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Behavioral Finance Insights into Land Management: Decision Aggregation and Real Estate Market Dynamics in China

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Abstract: The interplay between land management and real estate market dynamics is critical for sustainable development. This study employs behavioral finance theory to explore how irrational behaviors among key market participants, including developers, consumers, and brokers, influence housing prices in China. By examining decision aggregation processes and sociocultural influences, we identify significant behavioral factors such as overconfidence, herding behavior, and availability bias that contribute to real estate price fluctuations. Our empirical analysis, based on data from 2001 to 2018, reveals how these behaviors impact market outcomes and provides insights for improving land administration systems. The findings offer valuable perspectives for policy and strategy development aimed at stabilizing housing markets, promoting sustainable real estate practices, and supporting the achievement of sustainable development goals (SDGs). This research underscores the importance of integrating behavioral finance into land management to enhance the efficiency and security of land tenure systems.

Keywords: real estate; sustainable development; behavioral finance; decision aggregation; herding effect; availability bias

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1. Introduction

Homeownership holds a central place in Chinese society, shaped by both historical and social constructs. Traditionally, owning a home has symbolized peace, stability, and a commitment to work and diligence. In modern China, the significance of homeownership is further reinforced by its connection to essential services, such as education and healthcare, facilitated through the nation's household registration system, known as the hukou [1]. Moreover, the lack of standardization in China's rental market exacerbates the appeal of homeownership, as renters often face uncertainty and limited legal protections [2]. Consequently, homeownership is widely regarded as indispensable in China, deeply rooted in the nation's historical context and current social systems.

In recent years, the convergence of digital finance and green finance has emerged as a key global trend, driven by increasing demands for environmental sustainability. This shift parallels developments in China's real estate market, where green building standards and eco-friendly infrastructure are becoming more prevalent. Xie et al. [3] highlight how innovative green financial products are gaining traction among consumers, reflecting changing consumer preferences and a growing focus on sustainability. Similarly, studies have shown that ownership concentration and behavioral factors can significantly influence decision-making in real estate markets, affecting how green and sustainable initiatives are embraced [4]. These behavioral insights provide a valuable framework for understanding the broader impact of sustainability on real estate development.

Real estate prices have been a persistent focal point in China [5,6]. The shift from welfare distribution to marketization in 1998 marked a transformative era for China's real estate system, leading to a surge in average real estate prices from 2000 to 2018. After a

temporary decline in 2008 due to the global financial crisis, prices rebounded, fueled by the government's CNY 4 trillion investment plan. Despite numerous policy interventions aimed at moderating the sharp rise in housing prices, the market has experienced continued upward pressure, driven by speculation and economic growth. As a key sector of China's economy, real estate drives national development but also poses challenges related to speculation and market volatility [7].

Amid these economic dynamics, sustainability has emerged as a crucial aspect of real estate development. Rising housing prices and the expansive growth of the real estate market have raised concerns about sustainable urban development, energy consumption, and the ecological footprint of housing projects [8]. The push for sustainability is reshaping consumer preferences and influencing government regulations, with an increasing emphasis on green building standards and eco-friendly infrastructure [9]. This focus on sustainability is not only a response to global environmental challenges but also a strategic approach to ensuring the long-term viability of the real estate market.

While the rapid influx of investment and credit has spurred economic growth, it has also introduced challenges such as soaring housing prices, escalating inflation, and widening economic disparities [10]. The last three major financial crises in China were rooted in real estate bubbles triggered by rapid increases in housing prices, underscoring the importance of stabilizing housing prices for sustainable economic development [11]. Behavioral finance insights, which consider the psychological and sociocultural factors shaping market behaviors, offer a valuable lens through which to understand the underlying causes of these bubbles and fluctuations in the real estate market.

Traditional financial theories have primarily focused on objective factors to explain the rapid growth of real estate markets, with less attention paid to the influence of human behavior. However, as economies evolve, new market anomalies such as speculation and overreaction arise, which traditional theories often struggle to explain [12]. Behavioral finance provides an important framework for analyzing these deviations, highlighting the need for more comprehensive policies that account for both economic and psychological factors in real estate markets [13].

In this context, behavioral finance theory—which draws insights from psychology, sociology, and morphology—offers a nuanced approach to understanding decision-making behaviors in financial activities [14]. This study primarily utilizes data from China but also incorporates findings from international research to provide a broader comparative perspective. Behavioral finance goes beyond the traditional notion of rationality by delving into actual investment behaviors, acknowledging the influence of cognitive biases, emotions, and individual preferences [15]. This shift in perspective from "how decisions are made" to "how decisions are really made" enriches the study of real estate markets by embracing the complexities of human behavior.

While this study employs linear regression analysis to quantify the impact of behavioral factors on real estate prices, it is important to recognize the potential role of time series analysis in similar research contexts. Time series analysis could offer valuable insights into the temporal dynamics of real estate prices, capturing trends, cycles, and seasonal effects that might influence market behavior over time [16]. Although not the primary focus of this study, time series analysis could complement our findings by providing a deeper understanding of how behavioral factors interact with market forces across different periods, offering a more comprehensive view of real estate market dynamics [17].

This study conducts both domestic and international research to quantify the irrational behaviors of various stakeholders such as developers, consumers, and brokers in the real estate market. By examining these behaviors through the lens of behavioral finance, the study explores the intrinsic causes of real estate price fluctuations. Moreover, it offers novel insights that Chinese government officials can use to craft more effective and sustainable housing market regulation policies, thereby fostering the balanced development of China's real estate market.

This paper explores the significance of decision aggregation processes and sociocultural influences in the real estate market, with a particular focus on how collective decision-making shapes market outcomes. By examining the interplay between individual and group behaviors, driven by sociocultural factors, this study sheds light on how these behaviors aggregate to influence real estate prices and market dynamics. By integrating formal decision-making models with insights from behavioral finance, the study provides a nuanced understanding of the complexities involved in real estate market decisions. The findings offer valuable implications for policymakers and practitioners, particularly in the context of developing efficient land administration systems and promoting sustainable real estate markets.

The rest of the article proceeds as follows. Section 2 delves into behavioral finance theory, reviews prior research on the real estate market, and discusses real estate price theory. Section 3 examines the Chinese real estate market and evaluates whether real estate prices have surged significantly. Section 4 formulates the study's hypotheses and elucidates its empirical design. Section 5 presents the empirical findings. Section 6 concludes the paper, offers recommendations, outlines its limitations, and highlights the importance of sustainability in the ongoing discourse on real estate prices in China.

2. Prior Research and Theoretical Background

2.1. Literature Review

Behavioral finance theory, rooted in Kahneman and Tversky's [18] prospect theory, posits that investors' decisions vary according to their prospects, leading to different investment outcomes even within the same project. This contrasts with traditional expected utility theory, which assumes rational investor behavior. The field of behavioral finance gained momentum after De Bondt and Thaler's seminal work, "Does the Stock Market Overreact?" [19], and further expanded with Delong et al.'s [20] noise-trading model, which explained deviations of stock prices from their fundamental values and the formation of irrational bubbles.

In China, research on behavioral finance theory began around 2000, focusing on irrational behaviors in major securities markets. This framework has since been applied to analyze phenomena in China's real estate market that traditional financial theories struggle to explain. Zhou [21] categorized real estate market participants into microeconomic entities (e.g., developers, homebuyers, and financial institutions) and policymakers (e.g., central and local governments) to analyze their impact on housing price fluctuations. Using empirical analysis, Zhou [21] quantified behaviors such as herd behavior, adverse selection, Ponzi schemes, and positive feedback trading, finding that herd behavior and Ponzi schemes drive prices up, while adverse selection and positive feedback trading tend to drive prices down.

Li [22] applied a noise trader model to Beijing's real estate market, revealing that higher real estate prices and larger loans from financial institutions contribute to larger real estate bubbles. Xu [23] explored anomalies in the real estate market using behavioral finance theory, highlighting the roles of noise trading and herd behavior in excessive speculation. These behaviors, along with feedback mechanisms, were identified by Xu [23] as primary causes of market anomalies.

Liu [24] examined the real estate market bubble in Nanchang from a behavioral finance perspective, confirming the existence of bubbles using annual data from 1998 to 2013. Liu's analysis revealed that homebuyers' herding behavior and irrationally excessive support from financial institutions were significant contributors to the real estate bubbles in Nanchang.

Recent research has increasingly integrated decision aggregation processes and sociocultural influences into the analysis of real estate markets. For example, Barberis and Thaler [25] laid the groundwork by exploring various behavioral biases, such as overconfidence and herding, and their impact on market dynamics. Building on this, more recent studies have further examined how these biases influence collective decision-making in real estate markets, leading to behaviors that significantly affect market outcomes [26]. These studies underscore the importance of understanding the psychological and sociocultural factors that drive investor behavior, as they play a critical role in shaping real estate market trends.

Wang et al. [27] investigated the interplay between formal decision rules and behavioral biases in the Chinese real estate market. They found that while formal rules such as regulatory policies aim to stabilize the market, behavioral biases such as overconfidence and herding often counteract these efforts, leading to persistent market volatility.

Furthermore, Shiller [28] and Glaeser and Nathanson [29] examined the influence of behavioral factors on financial markets, emphasizing the importance of understanding psychological context when analyzing market behavior. Their findings suggest that behavioral factors significantly influence collective decision-making processes, leading to unique market dynamics that differ from those predicted by traditional financial theories.

These studies underscore the importance of considering both formal and behavioral aspects of decision aggregation in understanding real estate markets. By integrating insights from behavioral finance with an analysis of decision aggregation processes and sociocultural influences, this body of research provides a comprehensive understanding of how collective decisions are made and their implications for market stability and policy-making.

2.2. Theory of Real Estate Price Change

2.2.1. Characteristics of Real Estate Prices

Real estate prices, like commodity prices, are primarily determined by the interaction of supply and demand in the market. When supply exceeds demand, prices tend to fall; conversely, when demand outstrips supply, prices increase. The equilibrium price of a commodity typically reflects this balance between supply and demand. Factors influencing commodity prices include characteristics of the commodity itself, monetary conditions, and national policies. While real estate prices share similarities with commodity prices in terms of their dependence on supply and demand and their expression in a specific currency, they also possess distinct characteristics that differentiate them from ordinary commodities. These unique characteristics—such as location, long-term investment potential, and the influence of government regulations—significantly impact the dynamics of the real estate market [30].

Table 1 outlines the key characteristics of real estate prices, providing a description of each factor and the supporting references:

Table 1. Key characteristics of real estate prices.

Factor	Description
Duality	Real estate prices include both house and land prices. The price of a house reflects human labor value, while land prices are derived from capitalized land rent. The scarcity of land and its inelastic supply, coupled with increasing demand, leads to rising real estate values [31].
Locality	Real estate is immovable, meaning that transactions involve the transfer of rights such as use and ownership. This immobility leads to prices that reflect these specific rights, unlike general goods that can be transported [32].
Uniqueness	Real estate assets that seem identical can have different prices due to factors such as geographical location or environment, leading to individualized pricing based on these unique characteristics [33].
Government Interference	The real estate market often requires government intervention due to its significant impact on the economy and issues like information asymmetry. The government regulates the market to protect consumer interests and ensure stability, especially in contexts like China where real estate is a major industry [34].

2.2.2. Decision Aggregation Processes and Sociocultural Influences on Real Estate Prices

In the context of decision aggregation processes, the collective behaviors and decisions of various market participants play a crucial role in shaping real estate prices. These processes, influenced by sociocultural norms and market expectations, lead to significant fluctuations in the real estate market. Table 2 highlights key factors that illustrate how these decision aggregation processes and sociocultural influences impact real estate prices:

Table 2. Key factors in decision aggregation processes and sociocultural influences on real estate prices.

Factor	Description
Collective Decision-Making	Real estate prices are shaped by the aggregated decisions of various stakeholders, including developers, consumers, and financial institutions. Collective behaviors, influenced by sociocultural norms and market expectations, can lead to price fluctuations, such as herd behavior driving prices up or shifts in market sentiment causing declines [28].
Sociocultural Influences	Cultural norms and societal expectations significantly impact real estate market dynamics. In China, the strong cultural preference for homeownership, rooted in historical and social constructs, drives demand and affects market trends and price stability [35].
Government Policies and Market Regulation	Government intervention is crucial for maintaining market stability, addressing information asymmetry, and ensuring sustainable development. Policies aimed at curbing speculation, promoting affordable housing, and regulating market behaviors influence collective decision-making processes [36].

By integrating insights from behavioral finance and considering the sociocultural context, this study provides a comprehensive understanding of the factors influencing real estate prices in China. This dual focus on formal decision rules and behavioral aspects offers a nuanced perspective on how collective decisions are made and their broader implications for market stability and policy-making.

Understanding the characteristics of real estate prices through the lens of decision aggregation and sociocultural influences enriches our comprehension of market dynamics. This approach highlights the importance of both economic and behavioral factors in shaping real estate market outcomes.

2.2.3. Factors Affecting Real Estate Prices in China

Real estate is a crucial industry for the national economy, impacting not only the country's economic health but also the quality of life for its citizens. Real estate prices are a key component of the real estate market and directly influence its development. Due to the rapid growth of the market in recent years, real estate prices have become a hot topic of discussion in China. Numerous factors contribute to the rise in real estate prices, driven by the interests of various sectors. Tang et al. [37] identified seven key participants in the real estate market: the central government, local governments, commercial banks, real estate developers, speculative home buyers, investment home buyers, and residential home buyers. The interactions among these participants promote a rapid increase in housing prices [37].

Focusing on these dynamics, this study narrows the scope to four primary participants—real estate developers, consumers, brokers, and government departments. By synthesizing the results of previous studies, we aim to explain how each participant influences real estate prices through behavioral influences and decision aggregation processes.

A. Real Estate Developers

Real estate developers impact housing prices in two main ways. First, their primary goal of maximizing profits drives them to prefer rising housing prices. As major participants in the primary real estate market, developers possess more channels to acquire information than consumers due to the professional nature of the market. This information asymmetry allows developers to influence and elevate housing prices to gain advantages. Second, rising land prices directly increase housing costs, prompting developers to raise housing prices accordingly. In China, where there is no housing tax, land sales constitute a significant source of income for local governments. Consequently, local governments, as primary suppliers in the land market, favor increasing land prices, while real estate developers, representing the main demand, must contend with these rising costs.

Figure 1 illustrates the relationship between the number of real estate companies and their sales volume. As the quantity and sales of real estate companies have increased,

competition has intensified, leading to higher land prices. This competitive landscape reflects the aggregated decisions of developers striving to secure profitable land deals, which in turn affects overall housing prices.

By examining these interactions, we gain insights into the behavioral influences and decision aggregation processes shaping real estate prices in China. This understanding enables us to appreciate the complexities of market dynamics, influenced by both economic factors and collective behaviors.

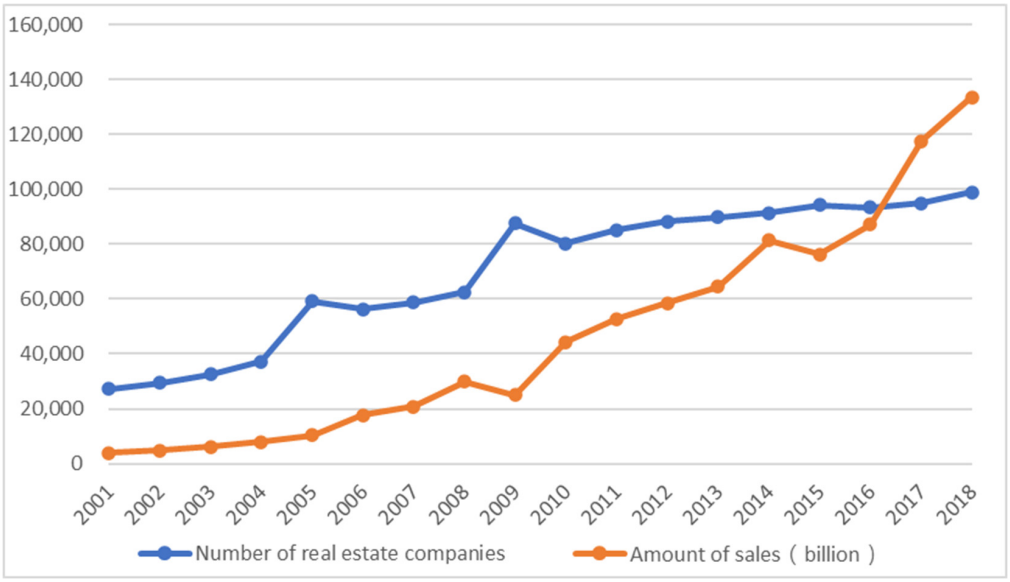

Figure 1. Number of real estate companies and amount of sales (Source: China Bureau of Statistics).

B. Consumers

Consumers represent the primary demand in the real estate market, with the increase in housing prices mainly driven by rising housing demand. The main drivers of house purchases are consumer and investment demand levels. Consumption demanders keep their houses after buying them, whereas investment demanders often sell them shortly after buying them to obtain a price differential or rent.

Regarding consumer demand, China's urbanization rate increased from 2000 to 2018 (see Figure 2). Many residents have migrated to cities, leading to an increase in housing demand. As urbanization accelerates, the demand for housing in urban areas intensifies, reflecting a significant sociocultural influence on the real estate market. Concurrently, economic development has greatly improved living standards, and more people are seeking to change houses to improve their living conditions, which is also increasing the demand for housing.

When examining investment demanders, China's housing prices have been rising since the nation's reform and opening-up began, influencing individual investment behaviors. Those who have been buying houses with the intention of selling have invested considerable money, driven by the expectation of significant returns. The increasing number of people seeking to invest in real estate reflects collective decision-making behaviors influenced by market expectations and guaranteed profits. Moreover, in cities with large floating populations, rental income is a main driver of an increase in investment demand. This behavior further aggregates the demand pressures in the market, influencing overall price stability and market trends.

As shown in Figure 2, the urbanization rate has steadily increased, paralleling the rise in real estate prices. The rapid increase in real estate prices in cities such as Beijing, Shanghai, and Shenzhen, which have China's largest floating populations, underscores the influence of aggregated investment behaviors. These investment trends, driven by the collective expectations of returns, have contributed to the continuous rise in real estate prices.

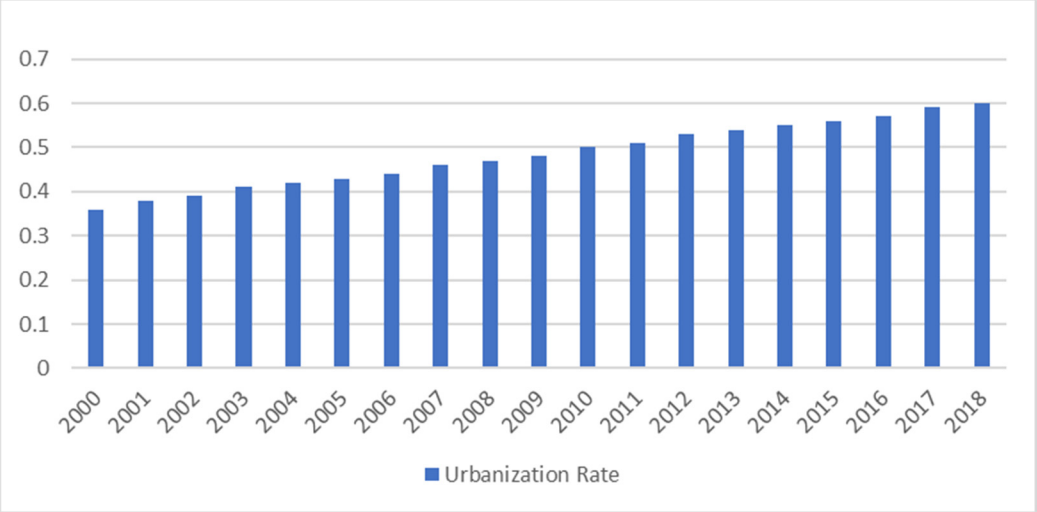

Figure 2. China's 2000–2018 urbanization rate (Source: China Bureau of Statistics).

C. Brokers

Commercial banks and other financial institutions play a pivotal role as brokers in China's real estate market. In China, most domestic buyers rely on bank loans; hence, financial institutions are integral to the real estate ecosystem. Homebuyers typically make a down payment to the developer and borrow the remaining amount from banks. After receiving the down payment and loans, developers transfer the property to buyers, using the property itself as collateral for the loan. This process benefits buyers, banks, and developers alike. It allows buyers to pay only part of the house cost upfront, enables banks to mortgage properties and earn interest, and allows developers to sell properties more quickly, improving cash flow and reducing risk.

Table 3 illustrates the adjustments to the down payment ratio for housing loans in China since the 1998 housing transaction system reform. Initially, the minimum down payment ratio was set at 30%, with subsequent changes responding to market conditions and government policies. These adjustments reflect the ongoing efforts to balance market stability with accessibility for homebuyers. For instance, the down payment ratio was reduced to 20% in 2003 to stimulate the market, then raised again to 30% in 2006, and later adjusted in response to the international financial crisis and other economic conditions.

The actions of these financial institutions, influenced by behavioral factors such as risk perception and herd behavior, significantly impact real estate prices. By understanding the behavioral influences and decision aggregation processes of these brokers, we can better grasp their role in shaping China's real estate market dynamics.

Table 3. Adjustments to down payment ratio.

Date	Minimum Down Payment	Notes	Source
1998	30%	The down payment ratio is 30% for those receiving house purchase subsidies. The down payment ratio is not less than 30% for those who are not receiving house purchase subsidies.	Ministry of Housing and Urban-Rural Development, 1998.
2003	20%	The minimum down payment is reduced to 20%.	China Real Estate Market Report, 2003.
2006	30%	The minimum down payment is raised to 30%.	People's Bank of China, 2006.
2008	20%	After the outbreak of the international financial crisis, the minimum down payment ratio is adjusted to 20% to help the housing market and boost the economy.	China Economic Review, 2008.

Table 3. *Cont.*

Date	Minimum Down Payment	Notes	Source
2010	30%	Regulation is renewed; the down payment must not be less than 30%, and that for the second house must not be less than 50%.	State Council of China, 2010.
2015	25%	Cities that do not impose "purchase restrictions" require a minimum down payment of 25% or more.	Ministry of Finance, 2015.
2016	20%	The down payment ratio for the first home is reduced to 25%. In cities not subject to the purchase restriction, the minimum down payment ratio is adjusted to 20%, and the down payment ratio for the second home is lowered to 30%.	Ministry of Housing and Urban-Rural Development, 2016.

D. Government Departments

China has two main levels of government: local and central. The goal of local governments is to develop local economies. The real estate industry is the main industry driving local economies; it can also drive the development of related industries (e.g., house demolition, residential construction, moving, home decoration, home appliance production, household appliances, kitchen equipment, steel, cement, and glass) and provide employment to many people. Local governments are the only land-sellers. The income from land sales and taxes paid by real estate companies and related industries provides the main revenue for local governments. Consequently, local governments have unwittingly contributed to the increases in housing prices.

The central government aims to promote sustained economic growth, maintain stable price levels, and achieve full employment and a balance of payments. The central government regulates the real estate market through economic policies designed to ensure that the real estate industry enjoys consistent development and drives national economic growth (see Table 4). The state has implemented many regulatory policies since real estate market reform began in 1998. The main purpose of regulations is to stabilize development and curb excessive increases in housing prices. The main regulatory policies employed include currency, loans, taxes, land policies, and purchase restrictions. Most of these policies have promoted the development of the real estate industry, leading to an increase in housing prices. The central government evaluates the performance of local governments by assessing local economic development, which indirectly promotes real estate industry development [38].

Table 4. Major Chinese government regulation policies for the real estate market (1998–2018).

Date	Main Policy	Control Purpose	Change in Real Estate Prices
1998–2002	1989: real estate market reform; establishment and improvement of real estate industry. 1999: strengthening of mortgage loan management. 2001: tax cuts. 2002: land policy reform.	Promoting housing consumption and making the real estate industry the main industry in China.	Full development of the real estate industry, stable growth of real estate prices.
2003–2004	March 2003: the real estate industry is announced as the pillar industry of China's national economy. April 2004: real estate investment capital ratio increases. August 2004: land purchase threshold is raised.	Suppressing rapid growth in real estate prices.	Real estate prices do not fall but keep increasing.

Table 4. *Cont.*

Date	Main Policy	Control Purpose	Change in Real Estate Prices
2005–2007	2005: eight national regulations published; regulation becomes political priority. 2006: six national regulations published; the start of a new round of regulation. 2007: the State Administration of Taxation imposes the land value-added tax; the central bank raises interest rates six times throughout the year; the down payment on loans for second homes must be no less than 40%.	Stabilizing housing prices.	Real estate prices begin to rise at an even faster rate after a temporary fall.
2008–2009	The State Council launches the "4 trillion" plan to stimulate the economy. The minimum down payment for first home loans is adjusted to 20%.	Promoting the development of the real estate industry.	House prices fall in 2008 because of the financial crisis. House prices start to increase dramatically in 2009.
2010–2013	2010: "Eleven Regulations of the State Council" is issued; the issuance of mortgages on third homes is suspended; some cities begin restricting purchases. 2011: eight national regulations are published, and the down payment for a second home must be no less than 60%. 2013: the "New Five National Principles" are promulgated; the personal income tax on second-hand house transactions is raised from 1% to 20%.	Curbing rising housing prices.	The tendency of house prices to rise rapidly is contained.
2014–2016.08	2014: the "930" policy on house loans and the "1121" interest rate cut policy are released. 2015: the "330" is published, and interest rates continue to be cut. 2016: tax on real estate transactions is reduced.	Digesting the real estate inventory; establishing an effective long-term real estate mechanism.	House prices fall and then increase.
2016.09–2018	2016: the "930" policy is published. 2017: cities are increasingly imposing purchase restrictions.	Curbing house prices, which are rising too fast; definancializing housing.	House price growth slows.

2.3. Theory of Behavioral Finance in the Context of Real Estate Markets

Behavioral finance theory, grounded in Kahneman and Tversky's [18] prospect theory, provides a framework for understanding how psychological influences affect financial decision-making processes. This theory diverges from traditional financial theories that assume rational behavior by highlighting how cognitive biases and emotional responses lead to irrational financial decisions. Haugen [39] categorizes the evolution of financial theory into three stages: old, modern, and new. Traditional financial theories, such as the capital asset pricing model (CAPM) and arbitrage pricing theory (APT), rest on the "rational man" hypothesis and the efficient market hypothesis, which suggest that markets are rational and prices reflect all available information.

Culture significantly influences decision-making processes in financial markets. Hoffmann and Anwar [40] investigate how cultural factors shape the susceptibility to biases and heuristics, affecting the efficiency of decision-making. Their findings underscore the importance of considering cultural context when analyzing market behaviors, as these factors can lead to overconfidence and other biases that impact market outcomes. This cultural perspective is essential in understanding the behavioral influences within China's real estate market.

However, anomalies observed in financial markets during the 1980s, including irrational bubbles and excessive speculation, prompted a reevaluation of these traditional models. Behavioral finance emerged as a response, incorporating insights from cognitive psychology to explain these irregularities. According to Cui [41], the inefficiency of real

capital markets is attributed to various human irrationalities, such as cognitive biases, which play a significant role in decision aggregation processes within real estate markets.

2.3.1. Psychological Foundations of Behavioral Finance

In real financial markets, investors' decisions are frequently influenced by psychological biases, which can lead to deviations from rational behavior. These biases play a critical role in the aggregation of decisions, significantly impacting market outcomes. Table 5 outlines key psychological biases that affect decision-making in the real estate market, along with their descriptions and supporting references:

Table 5. Key psychological biases affecting decision-making in the real estate market.

Psychological Bias	Description
Availability Bias	Availability bias occurs when individuals estimate the likelihood of an event based on how easily examples come to mind. In China's real estate market, this bias can cause investors to overreact to widely publicized developments or trends, leading to misjudgments about market conditions [42].
Representativeness Bias	Representativeness bias happens when people judge the probability of an event by comparing it to an existing mental prototype. In real estate, this might cause investors to overvalue properties in trendy areas, disregarding broader market signals and potentially leading to speculative bubbles [43].
Regret Avoidance	Regret avoidance leads investors to avoid decisions that might result in regret. In real estate, this could mean holding onto depreciating assets longer than advisable, in an attempt to avoid realizing a loss [44].
Loss Aversion	Loss aversion describes the preference for avoiding losses over acquiring equivalent gains. In China's real estate market, this can result in investors holding onto properties to avoid selling at a loss, distorting supply and demand [18].
Overconfidence	Overconfidence leads individuals to overestimate their knowledge and ability to predict market trends. In real estate, this can cause excessive investment based on unrealistic expectations of market growth [45].
Ambiguity Aversion	Ambiguity aversion causes individuals to avoid options where the probability of outcomes is unclear. In real estate, this can lead to a preference for familiar properties and markets, potentially missing better opportunities [46].
Herd Effect	The herd effect occurs when individuals mimic the actions of a larger group, often without independent analysis. In China's real estate market, this can exacerbate cycles of boom and bust as investors follow trends without proper evaluation [47].

2.3.2. Limits to Arbitrage in Real Estate

Arbitrage, the practice of profiting from price differences across different markets, faces significant constraints in the real estate sector due to various risks. These risks can limit the effectiveness of arbitrage strategies, making it challenging for investors to capitalize on price discrepancies. Table 6 outlines the key risks that constrain arbitrage in real estate, providing descriptions of each and the supporting references:

Table 6. Key risks constraining arbitrage in real estate markets.

Factor	Description
Fundamental Risk	Fundamental risk arises when there is a discrepancy between an asset's intrinsic value and its market price. In real estate, irrational market sentiments can lead to significant deviations from fundamental values, making it difficult for arbitrageurs to profit from these discrepancies [48].

Table 6. *Cont.*

Factor	Description
Implementation Cost Risk	Implementation cost risk involves the expenses associated with executing arbitrage strategies, which can include transaction costs, taxes, and regulatory barriers. In real estate, these costs can significantly reduce potential profits, thereby limiting arbitrage opportunities [49].
Model Risk	Model risk refers to the potential inaccuracies in financial models used to predict asset prices. In the real estate market, reliance on flawed models can result in incorrect investment decisions, exacerbating market inefficiencies and limiting the effectiveness of arbitrage strategies [50].

By examining these psychological and financial factors, we gain insights into how behavioral influences and decision aggregation processes shape the dynamics of China's real estate market. This analysis highlights the need for incorporating behavioral finance principles into market regulation and policy-making to mitigate irrational behaviors and promote market stability.

3. Analysis of Chinese Real Estate Market and Examination of Behavioral Influences on Real Estate Price Increases

3.1. Current State of Real Estate Market in China

China's real estate market entered the commercialization stage after its housing reform in 1998. As shown in Figure 3, real estate prices experienced steady growth nearly every year from 2000 to 2018, with the only significant dip occurring in 2008 due to the global financial crisis. Following this brief decline, prices began to rise rapidly, driven by the government's CNY 4 trillion investment plan, which aimed to stimulate the economy and support the housing market.

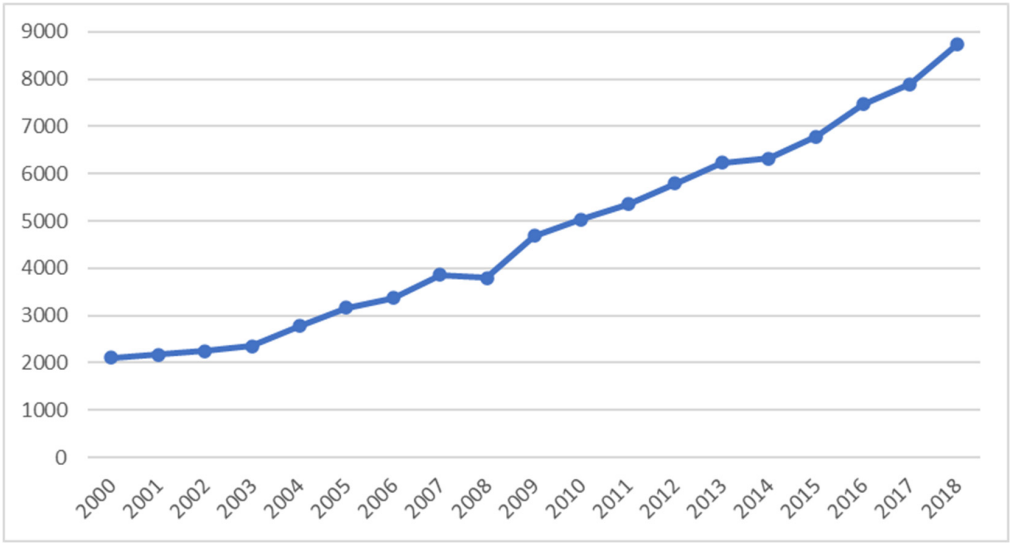

Figure 3. Average real estate prices in China, 2000–2018 (RMB/m^2) (Source: China Bureau of Statistics).

The increase in real estate sales, as depicted in Figure 4, reflects the growing demand driven by economic development and urbanization. The rising urban population and per capita income have provided a solid foundation for the real estate market. Between 2000 and 2018, China's gross domestic product (GDP) surged from CNY 10,028 to CNY 91,928.1 billion, an increase of 9.2 times, establishing a robust economic base for real estate development. Additionally, the growing urban population [51] and the rise in per capita total income of urban households in China have further fueled demand in the real

estate market [52]. This growth has been significantly influenced by various behavioral factors and collective decision-making processes among stakeholders, including developers, investors, and government policymakers.

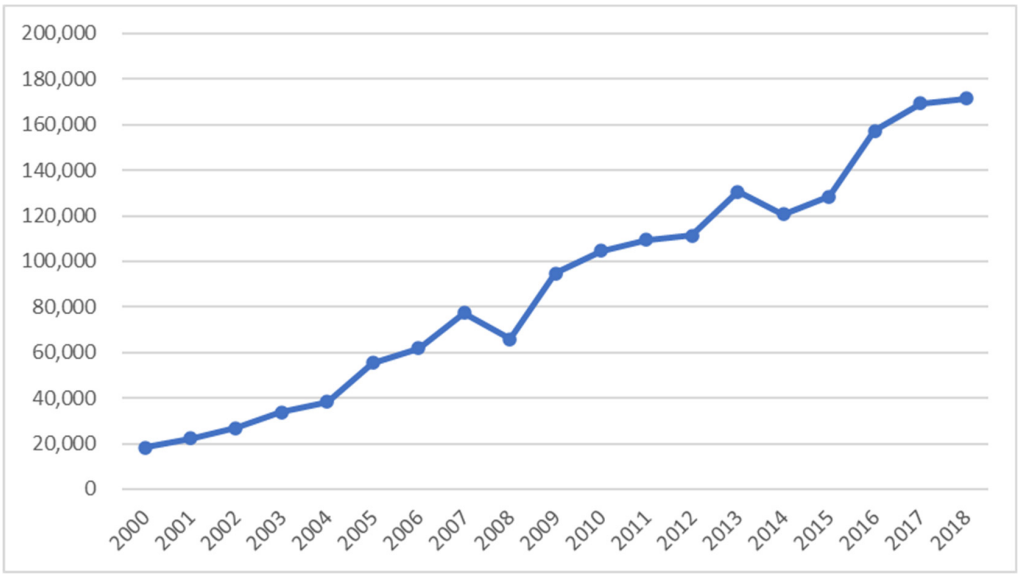

Figure 4. China's real estate sales area, 2000–2018 (square meters) (Source: China Bureau of Statistics).

3.2. Behavioral Influences on Real Estate Price Increases in China

Real estate bubbles have been the primary cause of several major financial crises, including those in Southeast Asia, Japan, and the United States. The rapid development of China's real estate market has spurred economic growth but has also led to problems such as high prices, intensified inflation, and potential financial crises. To determine whether China's real estate prices have risen excessively, it is essential to consider the behavioral influences and decision aggregation processes within the market.

Analyzing supply and demand dynamics, as shown in Figure 5, reveals the collective behaviors influencing price trends. Despite supply consistently outstripping demand, real estate prices have continued to rise, especially from 2009 to 2015. This anomaly can be attributed to herd behavior and speculative investment, driven by sociocultural factors and market expectations.

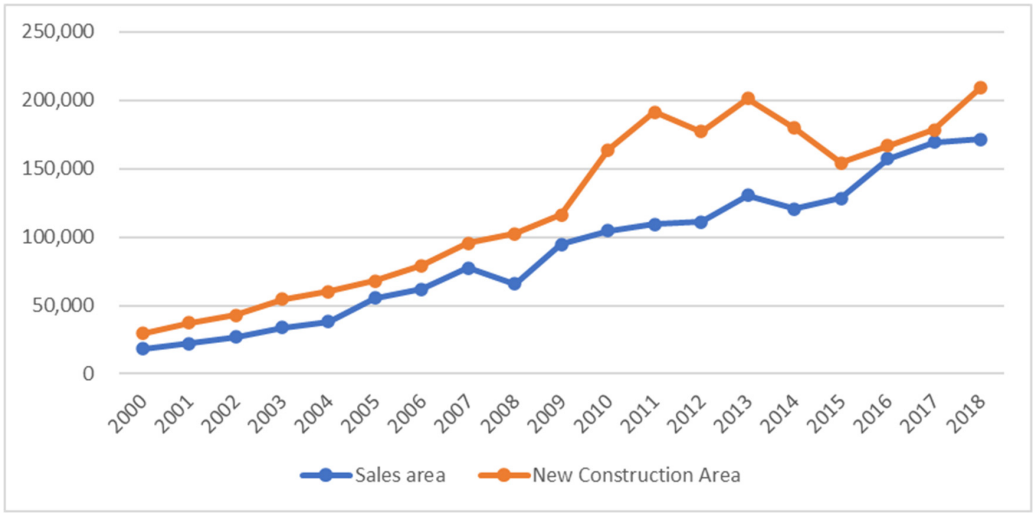

Figure 5. Real estate sales area and new construction area in China, 2000–2018 (square meters) (Source: China Bureau of Statistics).

The housing price-to-income ratio further illustrates the behavioral influences on the market. This ratio, which compares the average house price to the average total annual family income, has consistently exceeded international norms, indicating excessive price growth driven by collective investment behaviors and the sociocultural emphasis on homeownership.

$$\text{Housing Price-to-Income Ratio} = \frac{\text{Total Housing Price per Household}}{\text{Total Annual Income per Household}}$$

$$\begin{aligned}\text{Total Housing Price per Household} &= \text{Per Capita Housing Area} \\ &\times \text{Average Population per Household} \\ &\times \text{Average Housing Sales Price per Unit Area}\end{aligned}$$

$$\begin{aligned}\text{Total Annual Income per Household} &= \text{Average Population per Household} \\ &\times \text{Total Household Annual Income per Capita}\end{aligned}$$

As shown in Figure 6, China's housing market has exceeded a ratio of 6.5 since the reform, reaching over 8 in recent years [53]. This finding supports the conclusion that behavioral factors such as overconfidence, herd behavior, and the sociocultural value placed on homeownership have significantly contributed to the rapid increase in housing prices.

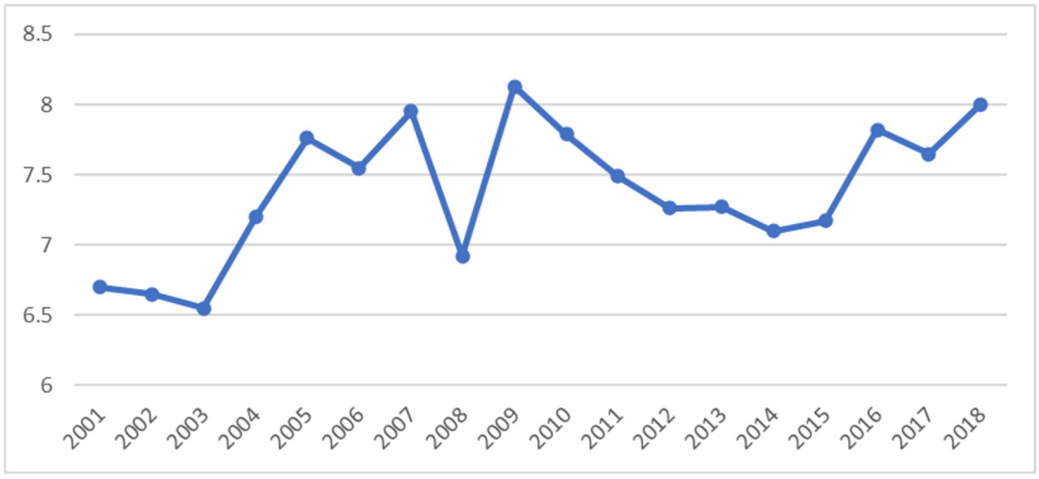

Figure 6. China's housing price-to-income ratio, 2001–2018 (Source: China Bureau of Statistics, E-house China R&D Institute).

4. Materials and Methods

This study employs the principles of behavioral finance to explore how irrational behaviors among key participants in China's real estate market contribute to deviations in housing prices from their intrinsic values. The participants analyzed in this research include developers, consumers, brokers, and government departments. This study aims to understand how these groups, influenced by decision aggregation processes and sociocultural factors, impact real estate market dynamics.

4.1. Identifying Irrational Behaviors and Formulating Hypotheses

To examine the influence of irrational behaviors on real estate prices, this study focuses on the specific actions and decisions of market participants. The following subsections outline the roles of developers, consumers, and brokers, along with the hypotheses derived from their observed behaviors.

4.1.1. Developers

In the real estate market, developers typically possess more information than consumers, leading to information asymmetry. This asymmetry allows developers to influence

housing prices by overestimating future price increases due to their overconfidence. Overconfidence bias, as demonstrated in previous studies, often results in overly optimistic projections and risky investment behaviors [45,54]. Figure 5 illustrates the consistent rise in China's new construction areas, suggesting that developers frequently expand their projects based on these optimistic expectations. This overconfidence can drive developers to increase real estate development, which may result in higher market supply and potentially lower-than-expected returns. To sustain operations and meet financial obligations, developers might further raise housing prices, thereby reinforcing the following hypothesis:

Hypothesis 1. *Overconfidence among real estate developers has a positive effect on real estate prices.*

4.1.2. Consumers

Consumers in the real estate market, whether purchasing for personal use or as an investment, often base their decisions on expected price trends. When prices are anticipated to rise, demand increases; conversely, when prices are expected to fall, purchases are delayed, and sales from investors increase. These behaviors, strongly influenced by herd behavior, significantly impact market dynamics. Research shows that herd behavior occurs when individuals follow the actions of the majority, often disregarding their personal analysis [47,55]. In the context of the real estate market, this herd behavior can contribute to price instability and amplify trends, as consumers rely on the collective behavior of others rather than independent decision-making. This leads to the following hypothesis:

Hypothesis 2. *The herding effect among consumers in the real estate market has a positive impact on real estate prices.*

4.1.3. Brokers

Brokers and financial institutions serve as intermediaries, seeking returns through lending activities. Their lending decisions are often based on the information available to them, which is susceptible to availability bias. Availability bias refers to the tendency to base decisions on readily available information rather than a comprehensive analysis of all relevant data [42]. This bias can result in increased lending during favorable market conditions, which contributes to real estate bubbles and a false sense of prosperity. Excessive lending based on biased information can inflate housing prices [56]. Li et al. [57] examined how investment experience influences risk perception and decision-making in stock investments, noting that experienced investors are better at assessing risks, which can mitigate or exacerbate the impact of availability bias. In the real estate market, brokers with varying levels of experience may exhibit different lending behaviors based on their risk perceptions, further influencing market dynamics. This observation supports the following hypothesis:

Hypothesis 3. *Availability bias among brokers in the real estate market has a positive impact on real estate prices.*

4.2. Empirical Study Design

4.2.1. Variable Measurement

The primary objective of this study is to analyze the factors contributing to the rapid increase in real estate prices in China. The dependent variable in the analysis is real estate prices (Y), which serves as the outcome variable we seek to explain through the influence of various behavioral factors.

The independent variables, representing key behavioral influences, are defined as follows:

Overconfidence (OC):

Overconfidence is measured by the current new construction area. This metric reflects the extent to which developers may exhibit overconfidence in their predictions about future market conditions, leading them to expand construction activities aggressively. The variable is specified as follows:

Overconfidence (OC) = Current new construction area

Herd Effect (HE):

The herd effect is captured by current real estate sales. This variable quantifies the tendency of consumers to follow the collective behavior of others rather than relying on individual analysis, which can lead to significant fluctuations in market demand. The variable is defined as follows:

Herd Effect (HE) = Current real estate sales

Availability Bias (AB):

Availability bias is measured by the current loan amount provided by financial institutions. This variable represents the tendency of market participants to make decisions based on readily available information, such as the ease of obtaining credit, rather than conducting a comprehensive analysis. The variable is defined as follows:

Availability Bias (AB) = Current loan amount

4.2.2. Sample and Data

The study spans the period from 2001 to 2018 and utilizes monthly data sourced from the China Statistics Bureau. The dataset includes crucial variables such as the real estate sales area, real estate sales, borrowing amounts, and new construction areas. These data points provide a robust foundation for analyzing the behavioral influences on real estate prices over time. The use of monthly data ensures that the analysis captures both short-term fluctuations and long-term trends, offering a comprehensive view of the market dynamics.

4.2.3. Empirical Model

To investigate the causal relationships between the variables, this study employs multiple regression analysis using SPSS. The choice of multiple regression analysis is grounded in its robustness for examining the direct effects of multiple independent variables—representing behavioral factors—on a dependent variable, in this case, real estate prices. This method is particularly suitable for this study as it allows for the simultaneous consideration of multiple predictors, which is crucial for capturing the complex interplay between various behavioral influences on the real estate market. By controlling for the effects of other variables, multiple regression analysis reduces bias and enhances the accuracy of the estimated relationships.

The regression model used in this study is adapted from established models in the behavioral finance literature [15,25]. The model is specified as follows:

$$Y = \alpha + \beta_1 \mathrm{OC} + \beta_2 \mathrm{HE} + \beta_3 \mathrm{AB} + \epsilon, \quad (1)$$

where

Y: Current real estate price, representing the dependent variable we aim to explain.

α: Intercept, indicating the baseline value of the real estate price when all independent variables are equal to zero.

β_1, β_2, β_3: Regression coefficients associated with the independent variables (OC, HE, AB), which quantify the effect of each behavioral factor on real estate prices.

ϵ: Error term, capturing the influence of unobserved factors that may affect real estate prices.

This model is specifically designed to examine how overconfidence, herd behavior, and availability bias among market participants contribute to the observed changes in real estate prices in China. By applying this model, this study aims to elucidate the complex interactions between these behavioral factors and market outcomes, thereby contributing to a broader understanding of the role of decision aggregation processes and sociocultural influences in the real estate market.

The justification for using linear regression in this context lies in its ability to handle multiple predictors simultaneously, providing clear and interpretable coefficients that represent the magnitude and direction of the relationships between the variables. Furthermore, the inclusion of an error term acknowledges that not all influences on real estate prices are captured by the independent variables, thus reinforcing the need for cautious interpretation of the results. This consideration is essential when dealing with a market as complex and multifaceted as China's real estate sector, where numerous external factors may also play a role.

In addition to the methodological rigor of multiple regression analysis, SPSS was chosen for its user-friendly interface and powerful statistical capabilities, which facilitate the efficient processing and analysis of large datasets. This approach provides a comprehensive framework for analyzing the behavioral dynamics within China's real estate market, offering insights that can inform more effective and sustainable housing market regulation policies.

4.2.4. Consideration of Time Series Analysis

While this study primarily employs linear regression analysis to investigate the influence of behavioral factors on real estate prices, it is important to acknowledge the potential relevance of time series analysis in similar research contexts. Time series analysis is a powerful tool for examining trends, cycles, and seasonal patterns in data over time, which can provide deeper insights into the dynamics of real estate markets.

The choice of linear regression as the primary analytical method in this study was driven by the need to quantify the direct impact of specific behavioral factors—overconfidence, herd behavior, and availability bias—on real estate prices at a given point in time. However, time series analysis could offer valuable additional insights, particularly in understanding how these relationships evolve and interact over longer periods. It could also help identify structural breaks or shifts in the market caused by external events or policy changes.

Although time series analysis was not the focus of this study due to the scope and objectives centered on behavioral finance, future research could benefit from incorporating time series methods to explore temporal patterns and long-term trends. Such an approach could complement the findings of this study and contribute to a more comprehensive understanding of the factors driving real estate market dynamics in China.

5. Results

5.1. Descriptive Statistics

Behavioral influences in China's real estate market can be comprehensively understood through descriptive statistics. Table 7 presents the descriptive statistics of the variables used in the study. The dependent variable, current real estate price (Y), ranges from CNY 2017.88 to CNY 8888.06, with an average of CNY 4975.16. Overconfidence (OC) is measured by the area of new construction, which fluctuates significantly from a minimum of 826.24 thousand square meters to a maximum of 24,779.68 thousand square meters. This wide range indicates substantial variations and the potential for developers' overconfidence in predicting market trends. The herding effect (HE) is captured by real estate sales, which range from CNY 515.2 billion to CNY 2046.464 billion, showing significant changes and reflecting the behavioral tendencies of consumers in the market. Finally, availability bias (AB) is represented by the amount of loans, ranging from CNY 567.2 billion to CNY 2993.08 billion, highlighting the role of financial institutions and their influence on real estate prices.

Table 7. Descriptive statistics of variables.

Variable	Obs	Minimum	Maximum	Mean	Std. Deviation	Variance
Y	216	2017.88	8888.06	4975.16	2018.81	4,075,585.68
OC	216	826.24	247,779.68	10,494.58	5807.41	33,726,050.82
HE	216	51.52	20,464.64	4569.49	4239.27	17,971,392.21
AB	216	56.72	2993.08	1002.09	716.37	513,188.54

5.2. Correlation Analysis

Correlation analysis provides insights into the relationships between variables before hypothesis testing. Table 8 shows significant positive correlations between real estate prices (Y) and the independent variables: overconfidence (OC), herding effect (HE), and availability bias (AB). The strong positive correlation between Y and OC (0.722 ***) suggests that overconfident real estate developers are likely to influence higher real estate prices. Similarly, the high correlation between Y and HE (0.814 ***) indicates that consumer herding behavior significantly impacts real estate prices. Lastly, the correlation between Y and AB (0.905 ***) reflects the substantial effect of financial institutions' lending behaviors on housing prices.

Table 8. Pearson correlation between variables.

	Y	OC	HE	AB	VIF
Y	1				-
OC	0.722 ***	1			2.968
HE	0.814 ***	0.805 ***	1		3.803
AB	0.905 ***	0.702 ***	0.778 ***	1	2.641

Note: *** indicates significance at the 1% level.

5.3. Multiple Regression Analysis

Table 9 presents the results of the multiple regression analysis, which evaluates the impact of behavioral factors on real estate prices. The regression model ($Y = \alpha + \beta_1 \mathrm{OC} + \beta_2 \mathrm{HE} + \beta_3 \mathrm{AB} + \epsilon$) aims to quantify the effects of overconfidence, herding behavior, and availability bias on real estate prices.

Table 9. Results of multiple regression analysis.

Variable	Coefficient	Standard Error	t-Value	*p*-Value	95% Confidence Interval		
Intercept	2355.68	119.84	19.657	0.000	2119.454	2591.906	***
OC	0.014	0.016	0.903	0.367	−0.017	0.046	
HE	0.120	0.025	4.885	0.000	0.072	0.169	***
AB	1.915	0.122	15.75	0.000	1.675	2.154	***
Year dummy		Yes					
Adj_R Square		0.849		Sample size		216	
F-statistics		402.449 ***		Durbin–Watson		1.897	

Note: *** indicates significance at the 1% level.

The coefficient for overconfidence (OC) is 0.014 with a *p*-value of 0.367, indicating that overconfidence among developers does not have a statistically significant impact on real estate prices. This suggests that while overconfident developers may expand their development areas, this behavior alone does not significantly drive up real estate prices.

The herding effect (HE) has a coefficient of 0.120, which is statistically significant at the 1% level (*p*-value = 0.000). This supports Hypothesis 2, indicating that consumer herding behavior significantly influences real estate prices. When consumers collectively believe that prices will continue to rise, their purchasing behaviors contribute to the actual increase in prices.

The coefficient for availability bias (AB) is 1.915, also statistically significant at the 1% level (*p*-value = 0.000). This supports Hypothesis 3, suggesting that the lending behaviors of financial institutions, influenced by availability bias, have a substantial positive impact on real estate prices. When brokers provide excessive loans based on readily available information, it facilitates more transactions and increases housing demand, leading to higher prices.

The model's adjusted R-square value is 0.849, indicating that the independent variables explain a significant portion of the variation in real estate prices. The high F-statistic (402.449 ***) further confirms the overall significance of the regression model.

In summary, the empirical analysis provides robust evidence that herding behavior among consumers and availability bias among brokers significantly influence real estate prices in China. These findings emphasize the critical role that behavioral factors play in shaping market dynamics, suggesting that policy-making and market regulation must account for these influences to maintain a balanced and sustainable real estate market.

While the analysis also explored the impact of overconfidence among developers, the results indicate that this factor does not have a statistically significant effect on real estate prices when considered in isolation. However, the collective effects of consumer herding and broker availability bias are substantial, underscoring the interconnected nature of market participants' behaviors. These insights highlight the necessity for comprehensive regulatory strategies that specifically target and mitigate the adverse effects of these behavioral biases, thereby contributing to a more stable real estate market environment.

6. Discussion and Conclusions

In October 2003, General Secretary Hu Jintao of the Communist Party of China introduced the concept of "scientific development" at the Third Plenary Session of the 16th Central Committee, emphasizing people-oriented, comprehensive, coordinated, and sustainable growth. This principle aligns with the ideas of Sun [58], who highlighted that a nation is composed of individuals driven by their ideologies, with psychological activity being a fundamental characteristic [59]. Behavioral finance integrates traditional financial theories with scientific insights into human cognition to explain and predict market developments based on participant behavior and the psychological factors underlying it [60]. This study leverages behavioral finance to examine the factors driving the rapid escalation of housing prices in China, providing insights to foster healthy real estate market growth and sustainable economic development.

Initially, this study analyzes the Chinese real estate market to ascertain whether housing prices have surged significantly. From a behavioral finance perspective, we investigate the irrational behaviors of key market participants—real estate developers, consumers, and brokers. Using monthly data from 2001 to 2018, we quantify these behaviors and conduct multiple regression analysis. The results confirm that China's real estate prices have increased excessively. Despite intensified economic development and urbanization raising real estate demand, theoretical expectations of price decreases were unmet, with housing prices escalating faster than before. The real estate price-to-income ratio, ideally between 3 and 6, exceeded 6.5 during the market reform period up to 2018, further indicating excessive price increases. Our empirical results reveal that consumer herding behavior significantly drives up housing prices [61]. Additionally, availability bias among financial institutions, leading to excessive lending, also positively impacts real estate prices. However, no significant correlation was found between developers' overconfidence and real estate prices.

Traditional financial theories have primarily focused on objective factors to explain the rapid growth of real estate markets, often overlooking the significant role of human behavior in housing price fluctuations. This study addresses this gap by applying behavioral finance, emphasizing the impact of human psychology on market pricing and decision-making. The findings offer new perspectives and methodologies for understanding real estate market dynamics. The results suggest that while price increases can stimulate market growth, efforts to curb prices may lead to unintended consequences, such as minimal or even adverse effects. These insights highlight the importance of incorporating behavioral considerations into housing price policies, enabling governments to develop more effective and sustainable strategies for managing real estate markets.

To promote a healthy and sustainable real estate market in China, we recommend the following strategies. First, the herding effect among consumers should be mitigated through three approaches: (1) the government should enhance market transparency and oversee information disclosure by developers to reduce information asymmetry [62], (2) the media should be encouraged to guide consumer investment behavior positively, and

(3) consumer education should be strengthened to advocate rational investment. Second, the government should address availability bias among brokers by ensuring financial institutions establish robust risk control systems to prevent excessive lending.

This study is limited by its use of monthly data from 2001 to 2018, reflecting the short-term impact of irrational behavior on real estate prices. Long-term impacts require further study for more comprehensive conclusions. Additionally, future research should distinguish between rational and irrational price increases to provide a more nuanced analysis.

By integrating behavioral finance insights into land management practices, this study contributes to the broader discourse on sustainable real estate markets. The findings emphasize the importance of considering psychological factors in policy-making and market regulation to achieve balanced and sustainable market development. This approach aligns with the themes of the Special Issue, highlighting the need for efficient land administration systems, policy development, and the economic impact of behavioral factors on sustainable real estate markets.

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References

1. Du, Y.; Dong, H. Homeownership Pathways and Fertility in Urban China. *J. Popul. Res.* **2023**, *40*, 309–325. [CrossRef]
2. Huang, Y.; Clark, W.A.V. Housing Tenure Choice in Transitional Urban China: A Multilevel Analysis. *Urban Stud.* **2002**, *39*, 7–32. [CrossRef]
3. Xie, X.; Gong, C.; Su, Z.; Nie, Y.; Kim, W. Consumers' Behavioral Willingness to Use Green Financial Products: An Empirical Study within a Theoretical Framework. *Behav. Sci.* **2024**, *14*, 634. [CrossRef]
4. Kim, S.; Jung, J.; Cho, S. The Influence of Ownership Concentration on Sustainable Merger and Acquisition Performance: Navigating Principal Conflicts in the Korean Market. *Sustainability* **2024**, *16*, 4985. [CrossRef]
5. Zhang, J.; Zhou, L. Incentive Mechanism Design of Access Management Policy in Affordable Housing and Analysis. *Cities* **2011**, *28*, 186–192. [CrossRef]
6. Wang, Z.; Zhang, Q. Fundamental Factors in the Housing Markets of China. *J. Hous. Econ.* **2014**, *25*, 53–61. [CrossRef]
7. Jiang, Y.S.; Zhao, D.; Sanderford, A.; Du, J. Effects of Bank Lending on Urban Housing Prices for Sustainable Development: A Panel Analysis of Chinese Cities. *Sustainability* **2018**, *10*, 642. [CrossRef]
8. Soier, S.; Schneider, S. Contributing to Sustainability: Using Digital Technologies in Real Estate Development. In Proceedings of the ISPIM Conferences, Copenhagen, Denmark, 5–8 June 2022; pp. 1–14.
9. Zhang, D.; Tu, Y.; He, Y. How a Mandate of Minimum Green Building Standards Influences Green Building Adoption in the Private Housing Sector: Evidence from Singapore during 2005–2019. *Cities* **2024**, *148*, 104893. [CrossRef]
10. Cerutti, E.; Dagher, J.; Dell'Ariccia, G. Housing Finance and Real-Estate Booms: A Cross-Country Perspective. *J. Hous. Econ.* **2017**, *38*, 1–13. [CrossRef]
11. Zhao, S.; Zhan, H.; Jiang, Y.; Pan, W. How Big is China's Real Estate Bubble and Why Hasn't it Burst Yet? *Land Use Policy* **2017**, *64*, 153–162. [CrossRef]
12. Michael, B.; Zhao, S. Bubble Economics: How Big a Shock to China's Real Estate Sector Will Throw the Country into Recession, and Why Does it Matter? *Int. J. Hous. Mark. Anal.* **2021**, *14*, 1111–1128. [CrossRef]
13. Kwon, S.G.; Kang, M.G. An Exploratory Study on the Discrepancy between Perception and Reality of the Real Estate Asset's Return: From the Behavioral Economics Perspective. *Seoul Stud.* **2011**, *12*, 127–138. (In Korean)
14. Baker, H.K.; Nofsinger, J.R. *Behavioral Finance: Investors, Corporations, and Markets*; John Wiley & Sons: New York, NY, USA, 2010.
15. Shefrin, H. *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*; Oxford University Press: New York, NY, USA, 2007.
16. Hamilton, J.D. *Time Series Analysis*; Princeton University Press: Princeton, NJ, USA, 1994.
17. Box, G.E.P.; Jenkins, G.M. *Time Series Analysis: Forecasting and Control*; Holden-Day: San Francisco, CA, USA, 1970.
18. Kahneman, D.; Tversky, A. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* **1979**, *47*, 263–291. [CrossRef]
19. De Bondt, W.F.M.; Thaler, R. Does the Stock Market Overreact? *J. Financ.* **1985**, *40*, 793–805. [CrossRef]

20. De Long, J.B.; Shleifer, A.; Summers, L.H.; Waldmann, R.J. Noise Trader Risk in Financial Market. *J. Polit. Econ.* **1990**, *98*, 703–738. [CrossRef]
21. Zhou, F. The Research of Real-Estate Price Fluctuation under the Perspective of Behavioral Finance Theory. Ph.D. Thesis, Anhui University of Finance and Economics, Bengbu, China, 2014.
22. Li, H. Urban Real Estate Bubble Detection and Its Formation Mechanism: Theoretical Model and Empirical Research. Ph.D. Thesis, Zhejiang University, Hangzhou, China, 2014. (In Chinese)
23. Xu, S.M. Research on the Anomalies in Real Estate Market Based on Behavioral Finance Theory. Master's Thesis, Anhui Agricultural University, Hefei, China, 2010. (In Chinese)
24. Liu, G. Research on the Housing Bubble of Nanchang Based on Behavioral Finance. Master's Thesis, Jiangxi Normal University, Nanchang, China, 2016. (In Chinese)
25. Barberis, N.; Thaler, R. A Survey of Behavioral Finance. In *Handbook of the Economics of Finance*; Constantinides, G.M., Harris, M., Stulz, R.M., Eds.; Elsevier: Amsterdam, The Netherlands, 2003; Volume 1.
26. Zhou, W.; Sornette, D. Antibubble and Prediction of China's Stock Market and Real-Estate. *Physica A* **2004**, *337*, 243–268. [CrossRef]
27. Wang, X.R.; Hui, E.C.M.; Sun, J.X. Population Aging, Mobility, and Real Estate Price: Evidence from Cities in China. *Sustainability* **2018**, *10*, 3140. [CrossRef]
28. Shiller, R.J. From Efficient Markets Theory to Behavioral Finance. *J. Econ. Perspect.* **2003**, *17*, 83–104. [CrossRef]
29. Glaeser, E.L.; Nathanson, C.G. An Extrapolative Model of House Price Dynamics. *J. Financ. Econ.* **2017**, *126*, 147–170. [CrossRef]
30. Nikitina, N. Analysis of Factors Affecting the Dynamics of Residential Real Estate Prices in Russia. *Financ. Theory Pract.* **2023**, *27*, 208–220. [CrossRef]
31. McDonald, J.F.; McMillen, D.P. *Urban Economics and Real Estate: Theory and Policy*; Blackwell Publishing: Oxford, UK, 2007.
32. Gyourko, J.; Tracy, J. The Structure of Local Public Finance and the Quality of Life. *J. Polit. Econ.* **1991**, *99*, 774–806. [CrossRef]
33. Malpezzi, S. A Simple Error Correction Model of House Prices. *J. Hous. Econ.* **1999**, *8*, 27–62. [CrossRef]
34. Case, K.E.; Shiller, R.J. Is There a Bubble in the Housing Market? *Brook. Pap. Econ. Act.* **2003**, *2003*, 299–342. [CrossRef]
35. Logan, J.R.; Bian, Y.; Bian, F. Housing Inequality in Urban China in the 1990s. *Int. J. Urban Reg. Res.* **1999**, *23*, 7–25. [CrossRef]
36. Zhang, L.; Zhao, S.X. City Branding and the Olympic Effect: A Case Study of Beijing. *Cities* **2009**, *26*, 245–254. [CrossRef]
37. Tang, G.N.; Han, F.J.; Chen, D.C. Analysis of the Basic Support Surface of Real Estate Price Rise and Its Market Risk Warning: From the Perspective of Granger Test and Mutation Model. *Economists* **2010**, *6*, 44–51. (In Chinese)
38. Hu, F.; Wu, J.Y. Analysis of Behavior Patterns of Major Players in the Real Estate Market under Macro-Control and Its Influence on the Housing Price. *Guide Econ. Res.* **2012**, *9*, 129–130. (In Chinese)
39. Haugen, R.A. *The New Finance: The Case Against Efficient Markets*; Prentice Hall: Hoboken, NJ, USA, 1995.
40. Hoffmann, S.; Anwar, S. The Influence of Culture on the Lure of Choice, Mental Accounting, and Overconfidence. *Behav. Sci.* **2024**, *14*, 156. [CrossRef]
41. Cui, W. *Behavioral Finance Case*; China Development Press: Beijing, China, 2013. (In Chinese)
42. Tversky, A.; Kahneman, D. Availability: A Heuristic for Judging Frequency and Probability. *Cogn. Psychol.* **1973**, *5*, 207–232. [CrossRef]
43. Kahneman, D.; Tversky, A. Subjective Probability: A Judgment of Representativeness. *Cogn. Psychol.* **1972**, *3*, 430–454. [CrossRef]
44. Loomes, G.; Sugden, R. Regret Theory: An Alternative Theory of Rational Choice under Uncertainty. *Econ. J.* **1982**, *92*, 805–824. [CrossRef]
45. Barber, B.M.; Odean, T. The Internet and the Investor. *J. Econ. Perspect.* **2001**, *15*, 41–54. [CrossRef]
46. Ellsberg, D. Risk, Ambiguity, and the Savage Axioms. *Q. J. Econ.* **1961**, *75*, 643–669. [CrossRef]
47. Bikhchandani, S.; Hirshleifer, D.; Welch, I. A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades. *J. Polit. Econ.* **1992**, *100*, 992–1026. [CrossRef]
48. Gyourko, J.; Saiz, A. Reinvestment in the Housing Stock: The Role of Construction Costs and the Supply Side. *J. Urban Econ.* **2004**, *55*, 238–256. [CrossRef]
49. Jeong, S.; Ahn, B. Implementation of Real Estate Contract System Using Zero Knowledge Proof Algorithm Based Blockchain. *J. Supercomput.* **2021**, *77*, 11881–11893. [CrossRef]
50. Case, K.; Shiller, R.J. Forecasting Prices and Excess Returns in the Housing Market. *Real Estate Econ.* **1990**, *18*, 253–273. [CrossRef]
51. Lin, Y.C.; Ma, Z.L.; Zhao, K.; Hu, W.Y.; Ji, W. The Impact of Population Migration on Urban Housing Prices: Evidence from China's Major Cities. *Sustainability* **2018**, *10*, 3169. [CrossRef]
52. Gonzalez, L.; Ortega, F. Immigration and Housing Booms: Evidence from Spain. *J. Reg. Sci.* **2013**, *53*, 37–59. [CrossRef]
53. Glaeser, E.; Huang, W.; Ma, Y.; Shleifer, A.A. A Real Estate Boom with Chinese Characteristics. *J. Econ. Perspect.* **2017**, *31*, 93–116. [CrossRef]
54. De Bondt, W.F.M.; Thaler, R.H. Financial Decision-Making in Markets and Firms: A Behavioral Perspective. *Handb. Oper. Res. Manag. Sci.* **1995**, *9*, 385–410.
55. Banerjee, A.V. A Simple Model of Herd Behavior. *Q. J. Econ.* **1992**, *107*, 797–817. [CrossRef]
56. Reite, E. Mortgage Lending Valuation Bias Under Housing Price Changes and Loan-to-Value Regulations. *Financ. Res. Lett.* **2023**, *58*, 102. [CrossRef]

57. Li, Z.; Wu, Q.; Hong, P.; Tian, R. Effects of Investment Experience on the Stock Investment Task: The Mediating Role of Risk Perception. *Behav. Sci.* **2023**, *13*, 115. [CrossRef]
58. Sun, Y.S. *Complete Works of Sun Yat-Sen*; Zhonghua Book Company: Beijing, China, 1985; Volume 6. (In Chinese)
59. Philip, G.Z.B.; Michael, R.L.P. *The Psychology of Attitude Change and Social Influence*; Posts and Telecom Press: Beijing, China, 2018. (In Chinese)
60. Shefrin, H. *Behavioral Corporate Finance: Decisions that Create Value*; McGraw-Hill: New York, NY, USA, 2007.
61. Lai, Y.F.; Zhou, Y.; Long, Q.Q. An Empirical Analysis of the Micro-Causes of the Real Estate Bubble. *Luojia Manag. Rev.* **2011**, *2*, 188–195. (In Chinese)
62. Wen, Y.J.; Tang, H.L. Study on the Influence of Herding Behavior on Commercial Housing Trading Area. *J. Lanzhou Univ. Financ. Econ.* **2017**, *3*, 44–55. (In Chinese)