Bubble burst: Unravelling the contraction of the Chinese housing market

by

Paul Lemarchand

Soumission pour le prix du meilleur mémoire de finance et de trésorerie, décerné par l'Association Française des Trésoriers d'Entreprise (AFTE)

Civilité du rédacteur : Monsieur

Filière d'éducation : Mastère Spécialisé Stratégies Financières et Investissements Responsables (MS SFIR) à Audencia

Directeur de mémoire : Jad BAZIH

Titre : "Bubble burst: Unravelling the contraction of the Chinese housing market"

Date : 9 September 2024

Contents

Table of Illustrations

Summary

Following the liberalization of China's real estate market in the late 1990s, the Chinese housing sector experienced over two decades of nearly uninterrupted growth. The scale of the growth, with average property prices increasing fivefold over the period, led many economists to consider the Chinese property market as a housing bubble. In 2021, China's second-largest property developer Evergrande defaulted, triggering an unprecedented crisis in the country. In 2022, Chinese real estate sales prices experienced their most significant year-on-year decline. The downward trend persisted throughout 2023, showing no signs of reversing. By the end of 2023, more than half of China's top fifty developers had defaulted, marking the worst property market crisis in the country's history.

This thesis aims to understand the primary factors related to the contraction in China's housing market since 2021. The study seeks to address this research problem through two hypotheses: The first hypothesis states that the current contraction in the Chinese housing market is more severe than in past market corrections, and the second hypothesis suggests that key economic indicators in China remain closely correlated with residential property prices in the ongoing crisis. While there is extensive literature on the factors that have historically contributed to the growth in the Chinese property market, there has been limited research published on this crisis to date, because it is still an ongoing situation.

The methodology integrates both qualitative and quantitative analyses to address the thesis problem and the hypotheses. The qualitative analysis leverages expert opinions and post-mortem reports on past market corrections to draw parallels with the current crisis. The quantitative analysis tests the Pearson correlation between key economic indicators identified in the literature review – consumer sentiment, per capita income growth, and household leverage – and housing prices, to identify whether these factors are still related in the ongoing crisis. The analysis covers the period from mid-2021 to the first quarter of 2024.

The qualitative analysis focuses on analyzing previous corrections in the Chinese housing market, specifically those that occurred in 2008-2009 and 2015-2016. These periods were identified because they were marked by a slowdown in residential property investment. Key results include the following:

(1) The default of Evergrande was identified as triggering the market contraction, similar to how the global financial crisis affected the Chinese housing sector in 2008-2009, with the Real Estate Business Climate Index deteriorating rapidly after the event occurred. However, the ongoing crisis since 2021 is due to internal factors within the Chinese property sector and was not caused by the banking sector. The default of Evergrande followed the introduction of the "Tree Red Lines" policy, which introduced stringent capital and liquidity requirements for real estate companies.
(2) Similar to the Chinese property downturn of 2015-2016, an imbalance between supply and demand was identified. In 2015-2016, a continuation of urbanization and population growth eventually absorbed the excess supply in 2015-2016. However, China is now facing a shift towards population decline, causing a greater supply-demand imbalance, while very high construction supply continues to enter the market.
(3) The current crisis is more severe than in past market corrections, validating the first hypothesis. Not only has the drop in the change in housing property investment and prices surpassed all prior downturns, but the crisis is also more prolonged with no sign of recovery to date.

The quantitative analysis focused on testing the hypothesis that key economic indicators – consumer sentiment, per capita income growth, and household leverage – remain closely correlated with residential property prices during the ongoing crisis. The correlation analysis revealed strong positive relationships between residential property prices and the three indicators, validating the hypothesis, with all three Pearson correlation coefficients surpassing 0.80. The proposed explanation of the results is that as consumer sentiment in the housing market declines and disposable income growth slows down, households are likely to cancel or delay their home purchase, reducing their leverage but further exacerbating downward pressure on housing prices.

The findings from both the qualitative and quantitative analyses resonate strongly with the theoretical framework outlined in the literature, highlighting the complex interplay of factors influencing the Chinese residential property market. The qualitative analysis reveals that the current downturn is a result of both external shocks and internal market imbalances, while the quantitative analysis demonstrates the relation between economic indicators and housing prices. Together, these findings suggest that the Chinese housing market remains highly sensitive to shifts in economic conditions and investor behavior, with implications for future market stability.

The following recommendations are made to stakeholders: Homeowners and investors should diversify beyond real estate due to the ongoing market downturn, oversupply, and declining population growth in China. If investing in real estate, they should focus on markets with strong demand, such as Tier-1 cities. Rigorous due diligence on property developers is essential, especially when using the pre-sale system, which exposes homebuyers to risk if the developer defaults before project completion. Developers should prioritize conservative financial management, deleveraging, and rebuilding trust with homebuyers through transparency and quality. Policymakers should implement targeted measures to address the mismatch between demand and supply and promote sustainable urbanization. While broad interventions like reducing interest rates may provide relief, policy makers should address market dynamics to fully restore consumer sentiment in the housing market.

Introduction

To establish the relevance of the subject, I will start by introducing the historical context of the Chinese property market, tracing its evolution over time. In doing so, I will draw extensively on the historical insights provided by G. Rougier-Brierre and G. Jeannet in their 2009 report for the Institut Français des relations internationales (Ifri)[1]. This historical overview will provide a solid foundation for discussing the abnormality and significance of the recent events that have affected the Chinese housing property market.

For centuries, the majority of Chinese people lived in rural agricultural communities, residing in homes they built themselves on land that was collectively owned by the villagers. Until the late 1970s, less than 20% of the population lived in urban areas (National Bureau Statistics of China, 2024)[2]. At the time, even city residents typically did not own their homes but were instead allocated apartments by their employers, often state-owned enterprises or government ministries. In 1976, a change of leadership occurred after the death of Mao Zedong, whose 30 years of country leadership were characterized by poor land management and the absence of a real estate market. Mao's successor Deng Xiaoping distanced himself from strict communist ideology and pushed reforms to decollectivize agricultural land, transferring the responsibility for farming to individual households, which notably allowed farmers to make decisions about how to use their land, and to keep any surplus produce after meeting the production quotas. These reforms ultimately led to a significant boost in agricultural productivity, which had formerly been widely inefficient.

With fewer hands needed in agriculture, many rural workers began to migrate to urban areas in search of better employment opportunities. This trend coincided with a series of government reforms to encourage foreign investment and enable entrepreneurs to establish private businesses. Moreover, specific areas in a selection of coastal cities, including Shenzhen and Shantou, were designated as Special Economic Zones, granting them special financial, trade, and investment privileges, along with additional benefits from open

[1] G. Rougier-Brierre, G. Jeannet (2019). Urbanization and Real Estate Investment in China. Institut français des relations internationales (Ifri). https://www.ifri.org/sites/default/files/atoms/files/av22rougierjeannetgb.pdf
[2] National Bureau of Statistics of China (2024). Degree of urbanization in China in selected years from 1980 to 2023 [Graph]. In Statista. https://www-statista-com.audenciagroup.idm.oclc.org/statistics/270162/urbanization-in-china/

economic policies. Collectively, these reforms led to a surge in demand for low-skilled workers in urban areas, greatly accelerating the country's urbanization as agricultural workers migrated from rural areas to cities in search of employment opportunities. Between 1986 and 1998, new land reforms were applied to cities, transferring the right of use of state-owned land to private individuals. This allowed for property ownership, which in turn facilitated the development of a real estate market. In particular, the abolition in 1998 of free social housing in cities boosted home buying by private individuals, triggering a real estate boom in China that would continue well into the 21st century.

Between 1999 and 2007, investment in real estate development increased by 21.5 percent annually, citing a 2011 book by Joyce Yanyun Man of the Lincoln Institute of Land Policy[3]. Home ownership rates also increased substantially over the period, reaching 82.3 percent in 2007. In 2007, a new property law expanded the legal framework behind land use rights and improved the security of real estate transactions. While the Chinese property market suffered in 2008, notably with land values falling by one-third, the downturn was quickly overshadowed in 2009 when average real estate sale price grew 23% in one year according to data from the National Bureau of Statistics of China[4]. This recovery was supported by a fiscal stimulus from the Chinese government. Since then, average real estate sale price in China grew every single year between 2009 and 2021. Overall, between 1998 and 2021, the average sale price of real estate in China increased nearly fivefold, according to the same data from the National Bureau of Statistics of China.

However, researchers and economists foresaw that Chinese housing prices could not keep rising indefinitely. For over a decade, economists have repeatedly characterized the Chinese housing market as a "bubble" – a situation in which the prices of properties rise rapidly and to levels that are significantly higher than their intrinsic value, eventually leading to a "burst", when a sharp correction erases some or all the previously accumulated gains. In 2020, Thomas Orlik, Chief Economist at Bloomberg, published the book "China: The Bubble

[3] Man, J. Y. (Ed.). (2011). China's housing reform and outcomes. Cambridge, MA: Lincoln Institute of Land Policy.
[4] National Bureau of Statistics of China (2023). Average real estate sale price in China between 1998 and 2022 (in yuan per square meter) [Graph]. In Statista. https://www-statista-com.audenciagroup.idm.oclc.org/statistics/242851/average-real-estate-sale-price-in-china/

that Never Pops"[5], in which he explores the remarkable resilience of China's real estate market.

In July 2021, Evergrande, the second biggest Chinese property developer by sales, missed two coupon payments. Later that year in December, the giant – once considered "too big to fail" – defaulted on its obligations. Since then, more than half of China's top fifty developers have also defaulted according to a 2023 article by the Financial Times[6], marking the worst crisis in the country's history.

In 2022, Chinese real estate sales prices experienced the most significant year-on-year decline since the reforms of 1998, according to data from the National Bureau of Statistics of China[7]. While the housing market had always been the go-to medium for Chinese savers to store wealth, owning a house is now more likely to destroy wealth than create it. An August 2024 article by Financial Times[8] gave a discouraging but realistic picture of the Chinese real estate market: "New home sales by area were about half the level of three years ago on a rolling 12-month basis as of June [2024], and construction starts were down two-thirds from their peak in early 2021 despite multiple property support measures, according to Chen Long, founder of research group Plenum."

The unprecedented scale of the contraction in the Chinese housing market suggests that the bubble has finally burst, posing challenges and uncertainties for stakeholders including homeowners, investors, developers, and policymakers. Despite extensive literature on the historical developments of the Chinese property market, there is a gap – because this is an ongoing situation – in understanding the specific factors driving the current market correction. I have identified the following research problem: What are the primary factors related to the contraction in China's housing market since 2021?

I will employ both qualitative and quantitative methods to address the research problem. The qualitative approach was chosen to explore historical crises, leveraging insights

---

[5] Orlik, T. (2020). China: the bubble that never pops. Oxford University Press.
[6] Thomas Hale, Cheng Leng, Andy Lin, Hudson Lockett (October 2023). "How China's property crisis has unfolded, from Evergrande to Country Garden". Financial Times. https://www.ft.com/content/a387a533-5995-43a9-b472-ce5691969657
[7] National Bureau of Statistics of China (2023). Average real estate sale price in China between 1998 and 2022 (in yuan per square meter) [Graph]. In Statista. https://www-statista-com.audenciagroup.idm.oclc.org/statistics/242851/average-real-estate-sale-price-in-china/
[8] Joe Leahy, Thomas Hale (21 August 2024). China's $70bn property rescue plan limps off starting line. Financial Times. https://www.ft.com/content/9f4fc133-46b0-47f2-844b-1af9718bd90a

from expert opinions. The quantitative approach will be used to empirically assess correlations between key economic indicators and housing prices in China. This combination of methods ensures a balanced analysis, leveraging the strengths of both approaches to provide a better understanding of the causes of the crisis for all stakeholders.

The research faces several limitations. First, the qualitative analysis relies on expert opinions, primarily from emerging markets economists at AXA Investment Managers, which may introduce bias into the findings. Second, the relatively short timeframe in the quantitative analysis, spanning from mid-2021 to the first quarter of 2024, may affect the robustness of the conclusions. Lastly, the study on an ongoing crisis may overlook more recent developments that occurred after data collection, unlike a post-mortem analysis.

This thesis will be organized as follows: I will begin with a literature review, followed by the presentation of the research problem and hypotheses. Next, I will explain the rationale for selecting this subject and provide an overview of the current state of China's housing market, including a timeline of the crisis. Following this, I will detail the methodological approach used in the analysis. The thesis will present the qualitative analysis first, followed by the quantitative analysis. Afterward, I will synthesize the results and discuss the validation or refutation of the hypotheses. Finally, I will offer recommendations for stakeholders, including homeowners, investors, developers, and policymakers.

Literature Review

This literature review aims to identify the factors that contributed to the overvaluation of the Chinese property market, leading to a significant market correction after two decades of rapid and almost uninterrupted growth in housing prices. Through the analysis of existing research and data, this review will pinpoint the independent variables that will guide the subsequent qualitative and quantitative analyses. Moreover, this literature review will highlight the gaps in the literature in understanding China's ongoing housing crisis.

Financialization of the Chinese city and the Housing Presale System

In an article in Urban Geography titled "The long shadow of the state: Financializing the Chinese city"[9], Fulong Wu explores the concept of financialization within the context of Chinese urban development. While the Western model of financialization often emerges from market dynamics, in contrary the Chinese government took an active role in urban development. Various mechanisms such as land collateral, local government financial vehicles, shadow banking, and the securitization of local government debts are discussed as tools used by the state to financialize urban development.

The researcher explains that due to the tightening of direct financing approaches, including bank loans, developers have increasingly relied on alternative financing sources. This includes using the housing presale system, which allows them to sell properties before completion to generate capital. Property developers were engaged in a practice where they used funds from new clients (who paid for homes that were still under construction) to finance ongoing and future developments. This system has become a significant source of development finance, absorbing consumer credits and capital.

The 2009 article "Mortgage Prepayment and Default Behavior with Embedded Forward Contract Risks in China's Housing Market"[10] by Yongheng Deng and Peng Liu emphasizes the risk of such practices. Since properties are sold before construction is

[9] Wu, F. (2023). The long shadow of the state: Financializing the Chinese city. Urban Geography, 44(1), 37-58.
[10] Deng, Y., & Liu, P. (2009). Mortgage prepayment and default behavior with embedded forward contract risks in China's housing market. *The Journal of Real Estate Finance and Economics*, *38*, 214-240.

complete, this exposes homebuyers to forward contract risks, particularly the risk that developers may default on the contract or fail to deliver the property as agreed. The study also highlights that the value of the property (as reflected in the House Price Index) in the forward market is closely related to the likelihood of developer defaults, which can destabilize the entire financing structure. The study recommends that banks and policymakers consider these risks more carefully to improve the stability and efficiency of the housing finance system in China.

To summarize, these two studies find that if property developers default on their financial obligations, the situation would unravel significant negative consequences for both homebuyers and the housing property market. As I will develop in the next section through the study of recent literature, this situation has materialized, effectively starting the ongoing housing market contraction.

Introduction of the "Three Red Lines" Policy

Before examining studies related to the introduction of the policy, I will first provide necessary context. In 2020, a new reform titled the "Three Red Lines" policy introduced new capital and liquidity requirements for property developers, aiming to promote lower leverage and better financial management practices. The reform set minimum levels for the liability-to-asset, net-debt-to-equity, and cash-to-short-term-debt ratios, which real estate companies had to comply with by mid-2021. Real estate companies who had overleveraged their balance sheet, including Evergrande and other property developers, suffered liquidity crises after the introduction of the policy and defaulted on their financial obligations.

Xiaoling Chu, Yongheng Deng, and Desmond Tsang examined the impact of the new regulation in a 2023 article titled "Firm leverage and stock price crash risk: The Chinese real estate market and three-red-lines policy" [11], published in The Journal of Real Estate Finance and Economics. In the researchers' view, the stability of the Chinese real estate market will be improved in the long-term, as the new capital and liquidity requirements will force surviving property developers to develop better financial practices. However, given

[11] Chu, X., Deng, Y., & Tsang, D. (2023). Firm leverage and stock price crash risk: The Chinese real estate market and three-red-lines policy. The Journal of Real Estate Finance and Economics, 1-39.

decreasing sales revenue and higher financial burden, many developers may not survive the crisis in the short-term, further negatively impacting Chinese consumer sentiment.

As the studies presented in the "Financialization of the Chinese city and the housing presale system" section foresaw, the policy ultimately negatively impacted homebuyers who had paid for homes that were still under construction and could not recover their investment. Moreover, many homebuyers were concerned about the financial stability of the real estate company in charge with their investment following Evergrande's default. In the next section, I will relate Chinese consumer sentiment and housing prices through a study of literature.

Consumer and Investor Sentiment

In a 2023 article published in Sustainability[12] titled "Heterogeneous impacts of policy sentiment with different themes on real estate market: Evidence from China", Diandian Ma, Benfu Lv, Xuerong Li, Xiuting Li, and Shuqin Liu investigated how varying policy sentiments influence China's real estate market. Using text mining to construct sentiment indices from official and unofficial media sources, the study reveals that policy sentiment significantly affected real estate prices and volatility, with official media having a more substantial impact. Another approach is presented in a 2023 article titled "A sentiment index of the housing market in China: text mining of narratives on social media" by Enwei Zhu, Jing Wu, Hongyu Liu, and Keyang Li, published in The Journal of Real Estate Finance and Economics[13]. The researchers employed advanced text mining techniques on social media Weibo to analyze sentiment expressed in online discussions and found that they were positively correlated with property prices.

In a 2016 article in Cities[14] titled "Evaluating the risk of Chinese housing markets: What we know and what we need to know", Jing Wu, Joesph Gyourko, and Yongheng Deng examine the relation between housing prices and the income that can be generated from renting properties. This gives insights into the reasons for investment in the Chinese housing

[12] Ma, D., Lv, B., Li, X., Li, X., & Liu, S. (2023). Heterogeneous impacts of policy sentiment with different themes on real estate market: Evidence from China. Sustainability, 15(2), 1690.
[13] Zhu, E., Wu, J., Liu, H., & Li, K. (2023). A sentiment index of the housing market in China: text mining of narratives on social media. The Journal of Real Estate Finance and Economics, 66(1), 77-118.
[14] Wu, J., Gyourko, J., & Deng, Y. (2016). Evaluating the risk of Chinese housing markets: What we know and what we need to know. China Economic Review, 39, 91-114.

market: whether investors seek regular, stable rental income or capital appreciation from their property. The authors analyzed the price-to-rent ratios across various Chinese cities, noting that in many regions, housing prices have risen much faster than rents, indicating a focus on capital appreciation over rental yield. This discrepancy is often a signal of a housing bubble, where investors are less concerned with regular income from renting out the property and more with potential price increases. This finding induces significant risk, because if Chinese homeowners anticipate that real estate prices will decline in the future, they may rush to sell their properties, further accelerating the price decline. Therefore, consumer sentiment is all the more important in relation to housing prices.

There is a gap in literature in linking the finding of these studies – that consumer sentiment is correlated with property prices – with up-to-date data in the ongoing housing crisis, after major residential property developers defaulted on their obligations. In the following sections, I will do a literature review of other economic indicators that could be correlating with housing prices in China.

Per Capita Income Growth

In their 2013 article in Urban Policy and Research titled "Is there a bubble in the Chinese housing market?"[15], Christian Dreger and Yanqun Zhang had already found the evidence of a bubble in the Chinese property market by the end of 2009. The authors estimate the equilibrium value of real house prices by identifying a long-run relationship between housing prices and fundamental economic variables, using a panel cointegration approach. Their model includes real per capita income, real land prices, and real interest rates. With data from 35 major cities, the study estimates average housing market prices to be about 25% above equilibrium value by the end of 2009.

An important article titled "Demystifying the Chinese Housing Boom"[16] was published in the NBER Macroeconomics Annual by Hanming Fang, Quanlin Gu, Wei Xiong, and Li-An Zhou in 2016. The authors of the article found that the surge in housing prices

[15] Dreger, C., & Zhang, Y. (2013). Is there a bubble in the Chinese housing market? Urban Policy and Research, 31(1), 27-39.
[16] Fang, H., Gu, Q., Xiong, W., & Zhou, L. A. (2016). Demystifying the Chinese housing boom. NBER macroeconomics annual, 30(1), 105-166.

between 2003 and 2013 was accompanied by significant income growth, particularly in first-tier cities. However, the authors warned that high price-to-income ratios could pose risks if income growth slows, potentially triggering a market correction. This may explain the reason why the bubble continued to exist for this long, with continued income growth to support the increase in home prices. Therefore, in the scope of this thesis, it will be valuable to monitor the recent evolution of Chinese income growth relative to housing prices.

Household Leverage

A key topic closely related to consumer confidence and income growth is the level of risk households are willing to assume by taking on debt for real estate investment. In an article titled “Household savings and housing prices in China” and published in The World Economy[17], Junmin Wan supports the speculative saving hypothesis to link savings to housing prices. The theory suggests that households save more to invest in real estate assets in response to rising housing prices, expecting future capital gains from their investment.

The 2020 article "Assetization: The Chinese path to housing financialization"[18], published by Fulong Wu, Jie Chen, Fenghua Pan, Nick Gallent and Fangzhu Zhang in Annals of the American Association of Geographers, explores the risks associated with this model. Because Chinese households have taken significant leverage to invest in housing, this creates a vulnerability, especially if housing prices stop appreciating. In that scenario, households might decide to reduce their financial burden instead of continuing to invest in real estate, further straining the housing market. It will be valuable to monitor whether the correlation between household leverage and housing prices holds in the ongoing housing market contraction.

Housing Supply and Changing Population Dynamics

[17] Wan, J. (2015). Household savings and housing prices in China. The World Economy, 38(1), 172-192.
[18] Wu, F., Chen, J., Pan, F., Gallent, N., & Zhang, F. (2020). Assetization: The Chinese path to housing financialization. Annals of the American Association of Geographers, 110(5), 1483-1499.

The previously cited article "A real estate boom with Chinese Characteristics"[19] by Edward Glaeser, Wei Huang, Yueran Ma, and Andrei Shleifer examined the unique supply and demand dynamics of China's real estate market. On the supply side, the Chinese government plays a critical role by promoting construction and sales, leading to a massive building boom, particularly in less-developed cities. The authors conclude that while a housing crash is not inevitable, the future of China's real estate market heavily depends on the management of supply and housing prices. Considering the recent Three Red Lines policy and its impact on property supply, it will be essential to assess supply – the new space under construction in the market – after the policy shift.

In the introduction, I outlined the rapid urbanization of China in the 21st century, accompanied by a fast increase in home ownership. A 2019 survey by the People's Bank of China found that 96% of urban households owned their homes, with nearly 40% of them owning multiple properties. However, as China has become urbanized and its population has started to decrease because of the former One Child policy, there is less need for the constantly increasing influx in new properties.

As outlined in a 2018 article[20] titled "China's real estate market", authored by Chang Liu and Wei Xiong in The Handbook of China's Financial System, the One-Child Policy has significantly contributed to an aging population, which will eventually pressure housing demand, as older generations pass on their properties to fewer descendants. This demographic shift may affect long-term stability in China's real estate sector. The authors stress the importance of considering these demographic factors in understanding future property price dynamics. This demographic trend is another important indicator to consider in explaining the current market contraction.

Interest Rates and Monetary Policy

As discussed in the previous sections, Chinese home buyers speculate on property prices, expecting capital appreciation. However, property prices have a negative relationship with interest rates, as higher rates reduce the ability of potential new homebuyers to secure

[19] Glaeser, E., Huang, W., Ma, Y., & Shleifer, A. (2017). A real estate boom with Chinese characteristics. Journal of Economic Perspectives, 31(1), 93-116.
[20] Liu, C., & Xiong, W. (2018). China's real estate market. The Handbook of China's Financial System.

financing. A 2012 article titled "The effect of monetary policy on real estate price growth in China"[21], published in Pacific-Basin Finance Journal by Xiaoqing Eleanor Xu and Tao Chen, provides empirical evidence into the relation between Chinese interest rates and real estate prices. They find that, while property prices increased almost continuously since the opening of the Chinese real estate market, decreasing interest rates tends to accelerate subsequent home price growth, while increasing interest rates tends to decelerate it. These findings suggest that Chinese monetary policy actions are key drivers behind changes in real estate price growth in China.

However, during a real estate crisis, the negative correlation between housing prices and interest rates may not hold, as the central bank might ease its monetary policy in response to falling property prices in an attempt to stabilize the market. Therefore, it would be difficult to identify the causes and monitor the impact of interest rates in the ongoing crisis.

Conclusions and Gaps in Literature

This literature review has identified various factors contributing to the current state and outlook of the Chinese housing market, emphasizing key elements that will shape its trajectory. Because the market correction is an ongoing situation, there is a gap in literature relating the following indicators to the housing market crisis the country has been facing since 2021. This thesis aims to address these gaps in the next sections, by identifying the independent variables that have the most explanatory power in a linear regression model, that will be conducted as part of the quantitative analysis.

There is extensive literature on the historical growth of the Chinese property market, as well as on the factors that have historically contributed to this growth. However, a gap in literature remains in understanding the current market correction. Given that this situation is still unfolding, there has been limited research published on this ongoing crisis to date. There is also a significant gap in understanding the potential trajectories of the Chinese housing market, with virtually no research yet published on the subject.

[21] Xu, X. E., & Chen, T. (2012). The effect of monetary policy on real estate price growth in China. Pacific-Basin Finance Journal, 20(1), 62-77.

Research Problem and Hypotheses

Since 2021, the Chinese property market has been experiencing its biggest contraction in history, marked by the default of major property developers and declining housing property prices. The correction has been driven by a substantial policy shift and macroeconomic changes. As stated in the conclusion of the literature review, there has been limited research published on this ongoing crisis to date, and thus there is a significant gap in understanding market correction and its potential future trajectories. This contraction presents considerable challenges and uncertainties for both Chinese homeowners and policymakers. The thesis can also provide valuable insights to investors, considering the risks associated with this discouraging landscape.

Research Problem

I have identified the following primary research problem: What are the primary factors related to the contraction in China's housing market since 2021? This thesis aims to fill gaps in the existing literature by analyzing up-to-date data, connecting it with historical data from past crises and previous studies, and providing insights into the current situation to assist stakeholders – including property developers, investors, and regulators – navigate this challenging market environment.

Hypotheses

This thesis seeks to address the research problem by drawing parallels between historical residential property market downturns and past and current literature with the ongoing housing crisis in China. The aim is to demonstrate that historical patterns can inform the current situation. I have formulated the following hypotheses that will guide the research. These hypotheses are based on the findings of the literature review.

1. The first hypothesis states that the current contraction in the Chinese housing market is more severe than in past market corrections, qualitatively analyzing residential property investment, and supply and demand dynamics.

2. The second hypothesis states that the following economic indicators in China remain closely correlated with the Chinese residential property prices in the ongoing crisis:
    a. Consumer sentiment
    b. Per capita income growth
    c. Household leverage

Presentation of China's Housing Property Market

Rationale for Choosing the Subject

The initial reason for choosing a subject relating to property markets was to expand the knowledge I've acquired in my apprenticeship as a real estate credit analyst at AXA Investment Managers. I wanted to focus my thesis on a crisis to better my comprehension of risk factors within property markets. When I started working on my thesis in November last year, I had a broader research focus across multiple crises in different property markets. However, because each market has its own specificities and is influenced by its own internal factors, it was impossible to concentrate on one research question. It is for this reason that I decided to focus the research on one country.

There are two reasons why I have ultimately picked the Chinese property market. The first reason is that it is an ongoing crisis, providing an opportunity to make a valuable contribution through my research by examining a subject which is still not well understood in the academic literature. By exploring the potential trajectories of the Chinese housing market, I aim to address significant gaps in the existing literature, as there is virtually no research currently available on this topic. The second reason is that I will be relocating to China in October after completing my thesis. Therefore, gaining an in-depth understanding of the Chinese property market will not only enhance the relevance of my research but also better prepare me for the job I will be occupying in the country.

Characteristics of China's Housing Property Market

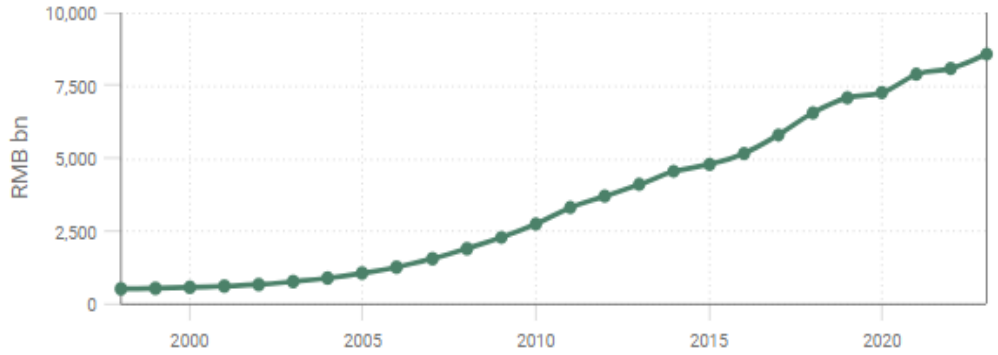
In 2023, the revenue from commercialized real estate sold in China was ¥11,662 billion[22], of which ¥10,299 billion (88%) originated from the sale of residential properties[23].

[22] National Bureau of Statistics of China (2024). Sales revenue from commercialized real estate sold in China from 2013 to 2023 (in billion yuan) [Graph]. In Statista. https://www-statista-com.audenciagroup.idm.oclc.org/statistics/243235/revenue-from-commercial-and-residential-real-estate-sold-in-china/

[23] National Bureau of Statistics of China. (2024). Revenue from residential real estate sold in China between 2013 and 2023 (in billion yuan) [Graph]. In Statista. https://www-statista-com.audenciagroup.idm.oclc.org/statistics/243239/revenue-from-residential-real-estate-sold-in-china/

The Gross Value Added (GVA) is a measure of the total value added by the Chinese construction sector, including construction and development activities. The following chart illustrates how the Chinese construction industry has grown from virtually nothing in the early 1990s to a GVA of ¥8,569 billion in 2024.

Chart 1: Yearly GVA in the Construction Sector in China

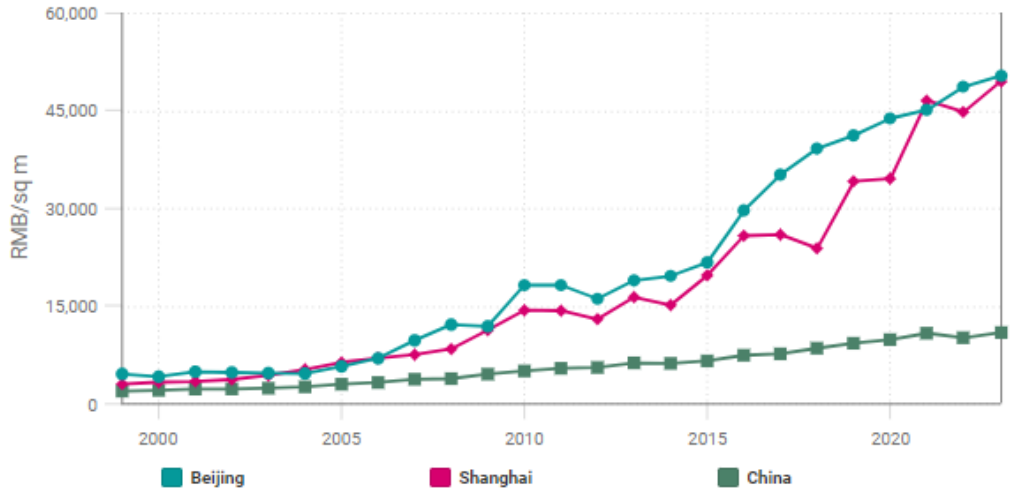


Source: CEIC Data, National Bureau of Statistics of China

Chinese cities represent the bulk of this construction activity, a need that emerged in relation to the rapid urbanization experienced in China in the past decades. They are characterized by a very high ownership rate of 96%, according to a 2019 survey by the People's Bank of China, as reported by Liao Shumin at Yicai Global[24]. 40% of these homeowners also owned a second property. Residential properties in China, often consisting of high-density housing apartments, have long been considered the safest investment for Chinese people to store their savings. This has led to consistently increasing residential property prices in the most advanced "Tier-1" cities, including Beijing and Shanghai, as illustrated below.

[24] Liao Shumin (April 2020). "China Is Likely First Country to Reach 96% Urban Home Ownership, PBOC Says". Yicai Global. https://www.yicaiglobal.com/news/china-is-likely-first-country-to-reach-96-urban-home-ownership-pboc-says

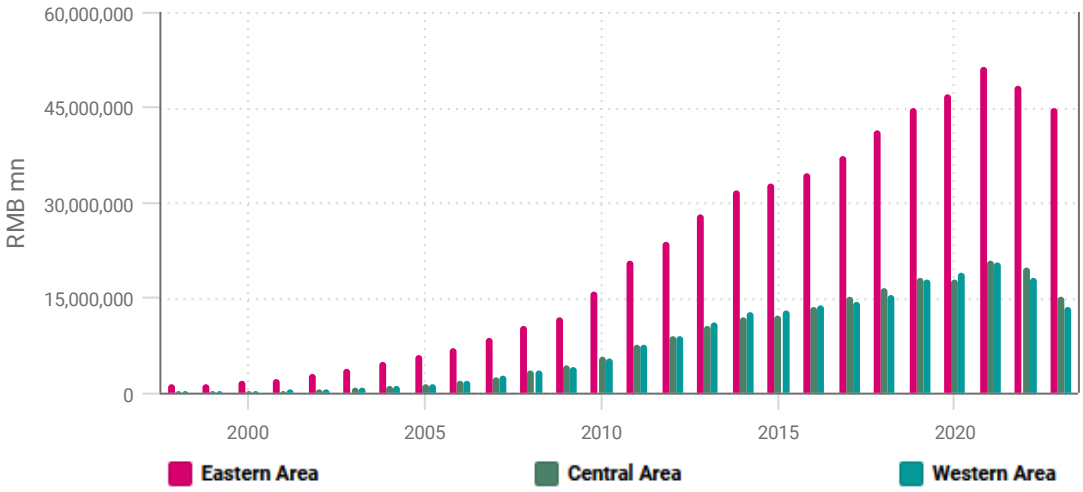
Chart 2: Average Home Price per Square Meter in Beijing, Shanghai, and China



Source: CEIC Data, National Bureau of Statistics of China

A significant portion of the Chinese residential property market growth has been concentrated along the Western coast, which contains the most developed areas in mainland China, with cities such as Beijing, Shanghai, Tianjin, Guangzhou, and Shenzhen. These major cities have attracted the majority of real estate investment in the country, with Eastern and Central areas of the country trailing behind, as illustrated below.

Chart 3: Real Estate Investment in China, by Area



Source: CEIC Data, National Bureau of Statistics of China

The majority of Chinese homebuyers prefer new, modern apartments to second-hand homes. In May 2024, a Reuters article titled “Swap old for new: China's latest property market plan off to a poor start” [25] detailed how 50 Chinese cities launched schemes to incentivize homeowners to trade in their existing homes for new developments. However, the initiative fell short due to low demand for second-hand homes. According to a survey by the Zhuge Real Estate Data Research Centre, the number of properties listed for sale was 20 times higher than the number of transactions across 14 surveyed cities, underscoring the low attractiveness of aging second-hand properties in Chinese cities.

A negative externality of the rapid urbanization in China is that many rural areas were left out. These are riddled with vacant properties and inefficient land use, as presented in a 2010 article published by Hualou Long, Yansui Liu, Xiubin Li, and Yufu Chen in Land use policy[26]. The researchers also discussed how new policies were introduced by the Chinese government as a means to balance urban and rural growth, however such reforms have come short at curbing the phenomenon. The important construction of buildings in rural land despite declining population in these areas exacerbated the vacant property rate.

Timeline of the Chinese Housing Market Crisis

In August 2020, the Chinese government introduced the "Three Red Lines" policy to curb speculative practices of property developers who had taken excessive leverage to fund their operations. This policy, which took full effect in 2021, imposed strict financial thresholds on real estate companies, requiring them to adhere to three key ratios: 1) liabilities must not exceed 70% of assets, 2) net debt must not surpass 100% of equity, and 3) cash reserves must cover at least 100% of short-term debt. These measures were designed to mitigate financial risks and encourage more sustainable growth within the real estate sector.

In July 2021, property developer giant Evergrande, the second biggest property developer by sales revenue in China at the time, with ¥704 billion of sales in 2020, missed two bond coupons. The same month, property developer Sichuan Languang (¥104 billion of

[25] Liangping Gao, Clare Jim (May 2024). “Swap old for new: China's latest property market plan off to a poor start”. Reuters. https://www.reuters.com/markets/asia/swap-old-new-chinas-latest-property-market-plan-off-poor-start-2024-05-16/

[26] Long, H., Liu, Y., Li, X., & Chen, Y. (2010). Building new countryside in China: A geographical perspective. Land use policy, 27(2), 457-470.

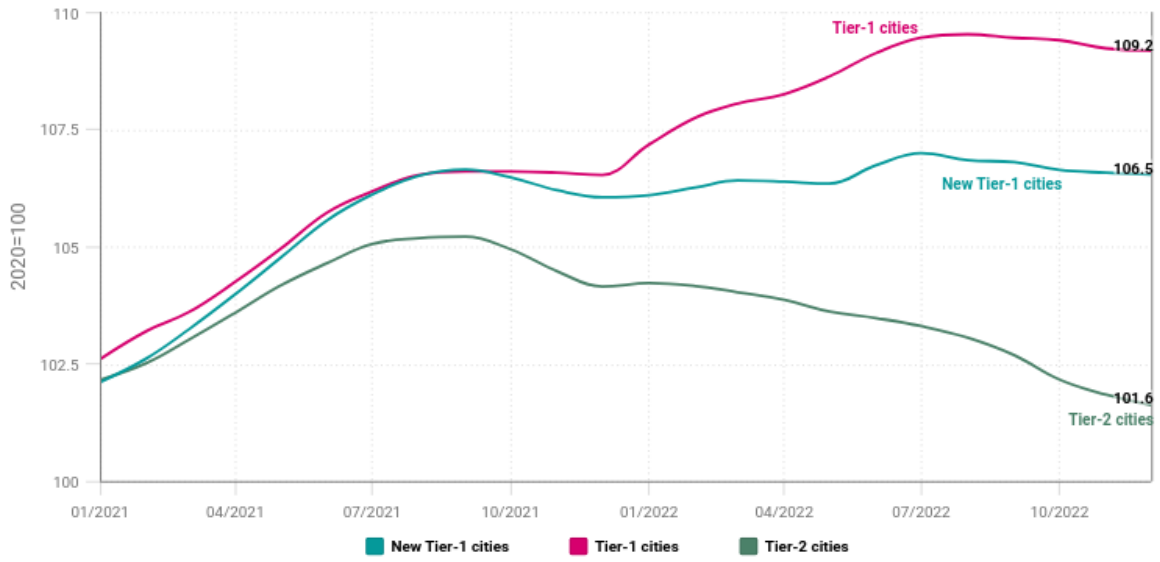
sales in 2020) defaulted on a bond payment, followed by two more similar-sized property developers in the following months: Sinic and China Fortune Land.

In December 2021, Evergrande announced that it would restructure its debt, after rating agency Fitch declared it in default. At the time, many economists feared a spillover effect on the Chinese economy. In March 2022, the company suspended trading in its shares, with banks seizing ¥13.4 billion of deposits from the company. In May 2022, Sunac, the third biggest property developer by sales revenue at the time (¥575 billion of sales in 2020), also defaulted. Many other smaller developers defaulted over the course of the year, raising doubts on the ability of developers to finish projects, which were typically sold on a pre-sale basis, where residential units are sold before they are constructed.

As a result, in mid-2022, hundreds of thousands of buyers halted mortgage payments on more than 200 unfinished property projects in China (Cheng Leng at Financial Times, 2022).[27] Protests of rare scale for China were shown in this 2022 Reuters article by David Kirton[28].While property prices started to decline in most cities over the course of the year, the most supply-constrained cities (so-called “Tier-1” and “New Tier-1”), with high density and strong demand for residential real estate, continued to grow as illustrated below.

Chart 4: Property Prices for Tier-1, New-Tier-1, and Tier-2 Cities for Newly Constructed Residential in Years 2021-2022

[27] Cheng Leng (July 2022). Chinese regulators rush to tame investor panic over mortgage boycotts. Financial Times. https://www.ft.com/content/1fab4b10-5e8e-4c94-8d19-d62f56044a91
[28] David Kirton(2022). 'Return our money!' Evergrande investors protest at office of Chinese developer. Reuters. https://www.reuters.com/markets/rates-bonds/evergrande-return-our-money-investors-protest-office-chinese-developer-2022-01-04/



Source: CEIC Data, National Bureau of Statistics of China

During the first half of 2022, Country Garden, China's largest property developer, experienced a 44% drop in sales, compared to the same period the previous year. Given the uncertainty of the sector, the number of transactions fell sharply, with few buyers willing to risk their luck, especially on a pre-sale basis.

In August 2023, Country Garden delayed payment on a bond, and suspended trading on 11 other onshore bonds. It warned that it was on the brink of default, saying in a filing that it had "failed to grasp and react to the risks of the ongoing real estate slump, most notably in smaller cities that are home to most of its developments.", as reported by Lily Kuo at The Washington post[29] the same month. The company defaulted on a dollar-denominated bond in October. As reported by Financial Times in October 2023, more than half of the former Chinese 50 biggest property developers have gone into default (Financial Times, 2023)[30].

In the year 2023, the Chinese government started to soften its stance on the real estate sector, announcing a series of support measures in an effort to regain market sentiment. This included extending the repayment of some loans for property developers, as reported by

[29] Lily Kuo (August 2023). China's largest property developer at risk of default. The Washington Post. https://www.washingtonpost.com/world/2023/08/31/china-country-garden-default-warning/
[30] Thomas Hale, Cheng Leng, Andy Lin, Hudson Lockett (October 2023). "How China's property crisis has unfolded, from Evergrande to Country Garden". Financial Times. https://www.ft.com/content/a387a533-5995-43a9-b472-ce5691969657

Bloomberg in July[31], and reducing required down payments and slashing interest rates on new mortgages for Chinese homebuyers, as reported by CNN in September[32]. However, sales continued to decrease year-over-year.

In May 2024, an unprecedented support package was announced, as reported by Clare Jim at Reuters the same month.[33] The package includes reducing down payment requirements, removing minimum mortgage rates, allowing state-owned firms to buy unsold apartments for social housing, setting up a 300 billion yuan relending facility to support these purchases, and enabling local governments to repurchase unused land from developers to improve their cash flow. However, the measures still disappointed investors, as reported by Reuters in another article.[34] It is currently difficult to assess the effectiveness that these measures will have and their implication for the broad Chinese residential real estate sector.

In the next section, I will outline the methodology I will use to better understand the factors related to the residential real estate crisis in China, through an analysis of past crises and the identified economic indicators in the literature review.

[31] July 2023. "China Signals More Economic Aid After Property Debt Relief". Bloomberg News. https://www.bloomberg.com/news/articles/2023-07-10/china-to-extend-policies-to-support-ailing-property-market

[32] Laura He (September 2023). "China takes aim at real estate crisis with new measures to boost economy". CNN. https://edition.cnn.com/2023/09/01/economy/china-mortgage-stimulus-intl-hnk/index.html

[33] Clare Jim (May 2024). "Explainer: China's latest property market support package - its contents and what's at stake". Reuters. https://www.reuters.com/world/china/chinas-latest-property-market-support-package-its-contents-whats-stake-2024-05-23/

[34] Clare Jim, Xie Yu (May 2024). "China's property support measures disappoint". Reuters. https://www.reuters.com/markets/asia/most-chinese-developers-shares-fall-despite-latest-support-measures-2024-05-20/

Methodological Approach

This study integrates both quantitative and qualitative research methods to provide a comprehensive understanding of the research problem. In the "Research problem and hypotheses" section, I have identified multiple hypotheses, to be analyzed through either qualitative or quantitative analysis, whichever is most appropriate.

Methodological Approach for the Qualitative Analysis

As outlined in the "Research problem and hypothesis" section, I formulated the hypothesis that the current contraction in the Chinese housing market is more severe than in past market corrections, which can be assessed through a qualitative analysis of these historical events.

For this analysis, I will draw upon the publicly available report titled "Brick by Brick: Unravelling China's Property Puzzle" by my AXA Investment Managers colleague Yingrui Wang, China Emerging Market Economist. This report provides an in-depth exploration of the origins of the current situation in China's property market. Additionally, I have the opportunity to consult directly with our team of emerging market economists, which will be invaluable in assisting my analysis of historical corrections in the Chinese housing market. Some key themes that are addressed in the report include:

- Insights into the previous corrections in the Chinese residential property market, and parallels with the current situation,
- Assessment of the crisis's scale, along with an analysis of overall sentiment regarding the future developments in the Chinese property market.

The data that I will be using to analyze historical market corrections and draw parallels with the ongoing market will be sourced from CEIC Data[35]. I have chosen this provider because of its extensive macroeconomic data offer on China, aggregating data from different Chinese public agencies including the National Bureau of Statistics, the National

[35] Global Economic Data, Indicators, Charts & Forecasts | CEIC (ceicdata.com)

Administration of Financial Regulation, The People's Bank of China, as well as independent surveyors such as the Switzerland-based Bank for International Settlement. By cross-referencing data from different sources within CEIC Data, I can enhance the reliability of the information and minimize the risk of bias that could arise from relying on a single data source in the qualitative analysis.

To identify historical corrections in the Chinese housing market, I will analyze a historical chart of residential real estate investment, focusing on troughs where investment growth is either flat or negative, signaling a perceived market correction by investors and developers. Additionally, the qualitative analysis will examine supply and demand dynamics, as well as the real estate business climate.

Methodological Approach for the Quantitative Analysis

In the "Research problem and hypothesis" section, I formulated the hypothesis that the following indicators in China continue to be correlated with the Chinese residential property prices in the ongoing crisis:

a. Consumer sentiment
b. Per capita income growth
c. Household leverage

I will also be using CEIC Data for the quantitative analysis, the main data provider that I will be using in the qualitative analysis. I have chosen this provider because of its extensive macroeconomic data offer on China, which can provide all the above independent variables identified in the literature review and formulated in the hypothesis. I will analyze data from the second quarter of 2021 through the most recent available data in the first quarter of 2024, providing three years of data. There are two reasons for starting with the second quarter of 2021. The first reason is that the Covid-19 pandemic will cause bias in the data if I include data from 2020., notably in the per capita income growth and in the short-term interest rates. The second reason is that the triggering event identified in the qualitative analysis, when Evergrande missed two coupon payments in July 2021, happened just after the second quarter of 2021.

Correlation analysis can offer empirical evidence into which of these independent variables are most correlated with Chinese residential property prices in recent years. The Pearson correlation analysis measures the correlation between two series with respect to number of lags. The Pearson correlation coefficient is measured on a scale that varies from +1 through 0 to -1. The method is used to measure the strength and direction of the linear relationship between two continuous variables.

Ideally, the data should be tested for non-stationarity since I am working with time series. A time series is considered stationary if its statistical properties – such as mean, variance, and autocorrelation – remain constant over time. This implies that the behavior of the series does not depend on the time at which it was observed, making it easier to model and predict. However, because the time series analyzed in this study are within the scope of an unfolding crisis in the property sector and are subject to variation due notably to the impact of the Covid-19 pandemic, the stationarity of all economic variables analyzed cannot be ensured.

Nevertheless, I should test the dependent variable for stationarity and transform it accordingly. Since the House Price Index is the central focus of my analysis, ensuring its stationarity helps to confirm that any observed relationships are not due to spurious trends in the housing market itself. The primary goal of my analysis is to understand the historical relationships between the Chinese residential property prices and various economic indicators during the ongoing crisis, rather than to forecast future values or build a predictive model. This is a descriptive and exploratory analysis, focused on uncovering existing correlations within the given time period. By testing for stationarity in the dependent variable, I ensure that the House Price Index is stable over time, which is crucial for reliable correlation analysis.

The Unit Root test of stationarity that I will be using for the dependent variable is the Augmented Dickey-Fuller (ADF) test of the null hypothesis that a time series has a unit root. The presence of a unit root indicates that the time series may have a stochastic trend, making it non-stationary, whereas the absence of a unit root suggests the series is stationary.

I will also ensure that the data is not significantly skewed, as Pearson correlation assumes the data is approximately normally distributed. To do this, I will calculate the skewness coefficient for both time series before performing each Pearson correlation analysis. If the skewness coefficient falls within the range of -1.5 to 1.5, the distribution will

be considered approximately symmetric, making it appropriate to proceed with the Pearson correlation analysis.

The Pearson correlation analysis will be conducted using CEIC Data. The output will be a chart displaying the correlation coefficients on the y-axis and a range of lags on the x-axis. By employing this method, it becomes possible to identify correlations between various economic indicators and residential property prices in China, even when the indicators lead or lag behind market trends. This approach enables a more comprehensive understanding of how different factors influence the Chinese housing market over time.

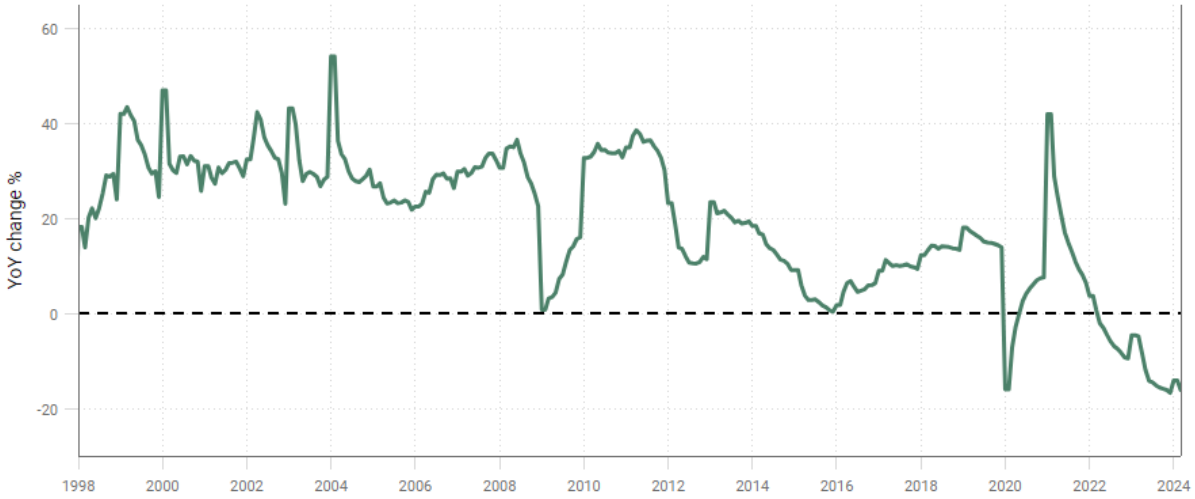
I will conclude the quantitative analysis by highlighting the indicators that were found to be the most correlated with housing price fluctuations in the last three years. By identifying these correlations, the analysis will offer a clearer understanding of the factors that have played a significant role in shaping the Chinese housing market during this period.

Results of the Qualitative Analysis

To better understand the contraction of China's housing market, I will examine the historical data on residential property investment to make parallels with previous market slowdowns. Investment in real estate development refers to investment by real estate developers and are a as a strong indicator of the overall health and vitality of the property market, reflecting future supply trends and economic sentiment of property developers and investors in the sector. The data I will be using is sourced from surveys conducted by the Department of Investment and Construction Statistics of the National Bureau of Statistics of China.

The chart below presents the year-over-year changes in residential property investment, which is presented on a monthly basis.

Chart 5: Year-over-Year Change in Residential Property Investment in China (1998-2024)



Source: CEIC Data, National Bureau of Statistics of China

As evidenced in the chart, there were multiple troughs in the historical data. I will be analyzing the three times when residential property investment dropped to approximately 0%. The chat shows that these events happened in 2008-2009, in 2015-2016, and in 2020. In the following pages, I will qualitatively analyze only the first two periods, as the 2020 drop was

primarily due to government-imposed lockdowns during the COVID-19 pandemic rather than economic or financial factors. By drawing parallels with the current situation, I aim to determine what lessons can be learned from these past events.

2008-2009

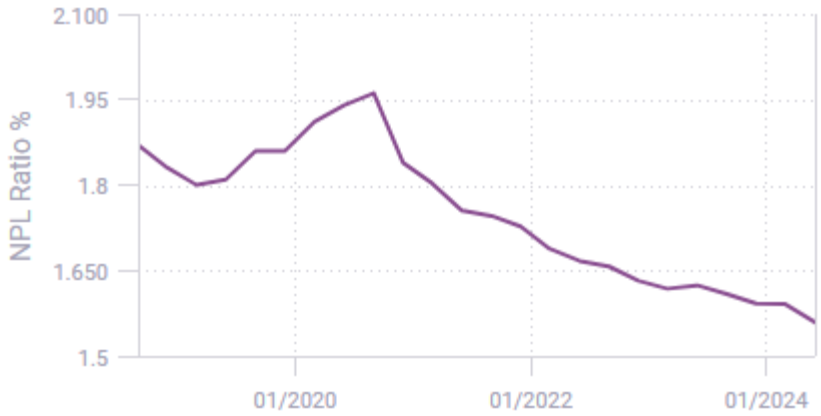
In 2008-2009, residential property investment fell, with a year-over-year change dropping to approximately 0% in January 2009. Investment quickly recovered in the next periods, staying above 30% in the following two years.

The US subprime crisis was caused by a surge of mortgage defaults of low-income homebuyers in the US, which led to the collapse of the property sector, ultimately sparking the global financial crisis. The source of the crisis was a lack of regulations in the US banking sector, where banks collateralized mortgages from high-risk consumers, that would not have been provided in the first place if appropriate risk assessments had been performed.

Drawing parallels with modern China, it is apparent that banks are now less susceptible of such practices (as is now the case in the US and other advanced economies). In the aftermath of the global financial crisis, stringent regulations were developed to address the shortcomings. The resulting Basel III standards apply to internationally active banks, and include increased capital requirements, leverage ratios, liquidity requirements and management of counterparty credit risk. While it doesn't apply to all Chinese banks, the country developed its own regulations. When the crisis started, buying a first home typically required a deposit of 30% of the property's value on average across the country. For secondary homes, the deposit requirement was increased to 60%. Chinese mortgage loans are recourse loans, meaning that if the borrower defaults, creditors have the right to seize not only the property tied to the mortgage, but also other assets owned by the borrower.

While China's non-performing loans ratio saw a slight uptick during the Covid-19 pandemic, it has been decreasing since 2020, currently standing at 1.56% for commercial banks according to the China's National Administration of Financial Regulation:

Chart 6: Non-Performing Loans Ratio of Commercial Banks in China (2019-2024)



Source: CEIC Data, National Administration of Financial Regulation

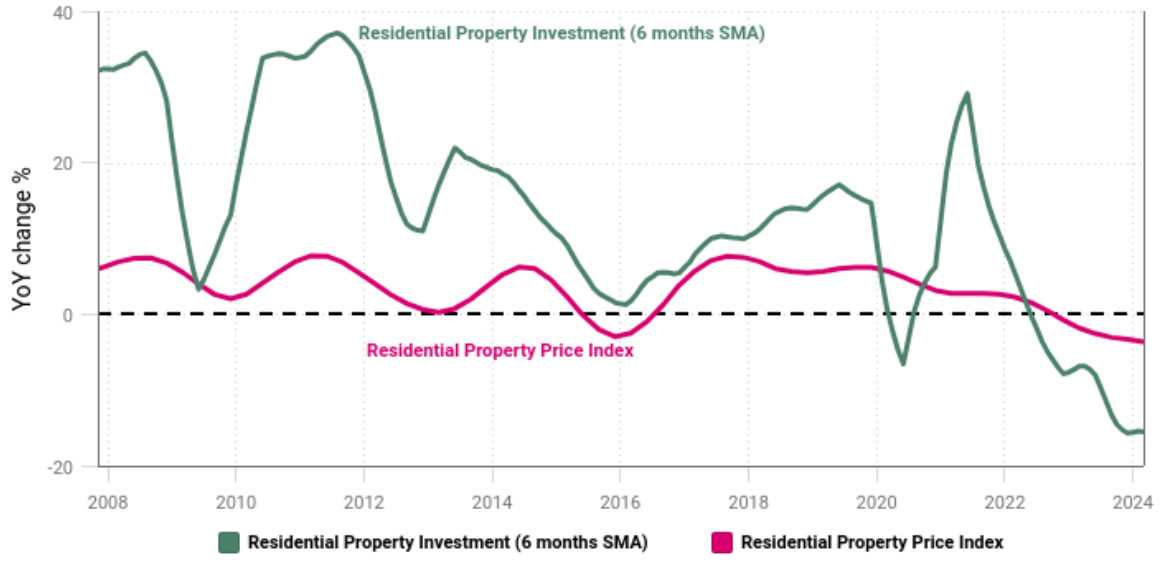
The low and decreasing ratio indicates that unlike the 2008-2009 correction observed on Chart 1, Chinese commercial banks have issued loans to borrowers who are generally able to meet their repayment obligations. It appears that effective risk management and credit assessment processes are currently in place. Therefore, judging from this criterion, the banking sector does not appear to have caused the ongoing market correction.

2015-2016

Following the 2008 crisis, a mega-stimulus package by Chinese authorities caused a boom in the residential market, which explains the very high levels of investment in 2010 and 2011. While the drop of year-over-year change in investment in the years 2012 to 2014 can be seen as a normalization effect, with a slowdown in market price, the year-over-year change in residential property price remained positive.

However, in 2015 and 2016, residential property prices contracted. The following chart presents the year-over-year change in the residential property price index (which is calculated on a quarterly basis), in relation to residential property investment. To facilitate the analysis, I applied a 6-months simple moving average to residential property investment to smooth out the highly volatile fluctuations.

Chart 8: Year-over-Year Change in the Residential Property Price Index and in Residential Property Investment (2008-2024)

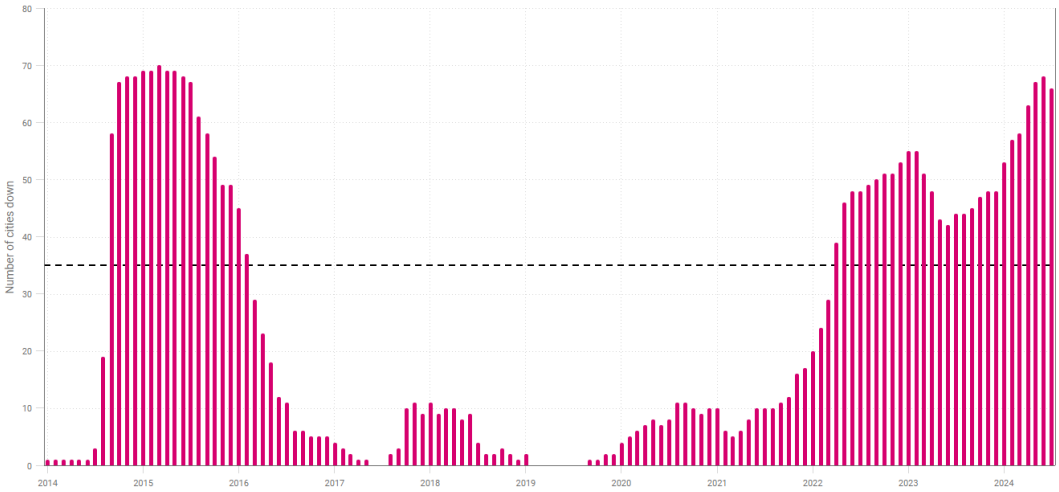


Source: CEIC Data, Bank for International Settlement, National Bureau of Statistics of China

The chart shows that 2015-2016 was the only time when the residential property price index contracted prior to the ongoing correction. The correction lasted less than two years and was followed by rapid price expansion in the following years.

The following chart shows the number of cities where the year-over-year change in property price for newly constructed residential was down, on a monthly basis. The National Bureau of Statistics of China aggregates data for 70 cities. The black-dotted line is at the point where 50% of cities are down on a year-over-year basis.

Chart 9: Number of Cities with Declining Property Prices out of 70 Cities in China



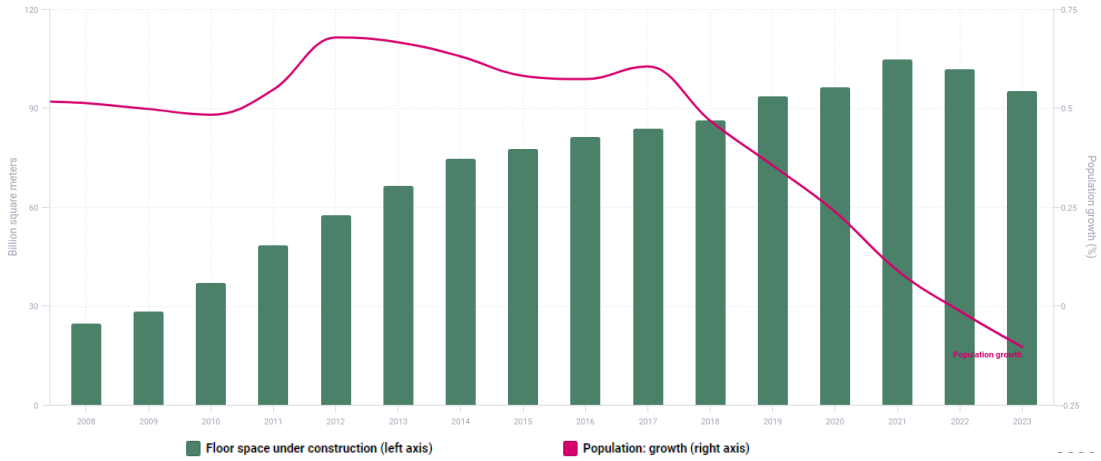
Source: CEIC Data, National Bureau of Statistics of China

The chart shows how the current housing market contraction is much more long-lived than the 2015-2016 correction. Over 50% of cities were down (represented by the black-dotted line) for over two years since April 2022, with no sign of coming down, whereas it had only lasted 18 months in the 2015-2016 market correction.

In 2015 and 2016, China experienced a period where property prices began to fall on a month-by-month basis starting in September 2014, accompanied by a decline in investment and a reduction in new housing projects. This downturn was primarily driven by an oversupply in the market after the high stimulus it had received in 2009. However, as population growth and urbanization continued, demand eventually caught up, reducing inventory levels and stabilizing prices by the end of 2016.

This reminds of the current crisis, as supply has consistently increased in the past years, potentially leading to an over-supply crisis. The following chart shows how much floor space was under construction each year in China from 2008 to 2023 (Green) in relation to population growth in China (pink). The floor space under construction is sourced from the National Bureau of Statistics of China, and the population growth data originates from the World Bank.

Chart 10: Population Growth and New Space Under Construction in China



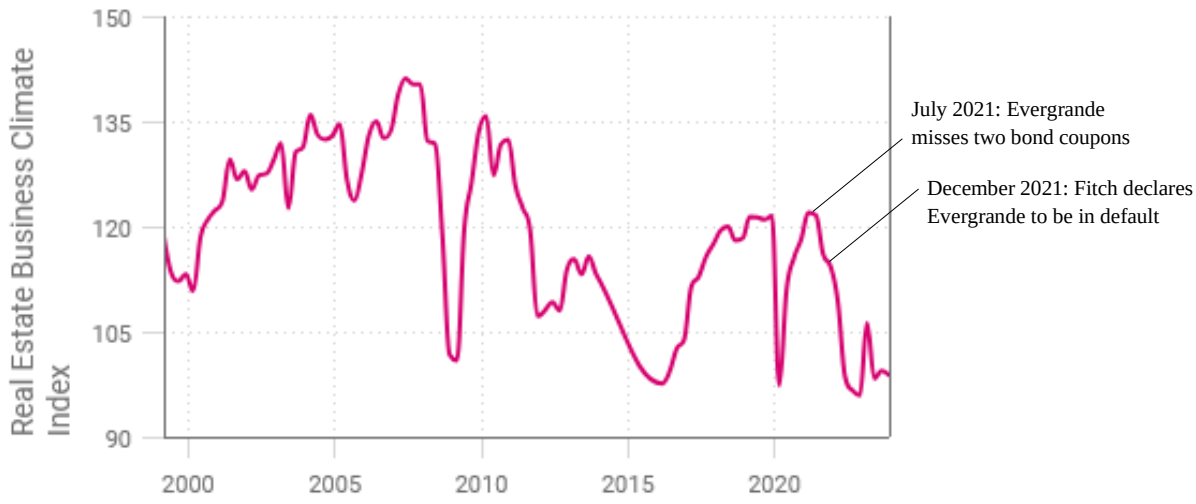
Source: CEIC Data, National Bureau of Statistics of China, World Bank

The chart illustrates that population growth began to decline slightly before the 2015-2016 correction. However, in recent years, this decline has accelerated significantly. In

contrast, floor space under construction continued to expand until 2021, and while it was reduced in subsequent years, it remains at inflated levels. On the supply side, this suggests that the current crisis could be much more severe than the 2015-2016 correction, which may account for the prolonged nature of the crisis, as previously demonstrated.

In the 2015-2016 correction, the presence of over-supply led to low business expectations from property developers and other real estate practitioners. The Real Estate Business Climate Index is an enterprises survey from the National Bureau of Statistics of China, showing the expectations of companies. The indicator is illustrated below.

Chart 11: Real Estate Business Climate Index



Source: CEIC Data, National Bureau of Statistics of China

The chart demonstrates that the business climate has deteriorated much more rapidly in the ongoing crisis than in the 2015-2016 market correction. This indicates that, more similarly to the 2008-2009 correction, there was a triggering event to the current contraction, which I identified on the chart as being when Evergrande missed two bond coupons in July 2021 and then was declared in default in December 2021. The events, which received wide media coverage, coincide with the decrease in the Real Estate Business Climate Index.

In this section, I examined historical data on residential property investment in China to draw parallels with previous market slowdowns, specifically in 2008-2009 and 2015-2016. The analysis revealed that while the 2008-2009 downturn was driven by the global financial crisis, the 2015-2016 contraction resulted from an oversupply in the housing market. The

current market contraction shows similarities with the 2008-2009 correction, when in both cases the Real Estate Business Climate Index fell sharply as a result of a triggering event, which I identified in the ongoing crisis as being the default of Evergrande. The current market contraction also appears to show similarities with the 2015-2016 correction in terms of over-supply, but in a more prolonged manner, with an important over-supply of floor space within the context of a declining population.

Results of the Quantitative Analysis

In this quantitative analysis, I will be testing the hypothesis that the following indicators in China continue to be correlated with the Chinese residential property prices in the ongoing crisis.

a. Consumer sentiment
b. Per capita income growth
c. Household leverage

The House Price Index I will be using is sourced from the Bank for International Settlements. The residential property prices selected are harmonized as closely as possible with the recommendations in the Handbook on Residential Property Prices, an internationally recognized framework for classifying property price data. The chosen indicator is designed to provide the closest possible nationwide coverage. The dataset is published on a quarterly basis. For the purposes of the correlation analysis, I will be using the year-over-year change in the property price index, for the three years between the second quarter of 2021 and the first quarter of 2024.

As outlined in the methodology section, I tested the House Price Index for stationarity to ensure that any observed relationships are not driven by spurious trends in the housing market, thereby avoiding spurious correlations. The initial Augmented Dickey-Fuller test indicated the presence of a unit root, confirming that the index was non-stationary. To address this, I applied a year-over-year change transformation on the quarterly data. A subsequent test rejected the null hypothesis that the transformed series has a unit root, with a p-value of 0.01 and a t-statistics of -4.926, validating that the year-over-year change in the House Price Index is stationary, as demonstrated in the table below.

Table 1: Unit Root Test of Stationarity for the House Price Index

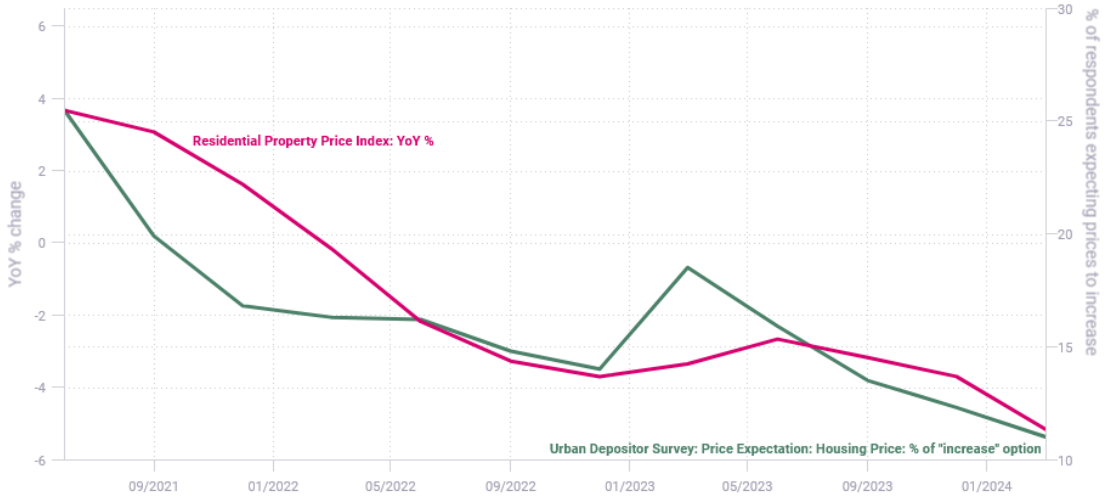
Result	Series	Observations	p-value	t-statistics	Null rejected
Stationary	House Price Index (YoY %)	12	0.01	-4.92644	true (1%)

Consumer Sentiment

For the purpose of finding the correlation between the consumer sentiment and the change in residential property prices in China, I will be using the Price Expectation Index of the Urban Depositor Survey, which is a quarterly survey performed by The People's Bank of China. Fifty depositors are selected randomly on a quarterly basis from each of 400 bank outlets in 50 large, medium and small-sized cities across the country to make up a survey sample of altogether 20,000 depositors. The Price Expectation Index is a diffusion index reflecting respondents' judgment on prices in the next quarter.

The hypothesis is that the Price Expectation Index of the Urban Depositor Survey is correlated with the year-over-year decline in the House Price Index. This correlation would suggest that when consumers expected lower prices, as captured by the Price Expectation Index, it coincided with a decline in housing prices, highlighting the role of sentiment in driving market trends. The two time series are plotted below, with a table of their respective statistics, including skewness.

Chart 12: Percentage of Urban Depositor Survey Respondents Expecting Housing Prices to Increase Relative to the House Price Index.



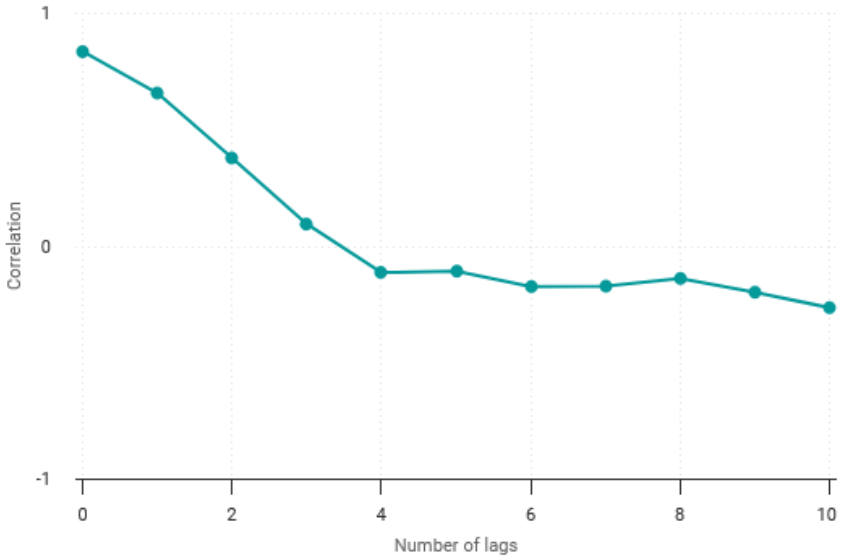
Source: CEIC Data, Bank for International Settlements, The People's Bank of China

Table 2: Statistics of the Price Expectation Index and the Year-over-Year Change in the House Price Index

Series	Observations	Min	Max	Mean	Median	Sum	Skewness
House Price Index (YoY %)	12	-5.17	3.67	-1.59	-2.92	-19.05	0.89
% Expecting an increase in housing prices	12	11	25.5	16.23	16.05	194.7	1.2

While there is slight positive skewness in the time series, it lies within the acceptable range of -1.5 to 1.5 as set in the methodology section. The Pearson correlation analysis is plotted below:

Chart 13: Pearson Correlation Analysis of the Price Expectation Index Relative to the House Price Index

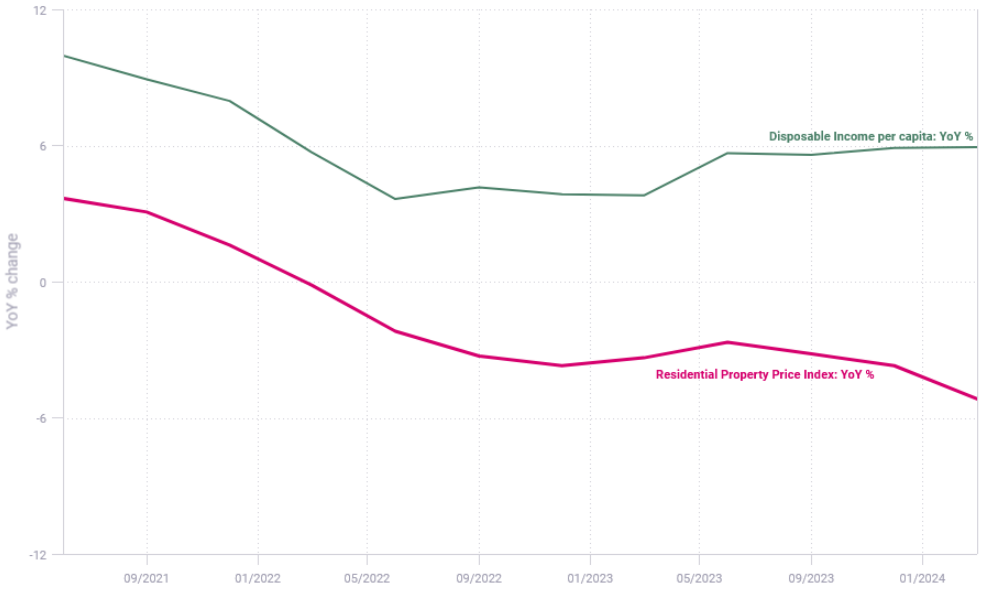


The two time series are very strongly positively correlated, with a Pearson correlation coefficient of 0.8334. The Pearson correlation coefficient is highest at zero lags, indicating that the Price Expectation Index is a coincident indicator of housing prices.

Per Capita Income Growth

The indicator used is the disposable income per capita for urban residents. Data on the living condition of urban residents come from the data collected through a sample survey on urban households conducted by the Department of Urban Social and Economic Survey of the National Bureau of Statistics of China. The year-over-year change in the indicator is plotted below in relation to the year-over-year change in the residential property price index.

Chart 14: Disposable Income per Capita Relative to the House Price Index



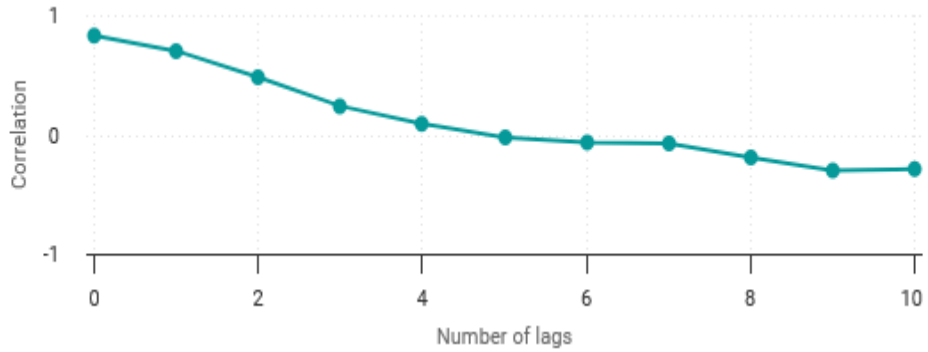
Source: CEIC Data, National Bureau of Statistics of China, Bank for International Settlements

Table 3: Statistics of the Year-over-Year Change in the Disposable Income per Capita and the Year-over-Year Change in the House Price Index

Series	Observations	Min	Max	Mean	Median	Sum	Skewness
House Price Index (YoY %)	12	-5.17	3.67	-1.59	-2.92	-19.05	0.89
Disposable Income per capita (YoY %)	12	3.64	9.96	5.92	5.68	71.06	0.81

There does not appear to be significant skewness present in the two time series. The Pearson correlation analysis is plotted below:

Chart 15: Pearson correlation Analysis of the Disposable Income per Capita Relative to the House Price Index

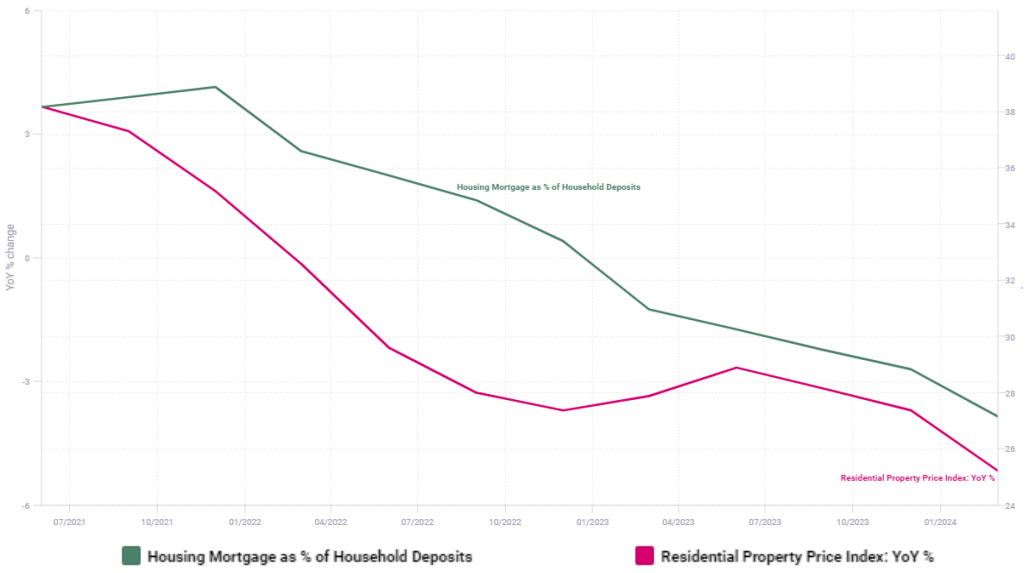


The two time series are also very strongly positively correlated, with a Pearson correlation coefficient of 0.8280. The Pearson correlation coefficient is highest at zero lags, indicating that the disposable income per capita is a coincident indicator of housing prices.

Household Leverage

The indicator used for measuring household leverage is housing mortgage as % of household deposits. The indicator is obtained by dividing housing mortgage by household deposit. Both data are sourced from The People's Bank of China. Below is the indicator relative to the House Price Index:

Chart 16: Housing Mortgage as % of Household Deposits, relative to the House Price Index.



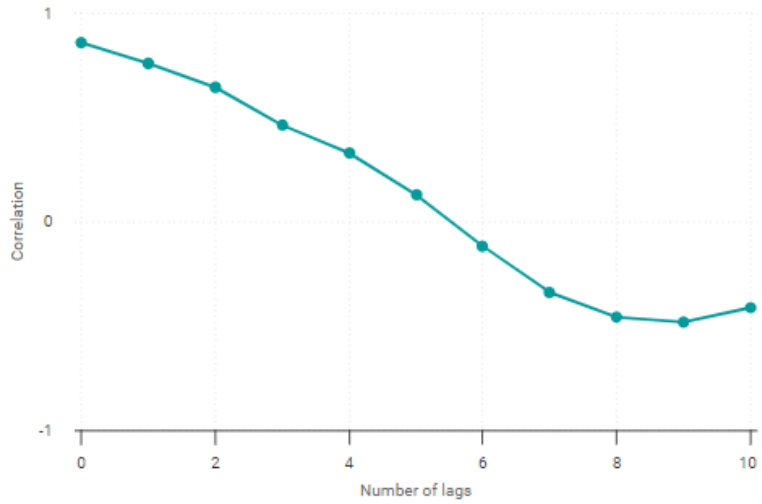
Source: CEIC Data, The People's Bank of China, Bank for International Settlements

Table 4: Statistics of the Housing Mortgage as % of Household Deposits and the Year-over-Year change in the House Price Index

Series	Observations	Min	Max	Mean	Median	Sum	Skewness
House Price Index (YoY %)	12	-5.17	3.67	-1.59	-2.92	-19.05	0.89
Housing mortgage as % of household deposits	12	27.15	38.87	33.57	34.11	402.78	-0.13

There does not appear to be significant skewness present in the two time series. The Pearson correlation analysis is plotted below:

Chart 17: Pearson correlation Analysis of the Housing Mortgage as % of Household Deposits Relative to the Year-over-Year change in the House Price Index



The two time series are also very strongly positively correlated, with a Pearson correlation coefficient of 0.8553. The Pearson correlation coefficient is highest at zero lags, indicating that the disposable income per capita is a coincident indicator of housing prices.

This quantitative analysis provides strong empiric evidence supporting the hypothesis that the three economic indicators – consumer sentiment, per capita income growth, and household leverage – remain closely correlated with Chinese residential property prices during the ongoing crisis. The analysis revealed that all three indicators are strongly positively correlated with the House Price Index, with correlation coefficients exceeding 0.80. This indicates that shifts in consumer expectations, income levels, and household financial behavior have significant and immediate impacts on housing prices.

Summary of Key Findings

This section consolidates the insights derived from both the qualitative and quantitative analyses conducted in this study, highlighting the intricate dynamics influencing the Chinese residential property market during the ongoing crisis since the second half of 2021.

Findings of the Qualitative Analysis

The qualitative analysis focused on drawing parallels between the current market contraction and previous corrections in the Chinese housing market, specifically those that occurred in 2008-2009 and 2015-2016. By examining historical data on residential property investment, several key observations were made.

In 2008-2009, the correction was triggered by the global financial crisis, which originated in the United States. The sharp decline in the change in residential property investment reflected the broader economic uncertainty. There are parallels to be made with the ongoing crisis, when the default of property developer Evergrande sparked a similar reaction. However, there is now a stringent regulatory environment supervising Chinese banks, with high deposit requirements and the presence of recourse loans. Given that the non-performing loans ratio has remained at low levels and has declined in recent periods, the banking sector does not appear to have caused the current market contraction.

In 2015-2016, the period was characterized by an oversupply of residential properties following a massive stimulus package by the Chinese government. Unlike the 2008-2009 crisis, the 2015-2016 downturn was driven by internal market dynamics, specifically an imbalance between supply and demand. The situation is similar to the ongoing crisis, but this time it is significantly more severe and long-lived. While a continuation of urbanization and population growth eventually absorbed the excess supply in 2015-2016, China is now facing a shift towards population decline, causing a greater supply-demand imbalance, when very high supply levels cannot be sustained forever. The Real Estate Business Climate Index has also deteriorated much more rapidly in the ongoing crisis than in the 2015-2016 market correction.

The analysis concludes that the current crisis is more severe than in past market corrections, due to the simultaneous occurrence of these factors, making the market more vulnerable to sustained downward pressure.

Findings of the Quantitative Analysis

The quantitative analysis focused on testing the hypotheses that consumer sentiment, per capita income growth, and household leverage remain closely correlated with Chinese residential property prices during the ongoing crisis.

The correlation analysis revealed strong positive relationships between residential property prices and the three economic indicators, validating the hypotheses: consumer sentiment had a Pearson correlation coefficient of 0.8334, per capita income growth had a Pearson correlation coefficient of 0.8280) and household leverage had a Pearson correlation coefficient of 0.8553. These findings highlight the significant impact of consumer expectations, income growth levels, and household financial behavior on the housing market. As consumer confidence declines or income growth slows, the market becomes more vulnerable to price contractions, with households likely to reduce their financial burdens (or delay their home purchase) rather than continue investing in real estate, further exacerbating downward pressure on housing prices.

The synthesis of these key findings highlights the complex interplay of factors influencing the Chinese residential property market during the ongoing crisis. The qualitative analysis reveals that the current downturn is a result of both external shocks and internal market imbalances, while the quantitative analysis demonstrates the relation between economic indicators and housing prices. Together, these findings suggest that the Chinese housing market remains highly sensitive to shifts in economic conditions and investor behavior, with implications for future market stability.

Discussion of Results in Relation to the Theorical Framework and Literature Review

This section follows the structure of the literature review to discuss the findings in relation to the theoretical framework and the insights from previous studies.

Financialization of the Chinese city and the Housing Presale System

The findings from both the qualitative and quantitative analyses resonate strongly with the theoretical framework outlined in the literature on financialization and the housing presale system in China. As Fulong Wu's[36] concept of financialization highlights, the Chinese government has played an active role in urban development, often utilizing mechanisms such as land collateral and housing presales to stimulate real estate investment. The crisis precipitated by the default of major property developers like Evergrande is a manifestation of the vulnerabilities inherent in this system. The reliance on housing presales, as previously warned by Yongheng Deng and Peng Liu (2009)[37], exposes homebuyers to significant risks, particularly when developers fail to deliver properties as promised. The ongoing contraction illustrates the materialization of these risks on a massive scale, as consumer sentiment plummeted following the realization that even large, seemingly secure developers could default.

This reinforces the theoretical argument that financialization, driven by aggressive state policies and market practices, has amplified both the growth and the risks in the Chinese property market. The current crisis demonstrates that the mechanisms intended to stimulate growth, such as the presale system, can lead to systemic instability when mismanaged or when market conditions turn adverse.

[36] Wu, F. (2023). The long shadow of the state: Financializing the Chinese city. Urban Geography, 44(1), 37-58.
[37] Deng, Y., & Liu, P. (2009). Mortgage prepayment and default behavior with embedded forward contract risks in China's housing market. The Journal of Real Estate Finance and Economics, 38, 214-240.

Introduction of the "Three Red Lines" Policy

The introduction of the "Three Red Lines" policy was a critical regulatory intervention aimed at curbing the excessive leverage in the real estate sector. As outlined by Xialoing Chu, Yongheng Deng, and Desmond Tsang (2023)[38], this policy was intended to impose financial discipline on property developers by enforcing stricter liquidity and leverage ratios. The findings from the qualitative analysis show that while this policy aimed to stabilize the market in the long term, it inadvertently triggered a liquidity crisis among over-leveraged developers, leading to widespread defaults and exacerbating the market downturn.

The impact of this policy aligns with the theoretical framework suggesting that regulatory measures, while necessary, can have unintended short-term consequences if not carefully calibrated. The timing and stringency of the "Three Red Lines" likely accelerated the market correction, demonstrating the delicate balance required in regulatory interventions within highly leveraged markets like China's real estate sector.

Consumer and Investor Sentiment

The quantitative analysis strongly supports the literature emphasizing the role of consumer sentiment in the housing market. Studies by Diandan Ma, Benfu Lv, Xuerong Li, Xiuting Li, and Shuqin Liu (2023)[39] and Enwei Zhu, Jing Wu, Hongyu Liu, and Keyang Li (2023)[40] demonstrated that sentiment, whether shaped by official policies or social media narratives, significantly impacts real estate prices and market volatility. The Pearson correlation coefficient of 0.8334 between consumer sentiment (as measured by the Price Expectation Index of the Urban Depositor Survey) and housing prices in this study underscores the critical role that consumer expectations play in market dynamics.

This finding aligns with the theoretical understanding that in a market driven by expectations of capital appreciation, shifts in sentiment can precipitate rapid changes in

[38] Chu, X., Deng, Y., & Tsang, D. (2023). Firm leverage and stock price crash risk: The Chinese real estate market and three-red-lines policy. The Journal of Real Estate Finance and Economics, 1-39.
[39] Ma, D., Lv, B., Li, X., Li, X., & Liu, S. (2023). Heterogeneous impacts of policy sentiment with different themes on real estate market: Evidence from China. Sustainability, 15(2), 1690.
[40] Zhu, E., Wu, J., Liu, H., & Li, K. (2023). A sentiment index of the housing market in China: text mining of narratives on social media. The Journal of Real Estate Finance and Economics, 66(1), 77-118.

market behavior. As noted by Jing Wu, Joseph Gyourko, and Youngheng Deng (2016)[41], when investor focus shifts from capital gains to risk aversion, the market can quickly transition from growth to contraction. The current crisis, characterized by a sharp decline in consumer confidence following the defaults of major developers, is a clear example of this dynamic in action.

Per Capita Income Growth

The correlation between per capita income growth and housing prices (Pearson correlation coefficient of 0.8280) found in this study supports the findings of earlier research, such as that by Christian Dreger and Yanqun Zhang (2013)[42] and Hanming Fang, Quanlin Gu, Wei Xiong, and Li-An Zhou (2016)[43]. These studies identified income growth as a fundamental driver of housing demand and price appreciation in China.

The results indicate that while income growth remains a significant factor, its ability to sustain housing market growth is being undermined by structural changes in the economy and demographics. This aligns with the literature that highlights the limits of income growth as a buffer against market corrections, particularly in an environment of oversupply and shifting population dynamics.

Household Leverage

The strong correlation between household leverage (housing mortgage as a percentage of household deposits) and housing prices (Pearson correlation coefficient of 0.8553) confirms the theoretical expectation that high leverage increases the vulnerability of households to market downturns. As outlined in the literature by Junmin Wan (2013)[44] and Fulong Wu, Jie Chen, Fenghua Pan, Nick Gallent, and Fangzhu Zhang (2020)[45], the

[41] Wu, J., Gyourko, J., & Deng, Y. (2016). Evaluating the risk of Chinese housing markets: What we know and what we need to know. China Economic Review, 39, 91-114.
[42] Dreger, C., & Zhang, Y. (2013). Is there a bubble in the Chinese housing market? Urban Policy and Research, 31(1), 27-39.
[43] Fang, H., Gu, Q., Xiong, W., & Zhou, L. A. (2016). Demystifying the Chinese housing boom. NBER macroeconomics annual, 30(1), 105-166.
[44] Wan, J. (2015). Household savings and housing prices in China. The World Economy, 38(1), 172-192.
[45] Wu, F., Chen, J., Pan, F., Gallent, N., & Zhang, F. (2020). Assetization: The Chinese path to housing financialization. Annals of the American Association of Geographers, 110(5), 1483-1499.

speculative behavior of Chinese households, driven by expectations of continued price appreciation, has led to high levels of debt relative to income and deposits.

The ongoing crisis, where declining prices have led households to reduce their financial burdens rather than continue investing in real estate, exemplifies the risks of such leverage. The results underscore the importance of managing household debt levels to maintain market stability, particularly in a declining market where the feedback loop between falling prices and reduced investment can exacerbate downward trends.

Housing Supply and Changing Population Dynamics

The qualitative analysis of supply-side dynamics, particularly the oversupply of residential properties in relation to population trends, aligns with the literature on the unique characteristics of China's real estate market. The works of Edward Glaeser, Wei Huang, Yueran Ma, and Andrei Shleifer (2018)[46] and Chang Liu and Wei Xiong (2018)[47] highlight the significant role of government policies in driving construction activity, often leading to imbalances between supply and demand. The current crisis, characterized by a surplus of unsold properties amidst a declining population, mirrors the concerns raised in these studies about the sustainability of China's real estate boom.

The findings suggest that the current crisis may be more severe and prolonged than previous corrections due to the demographic shifts that are reducing the underlying demand for new housing. This demographic factor, coupled with the high levels of ongoing construction, suggests that the market may face continued downward pressure as supply outstrips demand in many regions.

Integration of Findings and Theorical Implications

The integration of qualitative and quantitative findings in this study offers a comprehensive view of the current crisis in China's housing market. The results not only

[46] Glaeser, E., Huang, W., Ma, Y., & Shleifer, A. (2017). A real estate boom with Chinese characteristics. Journal of Economic Perspectives, 31(1), 93-116.
[47] Liu, C., & Xiong, W. (2018). China's real estate market. The Handbook of China's Financial System.

validate the theoretical frameworks discussed in the literature but also extend them by highlighting the unique factors at play in the ongoing market contraction. The combination of external shocks, such as the defaults of major developers, with internal market dynamics, such as oversupply and declining population growth, creates a complex environment where traditional market drivers like income growth and consumer sentiment are insufficient to maintain stability.

This discussion suggests that future research and policy efforts should focus on addressing the structural imbalances in the market, particularly the oversupply of residential properties and the high levels of household leverage. Additionally, regulatory measures need to be carefully calibrated to avoid triggering further market instability, as seen with the "Three Red Lines" policy.

Conclusion

In conclusion, this discussion has demonstrated that the current contraction in China's housing market is not only a product of recent policy changes and economic shifts but also deeply rooted in the structural dynamics of financialization, leverage, and supply-demand imbalances. The integration of these theoretical insights with the empirical findings of this study provides a robust framework for understanding the ongoing crisis and offers a basis for future research and policy interventions.

Recommendations to Stakeholders

Homeowners and Investors

Given the current volatility in the housing market, homeowners and real estate investors should consider diversifying their investment portfolios. Historically, Chinese households have relied heavily on real estate as a primary means of wealth accumulation, driven by expectations of continuous price appreciation. However, the ongoing market downturn, compounded by declining population growth and oversupply, suggests that real estate may no longer be a reliable investment for capital appreciation. Homeowners and real estate investors should explore alternative investment avenues, such as equities, bonds, or international assets, to reduce their exposure to the risks associated with the Chinese housing property market.

In light of the ongoing market contraction, homeowners and investors should exercise caution when considering new property purchases, particularly in Chinese cities where oversupply and declining demand are prevalent. It may be prudent to delay purchasing decisions until clearer signs of market stabilization emerge, or to focus on properties in Tier-1 cities or other areas with strong demand fundamentals. Engaging in thorough due diligence, including assessing the financial health of developers and the long-term viability of the location, is essential to avoid potential losses.

Moreover, homeowners and investors should pay close attention to macroeconomic indicators, particularly those correlated with housing prices, such as consumer sentiment, per capita income growth, and household leverage. These indicators provide insights into market trends and can serve as early warning signals for potential shifts in the market. While these indicators continue to decline, homeowners and investors should avoid investing in the real estate market if possible.

Property Developers

For developers, the current crisis underscores the importance of adopting conservative financial management practices. The analysis reveals that overleveraged developers are particularly vulnerable in a downturn, as evidenced by the numerous defaults following the

introduction of the “Three Red Lines” policy. Developers should prioritize deleveraging and improving liquidity to withstand market fluctuations. This includes reducing reliance on presales for financing and prioritizing strong credit and liquidity metrics to comply with the policy shift while waiting for a better market environment.

In an environment where consumer sentiment is fragile, developers must work to rebuild trust with homebuyers. This can be achieved by enhancing transparency in project timelines, financial disclosures, and the quality of construction. Developers should also consider offering guarantees or insurance products to reassure buyers, particularly in the presale market. Building a reputation for reliability and quality can differentiate developers in a competitive and cautious market, helping to sustain sales even in challenging conditions.

Policymakers

Policymakers should continue to implement targeted support measures to stabilize the housing market and listen closely to the demands of other stakeholders in deciding policy intervention. The analysis suggests that broad-based interventions, such as reducing interest rates or down payment requirements, may not be sufficient to address the underlying issues in the market. In addition, policymakers should focus on measures that directly address the oversupply of housing, such as purchasing unsold properties for social housing or incentivizing the redevelopment of vacant properties. Additionally, targeted financial support for distressed but fundamentally sound developers could prevent further defaults and maintain market stability. Moreover, policymakers should pay close attention to demographic shifts and promote sustainable urbanization practices that align with long-term population trends. Policymakers should also consider reforms to prevent the overbuilding that has contributed to the current oversupply.

Conclusion

This thesis has explored the complex dynamics underpinning the contraction of China's housing property market, drawing on both qualitative and quantitative analyses to understand the factors driving this unprecedented crisis. The research reveals that the current downturn is not merely a cyclical correction but is rooted in deeper structural issues, including oversupply, declining population growth, and shifting consumer sentiment. These factors have converged to create a more severe and prolonged crisis than previous market corrections, such as those experienced in 2008-2009 and 2015-2016.

The qualitative analysis underscored the importance of understanding the historical context of China's real estate market, particularly the role of government policies in shaping market dynamics. The “Three Red Lines” policy, while intended to reduce systemic risk, inadvertently triggered a liquidity crisis among over-leveraged developers, leading to widespread defaults and further destabilizing the market. This highlights the delicate balance required in regulatory interventions within a highly leveraged market.

Quantitatively, the thesis identified strong correlations between housing prices and key economic indicators, such as consumer sentiment, per capita income growth, and household leverage. These findings underscore the critical role of these factors in driving market trends, with shifts in consumer confidence and income levels having immediate and significant impacts on housing prices. The strong correlation with household leverage also suggests that the financial behavior of households has exacerbated the market’s vulnerability.

The recommendations provided offer a path forward for various stakeholders, emphasizing the need for diversification, conservative financial management, targeted support measures, and sustainable urbanization practices. These strategies are essential for mitigating the ongoing crisis and preventing future instability in China’s housing market.

In conclusion, the Chinese housing market is at a critical juncture. The current crisis serves as a stark reminder of the risks inherent in a highly leveraged and rapidly urbanizing economy. Moving forward, a careful balance of regulatory oversight, market-driven solutions, and strategic policy interventions will be crucial in navigating this challenging period and laying the groundwork for a more stable and sustainable real estate sector in China.

List of Academic References

1. Wu, F. (2023). The long shadow of the state: Financializing the Chinese city. Urban Geography, 44(1), 37-58.
2. Deng, Y., & Liu, P. (2009). Mortgage prepayment and default behavior with embedded forward contract risks in China's housing market. The Journal of Real Estate Finance and Economics, 38, 214-240.
3. Chu, X., Deng, Y., & Tsang, D. (2023). Firm leverage and stock price crash risk: The Chinese real estate market and three-red-lines policy. The Journal of Real Estate Finance and Economics, 1-39.
4. Ma, D., Lv, B., Li, X., Li, X., & Liu, S. (2023). Heterogeneous impacts of policy sentiment with different themes on real estate market: Evidence from China. Sustainability, 15(2), 1690.
5. Zhu, E., Wu, J., Liu, H., & Li, K. (2023). A sentiment index of the housing market in China: text mining of narratives on social media. The Journal of Real Estate Finance and Economics, 66(1), 77-118.
6. Wu, J., Gyourko, J., & Deng, Y. (2016). Evaluating the risk of Chinese housing markets: What we know and what we need to know. China Economic Review, 39, 91-114.
7. Dreger, C., & Zhang, Y. (2013). Is there a bubble in the Chinese housing market? Urban Policy and Research, 31(1), 27-39.
8. Fang, H., Gu, Q., Xiong, W., & Zhou, L. A. (2016). Demystifying the Chinese housing boom. NBER macroeconomics annual, 30(1), 105-166.
9. Wan, J. (2015). Household savings and housing prices in China. The World Economy, 38(1), 172-192.
10. Wu, F., Chen, J., Pan, F., Gallent, N., & Zhang, F. (2020). Assetization: The Chinese path to housing financialization. Annals of the American Association of Geographers, 110(5), 1483-1499.
11. Glaeser, E., Huang, W., Ma, Y., & Shleifer, A. (2017). A real estate boom with Chinese characteristics. Journal of Economic Perspectives, 31(1), 93-116.
12. Liu, C., & Xiong, W. (2018). China's real estate market. The Handbook of China's Financial System.
13. Xu, X. E., & Chen, T. (2012). The effect of monetary policy on real estate price growth in China. Pacific-Basin Finance Journal, 20(1), 62-77.

14. Long, H., Liu, Y., Li, X., & Chen, Y. (2010). Building new countryside in China: A geographical perspective. Land use policy, 27(2), 457-470.