Study on Real Estate Market Price Influencing Factors Based on Multiple Linear Regression Model

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Abstract. Real estate price fluctuations significantly affect investors, businesses, and the global economy. This study employs multiple linear regression analysis to identify the primary elements influencing real estate market pricing. An exhaustive literature review of theoretical frameworks influencing real estate prices initiates the inquiry. Data from 2021 to 2024 were subsequently studied through multiple regression analysis to ascertain the factors influencing property prices. The data indicate that the consumer price index, RMB-dollar exchange rate, and stock market volatility influence house prices. This research presents policy recommendations to assist the government and market stakeholders in comprehending and forecasting property market dynamics. This facilitates the formulation of effective policies and plans to enhance stability and growth in the property market.

Keywords：Real estate; Multiple linear regression model; CPI index; Exchange rate; Shanghai Composite Index

1 Introduction

In 2024, China's real estate market has experienced significant swings, accompanied by a series of legislative reforms aimed at stabilizing the market. The National Bureau of Statistics of China has indicated a continuous decrease in housing sales and investment. From January to July, investment in real estate development declined by 10.2% compared to the same time previous year, while the cash accessible to real

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estate development companies fell by 21.3%. Recent regulations encompass reduced down payment ratios and the elimination of a minimum threshold for commercial loan interest rates to enhance housing consumption and facilitate home purchases for locals. These modifications indicate initiatives in policies aimed at stabilizing the real estate market and may enhance residents' readiness and capacity to purchase properties.Over the past two decades, China's real estate market has seen a significant transformation, reflecting the nation's rapid economic and urban development. Commencing in the early 2000s, a housing boom was propelled by reforms, more accessible mortgages, and an influx of urban residents pursuing improved living conditions and investment opportunities. The market experienced significant development activity, particularly in major urban areas, leading to real estate being a favored and stable investment. Concerns of a speculative bubble and subsequent collapse led to the establishment of new regulations to mitigate over-borrowing, specifically through the deployment of measures designed to temper market activity and prevent undue leveraging .

The characteristics of China's real estate market differ markedly among city tiers. First- and second-tier cities such as Beijing and Shanghai see persistent demand and price escalation owing to robust economies and population influx. Conversely, third- and fourth-tier cities, despite experiencing initial development surges during economic growth, subsequently encountered oversupply and diminished price appreciation. Recently, premier cities shown market resilience in response to regulatory constraints on speculation, but lower-tier cities saw market volatility and surplus inventory. This gap illustrates varying economic and demographic characteristics within city levels and the government's strategic plans aimed at balancing expansion and regulating the housing market. Consequently, several cities have eased household registration limits and provided incentives for property purchases to recruit and retain talent, thereby fostering the city's sustainable development. The government has expedited the creation of a housing system that harmonizes renting and purchase, addressing the essential housing requirements of the workforce and accommodating the varied enhancement demands of urban and rural inhabitants.

Nationally, policy modifications primarily aim to expedite the creation of a housing system that integrates renting and purchase, develop a novel model for real estate advancement, and enhance the associated foundational systems. This entails altering the financing mechanisms for real estate development, the pre-sale framework for commercial properties, and the real estate taxation system, to foster the stable and healthy advancement of the real estate market. Local governments have instituted city-specific control measures based on the prevailing circumstances.

2 Literature Review

2.1 Real Estate Policy

The evolution of China's real estate policy demonstrates the state's sophisticated approach to market regulation and its keen awareness of the public's needs. From 2000 to 2018, academics have conducted comprehensive analyses of the uncertainty of real estate policy and its impact on the market, creating the Real Estate Policy Uncertainty Index [1] to this end. During this period, China's property market has undergone significant expansion, particularly in select first-tier cities and emerging second-tier cities, accompanied by a general increase in house prices.However, in response to policy regulation and shifts in market supply and demand, the market also underwent a period of adjustment. Scholars have conducted research into the cyclical fluctuations of the real estate market, examining the impact of policy cycles on operational indicators [2] such as residential sales area, new construction area, and price indices. They have also investigated the cyclical patterns of these indicators.

Subsequently, the real estate market has exhibited a late decline in prices, accompanied by a relaxation of policies designed to stimulate consumer transactions. The 2022 study further emphasises the central position of housing security in the social security system and elaborates on the implementation strategy of the "housing without speculation" policy. An evaluation of the impact of real estate control policies in 29 major cities indicates that purchase and loan restrictions have been instrumental in moderating housing prices, whereas price and sales restrictions have had a comparatively limited influence [3]. In the study of macro-control policies, it is highlighted that future control will focus on the innovation of fiscal policy, land supply policy and monetary policy [4]. The 2024 market forecast survey report indicates that the market generally anticipates the potential for further optimisation of policies, particularly with regard to the refinement of demand-side and supply-side policies. Furthermore, the discourse on policy evolutionary resilience establishes a comprehensive analytical framework that investigates the process of policy learning and evolution [5]. In conclusion, the aforementioned studies collectively illustrate the evolution of China's real estate policies, from the initial reform of marketisation to the balancing of market and people's livelihoods to the implementation of a rent-and-buy housing system. This demonstrates the continuous adjustments and optimisations made by the policies in response to the dynamics of the market and in order to meet the housing needs of residents.

The most significant challenges currently facing China's property market include the sustained increase in house prices, the structural imbalance between supply and demand, and the volatility of market expectations. Firstly, the issue of housing prices has historically constituted a primary focus of market attention. In some cities, the rapid increase in house prices has placed significant pressure on low- and middle-income families to purchase homes. This phenomenon is closely related to a number of factors, including land supply, investment in real estate development, and financial policies [6]. The government has acknowledged the gravity of this issue and has initiated policy adjustments, including augmenting the supply of subsidised housing, optimising the structure of land supply, and modifying real estate-related financial policies, with the objective of stabilising house prices [7].Secondly, the structural contradiction between supply and demand represents a significant challenge in the current market. Some regions are experiencing an excess of housing units, while others are facing a shortage of supply. This contradiction can be attributed to an imbalance in regional development, population mobility trends, and variations in the urbanisation process. In order to address this challenge, the government is accelerating the construction of a housing system that provides a balanced combination of rental and purchase options, while simultaneously increasing the construction and supply of subsidised housing in order to meet the diverse housing needs of the population [8].

3 Analysis of the Current Development Situation of the Real Estate Industry

The persistent rise in property costs has contributed to a large increase in the amount of pressure that families with low and middle incomes are under to purchase homes. As a result of the current scenario, which is characterized by an oversupply of housing in certain regions and a scarcity of housing in the majority of other regions, the possibility for inhabitants to update their consumption structure has been curtailed. The individuals who are at the lower end of the spectrum of consumption structures have been more significantly impacted by this, while those who are at the higher end have been impacted to a relatively lesser extent. Concurrently, the rise in real estate values may result in a bigger entry of capital into the property market, which may result in the displacement of investment in other sectors and may have an impact on the diversification of the economy.

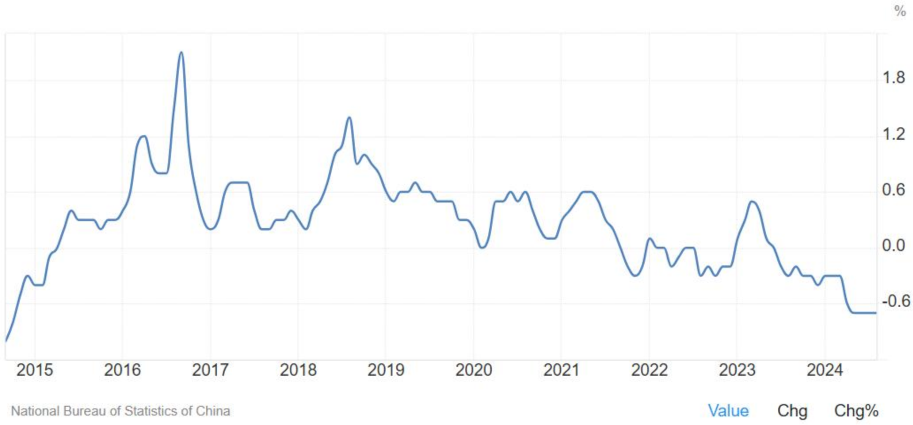

Fig. 1. China Housing Price Index (Monthly), 2015-2024

4 Qualitative Analysis of Influencing Factors in the Real Estate Market

4.1 Domestic Market

China's property market is presently undergoing a phase of recalibration after a period of significant expansion in preceding years, characterized by a relatively abundant supply. The market is experiencing downward pressure, characterized by a deceleration in house price increase and negative growth in certain regions. The market is currently experiencing an adjustment phase, characterized by a deceleration in house price rise and negative growth in certain regions. From January to August 2024, national investment in property development amounted to RMB 692.84 billion, reflecting a year-on-year decrease of 10.2%. Furthermore, house price growth in China was -6.3% in June, an improvement from -8.7% in May, however still demonstrating a declining trend.In the first half of 2024, China's gross domestic product (GDP) attained 61.68 trillion yuan, positioning it as the second-largest economy globally. An uptick in the Consumer Price Index (CPI) often signifies an overall escalation in price levels, which may indirectly affect property costs. Housing, as a commodity, is influenced by fluctuations in the overall price level. The escalation in the Consumer Price Index typically signifies a spike in The cost of living may affect inhabitants' purchasing power and consumer confidence, potentially resulting in financial limitations and postponed home-buying decisions. The Consumer Price Index (CPI) includes both rental expenses and implicit rental charges related to owner-occupied dwellings. An escalation in rental prices may compel potential homebuyers to acquire a house sooner to evade elevated rental costs in the future. This may offer some assistance to property values. Property developers often necessitate significant financing for their development projects concerning interest rates. An escalation in interest rates will subsequently result in elevated financing costs, potentially reducing developers' inclination to invest and the scale of their projects, thereby limiting housing supply to some extent and possibly applying upward pressure on domestic property prices.

4.2 International Market

The real estate sector in China plays a crucial role in the national economy, with a notably swift rate of growth during the last ten years. This sector has become crucial for attracting foreign investment and facilitating the global expansion of Chinese firms. International investors may find fresh investment opportunities during the adjustment period in China's property market. Policy tweaks may enhance market stability, whilst market fluctuations may create chances for international capital pursuing value investments to enter the market. In a property market dependent on exports, a depreciation of the local currency may improve export competitiveness and draw more international purchasers, thereby bolstering housing prices. A decrease in the exchange rate may lead to higher prices for imported items, thereby resulting in an overall increase in prices and fostering inflationary expectations. In the realm of inflationary expectations, real estate is regarded as a value-preserving asset, resulting in heightened demand and elevated housing prices. As China grows increasingly open and accommodating to the global community, a surge of foreign workers, investors, and consumers is expected, potentially leading to an escalation in housing costs.

4.3 Capital Markets

As indicated in the China Investment Development Report (2023), China's economy exhibited continued growth in 2022, driven by a surge in infrastructure investment despite a notable decline in real estate investment. Fixed asset investment registered a 5.1% expansion over the course of the year. It seems probable that China will increase its investment in the gold and equity markets as a result of demand for safe havens and market reforms. Conversely, the real estate market is likely to encounter greater difficulties and undergo further adjustments. Conversely, while the stock market and gold may offer more immediate investment opportunities, the property market will require a longer period of observation and assessment before its investment value can be determined.

The discrepancy between the real estate investment market and the gold and stock markets is primarily evident in their risk diversification and investment objectives. In terms of risk, real estate is typically regarded as a long-term investment and preservation tool, whereas gold is often utilized as a safe-haven asset, and stocks may offer higher growth potential but are accompanied by higher volatility. With respect to investment objectives, investors seeking stable income may be more inclined to invest in real estate and gold, while investors seeking long-term appreciation may focus more on the stock market.

5 Research Methods

5.1 Multiple Linear Regression Model

The notion of multiple linear regression was initially introduced by Francis Galton in the early nineteenth century. It can be utilized across various domains, including real estate research, to forecast multiple factors such as the sales area of the real estate market, the supply of residential units, and the demand for residential units. The model can anticipate the selling price, supply, and demand of residential units, among other variables. It can also be utilized to examine the linear relationship between numerous independent factors and the dependent variable, so elucidating the underlying mechanisms of fluctuations in real estate values.

Multiple regression analysis, being the initial statistical method utilized for the comprehensive evaluation of real estate tax bases, has evolved into one of the most developed and widely used models. Notwithstanding the constraints of the multiple regression model in addressing the issue of multiple covariance, it remains extensively utilized in the comprehensive evaluation of real estate. This methodology can quantify the determinants affecting residential property values, directly evaluate and forecast real estate prices, and may also be utilized in the adjustment mechanism of the comparative approach[9].

5.2 The Construction of the Model

In this model, X1, X2, and X3 denote the quantitative metrics for the domestic market, foreign market, and capital market, respectively. X1 denotes the CPI index, X2 signifies the exchange rate, and X3 indicates the SSE index.The CPI index indicates fluctuations in domestic pricing and demand throughout the whole property market. In international trade, the exchange rate plays a crucial role in determining the pricing of items in the worldwide market. Additionally, the stock market functions as a crucial medium for illustrating the prevailing investment ideology of consumers. It not only mirrors investors' anticipations concerning the economic forecast but also embodies the result of their thorough study of several aspects, including legislative alterations, industry advancements, and corporation fundamentals.

6 Data Collection and Analysis

6.1 Data Collection

The dependent variable, designated as Y in this paper, is obtained from fund.eastmoney.com. The data set spans from 1 September 2021 to 31 August 2024 and pertains to the Huaxia CSI Full-Time Real Estate Index ETF（515060) is a traded open-end index fund that tracks the performance of real estate stocks by investing in the constituent stocks of the CSI Full-Time Real Estate Index. This is done in order to reflect the listed companies in China's real estate industry's overall performance.

The dependent variables X1, X2, and X3 in this paper are derived from the Consumer Price Index (CPI) index, the Renminbi-US Dollar (RMB-USD) exchange rate, and the Shanghai Stock Exchange (SSE) index, respectively. The CPI data is sourced from the National Bureau of Statistics of China, while the exchange rate and SSE index data are obtained from https://cn.investing.com/.

6.2 Data Analysis

Table 1. -1: The SPSS results

Influencing factors	BETA
CPI	-0.250
Exchange Rate	0.347
Shanghai Securities Composite Index	0.419

The rise in the CPI positively influenced the real estate market. From the standpoint of numerical analysis, this effect was mostly manifested in the increase in home prices and did not directly lead to a significant growth in demand.The depreciation of the RMB, reflected in the reduced exchange rate, led to a concomitant decrease in domestic property values. The property sector's reliance on domestic demand has rendered its international market activities practically inconsequential.As the stock market showed an increasing trend, real estate values reflected a similar rise. Initially, a favorable link exists between the real estate market and the stock market. This occurs because certain real estate firms are publicly traded, and the appreciation of their stock prices generally propels a bullish sentiment in the whole real estate sector. This thus elevates real estate prices. Furthermore, the economic advantages and heightened investor confidence resulting from a flourishing stock market will positively influence the real estate market, resulting in an escalation of property values.A viable strategy for enhancing consumer demand in the domestic property market is the introduction of preferential and facilitative measures. Conversely, the international market should be further liberalized, the procedures for foreign investment and property acquisition in China should be streamlined, and the tax burden should be alleviated to promote this. Furthermore, while sustaining stable property values, it is crucial to provide an acceptable level of returns to successfully mitigate social issues that may arise from the collapse of the housing bubble.

7 Conclusions

In the current complex and turbulent economic environment, the property market has demonstrated notable resilience and dynamism. Notwithstanding the persistent rise in the consumer price index (CPI), the real estate industry has maintained a trajectory of positive expansion. This occurrence not only demonstrates the market's sustained excitement for property investment but also highlights its stabilizing function as a crucial component of the economy. In sharp contrast to the robust growth of the local property market, it has exhibited a declining tendency amid a depreciating currency rate. Variations in the currency rate directly influence the supply and demand dynamics in the real estate market, as well as the movement of domestic and international money. It is, nevertheless, crucial to acknowledge that the correlation between the real estate market and the equity market has intensified. The stock market's ascent has significantly enhanced investor confidence, leading to a transfer of capital from the stock market to the real estate sector. This influx of capital revitalized the property market and elevated its prices.

The inflationary conditions in the domestic market may drive investors to pursue assets that maintain and appreciate in value. As a result, they may allocate their capital to the comparatively stable real estate market, so augmenting demand for properties and instigating a surge in the property market. Nonetheless, this surge may have obscured several underlying issues, including the possibility for asset bubbles. Substantial investment in the property market may result in the creation of asset bubbles, causing property prices to diverge from their intrinsic values. The collapse of the bubble may lead to substantial economic consequences. The government can regulate the overheating of the property market by modifying its monetary and fiscal policies and by tightening bank lending regulations to avert excessive borrowing and speculation. In an international market marked by volatile exchange rates, investors may reassess their portfolios, leading to a reallocation of capital towards more stable asset classes. This may result in decreased liquidity in the real estate market, thereby causing a subsequent decline in property values. This scenario could stabilize domestic prices and the real estate market by engaging in international trade agreements like the RCEP, reducing import tariffs, lowering costs for enterprises involved in the international division of labor, and enhancing domestic market supply.The advancement of the real estate sector, propelled by investment, may be associated with the wealth impact resulting from increasing stock market valuations.

This may encourage investors to augment their investment in and consumption of real estate, thus elevating house values. A flourishing stock market may draw increased capital inflows, perhaps leading to diminished investment in other industries and affecting the balanced growth of the economy. Moreover, if the stock market surge was mostly propelled by transient speculative activity rather than enduring investment grounded in corporate fundamentals, it may lack sustainability. In this context, the government and regulators must implement a range of measures, such as fortifying financial regulation, improving market transparency, and making prompt adjustments to monetary and fiscal policies, to ensure the stable and healthy progression of the economy. Simultaneously, it is essential to elevate investor education, thereby cultivating awareness of potential risks and averting market volatility stemming from erroneous investment choices.

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