price Changes: Japan



Sources: Cabinet Office of Japan and authors' calculations
Notes: The figure plots city-level average annual real estate investment growth rate from 1975-1991 against house price growth from 1992-2002. Each point corresponds to a prefecture in Japan.

V. Consumption Drag Worsened by Weak Sentiment

Consumption is intimately linked to the dynamics of the housing market, affected most crucially by the housing wealth effects that shape household spending decisions: house price appreciations can create a sense of increased household wealth, encouraging higher consumption, whereas declining house prices erode perceived wealth, prompting households to cut back on expenditures.

5.1 Disproportionate Housing Wealth

For average households, home ownership is not only a necessity for marriage expected especially of young men, but also an appealing financial asset given a record of robust capital gains and a lack of alternative investment instruments. The result is a housing market with valuations far exceeding those of other financial assets. As earlier Figure 2 demonstrates the market valuation of housing, stock, and bond assets in China, U.S. and Japan, respectively. Housing wealth now forms a far larger share of overall Chinese assets (including stocks, securitized loans and bank lending) than it does in the United States, accounting for nearly 70 percent of all assets compared to around 30 percent for the United States.

Given a disproportionately large housing wealth share in China, it is natural to expect that Chinese private consumption is significantly more sensitive to a decline in housing prices. A correction in housing prices would substantially reduce household spending, reflecting a classic housing wealth effect. In the next subsection, we formalize the analysis of this effect in China and Japan.

5.2 Empirical Strategy

Estimating the housing wealth elasticity is complicated by endogeneity issues: housing prices and economic activity influence each other, which can lead to a significant upward bias in ordinary least squares (OLS) estimates. Following Guren et al. (2021), we construct a sensitivity instrument by first measuring the historical responsiveness of local house prices to regional housing cycles and then combining these estimates with current regional house price shocks. Relying on a shift-share design in a panel framework, this method captures the housing wealth effects by comparing how economic activity reacts differently in cities like Harbin, which is characterized by heavy industrial reliance, versus Qingdao, a coastal city with a more diversified economic structure, when the Northeast region experiences a housing boom or bust. (Equation (3))

$$p_{i,j,t} = \alpha_{i+}\beta_i P_{j,t} + X_{i,j,t} + +\epsilon_{i,j,t} \tag{3}$$

In Equation (3), $P_{j,t}$ symbolizes the natural logarithm of annual change in regional house prices, while β_i captures the coefficient specific to each city. To account for the possibility that local house prices may respond to regional shocks through channels other than variations in housing supply elasticities, we also include city fixed effects.

The empirical analysis proceeds in two stages. In the second stage, we use $\beta_i P_{j,t}$ as an instrument for $p_{i,j,t}$, and the coefficient of interest in Equation (3), $\beta 3$, captures the housing wealth elasticity. Following Aladangady (2017), household consumption is measured using data from China's income and expenditure accounts, and it enters the regression as the natural logarithm of annual change.

$$y_{i,j,t} = \beta 1_{i+} \beta 2_{j,t} + \beta 3 p_{i,j,t} + X_{i,j,t} + \epsilon_{i,j,t} \quad (4)$$

5.3 Significant Wealth Effects

Following the approach of Saiz (2010)[15] and Guren et al. (2021), we estimate China's housing wealth effects and find point estimates of a consumption elasticity with respect to house prices ranging from 0.15 to 0.23, depending on the model specification (Table 5), and the results are statistically significant at the one percent level.[16] In economic terms, this corresponds to approximately 1.6 to 2.5 cents of consumption per yuan of housing wealth. Given the average cumulative decline in house prices of 20–40 percent nationwide, this implies a potential impact of 2–4 percent of GDP, with a standard error of 0.8 percent.

Table 5. Housing Wealth Effects in China

	Change in Consumption		
	OLS	Sensitivity Instrument	Saiz Instrument
Change in House Price	0.154***	0.151***	0.230***
	(0.032)	(0.034)	(0.050)
Controls	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes
Region-year Fixed Effects	Yes	Yes	Yes
Number of Observations	1247	1247	1247
R-squared	0.553	0.577	0.512

[15] The Saiz instrument is the local housing supply elasticity instrument based on geographic constraints, and it is one of the most widely used instruments in housing and urban economics.

[16] Despite differences in data and methodology, the magnitudes of our estimates of China's housing wealth effects are broadly comparable to those in Mojon et al. (2025). Specifically, they find that a 10 percent increase in house prices raises consumption by 1.6 percent, implying an elasticity of 0.16, while our estimate is roughly 0.15 (Table 5—Table 6 in the revised version, Column 1). However, their analysis focuses on a selected sample of individuals over a shorter period (2017–2023), whereas we use city-level data for approximately 300 prefectures, covering the period 2000–2024. They also discuss the investment channel, but from a micro perspective, emphasizing households' use of housing as an investment asset in China. In contrast, we examine the investment channel from a macro perspective.

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

In contrast to China, where land is state-owned, land in Japan is privately held, so fluctuations in land values directly affect household wealth. During the crisis, total land values in Japan fell sharply. Given the substantial size of land assets, this revaluation had profound effects on households, many of whom ended up with negative net worth. With mortgages exceeding the market value of their properties, households were forced to cut consumption to meet their debt obligations. Empirical evidence supports this channel: using the same sensitivity instrument, we estimate that on average, Japanese households' consumption responds to house price changes with an elasticity of 0.063—lower than in China but roughly comparable to the United States. (Table 6)

Since the estimated consumption elasticity with respect to house prices, β, can be mapped to a marginal propensity to consume out of housing wealth following the equation $MPC^H = \beta \times \frac{C}{W^H}$,[17] this decomposition helps to explain, in part, cross-country differences. In China's case, housing wealth represents a large share of household portfolios (roughly five times GDP), while consumption remains comparatively low (around 40 percent of GDP), implying a low $\frac{C}{W^H}$ ratio (as documented in Figure 2). Consequently, even if the underlying propensity to consume out of housing wealth is moderate, the large weight of housing in household balance sheets can mechanically amplify the sensitivity of consumption to house price movements.

Table 6. Housing Wealth Effects in Japan

	Change in Consumption	
	OLS	Sensitivity Instrument
Change in House Price	0.024**	0.063**
	(0.011)	(0.031)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1056	1056
R-squared	0.465	0.325

[17] Consistent with the literature, we estimate the housing wealth effect by regressing changes in consumption on changes in house prices. Specifically, we estimate the elasticity: $\beta = \frac{\partial lnC}{\partial lnP^H}$ where C denotes consumption and P^H denotes house price. To incorporate the size of the housing stock explicitly, we can convert the estimated price elasticity into the marginal propensity to consume (MPC) out of housing wealth using the following relationship: $MPC^H = \frac{\partial C}{\partial W^H} = \frac{\partial lnC}{\partial lnP^H} \times \frac{C}{W^H} = \beta \times \frac{C}{W^H}$, where W denotes housing wealth. For housing wealth, China's housing wealth to GDP ratio is estimated at around 5 and its consumption to GDP ratio is approximately 40 percent, taken together, the housing wealth to consumption ratio is roughly 12.5.

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

It is worth noting also that in the case of Japan's crisis, elevated land value constituted a major component of high stock prices, so although Japanese consumer wealth was more evenly distributed between stocks and housing than in contemporary China, there was likely a large indirect effect of the land price collapse through stock prices that might not be fully captured in Table 4 and is an area for future research.

5.4 The Negative Sentiment Channel

Even more concerning is the growing belief that house prices will continue to fall in China. This can reinforce negative sentiment among buyers and investors, causing them to delay consumption and investment, which in turn creates a self-reinforcing feedback loop. We acknowledge that compared to investment and consumption channels, the sentiment channel is more sociological and therefore much less explored. But complete picture needs to take into account that just as euphoric animal spirits can help sustain a boom, so too national psychological trauma, which can discourage an entire generation of youth, might help aggravate a deep recession. (Malmendier and Nagel, 2011)

The consumption decline could be larger than what is implied by the direct wealth effect if sentiment amplifies the response. We find some suggestive evidence of this effect in China: once we account for market sentiment, the housing wealth effects more than doubled. As shown in Table 7 Column 2, a one percent decline in house prices is associated with a 0.126 percent decline in consumption in the baseline specification. However, heightened pessimism increases this sensitivity by an additional 0.176, on top of the baseline effect, implying a substantially stronger overall consumption response to house price movements when pessimistic sentiment prevails and reinforces the wealth effect.

Table 7. The Sentiment Channel in China

	Change in Consumption	
	Sensitivity Instrument	Sensitivity Instrument
Change in House Price	0.151***	0.126***
	(0.034)	(0.104)
Change in House Price × Negative Sentiment		0.176***
		(0.066)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1247	1247

R-squared	0.577	0.552

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

We perform the same test for Japan and present the results in Table 8. Our empirical analysis reveals that, in Japan's post-crisis period, consumption growth is positively correlated with housing market sentiment. This finding indicates that as households anticipate further declines in house prices, they reduce consumption even more sharply, amplifying the downturn beyond what would be predicted by wealth effects alone.

Table 8. The Sentiment Channel in Japan

	Change in Consumption	
	Sensitivity Instrument	Sensitivity Instrument
Change in House Price	0.063**	0.028
	(0.031)	(0.031)
Change in House Price × Negative Sentiment		0.124*
		(0.073)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1056	1056
R-squared	0.325	0.374

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

We stress that ours is a first pass at measuring what we term the sentiment channel, so further work is needed, not only using different sensitivity instruments but potentially broader measures of negative public sentiment about economic prospects.

VI. Conclusions

Japan's housing bubble is generally considered to have peaked in the late 1980s and burst in the early 1990s, with its effects lingering for over a decade. In many ways, the country lived for decades in the shadow of that crisis—reflected in persistent low inflation and a policy framework shaped by a deflationary mindset, albeit there may have been a turn recently. While influential studies have documented the evolution of Japan's crisis (e.g., Hoshi and Kashyap, 1999; Caballero et al., 2008), earlier research was limited by data availability and, over time, was overshadowed by growing interest in the U.S. subprime mortgage collapse and the Global Financial Crisis. Today, with historical datasets reaching further back into the pre-crisis period and updated data covering developments through to the present, we are better positioned to understand the full trajectory of the crisis.

Unlike typical financial crises, Japan's housing bubble burst led to an exceptionally long period of recovery. This study aims to estimate the duration of the recovery, examine the macroeconomic adjustment mechanisms, and explore the factors that made certain cities more vulnerable to severe losses. Through this analysis, we aim to provide a historical perspective that can help inform our understanding of the ongoing economic adjustment in China.

Our analysis suggests that Japan's prolonged recession was likely driven by the interplay of slowing returns to investment, soft consumption, and negative sentiment that reinforced these weaknesses. All of these could happen even without a financial sector collapse. With some structural and cyclical characteristics closely resembling Japan's pre- and post-bubble conditions, China appears to be in the middle stages of a multi-year correction.

China's post-boom adjustment is unfolding in a more difficult macroeconomic and demographic context than Japan's.[18] The fact that it is a much poorer country relative to Japan at the outset of its crisis (see Figure 14) maybe significant, though the effect is unclear since evidence on income convergence among countries is quite mixed. That said, China still possesses several economic and institutional advantages that could help cushion the blow of a prolonged real estate downturn. In Japan's post-bubble era, the country's productivity growth was considered a binding constraint. (Hayashi and Prescott, 2002), a factor that does not appear to limit China in the same way. Amid the "Deepseek Moment", China is widely perceived as a frontrunner, along with the United States, in the ongoing global AI revolution, despite technological bottlenecks in semiconductors and other critical industries. Most crucially, China possesses

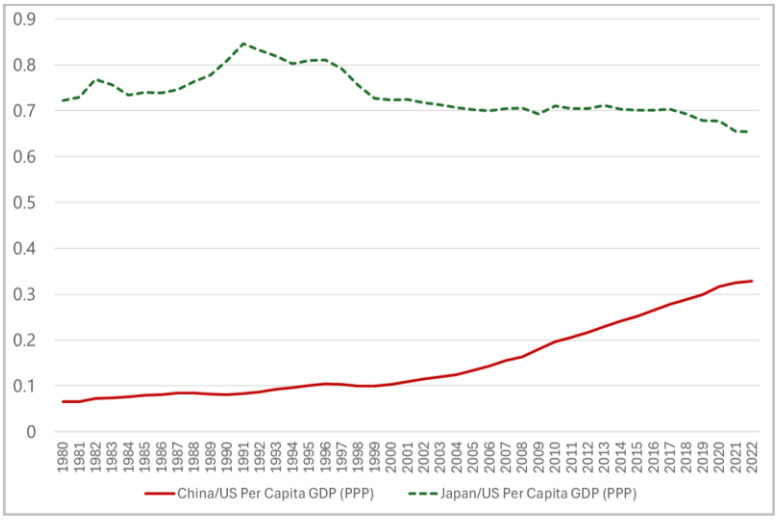
[18] Japan also experienced a housing boom-bust cycle in the 1970s. During this period, the country saw strong economic growth, rapid credit expansion, and sharp increases in land prices. However, a correction occurred following the 1973 oil shock, but was relatively short-lived, and growth quickly resumed. In other words, the 1970s adjustment was largely cyclical rather than structural.

By contrast, after the late-1980s bubble burst, Japan faced sluggish population growth and entrenched deflationary expectations—conditions that were more structural in nature and had lasting effects on the economy.

In China's case, the underlying issues in the housing market are also structural, rooted in demographic trends, oversized housing stock, and real estate-fiscal linkages, to name a few. For this reason, if one were to draw a parallel, we tend to view China's situation as more similar to Japan in the 1990s than to the cyclical adjustment of the 1970s.

a state-dominated financial system backed by implicit government guarantees and a highly proactive policymaking apparatus capable of large-scale interventions, which have thus far prevented the crisis from precipitating a financial sector breakdown.

Figure 14. China, Japan, and US Relative Per Capita Income



Sources: The Madison Project and authors' calculations

While China may be better equipped economically and institutionally to manage the crisis in the near term, the ultimate success of this strategy will depend on whether the economy can maintain productivity growth and restore real demand. (Muir et al., 2024) Without structural reforms to rebalance the growth model, the risk remains that today's managed adjustment could evolve into tomorrow's stagnation or instability, particularly if the current strength in areas such as electric vehicles, solar panels and ship-building turn out to run into export constraints, and these sectors, which remain still much smaller collectively than real estate and infrastructure, run into similar constraints that subsequently curtail investment.

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Annex I. Key Variable Definition and Sources

Appendix I Table 1. Variable Definition and Data Sources

Variable	Definition	Source
Real Estate Investment Ratio	The ratio of residential real estate investment over GDP	National Bureau of Statistics of China, Statistical Communique, Provincial Statistical Yearbooks, Cabinet Office of Japan, CEIC
Cumulative Real Estate Investment	The natural logarithm of total real estate investment in real terms	National Bureau of Statistics of China, Statistical Communique, Provincial Statistical Yearbooks, Cabinet Office of Japan, CEIC
Real GDP Per Capita	The natural logarithm of real GDP scaled by population	National Bureau of Statistics of China, Cabinet Office of Japan, Statistics Bureau of Japan, CEIC
Population Growth Rate	The growth rate of usual residence population	National Bureau of Statistics of China, Statistics Bureau of Japan, CEIC
Urbanization Rate	The ratio of urban resident population over total population	National Bureau of Statistics of China, CEIC
Population Size	The natural logarithm of total population	Statistics Bureau of Japan
Consumption	The natural logarithm of annual change in private consumption	National Bureau of Statistics of China, Cabinet Office of Japan, Statistics Bureau of Japan, CEIC

House Prices	The natural logarithm of annual change in house prices/land prices	National Bureau of Statistics of China, Cabinet Office of Japan, Statistics Bureau of Japan, CEIC
Housing Market Sentiment	Housing market sentiment index scaled by city-level news exposure	China Stock Market and Accounting Research, Baidu, CEIC
Housing Wealth	Housing stock multiplied by house price	National Bureau of Statistics of China, Statistical Communique, Provincial Statistical Yearbooks, Cabinet Office of Japan, CEIC

Annex II. Instrumental Regression First Stages

Annex II Table 1. First Stage Regressions for Table 1

Variables	(1) Instrumented Real Estate Investment
Real Estate Investment Ratio Instrument	0.689***
	(0.045)
Instrument × Cumulative Real Estate Investment	0.005
	(0.007)
Lagged GDP Growth	0.017***
	(0.005)
Per Capita GDP	-0.002
	(0.002)
Population Growth	-0.006
	(0.010)
Urbanization Rate	-0.000
	(0.000)
Constant	-0.014
	(0.017)
Year Fixed Effects	Yes
City Fixed Effects	Yes
Number of Observations	5,980
F statistic	63.146

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Annex II Table 2. First Stage Regressions for Table 2

Variables	(1) Instrumented Real Estate Investment
Real Estate Investment Ratio Instrument	1.017***
	(0.209)
Instrument × Cumulative Real Estate Investment	0.010
	(0.012)
Lagged GDP Growth	-0.012*
	(0.005)
GDP Level	-0.015***
	(0.002)
Population Growth	0.552***
	(0.073)
Constant	-0.276***
	(0.082)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	1,931
F statistic	132.262

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Annex II Table 3. First Stage Regressions for Table 3

Variables	(1) Instrumented Real Estate Investment
Real Estate Investment Ratio Instrument	0.668***
	(0.031)
Instrument × Period Dummy 2009-14	0.069***
	(0.028)
Instrument × Period Dummy 2015-18	0.069
	(0.053)
Instrument × Period Dummy 2019-24	0.023
	(0.040)
Lagged GDP Growth	0.015***
	(0.004)
Per Capita GDP	-0.002
	(0.002)
Population Growth	-0.009
	(0.010)
Urbanization Rate	0.000
	(0.000)
Constant	-0.006
	(0.017)
Year Fixed Effects	Yes
City Fixed Effects	Yes
Number of Observations	5,994
F statistic	57.792

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Annex II Table 4. First Stage Regressions for Table 4

Variables	(1) Instrumented Real Estate Investment
Real Estate Investment Ratio Instrument	1.135***
	(0.062)
Instrument × Period Dummy 1985-87	-0.019
	(0.039)
Instrument × Period Dummy 1988-90	0.142***
	(0.041)
Instrument × Period Dummy 1991-92	0.126***
	(0.036)
Instrument × Period Dummy 1993-94	0.102***
	(0.031)
Instrument × Period Dummy 1995-96	0.110**
	(0.043)
Instrument × Period Dummy 1997-98	0.111***
	(0.039)
Instrument × Period Dummy 1999-01	0.083***
	(0.022)
Instrument × Period Dummy 2002-04	0.047**
	(0.020)
Instrument × Period Dummy 2005-07	0.094***
	(0.025)
Instrument × Period Dummy 2008-10	-0.012
	(0.038)
Lagged GDP Growth	-0.007
	(0.005)
GDP Level	-0.022***
	(0.003)
Population Growth	0.595***
	(0.074)
Population Size	-0.009***
	(0.003)
Constant	-0.406***
	(0.090)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	1,931
F statistic	36.979

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Annex II Table 5. First Stage Regressions for Table 5

	Instrumented Change in House Price
Change in House Price	1.047***
	(0.079)
Controls	Yes
City Fixed Effects	Yes
Region-year Fixed Effects	Yes
Number of Observations	1056
F-Statistic	177.260

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Annex II Table 6. First Stage Regressions for Table 6

	Instrumented Change in House Price
Change in House Price	0.412***
	(0.068)
Controls	Yes
City Fixed Effects	Yes
Region-year Fixed Effects	Yes
Number of Observations	1056
F-Statistic	38.290

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

Appendix III. Robustness Tests

1. Testing Sensitivity to Dropping High-Weight Cities

Identification requires that national real estate investment is not driven by GDP growth in any single prefecture. To mitigate concerns that this assumption may be violated by high-weight prefectures, we exclude prefectures with disproportionate influence, such as Tokyo and Osaka, from the Japanese sample. Likewise, in China, our findings still hold after excluding Tier 1 cities, namely Beijing, Shanghai, Guangzhou, and Shenzhen.

Appendix III Table 1. Results Excluding Tier 1 Cities in China

Variables	(1) Real GDP Growth
Instrumented Initial Real Estate Investment Ratio	0.388***
	(0.073)
Instrument × Period Dummy 2009-14	-0.146**
	(0.058)
Instrument × Period Dummy 2015-18	-0.010
	(0.089)
Instrument × Period Dummy 2019-24	-0.450***
	(0.097)
Lagged GDP Growth	0.213***
	(0.025)
Per Capita GDP	-0.096***
	(0.008)
Population Growth	0.014
	(0.036)
Urbanization Rate	0.002***
	(0.000)
Constant	0.319***
	(0.072)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	5,901
R-squared	0.366

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

2. Including Additional Fixed Effects

While we estimate models with prefecture fixed effects to control for unobserved time-invariant heterogeneity, and year fixed effects to account for aggregate temporal shocks in our baseline regressions, we include more rigorous region–year fixed effects to absorb region-specific time-varying shocks in the robustness check. The estimated coefficients remain robust to this specification.

Appendix III Table 2. Results with Additional Fixed Effects in China

Variables	(1) Real GDP Growth
Instrumented Initial Real Estate Investment Ratio	0.437***
	(0.079)
Instrument × Period Dummy 2009-14	-0.210***
	(0.057)
Instrument × Period Dummy 2015-18	-0.044
	(0.078)
Instrument × Period Dummy 2019-24	-0.470***
	(0.089)
Lagged GDP Growth	0.175***
	(0.023)
Per Capita GDP	-0.104***
	(0.010)
Population Growth	0.013
	(0.044)
Urbanization Rate	0.001***
	(0.021)
Constant	0.263***
	(0.087)
Province-Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	5,994
R-squared	0.635

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

3. Mitigating Endogeneity in the Shares

Our shift-share instrumental variable design uses the lagged real estate investment ratio as the “share” variable. As an alternative, we employ the initial real estate investment ratio, defined as the average real

estate investment share over the preceding three years, to further mitigate endogeneity concerns, and the results remain robust (Appendix III Table 3)

Appendix III Table 3. Alternative Instrument for China's Real Estate Investment

Variables	(1) Real GDP Growth
Instrumented Initial Real Estate Investment Ratio	0.297***
	(0.082)
Instrument × Period Dummy 2009-14	-0.113*
	(0.058)
Instrument × Period Dummy 2015-18	0.077
	(0.098)
Instrument × Period Dummy 2019-24	-0.271***
	(0.087)
Lagged GDP Growth	0.212***
	(0.027)
Per Capita GDP	-0.097***
	(0.007)
Population Growth	0.004
	(0.037)
Urbanization Rate	0.002***
	(0.000)
Constant	0.316***
	(0.071)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	5,920
R-squared	0.371

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

4. Mitigating Endogeneity in the Shift

Part of the shift-share variation may capture common macroeconomic or policy shocks as well as persistent local trends. To alleviate these concerns, we identify variables correlated with the initial real estate investment share and present specifications that include interactions between these correlates and period dummies. The results remain robust to the inclusion of these additional controls.

Appendix III Table 4. Results Including Correlates with Initial Shares For China

	(1)

Variables	Real GDP Growth
Instrumented Initial Real Estate Investment Ratio	0.216***
	(0.084)
Instrument × Period Dummy 2009-14	-0.030
	(0.079)
Instrument × Period Dummy 2015-18	0.082
	(0.108)
Instrument × Period Dummy 2019-24	-0.345***
	(0.113)
Lagged GDP Growth	0.214***
	(0.025)
Per Capita GDP	-0.096***
	(0.008)
Population Growth	0.008
	(0.036)
Urbanization Rate	0.002***
	(0.000)
Per Capita GDP × Period Dummy 2009-14	-0.033***
	(0.005)
Per Capita GDP × Period Dummy 2015-18	-0.046***
	(0.008)
Per Capita GDP × Period Dummy 2019-24	-0.037***
	(0.008)
Population Growth × Period Dummy 2009-14	0.251*
	(0.134)
Population Growth × Period Dummy 2015-18	0.456***
	(0.173)
Population Growth × Period Dummy 2019-24	0.312**
	(0.134)
Constant	0.313***
	(0.072)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	5,994
R-squared	0.366

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

5. Using Alternative Instrumental Variable

The Saiz housing supply elasticity instrument has been widely adopted to estimate housing wealth elasticities (e.g., Saiz, 2010; Mian et al., 2013; Mian and Sufi, 2014). This instrument relies exclusively on variation in land availability and regulation, making it a relatively weak predictor of house price movements. The Saiz instrument gives an estimate of 0.230 for the housing wealth elasticity, and in

comparison, using the chosen sensitivity instrument produces an estimate that is considerably lower (Appendix III Table 5). However, since the Saiz instrument has been shown to correlate with other city characteristics (Davidoff, 2016), we base our baseline analysis on the more recently-developed sensitivity instrument.

Appendix III Table 5. Alternative Instruments for China's House Prices

	Change in Consumption	
	Sensitivity Instrument	Saiz Instrument
Change in House Price	0.151***	0.230***
	(0.034)	(0.050)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1247	1247
R-squared	0.577	0.512

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

6. Broadening the Definition of Investment

We adopt a broader definition of real estate investment that includes both residential and commercial real estate. The results, shown in Appendix III Table 6, are also statistically significant, indicating that the issues of overinvestment and subsequent declining returns are plaguing the commercial real estate sector as well.

Appendix III Table 6. Alternative Measures of China's Real Estate Investment

Variables	(1) Real GDP Growth
Instrumented Total Real Estate Investment Ratio	0.253***
	(0.052)
Instrument × Period Dummy 2009-14	-0.100**
	(0.047)
Instrument × Period Dummy 2015-18	-0.023
	(0.074)
Instrument × Period Dummy 2019-24	-0.201***
	(0.057)

Lagged GDP Growth	0.210***
	(0.023)
Per Capita GDP	-0.094***
	(0.007)
Population Growth	0.005
	(0.036)
Urbanization Rate	0.002***
	(0.000)
Constant	0.339***
	(0.072)
Year Fixed Effects	Yes
Prefecture Fixed Effects	Yes
Number of Observations	5,842
R-squared	0.365

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

7. Using Alternative Measures of Housing Market Sentiment

To measure attention to the housing market in China, we use the city-level Baidu search index, which tracks how frequently residents search for information related to the housing market. Instead of using the keywords that include general housing market news and policies, we focus specifically on house price-related search hits and the results remain broadly unchanged. (Appendix III Table 7A)

Appendix III Table 7A. Alternative Measures of Housing Market Sentiment: China

	Change in Consumption	
Change in House Price	0.126***	0.137***
	(0.104)	(0.104)
Change in House Price * Alternative Negative Sentiment Index	0.176***	0.104*
	(0.066)	(0.060)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1247	1247
R-squared	0.552	0.567

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

For Japan, sentiment is proxied using a diffusion index based on surveys of homebuilders, developers, real estate agents, and office leasing companies, as this measure is most closely related to conditions in the housing market. While the index plausibly captures expectations specific to the real estate sector, it may also reflect contemporaneous industry conditions and financing constraints, and thus could be endogenous to housing price dynamics. As a robustness check, we alternatively measure sentiment using household-based indicators, namely the OECD consumer confidence index, and the results remain largely unchanged. (Appendix III Table 7B)

Appendix III Table 7B. The Sentiment Channel in Japan

	Change in Consumption	
	Sensitivity Instrument	Sensitivity Instrument
Change in House Price	0.063**	0.027
	(0.031)	(0.031)
Change in House Price * Negative Sentiment		0.095*
		(0.056)
Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1056	1056
R-squared	0.325	0.392

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

8. Including Additional Controls

In addition to the log change in GDP, which reflects changes in income levels, we include population growth as an additional control, and the results continue to hold.

Appendix III Table 8. Housing Wealth Effects with Additional Controls: China

	Change in Consumption	
	OLS	Sensitivity Instrument
Change in House Price	0.150***	0.145***
	(0.030)	(0.030)

Controls	Yes	Yes
City Fixed Effects	Yes	Yes
Region-year Fixed Effects	Yes	Yes
Number of Observations	1274	1234
R-squared	0.553	0.591

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.

9. Sentiment and Population Growth

The sentiment may correlate with underlying fundamentals, including demographic trends, since declining population growth and population outflows could lead to negative sentiment about the housing market. To account for this, we regress the sentiment measure on population growth and find that weaker population growth is associated with more negative sentiment. We then plug the residual component—orthogonal to population dynamics—into our main regressions and the results remain robust. This seems to suggest that sentiment operated not merely as a reflection of demographic fundamentals, but as an independent propagation mechanism that reinforced and prolonged the slump.

Appendix III Table 9. Housing Market Sentiment and Demographic Trends: China

	Change in Consumption	
	Sentiment	Sensitivity Instrument
Population Growth	-1.077***	
	(0.352)	
Change in House Price		0.162***
		(0.033)
Change in House Price * Negative Sentiment		0.163**
		(0.065)
City Fixed Effects	No	Yes
Year Fixed Effects	Yes	Yes
Number of Observations	1234	1234
R-squared	0.046	0.557

Notes: Statistical significance is denoted as follows: *** p < 0.01, ** p < 0.05, * p < 0.1.