MARKET SENTIMENT, HOUSING PRICES, CONSUMPTION STRUCTURE UPGRADING AND CITIES' INNOVATION CAPACITY IN CHINA

By

DING YEMIN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

December 2022

SPE 2022 55

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

MARKET SENTIMENT, HOUSING PRICES, CONSUMPTION STRUCTURE UPGRADING AND CITIES' INNOVATION CAPACITY IN CHINA

By

DING YEMIN

December 2022

Chair : Lee Chin, PhD
School : Business and Economics

In recent years, the media has portrayed China's housing market with terms like "Riguangpan" and "panic-buying housing", which has fueled irrational sentiment among potential home buyers, leading to noise trading and the herding effect. This has caused a dramatic rise in China's housing demand and housing prices. While existing literature has explained this phenomenon from multiple perspectives, there is a lack of empirical research on it through the lens of behavioral economics. Therefore, the first objective of this study was to explore the impact of market sentiment on China's housing prices from the behavioral economics perspective. The results of a fixed effect model analysis of 45 sample cities from 2011 to 2017 showed that market sentiment plays a significant role in driving up China's housing prices; this relationship was confirmed through robustness checks. Additionally, the sample cities were divided into two sub-samples (first-tier cities and second-tier cities) for heterogeneity analysis, revealing that market sentiment has a stronger positive impact on housing prices in China's first-tier cities. These findings suggest that local governments in China should pay attention to housing market sentiment and consider regularly quantifying and publishing it to help improve market participants' understanding of the current housing market and encourage rational decisions.

Although consumption structure upgrading reflects the improvement of Chinese residents' living standards and stimulates economic growth, the dramatic rise of housing prices makes such upgrading difficult. Therefore, the second objective of this study was to examine the impact of housing prices on the upgrading of Chinese residents' consumption structure. The estimation results showed that housing prices have an inverted U-shaped impact on the upgrading of urban residents' consumption structure, but an inhibitory effect on the upgrading of rural residents' consumption structure. There was also heterogeneity in the relationship between housing prices and consumption structure upgrading

i

across different cities. Based on these findings, it is recommended that local governments in China, with the exception of a few cities where housing prices have not yet passed the extreme point of this inverted U-shaped relationship, should focus on house price regulation. The Chinese government should also prioritize promoting rural revitalization to mitigate the negative impact of rising commercial housing prices on the upgrading of Chinese rural residents' consumption structure.

Innovation is a decisive factor in China's sustained economic growth, but the effect of rising house prices on cities' innovation capacity is unclear. The third objective of the study was thus to investigate the impact of housing prices on cities' innovation capacity in China. The results of static, dynamic, and Poisson estimation demonstrated a positive relationship between the two. Further exploration revealed that high housing prices achieve innovation through talent attraction and fiscal growth but can restrain innovation by lowering fund availability and residents' consumption ability. Additionally, the tight bank credit scale prevents rising house prices from promoting cities' innovation capacity. Based on these findings, it is recommended that local governments restrain real estate investments and expand the scale of bank credit, to increase the availability of loans for innovation.

SENTIMEN PASARAN, HARGA PERUMAHAN, PENINGKATAN STRUKTUR PENGGUNAAN DAN KAPASITI INOVASI BANDARAYA DI CHINA

Oleh

DING YEMIN

Disember 2022

Pengerusi   : Lee Chin, PhD
Sekolah   : Perniagaan Dan Ekonomi

Kebelakangan ini, media telah menggambarkan pasaran perumahan China dengan istilah seperti "Riguangpan" dan "pembelian panik perumahan", yang telah mencetuskan sentimen tidak rasional dalam kalangan bakal pembeli rumah, lalu membawa kepada perdagangan bunyi dan kesan penggembalaan. Ini telah menyebabkan kenaikan mendadak dalam permintaan dan harga perumahan China. Walaupun kesusasteraan sedia ada telah menjelaskan fenomena ini dari pelbagai perspektif, terdapat kekurangan penyelidikan empirikal mengenainya melalui lensa ekonomi tingkah laku. Oleh itu, objektif pertama kajian ini adalah untuk meneroka kesan sentimen pasaran terhadap harga perumahan China dari perspektif ekonomi tingkah laku. Keputusan analisis model kesan tetap bagi 45 bandar sampel dari 2011 hingga 2017 menunjukkan bahawa sentimen pasaran memainkan peranan penting dalam menaikkan harga perumahan China; hubungan ini telah disahkan melalui pemeriksaan kekukuhan. Selain itu, bandar sampel dibahagikan kepada dua sub-sampel (bandar peringkat pertama dan bandar peringkat kedua) untuk analisis heterogeniti, yang mendedahkan bahawa sentimen pasaran mempunyai kesan positif yang lebih kuat ke atas harga perumahan di bandar peringkat pertama di China. Penemuan ini mencadangkan bahawa kerajaan tempatan di China harus memberi perhatian kepada sentimen pasaran perumahan dan mempertimbangkan mengukur dan menerbitkannya secara kerap untuk membantu meningkatkan pemahaman peserta pasaran tentang pasaran perumahan semasa serta menggalakkan keputusan yang rasional.

Walaupun peningkatan struktur penggunaan mencerminkan peningkatan taraf hidup penduduk China dan merangsang pertumbuhan ekonomi, kenaikan harga perumahan yang dramatik menyukarkan peningkatan tersebut. Oleh itu, objektif kedua kajian ini adalah untuk mengkaji kesan harga perumahan terhadap peningkatan struktur penggunaan penduduk China. Keputusan anggaran menunjukkan bahawa harga perumahan mempunyai kesan

berbentuk U terbalik ke atas peningkatan struktur penggunaan penduduk bandar, tetapi kesan menghalang ke atas peningkatan struktur penggunaan penduduk luar bandar. Terdapat juga heterogeniti dalam hubungan antara harga perumahan dan peningkatan struktur penggunaan antara bandar-bandar berbeza. Berdasarkan penemuan ini, adalah disyorkan bahawa kerajaan tempatan di China, kecuali beberapa bandar di mana harga perumahan belum melepasi titik ekstrem hubungan berbentuk U terbalik ini, harus bertumpu pada regulasi harga rumah. Kerajaan China juga harus mengutamakan penggalakan pemulihan luar bandar untuk mengurangkan kesan negatif kenaikan harga perumahan komersial terhadap peningkatan struktur penggunaan penduduk luar bandar China.

Inovasi ialah faktor penentu dalam pertumbuhan ekonomi China yang mampan, tetapi kesan kenaikan harga rumah terhadap kapasiti inovasi bandar tidak jelas. Objektif ketiga kajian itu adalah untuk menyiasat kesan harga perumahan ke atas kapasiti inovasi bandar di China. Keputusan anggaran statik, dinamik, dan Poisson menunjukkan hubungan positif antara kedua-duanya. Penerokaan lanjut mendedahkan bahawa harga perumahan yang tinggi mencapai inovasi melalui penarikan bakat dan pertumbuhan fiscal, tetapi boleh menghalang inovasi dengan mengurangkan ketersediaan dana dan keupayaan penggunaan penduduk. Selain itu, skala kredit bank yang ketat menghalang kenaikan harga rumah daripada mempromosikan kapasiti inovasi bandar. Untuk meningkatkan ketersediaan pinjaman untuk inovasi, adalah disyorkan agar kerajaan tempatan menyekat pelaburan hartanah dan mengembangkan skala kredit bank.

iv

ACKNOWLEDGEMENTS

First of all, I heartily thank my supervisors, Assoc. Prof. Dr. Lee Chin and Dr. Muhamad Senan. M. Khair-Afham for their invaluable insights, unwavering supports, guidance, and encouragement throughout my Ph.D program.

Secondly, I want to thank my parents and my uncle Mr. Wu Hongbing. The continued encouragement and support from the three elders enable me to devote myself to my study.

Thirdly, I want to thank Ms. Lu Mengqiu in Jiangxi University of Science and Technology, and Dr. Deng Peidong in Xi'an Jiaotong University for sharing the knowledge of Econometrics.

Fourthly, I want to thank Mr. Han Liang in Northwest Normal University and Ms. Yan Xiaohan in Universiti Putra Malaysia. Mr. Han Liang and Ms. Yan Xiaohan not only provided a lot of constructive advice on this study, but also always comforted and encouraged me unswervingly when I experienced a low mood. It is no exaggeration to say that their company is a necessary condition for me to complete my Ph.D program.

Fifthly, I would like to thank other teachers who have helped me, namely Ms. Zhou Xia in Yangxinwa Kindergarten, Mr. Zhu Jihong in Yangxinwa Junior Middle School, Ms. Fang Hua in Dafeng Junior Middle School, Mr. Shang Zhaolin in Dafeng Senior Middle School, Assoc. Prof. Zhou Shiqi in Jiangxi University of Science and Technology, Prof. Dr. Peng Yuelan in Shanxi University of Finance and Economics, and Prof. Dr. Wang Yongxiang in Nanjing Normal University. With their help, I had successfully completed my study before the Ph.D program and thus had the opportunity to receive the Ph.D education.

Last but not least, I want to thank my friends in Universiti Putra Malaysia, such as Ms. Liu Siyuan, Mr. Xie Renzhao, Mr. Cong Shufeng, and Ms. Liu Yunyun. Their companionship made my Ph.D journey more colorful.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Lee Chin, PhD
Associate Professor
School of Business and Economics
Universiti Putra Malaysia
(Chairman)

Mohamad Khair Afham bin Muhamad Senan, PhD
Senior Lecturer
School of Business and Economics
Universiti Putra Malaysia
(Member)

_____
ZALILAH MOHD SHARIFF, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 9 March 2023

Declaration by the Graduate Student

I hereby confirm that:
- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any institutions;
- intellectual property from the thesis and the copyright of the thesis are fully-owned by Universiti Putra Malaysia, as stipulated in the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from the supervisor and the office of the Deputy Vice-Chancellor (Research and innovation) before the thesis is published in any written, printed or electronic form (including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials) as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld in accordance with the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2015-2016) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software

Signature: _____ Date: _____

Name and Matric No.: Ding Yemin

Declaration by Members of the Supervisory Committee

This is to confirm that:
- the research and the writing of this thesis were done under our supervision;
- supervisory responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2015-2016) are adhered to.

Signature:
Name of Chairman
of Supervisory
Committee: Assoc. Prof. Dr. Lee Chin

Signature:
Name of Member of
Supervisory
Committee: Dr. Mohamad Khair Afham Muhamad Senan

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

China   The People's Republic of China

CPC   The Communist Party of China

GII   The global innovation index

PCA   Principal component analysis

NHS   New housing sale volume

SHS   Second-hand housing sale volume

NHFSC   New housing floor space under construction

LPV   The volume of land purchased by real estate enterprises

RLTN   The transaction number of residential land

LPR   Land premium rate

BI   Baidu index

HP   Housing prices

Sentiment   Sentiment index

LTP   Land transfer price

FSHC   Floor space of completed housing

PP   Permanent population

PCDI   Disposable income per capita

UR   Urbanisation rate

CIC   Cities' innovation capability

EG   Economic growth

Edu   Education

FDI   Foreign direct investment

SIC   Service industry cluster

IT   International trade

PP   Permanent population

CS   Consumption structure

Inflation   Inflation rate

ISU   Industrial structure upgrading

Interest   Interest rate

DRC   Dependency ratio of children

DRE   Dependency ratio of the elderly

CHAPTER 1

INTRODUCTION

1.1   Introduction

The prosperity of the housing market does not only impact the housing sector itself, but significantly affects other sectors as well (Iacoviello, 2004; Lin et al., 2021; Xu et al., 2021). Housing market development encourages consumer spending through the wealth effect (Leonard, 2010) and collateral effect (Attanasio et al., 2009); thus, it increases business and government revenue and leads to economic growth. Besides, the prosperity of the housing market can promote governments' investment in innovation by stimulating the growth of fiscal revenue (Wen & Goodman, 2013), which again promotes economic growth. However, the excessive uncontrolled development of the housing market can also have a negative impact on the economy. According to Louise (1995), the irrational development of the housing market can restrain household consumption through the liquidity constraint effect. Additionally, it can squeeze out innovation funds by channeling financing into the housing market, thereby generating a negative impact on innovation output and economic growth (Yu & Cai, 2021).

Since the capitalization of housing distribution[1] in 1998, housing prices in China have been experiencing a radical rise. In 2000, the average housing price in China was only 2112 RMB per square meter; the price rose to 9860 RMB per square meter in 2020, with an increase of nearly 400%. More dramatically, the housing prices in China's superstar cities, such as Beijing, Shanghai, Guangzhou and Shenzhen, increased by nearly 900% from 2000 to 2020.[2] At the same time, China's consumption demand has not been rising consistently, even showing a downward trend. Specifically, the proportion of per capita household consumption in per capita GDP decreased from 36.69% in 2000 to less than 30% in 2020[3], which inspires the question of whether high housing prices can have a negative impact on the consumption of Chinese residents.

In addition, the endogenous growth theory holds the view that technological progress is the decisive factor of sustainable economic growth. Although house price is widely known as a factor that may affect innovation (Wu & Song, 2021), empirical studies on the relationship between housing prices and innovation in China are still relatively scarce (Lin et al., 2021; Yu & Cai, 2021). More

---

[1] The capitalization of housing distribution refers to the system in which the Chinese government, under the institution of the Chinese market economy, converts housing from being allocated physically to being allocated monetarily to employees.

[2] The data of housing prices was derived from China's housing information network organized by the State Information Center of China, and the increase rates were calculated by the author.

[3] The data on household consumption and per capita GDP was from the National Bureau of Statistics of China.

specifically, Lin et al. (2021) concluded that there was a positive relationship between housing prices and cities' innovation output in China. However, Yu and Cai (2021) believed that the relationship between housing prices and cities' innovation performance in China was not a simple linear relationship, but an inverted U-shaped relationship. As such, this study deeply explored the reasons for the rapid rise of housing prices in China and the possible effects of housing prices on consumption and innovation in China.

1.2 Overview of China's Housing Market

After the founding of the People's Republic of China (hereafter referred to as "China") (1949) and before the implementation of the policy of Reform and Opening Up (1978), the housing market did not exist in China. In the early days of the founding of China, the government collectivized housing by confiscating the housing of war criminals, traitors, bureaucratic capitalists, and counter-revolutionaries (The Government Administration Council of the Central People's Government of China, 1951), as well as by redeeming or adopting the policy of public-private joint management on private housing (Li & Yan, 2019). During this period of nearly 30 years (from 1949 to 1978), the housing in China was communal and uniformly allocated by the government for production or residence. There was almost no private housing in China during this time, which fundamentally meant that the housing market could not appear in China in that period.

From 1978 to 1987, with the implementation of the Reform and Opening-up Policy, China began to progressively test the market economy. During that decade, the ban against public housing ownership was gradually lifted, and the idea of housing privatization began to develop. Specifically, in 1978, Deng Xiaoping, then-member of the Standing Political Bureau Committee of the Central Committee of the Communist Party of China (the Communist Party of China hereafter referred to as "CPC"), proposed that private construction and the purchase of housing be allowed to alleviate the housing shortage (Sit, 2000). This was the first time that a leader of the CPC made it clear that they were planning housing privatization. Two years later, the policy of housing commercialization was officially launched when the CPC Central Committee and the State Council of China jointly endorsed the document called "Report Outline of National Capital Construction Work Conference" in 1980, which was the first official CPC document to clearly commercialize housing (The Committee of the Ministry of Housing and Urban-Rural Development of CPC, 2008). In the same year, the State Council of China (1980) put forward the decision to levy a land use fee in endorsing the document titled "Summary of National Urban Planning Meeting". Levying a land use fee meant the gradual transition of land use rights from state-owned to private, which laid the foundation for China's subsequent housing privatization and the emergence of its housing market. According to the key contents of the documents mentioned above, China first tried to sell housing in 1982, carrying out pilot housing sales in the four cities of Zhengzhou, Shashi, Changzhou, and Siping (The State Council of China, 1984). As of 1986, the pilot project was expanded to more

than 90 cities in China, covering the vast majority of China's provincial regions (The Ministry of Urban and Rural Construction and Environmental Protection of China, 1986).

Although commercial housing had appeared in China in 1982, the housing sold by the government to residents from 1982 to 1986 could not be resold to other residents (ibid). In other words, the housing purchased between 1982 and 1986 could not circulate freely in the market. As such, China still had no housing market in the strict sense between 1982 and 1986. In 1987, a land auction in Shenzhen opened the prelude to China's land marketization, which marked the beginning of China's housing market (Zhu, 1994). Several years later in 1991, through the housing reform document titled "Circular of the General Office of the State Council on transmitting the opinions of the leading group for housing system reform of the State Council on comprehensively promoting the reform of urban housing system", a standardized housing market began to be fully launched in China (The General Office of the State Council of China, 1991). Based on the above analysis, the period from 1987 to 1991 can be summarized the initial stage of China's housing market.

With the full launch of housing reform in China, after 1992, huge amounts of capital began to flood into China's housing market; hence, China's housing industry developed rapidly. This concurrently drove the emergence of relevant supporting services in China, such as realty brokerages, property management institutions, and housing loans. However, the Asian Financial Crisis in 1997 dealt a heavy blow to China's housing market, causing it to slump after only five years of prosperity. After the financial crisis, China's housing vacancy rate increased sharply, and a large number of housing enterprises fell into debt crisis. Fortunately, the Chinese government's decision to sell (instead of distribute) all housing built after January 1st 1999 revived China's housing market (Fung et al., 2006).

After the brief assault from the Asian Financial Crisis, China's housing market began to pick up rapidly, even giving rise to an irrational housing bubble (Yu, 2011). To cope with the overheated housing market, China has taken a series of measures to regulate the market in an all-round way since 2003. Specifically, in order to prevent financial risk in the housing market, the People's Bank of China decided to tighten housing credit in 2003, which preluded the regulation of China's housing market (The People's Bank of China, 2003). Since then, the Chinese government has continued to make a set of combined initiatives to regulate the housing market, including not only market-oriented measures such as financial and fiscal policies, but also administrative measures such as restrictions on purchasing, prices, and sales (Li et al., 2020b). Additionally, the Chinese government has built a large number of public rental housing to alleviate the contradiction between housing supply and demand (Chen et al., 2014). Unfortunately, judging from housing data at the national level, the

investment enthusiasm in housing in China does not seem to have weakened, and the rising trend of housing prices has not been controlled[4].

Based on the above analysis, it can be summarized that China's housing market started late but developed unusually rapidly. Currently, the Chinese housing market is in a disordered expansion phase, and a housing bubble seems to have emerged. To stabilize the housing market, various approaches have been attempted by the Chinese government, yet do not appear to have played a significant role.

1.3   Determinants of Housing Prices in China

Figure 1.1 shows China's house price and its annual growth rate during the period of 2000 to 2020. It can be seen from the blue line describing China's housing prices (HP) that except for a slight decline in 2008, the housing prices in China increased every year over the 20 years. The orange line depicts the growth rate of China's housing prices, which shows the following characteristics. First, in general, the growth rate of China's housing prices fluctuated sharply. Second, since 2000, China's housing prices grew positively almost every year, and the annual growth rate exceeded 5% except for a few years. Third, the year 2008 is the only year with a negative growth rate in housing prices, which may be due to the Global Economic Crisis. However, the negative impact of the crisis on China's housing prices obviously did not last long. After the crisis eased, China's housing prices began to rise in retaliation in 2009, with an increase of more than 20%.

Alexander and Barrow (1994) believed that housing prices at the city level contain more information about the housing market. From 2019, the China Business Network has categorized Chinese cities into five tiers[5] as per their level of economic development, where cities with higher levels are always more economically developed (Lee & Li, 2020). More specifically, first-tier cities are more economically developed than second-tier cities in China; second-tier cities are more economically developed than third-tier cities in China; and so on. The difference in economic development among these five tiers is reflected in Figure 1.2, which describes the per capita GDP of the five tiers of cities in China from 2001 to 2019. According to the figure, per capita GDP increases with the improvement of city level.

---

[4] From 2003 to 2020, the average annual growth rate of newly constructed housing area by housing developers exceeded 10% in China, and that of housing price per square meter exceeded 8%. The data of newly constructed housing area and housing price was derived from the National Bureau of Statistics of China, and the average annual growth rates were calculated by the author.
[5]   The   specific   list   of   these   five   tiers   of   cities   can   be   obtained   from https://www.yicai.com/news/101430366.html.

4
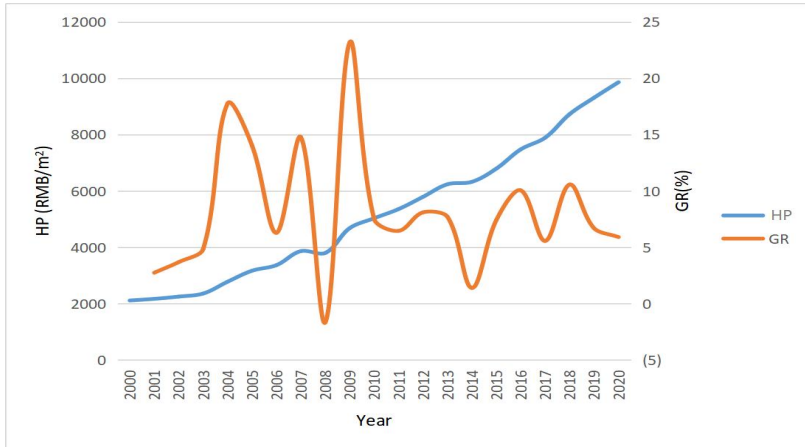
Figure 1.1: House Price (HP) and Its Growth Rate (GR) in China from 2000 to 2020
(Sources: National Bureau of Statistics of China, Various Years)
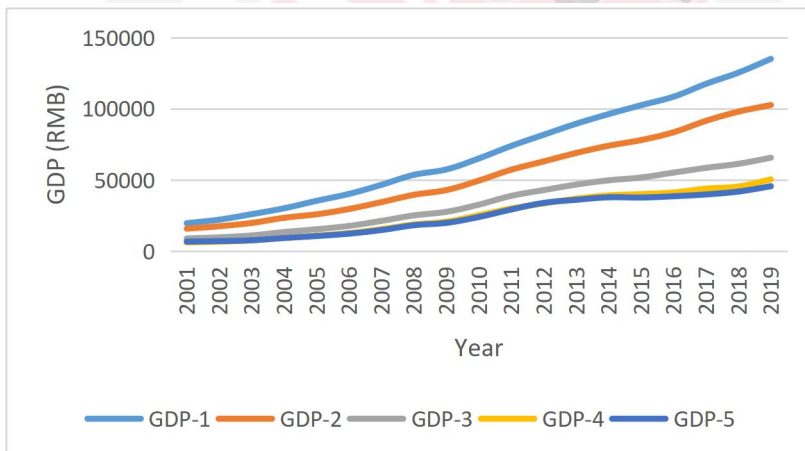
Figure 1.2: The Per Capita GDP (GDP) in China's Five Tiers of Cities from 2001 to 2019
Note: GDP-n represents the per capita GDP in China's nth-tier cities.
(Sources: China Housing Information Network, Various Years)

Figure 1.3 shows the housing prices of China's five tiers of cities from 2002 to 2019, where HP-n represents the housing prices in China's nth-tier cities. According to the figure, the housing prices of these five tiers of cities have two features in common. Firstly, they all show an increasing trend during the period of 2002 to 2019. Secondly, the five curves describing the housing prices became steeper after 2016, indicating that the rise in housing prices in the five tiers of cities was more intense. The sharp rise in housing prices around 2016 may be closely related to the policies at that time. Specifically, according to Qu

(2021), under the dual background of the housing destocking policy and the continuous easing of monetary policy in response to the downturn of China's economy, a large amount of funds flooded the housing market, which led to a sharp rise in housing prices around 2016. However, there are also differences in the housing prices of the five tiers of cities. The most obvious is that the housing prices increased with the improvement of the city tier, and the range of increase gradually enlarged. More specifically, the house price difference between the first- and second-tier cities was larger than that between the second- and third-tier cities; the house price difference between the second- and third-tier cities was larger than that between the third- and fourth-tier cities; and so on.
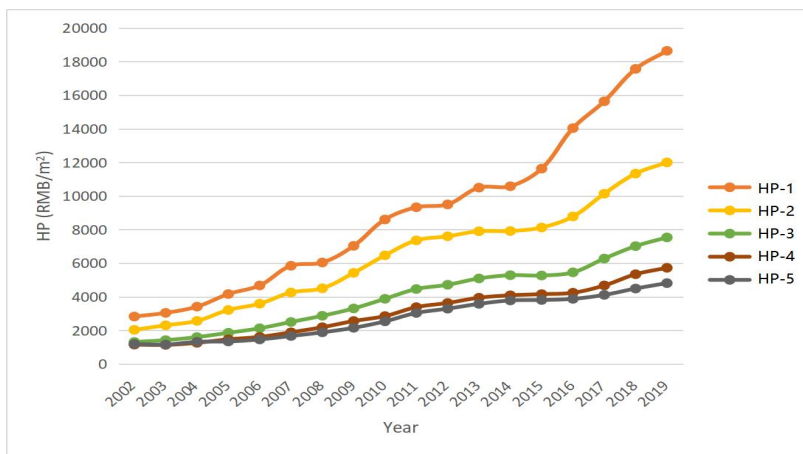
Figure 1.3: Average Housing Prices (HP) in China's Five Tiers of Cities from 2002 to 2019
Note: HP-n represents the average housing prices in China's nth-tier cities.
(Sources: China Housing Information Network, Various Years)

In general, while there has been occasional negative growth in third- to fifth-tier cities, housing prices in the first- and second-tier cities have never experienced negative growth, which proves the strong heat of the housing market in the latter cities. In addition, except for the three years of 2005, 2010, and 2017, the movement of the housing prices in China's five tiers of cities has maintained almost the same trend over the years. In other words, there has been consistency in the housing markets of China's five tiers of cities to a certain extent.

Based on the discussion above, it can be summarized that although housing marketization in China has only existed for more than 20 years, China's housing prices have experienced an explosive rise during this period. The dramatic rise of housing prices in China has aroused widespread concern among researchers. Mainstream notions, such as economic growth (Lee & Li, 2020; Wang & Zhang, 2014; Zhang et al., 2016), growing urbanization (Liu et

al., 2022; Wang et al., 2015b; Wang et al., 2017a), China's land policy (Fan et al., 2021; Wang et al., 2017b; Zhang et al., 2013), population (Choi et al., 2019; Lee & Li, 2020; Lin et al., 2018), loose monetary policy (Xu & Chen, 2012; Yan, 2019; Yu & Zhang, 2019) and industrial structure upgrading (Lv & Wang, 2017; Zhang & Wang, 2018; Zhou et al., 2020), have all been used to explain the reasons for the rise in China's housing prices from the standpoint of traditional economics.

However, it is not enough to rely solely on traditional economics theory, which is based on the market efficiency hypothesis and the complete rationality hypothesis, to explain rising housing prices in China (Lai & Order, 2010). In all likelihood, China's housing market is not efficient, and home-buyers and real estate developers are not completely rational (Shen & Liu, 2004). In the day and age of the Internet, where information is abundant and communication is convenient, market participants can access prodigiously vast quantities of information anytime and anywhere. In recent years, terms such as "Riguangpan[6]" and "panic-buying housing" appear frequently in Chinese Internet news reports and on social media, which may boost the irrational sentiment of potential home-buyers. Specifically, the frequent media portrayals of the housing market with such terms may make home-buyers firmly believe that China's housing market is in a state of short supply, and that it is almost impossible for housing prices to fall in a short space of time. This may increase noise trading, which in turn, may lead to the herding effect. Noise trading and herding effect can increase the demand for housing in China, and consequently, drive up China's housing prices. Supporting this, Shiller (2005) argued from the perspective of behavioral economics that human desires can play an important driving role in the property market. More deeply, Clayton et al. (2009) elaborated how the abnormal deviation of house pricing is caused by sentiment from the perspective that low liquidity, high segmentation, and the inability of short-selling in the housing market weaken the ability of market regulation to correct mis-pricing. However, it should be noted that not only market sentiment could affect housing prices, but also housing prices could affect market sentiment (André et al., 2021). In other words, market sentiment and housing prices could influence each other, that is, market sentiment is endogenous to housing prices.

According to Aggarwal (2022), market sentiment can be defined as a comprehensive presentation of the views of all market participants. The existing literature on market sentiment mainly focuses on the financial market and the housing market. Although there are only a few literature on the sentiment in the housing market (Hui et al., 2017; Hui et al., 2018; Lam & Hui, 2018; Dong et al., 2021), there are plenty of in-depth studies on investor sentiment on the financial market (Clarke & Statman, 1998; Neal & Wheatley, 1998; Fisher & Statman, 2000; Baker & Wurgler, 2006; Chen et al., 2010; Chong et al., 2017; Kim et al., 2019; Jokar & Daneshi, 2020). There are three methods of constructing an index of investor sentiment on the financial market:

---

[6] "Riguangpan" is a vivid description of a scene in which all the housing for sale is sold out on the opening day, which marks the boom of China's housing market.

1. the direct proxy measurement method, 2. the indirect proxy measurement method, and 3. the composite indirect proxy measurement method. The direct proxy measurement method is directly collecting data of investor expectations of the financial market through a survey questionnaire. For analysing the impacts of investor sentiment on the share market, "investors intelligence" by Clarke and Statman (1998) and Fisher and Statman (2000) deploys the direct proxy measurement method. However, using the direct proxy measurement method to construct an investor sentiment index is subject to sample size, geographical distribution, and subjective factors (Groves, 2004). Indirect proxy measurement method refers to the use of indirect proxies that can reflect investor sentiment to some extent, such as the odd-lot sales to purchases ratio, the extent of discounts on closed-end funds, and net mutual fund redemptions (Neal & Wheatley, 1998), to quantify investor sentiment. Both the direct and indirect proxy measurement methods select only one proxy to measure investor sentiment, which is biased. As such, a sentiment index constructed via direct or indirect proxy measurement methods can fail to accurately and comprehensively quantify investor behaviour and psychology. Baker and Wurgler (2006) pioneered the formulation of the investor sentiment index through the composite indirect proxy measurement method, which is to select multiple indirect sentiment proxies at the same time, and then extract principal components of the proxies selected through principal component analysis (PCA) for building the investor sentiment index. As the composite indirect proxy measurement method selects multiple proxies simultaneously, the constructed investor sentiment index effectively mitigates bias and covers as many sentiment factors as possible. Accordingly, investor sentiment indices constructed using the composite indirect proxy measurement method have a more comprehensive description of investor sentiment. As such, most researchers use the composite indirect proxy measurement method to construct investor sentiment indices (Chen et al., 2010; Chong et al., 2017; Kim et al., 2019; Jokar & Daneshi, 2020).

Hui et al. (2017) were the first to use Baker and Wurgler (2006)'s composite indirect proxy measurement method in the housing market. Hui et al. (2017) chose the indirect proxies from different categories, including land market, stock market, and capital market, and then employed PCA for building sentiment indices. Then, the constructed sentiment indices were applied to empirically examine the impact of market sentiment on housing prices in Shanghai. Through a series of empirical estimations, Hui et al. (2017) confirmed that developer sentiment plays a significant role in increasing Shanghai's housing prices. Unfortunately, as all the sentiment proxies selected by Hui et al. (2017) were based on lagged market data, the market sentiment index in the housing market that was constructed may be lagging behind (Hui et al., 2018), thus weakening the reliability of the study's findings. Alternatively, according to Da et al. (2015), using Internet big data to measure market sentiment is forward-looking as its immediacy effectively alleviates delays. As many potential home-buyers or investors scour the Internet for market information, the Baidu index[7] could be an appropriate indicator to measure market sentiment in China (Fang et al., 2020). By December 2020, the number

---

[7] Baidu Index reflects the search scale of a keyword in Baidu.

of Internet users in China had touched 989 million, with an Internet penetration rate of more than 70%. The search engine Baidu boasts the highest utilization rate of nearly 80% (CNNIC, 2021; Song & Coupé, 2022). Therefore, the frequency of searches containing housing price-related keywords in Baidu (i.e. Baidu index) could be interpreted to reflect the degree of attention of potential home-buyers to the housing market.

1.4   The Effects of Housing Prices

In addition to affecting the housing industry itself, changes in housing prices can also affect other fields, such as finance, construction, migration, consumption and innovation (Aghion et al., 2013; Cai et al., 2020; Iacoviello, 2004; Nguyen et al., 2020; Tao et al., 2015). Among the above-mentioned fields, consumption is most directly related to people's living standards, which can directly affect their well-being. In addition, after entering a "new normal[8]", China's economic growth has slowed and shifted from being factor-driven to innovation-driven (Morrison, 2019). In other words, innovation has become an important condition for the long-term steady growth of China's economy. As such, this study focused on consumption and innovation in China, which are explained further in Sections 1.4.1 and 1.4.2.

1.4.1   Housing Prices and Consumption in China

On the one hand, consumption is a major source of economic growth (Lardy, 2007); on the other, consumption directly affects people's living standards. As such, the Chinese government has been committed to improving Chinese residents' consumption (Chen, 2022). The growing consumption ability of Chinese residents is reflected by the three curves with positive slopes in Figure 1.4. The figure shows the per capita consumption expenditure of all Chinese residents, Chinese urban residents, and Chinese rural residents during the period of 2000 to 2019. From Figure 1.4, it can be observed that, first, the per capita consumption expenditure of Chinese urban residents is higher than that of Chinese rural residents. In addition, the consumption expenditure of both urban and rural residents in China has increased year by year. At the same time, as mentioned earlier, China's housing prices have been experiencing a dramatic rise since this century began, which indicates a positive correlation between China's housing prices and Chinese residents' consumption expenditure. Supporting this, Skinner (1994), Aoki et al. (2004), and Iacoviello (2004) believed that rising housing prices can promote residents' consumption through the wealth effect and collateral effect.

---

[8] The "new normal" was proposed by the president of China, Xi Jinping, to mean that China's economy has entered a new stage, different from the 30-year high-speed growth period before 2012.

9
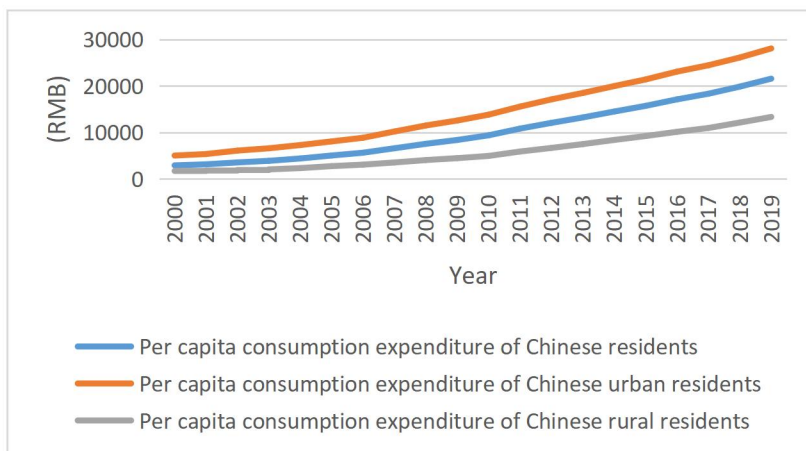
Figure 1.4: Per Capita Consumption Expenditure in China from 2000 to 2019
(Sources: National Bureau of Statistics of China, Various Years)

Consumption includes survival consumption, development consumption, and enjoyment consumption[9] (Hirschman & Holbrook, 1982; Uhrich & Benkenstein, 2012), and consumption structure can be defined as the proportion of various types of consumption expenditure in total consumption expenditure. Promoting the transformation from survival consumption to development and enjoyment consumption is referred to as consumption structure upgrading (Hudson & Murray, 1986; Wertenbroch, 2002). In other words, consumption structure upgrading is reflected in the increase of the share of development and enjoyment consumption. According to Tang et al. (2020), encouraging the consumption structure upgrading of Chinese residents is the top priority of the Chinese government, as this is the only way to improve the living standards of the Chinese people. In addition, consumption structure upgrading can promote China's economic growth by facilitating industrial structure upgrading (Dong et al., 2020; Shi et al., 2021). In short, promoting the upgrading of consumption structure can play a positive role both at the micro level of residents and the macro level of the country. On the contrary, if the upgrading of consumption structure is restrained, residents' living standards and the national macro-economy may be negatively affected. As such, this study shifted the focus from total consumption to consumption structure upgrading. Figure 1.5 shows the proportion of development and enjoyment consumption from the total consumption (i.e. consumption structure upgrading) of Chinese residents, Chinese urban residents, and Chinese rural residents. According to the figure, first, at the beginning of this century, the proportion of development and enjoyment consumption of Chinese urban residents was higher than that of Chinese rural residents. However, the growth rate of this proportion was slower for urban residents than rural residents. In other words, compared with Chinese

---

[9] Survival consumption is the consumption necessary to compensate the laborers' necessary labor consumption; Development consumption is the consumption necessary for expanding reproduction; Enjoyable consumption is a kind of consumption that improves the living standard of people and satisfies people's enjoyment needs.

rural residents, Chinese urban residents had relatively less momentum to upgrade their consumption structure. The proportion of development and enjoyment consumption of rural residents in China maintained a leading position, and surpassed that of Chinese urban residents for the first time in 2013. Although rural residents had a relatively higher growth rate in their proportion of development and enjoyment consumption, in general, both Chinese rural and urban residents seem to lack the momentum to upgrade their consumption structure, which is reflected by the moderate curves in Figure 1.5. At the same time, China's housing prices have been experiencing a dramatic rise since the turn of the century. This inspired this study to consider whether rising housing prices inhibit the consumption structure upgrading of Chinese residents.
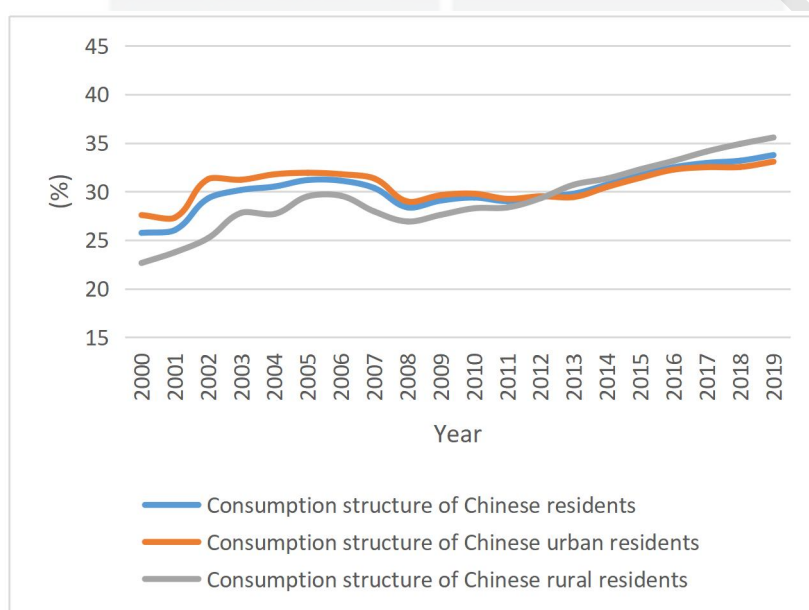
Figure 1.5: Consumption Structure of Chinese Residents from 2000 to 2019
Note: Consumption structure means the proportion of development and enjoyment consumption in total consumption.
(Sources: National Bureau of Statistics of China, Various Years)

Due to the differences in ownership between urban housing and rural housing in China[10], the impact of housing prices on the consumption structure upgrading of urban residents and rural residents in China could be different. Specifically, this impact may be positive or inverted U-shaped among Chinese urban residents. The housing ownership rate of Chinese urban residents ranks

---

[10] Generally, urban housing is commercial housing in China, and the house price data announced by China's statistics agencies refer to the house prices of (urban) commercial housing. Rural housing in China is not commercial housing, but self-built housing by villagers. The house prices involved in this study were all (urban) commercial housing prices.

among the top in the world, and nearly 90% of Chinese urban households own urban commercial housing (Huang et al., 2021). When housing prices rise, the wealth effect and collateral effect should dominate; that is, the rise of housing prices will promote the increase of total household consumption, which in turn, is usually accompanied by the upgrading of consumption structure (Yu et al., 2021). As such, the increase of housing prices may have a positive effect on the consumption structure upgrading of Chinese urban residents. However, most Chinese families apply for housing loans from commercial banks when buying houses, which means that they have to make monthly house payments (Fung et al., 2006). When housing prices are at a relatively low level, the families only need to apply for a small housing loan and correspondingly, make a small monthly house payment. When the proportion of monthly house payment out of household income is relatively low, this monthly house payment will not have a significant negative impact on household consumption. As such, when housing prices rise, the wealth effect and collateral effect should still dominate, such that the rise of housing prices has a positive effect on the upgrading of consumption structure. Conversely, when housing prices increase to a relatively high level, wherein monthly house payments account for a large proportion of household income, the rise in housing prices will produce a liquidity constraint effect; that is, residents have to reduce consumption to make higher monthly house payments. With the reduction of total consumption, residents have to allocate their limited consumption funds more towards necessities, which leads to the consumption structure downgrading of urban residents. Therefore, in the context of housing loans, the impact of housing prices on the consumption structure upgrading of Chinese urban residents may be positive or inverted U-shaped, depending on whether commercial housing prices are high enough.

Three effect scenarios are possible regarding the effect of housing prices on the consumption structure upgrading of rural residents in China, namely insignificant, negative, and U-shaped effects. In China, rural housing is not commercial housing but is self-built by villagers, and the proportion of Chinese rural residents owning urban commercial housing is low. (Huang et al., 2021). As such, the wealth effect and collateral effect caused by the growth of commercial housing prices may not exist for rural residents. When the vast majority of rural residents do not plan to move to cities and towns to buy housing, the liquidity constraint effect and substitution effect caused by the rise of commercial housing prices may also not exist for rural residents. Subsequently, the fluctuation of commercial housing prices may not have a significant impact on the consumption structure of Chinese rural residents. However, it is more likely that Chinese rural residents eventually tend to move to cities and towns, which can be proved by urbanization data in China[11]. When Chinese rural residents intend to buy housing in cities and towns, the rise of commercial housing prices can produce the liquidity constraint effect; that is, Chinese rural residents have to reduce their total consumption to pay higher housing prices and thus downgrade their consumption structure. When commercial housing prices rise further and exceed the acceptable range of

---

[11] China's urbanization rate rose from 36% in 2000 to 64% in 2020. Urbanization rate data was obtained from the National Bureau of Statistics of the People's Republic of China.

Chinese rural residents, these residents may delay or even cancel their house purchase plan in cities and towns, giving rise to the substitution effect where rural residents use the funds originally planned to buy city housing for consumption instead. Accordingly, the consumption structure of rural residents will upgrade with higher total consumption. As such, under the assumption that Chinese rural residents intend to buy housing in cities and towns, the impact of commercial housing prices on the consumption structure upgrading of Chinese rural residents may be negative or U-shaped, depending on whether commercial housing prices are high enough.

So far, only Dai (2019) has empirically examined and established the negative impact of housing prices on the consumption structure upgrading of Chinese urban residents. However, Dai's (2019) study has some limitations. First, as discussed earlier, the impact of housing prices on the upgrading of Chinese urban residents' consumption structure could be linear or non-linear (inverted U-shaped), but Dai (2019) only empirically examined the linear relationship between the two concepts. Second, Dai (2019) ignored Chinese rural residents in exploring this relationship, only focusing on urban residents. The rural population accounts for a large proportion of the total population in China, approaching 40% as of 2020. As such, it is also necessary to study the consumption structure upgrading of Chinese rural residents. Additionally, consumption can be greatly affected by economic development. Thus, the relationship between housing prices and the upgrading of consumption structure could be different in cities with different levels of economic development in China, which was ignored by Dai (2019).

1.4.2   Housing Prices and Innovation in China

As mentioned earlier, innovation has become an important condition to stimulate China's sustained and stable economic growth. As such, innovation has been placed in an extremely prominent position by China, as reflected in Figures 1.6 and 1.7. Figure 1.6 records the data of two indicators that represent China's innovation input this century, namely total R&D expenditures and R&D intensity[12]. Figure 1.6 shows that, in addition to both indicators rising from year to year, more importantly, R&D intensity maintained a high level of over 2% since 2013. The comparison of R&D expenditure between China and other countries is shown in Table 1.1 and Figure 1.7. Table 1.1 presents the top 10 countries in R&D expenditures during the period of 2000 to 2019. According to the table, it can be found that since this century, the ranking of China's R&D expenditure in the world has had a stepwise upward trend, surpassing Japan for the first time in 2009 and becoming the world's second largest R&D market following the US. Figure 1.7 more intuitively shows the global ranking of China's R&D expenditure and its gap with the country with the largest R&D expenditure around the world (i.e. U.S.). According to the figure, it can be found

---

[12] Following Gao and Jefferson (2007), the proportion of total R&D expenditure from GDP was used to measure R&D intensity. R&D intensity can measure the willingness of a country to invest in R&D.

that the gap between China and the United States in R&D expenditure had been narrowing quickly. In just 20 years, the surplus percentage of R&D expenditure in the US over China decreased from more than 800% in 2000 to less than 20% in 2019.
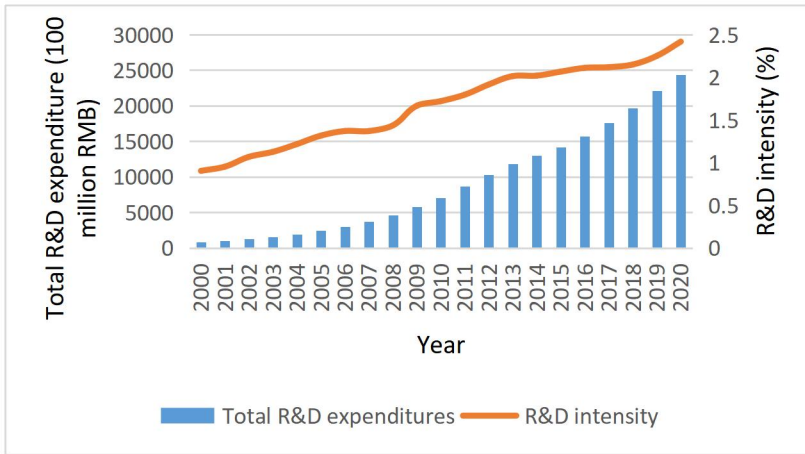
Figure 1.6: Total R&D Expenditures and R&D Intensity in China from 2000 to 2020
(Sources: National Bureau of Statistics of China, Various Years)
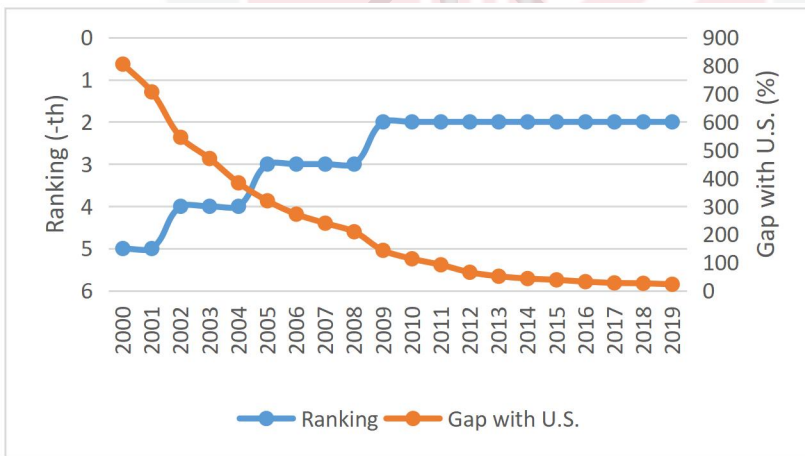
Figure 1.7: The Global Ranking of China's R&D Expenditures and Its Gap with the US from 2000 to 2019
(Sources: Organization for Economic Co-operation and Development, Various Years)

Table 1.1: Top 10 Countries in Total R&D Expenditures from 2000 to 2019 (Values are in Million US dollars)

Country	Year	Total R&D expenditures	Country	Year	Total R&D expenditures	Country	Year	Total R&D expenditures	Country	Year	Total R&D expenditures
USA	2000	360340	USA	2001	366183	USA	2002	359727	USA	2003	370178
Japan	2000	133314	Japan	2001	136875	Japan	2002	138884	Japan	2003	142350
German	2000	79146	German	2001	80295	German	2002	81198	German	2003	81900
France	2000	47748	France	2001	49733	China	2002	55742	China	2003	64961
China	2000	39806	China	2001	45402	France	2002	51155	France	2003	50282
UK	2000	35219	UK	2001	35687	UK	2002	36766	UK	2003	37035
Italy	2000	22558	Korea	2001	25176	Russia	2002	26277	Russia	2003	28552
Korea	2000	22394	Russia	2001	24531	Korea	2002	25820	Korea	2003	27957
Canada	2000	22160	Italy	2001	23848	Italy	2002	24839	Canada	2003	25048
Russia	2000	19755	Canada	2001	23274	Canada	2002	24653	Italy	2003	24361
USA	2004	374897	USA	2005	390306	USA	2006	408147	USA	2007	427755
Japan	2004	144881	Japan	2005	154900	Japan	2006	161877	Japan	2007	167584
China	2004	81542	China	2005	93021	China	2006	109714	China	2007	125799
German	2004	77572	German	2005	82366	German	2006	86574	German	2007	88724
France	2004	51087	France	2005	50868	France	2006	52100	France	2007	52675
UK	2004	36742	UK	2005	38146	UK	2006	39693	Korea	2007	43097
Korea	2004	31540	Korea	2005	33986	Korea	2006	38561	UK	2007	41598
Russia	2004	27395	Russia	2005	27032	Russia	2006	29372	Russia	2007	33162

15

Table 1.1: Continued

Country	2004	Country	2005	Country	2006	Country	2007
Canada	26208	Canada	26695	Canada	27005	Italy	27435
Italy	24505	Italy	24566	Italy	25956	Canada	27006

Country	2008	Country	2009	Country	2010	Country	2011
USA	449510	USA	445321	USA	444709	USA	455526
Japan	165515	China	182883	China	208280	China	237043
China	145192	Japan	151524	Japan	153245	Japan	158239
German	95206	German	94163	German	97655	German	104287
France	53766	France	56044	Korea	56271	Korea	61963
Korea	46192	Korea	49017	France	55165	France	57850
UK	41336	UK	40991	UK	41214	UK	41938
Russia	32658	Russia	36087	Russia	34046	Russia	34257
Italy	27911	Italy	27762	Italy	28240	Italy	28057
Canada	26592	Canada	26671	Canada	26174	Canada	26434

Country	2012	Country	2013	Country	2014	Country	2015
USA	454820	USA	468277	USA	481775	USA	507401
China	274611	China	309205	China	336251	China	366081
Japan	158829	Japan	167387	Japan	172436	Japan	168514
German	107565	German	106323	German	110276	German	114098
Korea	68017	Korea	72007	Korea	76695	Korea	76922
France	58969	France	59574	France	61190	France	60541
UK	40709	UK	42574	UK	44410	UK	45451
Russia	36064	Russia	36685	Russia	38577	Russia	38819

Table 1.1: Continued

Italy	2012	28594	Italy	2013	28932	Italy	2014	29761	2015	29995
Canada	2012	26676	Canada	2013	26267	Canada	2014	27159	2015	27005
USA	2016	528172	USA	2017	549878	USA	2018	586965	2019	632655
China	2016	399390	China	2017	430330	China	2018	464705	2019	514798
Japan	2016	162761	Japan	2017	168668	Japan	2018	172589	2019	171840
German	2016	116904	German	2017	124394	German	2018	128212	2019	131969
Korea	2016	79365	Korea	2017	88136	Korea	2018	95438	2019	99971
France	2016	61077	France	2017	61816	France	2018	62905	2019	63923
UK	2016	47016	UK	2017	48393	UK	2018	50844	2019	51519
Russia	2016	38948	Russia	2017	39921	Russia	2018	36616	2019	39201
Italy	2016	31017	Italy	2017	31620	Italy	2018	33177	2019	34213
Canada	2016	27852	Canada	2017	28001	Canada	2018	29594	2019	30237

(Sources: Organization for Economic Co-operation and Development, Various Years)

17

After learning China's innovation input, this study shifted its attention to China's innovation output. Because the number of patent applications (Chang et al., 2015; Wen et al., 2021) and patent authorizations (Tian & Wang, 2018; Liang et al., 2019) are two commonly used proxy variables for innovation output, both China's patent applications and authorizations are discussed below. Table 1.2 shows the number of patent applications and patent authorizations in China in this century. It can be seen that although the two indicators decreased slightly in 2014, both still showed an overall growth trend during the period of 2000 to 2020, indicating that China's innovation atmosphere and creativity has significantly improved this century. Since 2007, the World Intellectual Property Organization, together with Cornell University and Institut Européen d'Administration des Affaires, has conducted a comprehensive assessment of the innovation capacity of more than 120 economies around the world and thus established the Global Innovation Index (hereafter referred to as "GII") (Silva et al., 2017). Figure 1.8 describes China's GII score and its ranking in the world since 2011[13]. According to Figure 1.8, although China's GII score and global ranking decreased slightly before 2013, it still exhibited an upward trend on the whole, which is consistent with the overall enhancement of China's innovation capability shown in Table 1.2.

Table 1.2: The Number of Patent Applications and Authorizations in China (Values are in 10,000 pieces)

Year	The number of patent applications	The number of patent authorizations
2000	17.07	10.53
2001	20.36	11.43
2002	25.26	13.24
2003	30.85	18.22
2004	35.38	19.02
2005	47.63	21.40
2006	57.32	26.80
2007	69.39	35.18
2008	82.83	41.20
2009	97.67	58.20
2010	122.23	81.48
2011	163.33	96.05
2012	205.06	125.51
2013	237.71	131.30
2014	236.12	130.27
2015	279.85	171.82
2016	346.48	175.38
2018	432.31	244.75

---

[13] The scoring standard of GII has changed since 2011, the most obvious of which is to enlarge the scale from 10 to 100. In order to ensure the comparability of data, Figure 1.7 only shows the relevant data after 2011.

Table 1.2: Continued

Year		
2019	438.05	259.16
2020	519.42	363.93

(Sources: National Bureau of Statistics of China, Various Years)

Figure 1.8: China's GII Score and Global Ranking from 2011 to 2021
(Sources: World Intellectual Property Organization, Various Years)

As the center of regional economic activities, cities attract various production factors (e.g., human capital) and bring together various industries. As such, cities have become the primary carrier of a country's innovation activities (Caragliu & Del Bo, 2019; Yao et al., 2020). Accordingly, in addition to China's national innovation capability, it is also necessary to sort out cities' innovation capability in China. The Institute of Scientific and Technical Information of China (2021) released the innovation index of 72 major cities in China in 2020, which is shown in Table 1.3. It can be seen from the table that the higher the tier of cities, the stronger their innovation capacity. Specifically, among the 72 cities listed in Table 1.3, the average innovation index of the first-tier cities is 69.46, that of the second-tier cities is 53.38, that of the third-tier cities is 40.56, that of the fourth-tier cities is 30.57, and that of the fifth-tier cities is 20.92. Coincidentally, as mentioned in Section 1.3, housing prices in China also increase with the improvement of the city tier, which seems to indicate the consistency between cities' housing prices and innovation capacity.

Table 1.3: The Innovation Index of Main Cities in China in 2020

City	Tier	Innovation index	City	Tier	Innovation index
Shenzhen	1	87.79	Luoyang	3	48.57
Guangzhou	1	78.46	Maanshan	4	47.24
Hangzhou	1	76.88	Shaoxing	2	46.86
Nanjing	1	75.48	Lanzhou	2	46.67
Wuhan	1	72.33	Zhuzhou	3	46.44
Xi'an	1	71.61	Weifang	2	45.48
Suzhou	1	71.54	Shijiazhuang	2	45.00
Changsha	1	70.18	Xuzhou	2	44.82
Chengdu	1	68.38	Nanning	2	44.31
Qingdao	1	68.07	Jinhua	2	42.50
Xiamen	2	67.30	Lianyungang	3	42.02
Wuxi	2	67.02	Wulumuqi	3	41.95
Hefei	1	66.84	Haikou	3	40.16
Jinan	2	64.54	Yancheng	3	39.82
Ningbo	1	62.64	Yinchuan	3	39.10
Changzhou	2	61.42	Qinhuangdao	4	38.61
Dalian	2	60.58	Yichang	3	38.15
Nanchang	2	59.32	Dongying	4	38.13
Zhengzhou	1	59.14	Xiangyang	3	38.00
Shenyang	2	59.11	Jingdezhen	4	36.34
Zhenjiang	3	57.68	Huhehaote	3	36.14
Dongguan	1	57.32	Jining	3	34.38
Jiaxing	2	56.38	Quanzhou	2	34.13
Guiyang	2	55.80	Tangshan	3	33.50
Wuhu	3	55.53	Xining	4	30.25
Nantong	2	55.37	Longyan	4	30.09
Foshan	1	55.30	Baotou	4	29.60
Kunming	2	55.28	Baoji	4	28.39
Huzhou	3	55.21	Lasa	4	26.90
Fuzhou	2	55.16	Hengyang	3	24.24
Taiyuan	2	55.16	Pingxiang	5	21.85
Yantai	2	53.89	Yuxi	5	19.99
Haerbin	2	53.77	Zunyi	3	19.97
Yangzhou	3	53.41	Nanyang	3	17.78
Changchun	2	51.25	Jilin	4	17.55
Taizhou	3	49.10	Hanzhong	4	13.20

Note: Innovation index is a comprehensive score of a city's innovation capacity; a higher innovation index means a city's stronger innovation capacity.
(Sources: Institute of Scientific and Technical Information of China, 2021)

In fact, the impact of housing prices on cities' innovation capacity has been widely recognized (Wu & Song, 2021). Specifically, housing prices may affect cities' innovation capacity in the following five ways. First, high housing prices may inhibit cities' innovation capacity by crowding out innovation funds. Compared with the real estate industry's low risk and high return, innovation investment has higher risk, which is mainly reflected in the high failure rate of innovation activities (Castellion & Markham, 2013). As such, rising housing prices may attract investors to transfer more funds to the real estate industry, which squeezes out innovation input and then inhibits cities' innovation output. Second, rising housing prices may affect cities' innovation capacity by attracting or crowding out talents. According to Yang and Pan (2020), high housing prices have an inhibitory effect on the aggregation of human capital, which means that with the rise of the housing price of a city, the possibility of talents working in the city may decrease. Accordingly, cities' innovation capacity may be weakened by brain drain. However, Lin et al. (2021) found that cities with higher housing prices are more attractive to talents in China. Accordingly, cities' innovation capacity may also be enhanced due to talent inflow. Third, rising housing prices may improve cities' innovation capacity by easing the financing constraints of the enterprises located in cities. According to Chaney et al. (2012), the rise in housing prices increases the value of enterprises' real estate that can be mortgaged, which in part alleviates their financing constraints. This increases the credit funds available to them for R&D, and in turn, boosts the innovation output of enterprises. Accordingly, the improvement of enterprises' innovation output increases the innovation performance of the cities where they are located. Fourth, rising housing prices may improve cities' innovation capacity by promoting the growth of local fiscal revenue. According to Wen and Goodman (2013), rising housing prices can promote the rise of land prices, which augments the fiscal revenue of local governments in China[14]. This means that local governments have more funds to be used to support innovation, which may improve the innovation performance of cities. Finally, housing prices may affect cities' innovation capacity by affecting residents' consumption ability. Specifically, higher housing prices can increase consumption via the wealth effect and collateral effect (Leonard, 2010; Attanasio et al., 2009). The improvement of consumption power can increase consumption demand, and thereby enhance the profitability of enterprises. Greater enterprise profits means enterprises have more funds available for R&D, which positively impacts their innovation output. Accordingly, enterprises' higher innovation output will improve the innovation capacity of the cities where they are located. However, rising housing prices can also restrain consumption through the liquidity constraint effect (Yang et al., 2018). As such, the rise of housing prices may also have an inhibitory effect on cities' innovation capacity by restraining consumption.

So far, only Lin et al. (2021) and Yu and Cai (2021) have empirically examined the relationship between housing prices and cities' innovation output in China.

---

[14] "Land prices" here refers to the price of leased land use rights. The land is owned by the state in China and the income from renting land use rights is owned by local governments.

Specifically, using the fixed effect model to explore the data of 51 cities in China from 2005 to 2014, Lin et al. (2021) concluded that there is a positive correlation between housing prices and cities' innovation output in China. Different from the former, Yu and Cai (2021) demonstrated that the relationship between housing prices and cities' innovation performance in China is not a simple linear relationship, but an inverted U-shaped one. Although the effect of housing prices on cities' innovation capacity in China has been empirically examined by these scholars, the mechanism underlying this effect has not been fully explored. Specifically, Yu and Cai (2021) simply examined the relationship between housing prices and cities' innovation capacity in China, but did not further explore the mechanism of this relationship. Meanwhile, although Lin et al. (2021) made a useful attempt to explore the mechanism of this relationship from the perspective of talent migration, it was obviously not comprehensive. As mentioned earlier, housing prices could affect cities' innovation capacity through the five ways of real estate investment, talent attraction, enterprise financing constraints, local fiscal revenue, and residents' consumption ability. As such, the mechanism of the impact of housing prices on cities' innovation capacity in China still needs to be further examined.

1.5   Problem Statement

Since the reform of China's housing system, China's housing prices have continued to rise explosively, which not only increases the burden on Chinese residents to buy homes, but also buries the hidden danger of China's housing market collapse. As such, a large number of researchers explained the rise of housing prices in China from multiple perspectives. However, there is still a relatively lack of literature to explain China's housing prices from the perspective of market sentiment. As mentioned earlier, market sentiment can be defined as a comprehensive presentation of the views of all market participants. In recent years, with the dramatic rise of China's housing prices, some terms that over describe the popularity of China's housing market, such as "Riguangpan" and "panic-buying housing", are more frequently seen in China's news reports and social media, suggesting that market sentiment could also be the driver of China's housing price rise. Theoretically, the rise of market sentiment can lead to more noise trading and thus stronger herding effect (Hanna et al., 2020), which will increase the demand for housing and therefore raise the house price. Although Hui et al. (2017) has empirically examined the relationship between market sentiment and housing prices in Shanghai, this study still needs improvement. Firstly, Hui et al. (2017) only focused on Shanghai. However, the sharp rise in housing prices is not unique to Shanghai but is a common phenomenon in China. As such, the findings of Hui et al. (2017) are not universal in China. Additionally, all the sentiment proxies that Hui et al. (2017) utilized in their study was based on lagged market data. The sentiment index they constructed may thus lag behind (Hui et al., 2018), which weakens the reliability of their conclusions.

Housing prices can affect consumption through wealth effect (Attanasio et al., 2009), collateral effect (Iacoviello & Minetti, 2008), liquidity constraint effect

22

(Louise, 1995) and substitution effect (ibid). Although a large number of literature have empirically confirmed the impact of housing prices on consumption, the existing studies almost focus on total consumption, rather than consumption structure upgrading. As mentioned earlier, consumption encompasses consumption for survival, consumption for development and consumption for enjoyment, and consumption structure upgrading is exemplified by the rise in the share of consumption for development and enjoyment. Compared with the increase of total consumption, consumption structure upgrading is not only a better reflection of the improvement of residents' living standards, but also can stimulate national economic growth by promoting industrial structure upgrading. As revealed from Figure 1.5, the consumption structure of Chinese residents has been upgrading weakly since this century. Correspondingly, China's housing prices rise continuously. This inspires the researcher to consider whether the rise in housing prices can hinder the consumption structure upgrading of Chinese residents. As far as the researcher knows, only Dai (2019) has empirically explored the impact of housing prices on the consumption structure upgrading of Chinese urban residents, albeit with some limitations. First, Dai (2019) did not examine the nonlinear relationship between housing prices and the consumption structure upgrading of Chinese urban residents. Second, Dai (2019) only focused on Chinese urban residents, without examining the impact of rising house prices on the consumption structure upgrading of Chinese rural residents. Additionally, as consumption can largely be restricted by the level of economic development, the relationship between housing prices and residents' consumption structure upgrading could be different across cities with different levels of economic development, which was ignored by Dai (2019).

Since China's economy entered the "new normal", China's economic growth has continued to slow down due to the lack of innovation drive (Morrison, 2019). As an influencing factor that could affect cities' innovation capacity, the rise of housing prices could promote cities' innovation capacity by easing enterprises' financing constraints, or inhibit cities' innovation capacity by crowding out innovation funds. As such, the actual role of housing prices on cities' innovation capacity is controversial. In the context of the overall slowdown of China's economic growth, it is necessary to explore the relationship between housing prices and cities' innovation capacity in China, in order to provide some references for the improvement of cities' innovation capacity in China and further for China's economic growth from the perspective of housing prices. So far, only Lin et al. (2021) and Yu and Cai (2021) empirically examined the relationship between housing prices and cities' innovation output in China, and they fail to reach a unanimous conclusion. In addition, the two literature has not fully explored the mechanism of the impact of housing prices on cities' innovation capacity in China. Specifically, Yu and Cai (2021) simply examined the direct relationship between housing prices and cities' innovation capacity in China, but did not further explore the mechanism of this relationship. Although Lin et al. (2021) has empirically confirmed that rising housing prices can promote cities' innovation capacity in China by attracting talents, but it is obviously not comprehensive to explore the mechanism only from the perspective of talent migration.

23

1.6   Objectives of the Study

The study's main goals were to investigate how housing prices affect other macroeconomic variables in China and to provide a behavioural economics-based justification for China's continually high housing prices. More specifically, the three objectives of this study were:
(1) To examine the impact of market sentiment on housing prices in China;
(2) To investigate the impact of housing prices on the upgrading of consumption structure in China;
(3) To study the effect of housing prices on cities' innovation capacity in China.

1.7   Significance of the Study

The significance of the first objective of the study is as follows. First, the sentiment index constructed in the existing literature is based on lagged market data, which weakens the immediacy of the index. As such, this study incorporated Internet big data, namely the Baidu Index, into the construction framework of the housing market sentiment index, which is helpful to improve the immediacy of the index. Second, thus far, only Hui et al. (2017) have empirically examined the relationship between market sentiment and housing prices in the Chinese mainland. However, the study sample of Hui et al. (2017) was only Shanghai, which makes their conclusion not generalizable to China. As such, when studying the impact of market sentiment on housing prices in China, this study expanded the sample cities from Shanghai to 45 large and medium-sized cities in China, which makes the current findings applicable to the vast majority of major Chinese cities. Third, the findings can help the Chinese local governments regulate housing prices from the perspective of stabilizing market sentiment. Additionally, motivated by the fact that China's housing market varies widely among the different tiers of cities, this study explored whether market sentiment can differently affect the housing prices of first-tier and second-tier cities in China for the first time, which can help local governments in different city tiers create more targeted policies when regulating housing prices from the perspective of market sentiment.

The significance of the second objective of the study is as follows. First, to date, only Dai (2019) has empirically explored the impact of housing prices on the consumption structure upgrading of Chinese urban residents. However, Dai (2019) neglected the possibility of the inverted-U shaped relationship between housing prices and the consumption structure upgrading of Chinese urban residents. As such, this study added the squared term of house price to the model to check whether the inverted U-shaped relationship exists. Second, so far, the researcher has not found any literature on the relationship between housing prices and the upgrading of Chinese rural residents' consumption structure. As such, this study empirically examined the impact of housing prices on the consumption structure upgrading of Chinese rural residents for the first time, which broadens the research scope in this field. Third, the findings provide references for Chinese local governments to promote the upgrading of

24

Chinese residents' consumption structure from the perspective of housing price regulation. Additionally, consumption is largely affected by the level of regional economic development, which may lead to the variations in the relationship between housing prices and residents' consumption structure upgrading across cities with different levels of economic development in China, which has been ignored by the existing literature. As such, this study divided the full-sample into five sub-samples, namely first- to fifth-tier cities, to empirically examine whether housing prices affect the upgrading of residents' consumption structure in these five city tiers differently. This is helpful to make the research findings and their subsequent policy implications more targeted.

The significance of the third objective of the study is as follows. So far, only Lin et al. (2021) have empirically explored the mechanism of the relationship between housing prices and cities' innovation capacity in China, but they did so only from the perspective of talent attraction, which is not comprehensive. As such, deeper than the existing literature, this study empirically examined the mechanism of the impact of housing prices on cities' innovation capacity in China from the five perspectives of real estate investment, talent migration, enterprise financing constraints, local fiscal revenue, and residents' consumption ability, which broadens the research scope in this field. Additionally, the findings provide empirical evidence for Chinese local governments to promote cities' innovation capacity from the perspectives of controlling the scale of real estate investment and expanding the availability of credit for innovation activities.

1.8   Organization of the Study

The organization of the study is as follows. Chapter 1 gives a general introduction to this study. Chapter 2 reviews the previous literature related to the study. The explanations for the variables, methodology, and data involved in the study are arranged in Chapter 3. Chapter 4 reports the empirical results and discusses them. Chapter 5 concludes the study and puts forward policy implications.

REFERENCES

Abraham, J. M., & Hendershott, P. H. (1996). Bubbles in Metropolitan Housing Markets. Journal of Housing Research, 7(2): 191-207.

Aggarwal, D. (2022). Defining and measuring market sentiments: A review of the literature. Qualitative Research in Financial Markets, 14(2): 270-288.

Aghion, P ., Alesina, A. F ., & Trebbi, F. (2007). Democracy, technology, and growth (Working Paper No. 13180). National Bureau of Economic Research.

Aghion, P., Reenen, J. V., & Zingales, L. (2013). Innovation and institutional ownership. American Economic Review, 103(1): 277-304.

Alexander, C., & Barrow, M. (1994). Seasonality and cointegration of regional house prices in the UK. Urban Studies, 31(10): 1667-1689.

An, H., Wang, L., & Dou, J. (2013). Determinants of housing price on both the long-term trend and the short-term fluctuation: Panel data of 35 China cities. Proceedings of the 5th International Conference on Financial Risk and Corporate Finance Management. Dalian; China, 29-30 June, 2013. Dalian University of Technology Press.

André, C., Gabauer, D., & Gupta, R. (2021). Time-varying spillovers between housing sentiment and housing market in the United States. Finance Research Letters, 42: 101925.

Aoki, K., Proudman, J., & Vlieghe, G. (2004). House prices, consumption, and monetary policy: A financial accelerator approach. Journal of Financial Intermediation, 13(4): 414-435.

Arellano, M., & Bond, S. R. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies, 58(2): 277-297.

Attanasio, O. P., Blow, L., Hamilton, R., & Leicester, A. (2009). Booms and busts: consumption, house prices and expectations. Economica, 76(301): 20–50.

Autor, D., Dorn, D., Hanson, G. H., Pisano, G., & Shu, P. (2016). Foreign competition and domestic innovation: Evidence from Us patents (Working Paper No. 22879). National Bureau of Economic Research.

Ayres, R. U., Turton, H., & Casten, T. (2007). Energy efficiency, sustainability and economic growth. Energy, 32: 634-648.

Ayuso, J., & Restoy, F. (2006). House prices and rents: An equilibrium asset pricing approach. Journal of Empirical Finance, 13(3): 371-388.

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. The Journal of Finance, 61(4): 1645-1680.

Balassa, B. (1993). The effects of interest rates on savings in developing countries. In Balassa, B. Policy Choices for the 1990s (pp. 242-258). Palgrave Macmillan UK.

Bartelsman, E. J., Gautier, P. A., De Wind, J. (2016). Employment protection, technology choice, and worker allocation. International Economic Review, 57(3): 787-826.

Bassanini, A., Nunziata, L., Venn, D. (2009). Job protection legislation and productivity growth in OECD countries. Economic Policy, 24(58): 349-402.

Benjamin, J., Chinloy, P ., & Jud, D. G. (2004). Real estate versus financial wealth in consumption. Journal of Real Estate Finance and Economics, 29(3): 341-354.

Benos, A. (1998). Aggressiveness and survival of overconfident traders. Journal of Financial Markets, 1(3): 353-383.

Bianchi, N., & Giorcelli, M. (2020). Scientific education and innovation: from technical diplomas to university STEM degrees. Journal of the European Economic Association, 18(5): 2608-2646.

Blanchard, O. (1979). Speculative bubbles, crashes and ratinal expectations. Economic Letters, 3(4): 387-389.

Boone, L., & Girouard, N. (2002). The stock market, the housing market and consumer behavior. OECD Economic Studies, (2): 175-200.

Bostic, R., Gabriel, S., & Painter, G. (2009). Housing wealth, financial wealth, and consumption: New evidence from micro data. Regional Science & Urban Economics, 39(1): 79–89.

Cai, N., Li, G., & Ruan, G. (2002). The study on the effect of interest rate policy on the intertemporal consumption choice of Chinese residents. Economic Science, (4), 23-34. (In Chinese)

Cai, Q., & Chen. Y. (2018). Study of opinion leaders on Zhihu in view of social network. Journal of Social Science of Hunan Normal University, 47(05): 128-138. (In Chinese)

Cai, S., Wang, H., & Zhou, X. (2021). Do city size and population density influence regional innovation output evidence from China?. Wireless Communications and Mobile Computing, 2021: 3582053.

Cai, Z., Liu, Q., & Cao, S. (2020). housing supports rapid development of China's urbanization. Land Use Policy, 95: 104582.

Calcagno, R., Fornero, E., & Rossi, M. C. (2009). The effect of house prices on household consumption in Italy. Journal of Real Estate Finance & Economics, 39(3): 284–300.

Campbell, J. Y., & Cocco, J. (2007). How do house prices affect consumption? Evidence from micro data. Journal of Monetary Economics, 54(3): 591-621.

Cao, G., Li, K., Wang, R., & Liu, T. (2017). Consumption structure of migrant worker families in China. China & World Economy, 25(4): 1-21.

Caragliu, A., & Del Bo, C. F. (2019). Smart innovative cities: The impact of Smart City policies on city's innovation. Technological Forecasting and Social Change, 142: 373-383.

Case, K. E., Quigley, J. M., & Shiller, R. J. (2005). Comparing wealth effects: The stock market versus the housing market. Advances in Macroeconomics, 5(1): 1235-1235.

Castellion, G., & Markham, S. K. (2013). Perspective: New product failure rates: Influence of argumentum ad populum and self-interest. Journal of Product Innovation Management, 30(5): 976-979.

Chaney, T., Sraer, D., & Thesmar, D. (2012). The collateral channel: How housing shocks affect corporate investment. American Economic Review, 102(6): 2381-2409.

Chang, C. P., & Lee, C. C. (2011). The effect of globalization and political party on economic growth- Panel data analysis of former communist countries and European OECD members. Eastern European Economics, 49(6): 5–26.

Chang, X., Fu, K., Low, A., & Zhang, W. (2015). Non-executive employee stock options and corporate innovation. Journal of Financial Economics, 115(1): 168-188.

Chao, C. C., Laffargue, J. P., & Yu, E. (2011). The Chinese saving puzzle and the life-cycle hypothesis: A revaluation. China Economic Review, 22(1): 108–120.

Chen, H., Chong, T. T., & Duan, X. (2010). A principal-component approach to measuring investor sentiment. Quantitative Finance, 10(4): 339-347.

Chen, J., Yang, Z., & Wang, Y. P. (2014). The new Chinese model of public housing: A step forward or backward?. Housing Studies, 29(4): 534-550.

Chen, T. (2022). Economic fluctuations, precautionary saving motive and excess sensitivity of consumption. Statistical Research, 39(4): 33-48. (In Chinese)

Chenery, H. B., Robinson, S., & Syrquin, M. (1986). Industrialization and Growth: A Comparative Study. New York: Oxford University Press.

Cheng, C. (2013). A study of dynamic econometric relationship between urbanization and service industries growth in China. Journal of Industrial Engineering and Management, 6(1): 8-15.

Choi, C., Jung, H., & Su, L. (2019). Population structure and housing prices: Evidence from Chinese provincial panel data. Emerging Markets Finance and Trade, 55(1): 29-38.

Chong, T. T., Cao, B., & Wong, W. K. (2017). A principal component approach to measuring investor sentiment in Hong Kong. Journal of Management Sciences, 4(2): 237-247.

Clarke, R. G., & Statman, M. (1998). Bullish or bearish?. Financial Analysts Journal, 54(3): 63-72.

Clayton, J., Ling, D. C., & Naranjo, A. (2009). Commercial housing valuation: fundamentals versus investor sentiment. The Journal of housing Finance and Economics, 38: 5-37.

CNNIC. (2021). The 47th China statistical report on Internet development. Retrieved February 4 2021 from http://www.cac.gov.cn/2021-02/03/c_1613923423079314.htm (In Chinese).

Cong, Y., & Wang, D. (2013). The study on the impact of incomplete urbanization on consumption in China. East China Economic Management, 27(7): 34-38. (In Chinese)

Cornaggia, J., & Li, J. Y. (2019). The value of access to finance: Evidence from M&As. Journal of Financial Economics, 131(1): 232-250.

Costello, G., Fraser, P., & MacDonald, G. (2015). Monetary policy influences in Australian housing markets. International Journal of Housing Markets and Analysis, 8(2): 265-286.

Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. The Review of Financial Studies, 28(1): 1-32.

Dai, Z. (2019). Housing price and upgrading of consumption structure of urban residents in China. Modern Economy, 10(1): 156-174.

Davidov, E., & Semyonov, M. (2017). Attitudes toward immigrants in European societies. International Journal of Comparative Sociology, 58(5): 359-366.

Demery, D., & Duck, N.W. (2006). Savings-age profiles in the UK. Journal of Population Economics, 19: 521-541.

Ding, Y. (2019). Housing prices and population dynamics in urban China. Pacific Economic Review, 24(1): 27-45.

Disney, R., Gathergood, J., & Henley, A. (2010). House price shocks, negative equity, and household consumption in the United Kingdom. Journal of the European Economic Association, 8(6): 1179-1207.

Dong, B., Xu, Y., & Fan, X. (2020). How to achieve a win-win situation between economic growth and carbon emission reduction: Empirical evidence from the perspective of industrial structure upgrading. Environmental Science and Pollution Research, 27(35): 43829-43844.

Dong, Z., Hui, E. C., & Yi, D. (2021). Housing market sentiment and homeownership. Journal of Housing and the Built Environment, 36(1): 29-46.

Dreger, C., & Zhang, Y. (2013). Is there a bubble in the Chinese housing market?. Urban Policy and Research, 31(1): 27-39.

Du, W., & Li, M. (2019). Government support and innovation for new energy firms in China. Applied Economics, 51(25): 2754-2763.

Duesenberry, J. S. (1949). Income, Saving and the Theory of Consumer Behaviour. Cambridge, MA: Harvard University Press.

Enos, J. L. (1962). Invention and innovation in the petroleum refining industry. Nber Chapters, 27(8): 786–790.

Ermisch. J. (1996). The demand for housing in Britain and population aging: Microeconometric evidence. Economica, 63(251): 383-404.

Fan, C., Hook, L. S., Ibrahim, S., & Ahmad,M. N. (2022). Modeling and analysis of the impact of information and communication technology on household consumption expenditure in different regions. Mathematical Problems in Engineering: 5778788.

Fan, J., Zhou, L., Yu, X., & Zhang, Y. (2021). Impact of land quota and land supply structure on China's housing prices: Quasi-natural experiment based on land quota policy adjustment. Land Use Policy, 106: 105452.

Fan, Z., & Zhou, S. (2016). The impact of urbanization and population age structure on residents' consumption. Urban Problems, (10), 97-103. (In Chinese)

Fang, J., Gozgor, G., Lau, C-K. M., & Lu, Z. (2020). The impact of Baidu Index sentiment on the volatility of China's stock markets. Finance Research Letters, 32: 101099.

Farre-Mensa, J., Hegde, D., & Ljungqvist, A. (2020). What is a patent worth? Evidence from the US patent "lottery". The Journal of Finance, 75(2): 639-682.

Feng, F. (2014). Myopia, liquidity constraints and aggregate consumption in China: An empirical analysis based on threshold regression model.

Journal of Central University of Finance and Economics, (7): 72-77. (In Chinese)

Feng, Y., Wang, X., Du, W., Wu, H., & Wang, J. (2019). Effects of environmental regulation and FDI on urban innovation in China: A spatial durbin econometric analysis. Journal of Cleaner Production, 235: 210–224.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: The appropriateness of extreme confidence. Journal of Experimental Psychology: Human Perception and Performance, 3(4): 552-564.

Fisher, K. L., & Statman, M. (2000). Investor sentiment and stock returns. Financial Analysts Journal, 56(2): 16-23.

Frank, J. D. (1935). Some psychological determinants of the level of aspiration. The American Journal of Psychology, 47: 285-293.

Fu, B., Wan, Q., & Song, D. (2013). Urbanization, population age composition and resident consumption: Empirical research based on provincial dynamic panel data. China Population, Resources and Environment, 23(11): 108-114. (In Chinese)

Fung, H. G., Huang, A. G., Liu, Q., & Shen, M. X. (2006). The development of the housing industry in China. Chinese Economy, 39(1): 84-102.

Gan, J. (2007). Collateral, debt capacity, and corporate investment: Evidence from a natural experiment. Journal of Financial Economics, 85(3): 709-734.

Gao, J., & Jefferson, G. H. (2007). Science and technology take-off in China?: Sources of rising R&D intensity. Asia Pacific Business Review, 13(3): 357-371.

Grossman, G. & Helpman, E. (1995). Technology and Trade. Pp. 1279-1337 in Gene Grossman & Kenneth Rogoff (eds.), Handbook of International Economics 3. Amsterdam, Netherlands: Elsevier.

Groves, R. M. (2004). Survey errors and survey costs. John Wiley & Sons, Inc.

Gu, H., Meng, X., Shen, T., & Wen, L. (2020). China's highly educated talents in 2015: Patterns, determinants and spatial spillover effect. Applied Spatial Analysis and Policy, 13(3): 631-648.

Hamburger, W. (1955). The relation of consumption to wealth and the wage rate. Econometrica, 23(1): 1-17.

Hanna, A. J., Turner, J. D., & Walker, C. B. (2020). News media and investor sentiment during bull and bear markets. The European Journal of Finance, 26(14): 1377-1395.

Hansen, A. H. (1939). Economic progress and declining population growth. The American Economic Review, 29(1): 1-15.

He, Y., & Ye, C. (2010). The analysis on the intertemporal consumption behavior of Chinese residents. Finance Economy, (14): 54-55. (In Chinese)

Heijster, J. (2020). Imagining modernization: The symbolic embrace of GDP in China. Chinese Political Science Review, 5(1): 50-73.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: Emerging concepts, methods and propositions. Journal of Marketing, 46(3): 92-101.

Howard, D. H. (1978). Personal saving behavior and the rate of inflation. The Review of Economics and Statistics, 60(4): 547-554.

Howell, A. (2020). Industry relatedness, FDI liberalization and the indigenous innovation process in China. Regional Studies, 54(2): 229-243.

Hu, Y., & Wang, X. (2019). Analysis of differences in the impact of industrial structure optimization on regional innovation performance in the Yangtze River Economic Belt. Science and Technology Management Research, 39(14): 86-93. (In Chinese)

Huang, D. J., Leung, C. K., & Qu, B. (2015). Do bank loans and local amenities explain Chinese urban house prices?. China Economic Review, 34: 19-38.

Huang, Y., He, S., & Gan, L. (2021). Introduction to SI: Homeownership and housing divide in China. Cities (London, England), 108: 102967.

Hudson, L. A., & Murray, J. B. (1986). Methodological limitations of the hedonic consumption paradigm and a possible alternative: A subjectivist approach. Advances in Consumer Research, 13: 343-348.

Hui, E. C., Dong, Z., & Jia, S. (2018). How do housing price and sentiment affect consumption distribution in China. Habitat International, 77(7): 99-109.

Hui, E. C., Dong, Z., Jia, S., & Lam, C. H. (2017). How does sentiment affect returns of urban housing? Habitat International, 64(6): 71-84.

Hui, E. C., & Wang, Z. (2014). Market sentiment in private housing market. Habitat International, 44: 375-385.

Iacoviello, M. (2004). Consumption, house prices, and collateral constraints: A structural econometric analysis. Journal of Housing Economics, 13(4): 304-320.

Iacoviello, M., & Minetti, R. (2008). The credit channel of monetary policy: Evidence from the housing market. Journal of Macroeconomics, 30(1): 69–96.

Iammarino, S., & McCann, P. (2006). The structure and evolution of industrial clusters: Transactions, technology and knowledge spillovers. Research Policy, 35(7): 1018-1036.

111

Institute of Scientific and Technical Information of China. (2021). Evaluation report on innovation capability of national innovative cities 2020. Beijing: Scientific and Technical Documentation Press. (In Chinese)

Ito, T. (2021). The determinants of residential property prices in Japan: Analysis of different monetary policy regimes. Journal of Corporate Accounting and Finance, 32(1): 90-95.

Jacobsen, D. H., & Naug, B. E. (2005). What drives house prices?. Economic Bulletin, 76(1): 29-41.

Jager, P.,& Schmidt, T. (2017). Demographic change and house prices: Headwind or tailwind?. Economics Letters, 160: 82-85.

Jalles, J. T. (2010). How to measure innovation? New evidence of the technology-growth linkage. Research in Economics, 64(2): 81-96.

Jeong, H., Shin, K., Kim, S., & Kim, E. (2021). What types of government support on food SMEs improve innovation performance?. Sustainability, 13(16): 9461.

Ji, X., & Shi, M. (2020). Population age structure , social security and household consumption rate. E3S Web of Conferences, 214, 01021.

Jiang, Y., & Zhu, X. (2021). The gap between the rich and the poor, the mismatch of financial resources and the fluctuation of property prices. Statistics & Decision, 37(12): 117-121. (In Chinese)

Jin, C., Soydemir, G., & Tidwell, A. (2014). The US housing market and the pricing of risk: Fundamental analysis and market sentiment. Journal of housing Research, 36(2): 187-220.

Jo, K. J., & Kim, S. B. (2014). Price inertia in the residential property market. International Journal on Information, 17(8): 3571-3576.

Jokar, H., & Daneshi, V. (2020). Investor sentiment, stock price, and audit quality. International Journal of Managerial and Financial Accounting, 12(1): 25-47.

Katona, G. (1975). Psychological Economics. New York: Elsevier.

Keynes, J. M. (1936). The General Theory of Employment, Interest and Money. London: Harcourt Brace Jovanovich.

Kim, J. H. (2005). Housing price hike and price stabilization policy in Korea. KDI School of Public Policy and Management.

Kim, K., Ryu, D., & Yang, H. (2019). Investor sentiment, stock returns, and analyst recommendation changes: The KOSPI stock market. Investment Analysts Journal, 48(2): 89-101.

Koomson, I., Villano, R. A., & Hadley, D. (2021). Accelerating the impact of financial literacy training programmes on household consumption by empowering women. Applied Economics, 53(29): 3359-3376.

Kuhn, M., & Prettner, K. (2018). Population age structure and consumption growth: Evidence from National Transfer Accounts. Journal of Population Economics, 31: 135-153.

Lai, R. N., & Order, R. A. V. (2010). Momentum and house price growth in the United States: anatomy of a bubble. housing Economics, 38(4): 753-773.

Lam, C. H., & Hui, E. C. (2018). How does investor sentiment predict the future housing returns of residential property in Hong Kong?. Habitat International, 75(5): 1-11.

Landry, C.(2001). The creative city: A toolkit for urban innovators. Community Development Journal, 36(2): 165-167.

Lardy, N. R. (2007). China: Rebalancing economic growth. Chapter 1 from The China balance sheet in 2007 and beyond. The Peterson Institute for International Economics.

Lee, C., & Li, X. (2020). House prices and bank credit in China: Analysis of first- and second-tier cities. International Journal of Housing Markets and Analysis, 14(4): 779-795.

Lehrer, E., & Light, B. (2018). The effect of interest rates on consumption in an income fluctuation problem. Journal of Economic Dynamics and Control, 94, 63-71.

Leonard, J. A. (2010). The impact of the housing market boom and bust on consumption spending. Business Economics, 45: 83–93.

Li, H., & Gao, W. (2008). Grey correlation analysis of the impact of China's aging population on consumption structure. Population and Development, 14(6): 67-72. (In Chinese)

Li, H., & Yan, K. (2019). Evolution and Enlightenment of urban housing system in the 70 years since the founding of new China. Social Sciences in Guangxi, (8): 57-62. (In Chinese)

Li, J., Fu, J., & Wei, P. (2015). Industrial structure change and regional innovation capacity- An empirical study based on China's provincial panel data. Hubei Social Sciences, (12): 72-78. (In Chinese)

Li, J., Wu, Y., & Xiao, J. (2020a). The impact of digital finance on household consumption: Evidence from China. Economic Modelling, 86: 317-326.

Li, L., & Zhang, X. (2020). Spatial evolution and critical factors of urban innovation: Evidence from Shanghai, China. Sustainability, 12(3): 938.

Li, V. J., Cheng, A. W. W., & Cheong, T. S. (2017). Home purchase restriction and housing price: A distribution dynamics analysis. Regional Science and Urban Economics, 67: 1-10.

Li, W., & Zheng, M. (2016). Is it substantive innovation or strategic innovation?- Impact of Macroeconomic Policies on Micro-enterprises' Innovation. Economic Research Journal, 51(4): 60-73.

Li, Y., Zhu, D., Zhao, J., Zheng, X., & Zhang, L. (2020b). Effect of the housing purchase restriction policy on the housing Market: Evidence from a typical suburb of Beijing, China. Land Use Policy, 94: 104528.

Liang, S., Zhao, J., He, S., Xu, Q., & Ma, X. (2019). Spatial econometric analysis of carbon emission intensity in Chinese provinces from the perspective of innovation-driven. Environmental Science and Pollution Research, 26(14): 13878-13895.

Liang, W., & Yang, M. (2019). Urbanization, economic growth and environmental pollution: Evidence from China. Sustainable Computing-Informatics & Systems, 21: 1-9.

Lim, J., & Lee, J. H. (2013). Demographic changes and housing demands by scenarios with ASFRs. International Journal of Housing Markets and Analysis, 6(3): 317-340.

Lin, C., & Tsai, I. (2021). The special effect of interest rate cuts on housing prices. Journal of Business Economics and Management, 22(3): 776-798.

Lin, X., Ren, T., Wu, H., & Xiao, Y. (2021). Housing price, talent movement, and innovation output: Evidence from Chinese cities. Review of development economics, 25(1): 76-103.

Lin, Y., Ma, Z., Zhao, K., Hu, W., & Wei, J. (2018). The impact of population migration on urban housing prices: Evidence from China's major cities. Sustainability, 10(9): 3169.

Lind, J. T., & Mehlum, H. (2010). With or without U? The appropriate test for a U-shaped relationship. Oxford Bulletin of Economics and Statistics, 72(1): 109-118.

Lindenthal, T., & Eichholtz, P. (2012). Prolonged Crisis: Housing in Germany and Berlin. In: Bardhan, A., Edelstein, R. H., & Kroll, C. A. eds. Global Housing Markets: Crises, Policies, and Institutions. Hoboken: John Wiley & Sons, Inc, 69-99.

Lindh, T., & Malmberg, B. (2008). Demography and housing demand - What can we learn from residential construction data?. Journal of Population Economics, 21(3): 521-539.

Liu, C., & Minford, P. (2014). Comparing behavioural and rational expectations for the US post-war economy. Economic Modelling, 43: 407-415.

Liu, D., & Liu, W. (2016).Trade openness and manufacturing industry's innovation performance based on the perspective of positive and negative list. Science & Technology Progress and Policy, 33(23): 57-61. (In Chinese)

Liu, G. (2010). The analysis of the impact of interest rate decline on the intertemporal consumption choice of Chinese residents. Seeking Truth, 37(1): 60-64. (In Chinese)

Liu, J., & Wei, H. (2021). How do high urban housing prices affect migrant workers' settlement intention?. Finance & Trade Economics, 42(2): 134-148. (In Chinese)

Liu, S. (2006). General Economic Theory of Consumption. Beijing: China Renmin University Press. (In Chinese)

Liu, Y., & Ding, Y. (2021). Comparative Analysis of the Impact of Investment on Consumption. Finance and Trade Economics, 42(10): 5-20. (In Chinese)

Liu, Y., Gao, H., Cai, J., Lu, Y., & Fan, Z. (2022). Urbanization path, housing price and land finance: International experience and China's facts. Land Use Policy, 113: 105866.

Liu, Z. (2012). Fiscal decentralization, rise of housing price and consumption repression. Finance & Economics, (2): 54-62. (In Chinese)

Loewenstein, G., Weber, E. U., Hsee, C. K. & Welch, N. (2001). Risk as feelings. Psychological Bulletin, 127(2): 267-286.

Louise, S. (1995). Housing prices and the savings of renters. Journal of Urban Economics, 38(1): 94–125.

Luo, J., & Cheng, K. (2013). The influence of FDI on energy efficiency of China: An empirical analysis based on DEA method. Applied Mechanics and Materials, 291: 1217-1220.

Lv, H., & Wang, K. (2017). Interaction between housing price, industrial structure and urban-rural income gap. Journal of South China Agricultural University (Social Science Edition), 16(4): 116-131.

Maddison, A. (2006). The World Economy. Paris: OECD Publishing.

Madsen, J. B. (2012). A behavioral model of house prices. Journal of Economic Behavior and Organization, 82(1): 21-38.

Maisel, S. J. (1949). Variables commonly ignored in housing demand analysis. Land Economics, 25(3): 260-274.

Malpezzi, S. (2001). The contribution of Stephen K. Mayo to housing and urban economics. Journal of Housing Economics, 10(2): 72-108.

Mankiw, N. G., & Weil, D. N. (1989). The baby boom, the baby bust, and the housing market. Regional Science and Urban Economics, 19(2): 235-258.

Mayo, S. K. (1981). Theory and estimation in the economics of housing demand. Journal of Urban Economics, 10: 95-116.

McDonald, J. F., & Stokes, H. H. (2013). Monetary policy, mortgage rates and the housing bubble. Economics and Finance Research, 1(1): 82-91.

McFadden, D. L. (1994). Demographics, the housing market, and the welfare of the elderly. NBER Chapters, in: Studies in the Economics of Aging, 225-288, National Bureau of Economic Research, Inc.

Miao, W., He, D., & Zhou, C. (2019). Innovation heterogeneity and the effect of government technological innovation expenditure. Economic Research Journal, 54(1): 85-99. (In Chinese)

Mishkin, F. S. (2007). Housing and the monetary transmission mechanism. National Bureau of Economic Research Working Paper, 13518.

Modigliani, F. (1971). Monetary policy and consumption: Linkages via interest rate and wealth effects in the FMP model. Federal Reserve Bank of Boston Conference Series, 5: 9-84.

Modigliani, F., & Brumberg, R. (1954). Utility analysis and the consumption function: An attempt at integration, in Post-Keynesian Economics. Kenneth Kurihara, ed.

Morrison, W. M. (2019). China's economic rise: History, trends, challenges, and implications for the United States, Congressional Research Service, June 25.

Neal, R., & Wheatley, S. M. (1998). Do measures of investor sentiment predict returns? Journal of Financial and Quantitative Analysis, 33(4): 523-547.

Neuteboom, P., & Brounen, D. (2007). Demography and Housing Demand - Dutch Cohort Evidence. Erasmus University Working Paper.

Nguyen, M., Xuan, P., & Bui, T. (2020). Casual relationship between banking system development and housing market. Management Science Letters, 10(1): 41-52.

Nickell, S. (1981). Biases in dynamic models with fixed effects. Econometica, 49(6): 1417-1426.

Ning, L., Wang, F., & Li, J. (2016). Urban innovation, regional externalities of foreign direct investment and industrial agglomeration: Evidence from Chinese cities. Research Policy, 45(4): 830–843.

Odean, T. (1998). Volume, volatility, price and profit when all traders are above average. The Journal of Finance, 53(6): 1887-1934.

Ong, T. S., & Chang, Y. S. (2013). Macroeconomic determinants of Malaysian housing market. Journal of Human and Social Science Research, 1(2): 119-127.

Ooi, J., & Lee, S. (2006). Price discovery between residential land & housing markets. Journal of Housing Research, 15(2): 95-112.

Pan, M., & Gao, W. (2014). The examination and analysis on the impact of urbanization on residents' consumption in China. Macroeconomics, (1): 118-125. (In Chinese)

Parrotta, P., Pozzoli, D., & Pytlikova, M. (2014). The nexus between labor diversity and firm's innovation. Journal of Population Economics, 27(2): 303-364.

Potepan, M. J. (1994). Intermetropolitan migration and housing prices: Simultaneously determined? Journal of Housing Economics, 3(2): 77-91.

Qu, G. (2021). Analyzing the trend of Chinese housing under the epidemic era by comparing the housing markets between China and Japan. Proceedings of the 6th International Conference on Financial Innovation and Economic Development (ICFIED 2021). Sanya; China, 29-31 January, 2021. Atlantis Press.

Radonjic, M., Durisic, V., Rogic, S., & Durovic, A. (2019). The impact of macroeconomic factors on housing prices: Evidence from Montenegro. Ekonomski Pregled, 70(4): 603-626.

Sanchez-Gonzalez, G., & Herrera, L. (2015). User cooperation effects on firm's innovation outputs. Canadian Journal of Administrative Sciences-Revue Canadienne Des Sciences de L Administration, 32(2): 86-101.

Schneider, P. (2005). International trade, economic growth and intellectual property rights: A panel data study of developed and developing countries. Journal of Development Economics, 78(2): 529-547.

Schumpeter, J. A. (1934). The theory of economics development. Journal of Political Economy, 1(2): 170-172.

Shao, H., & Wang, Y. (2019). Population structure and technological innovation. Studies in Science of Science, 37(4): 739-749. (In Chinese).

Shen, Y., & Liu, H. (2004). Housing prices and economic fundamentals: a cross city analysis of China for 1995-2002. Economic Research Journal, (6): 78-86. (In Chinese)

Shi, D., Zhang, Q., & Liu, J. (2020). Impact of college enrollment expansion on regional innovation capability: The mechanism and an empirical analysis. Science Research Management, 41(3): 83-90. (In Chinese)

Shi, J., Wang, Y., & Wu, W. (2016). The crowding-out effect of housing markets on corporate innovation: Evidence from China. Working Paper.

Shi, L., Zhang, C., & Hu, H. (2021). Consumption upgrading, consumption rate changing and economic development divergence- An empirical analysis based on threshold model and mechanism. China Business and Market, 35(9): 74-85. (In Chinese)

Shi, S., Jou, J., & Tripe, D. (2014). Can interest rates really control house prices? Effectiveness and implications for macroprudential policy. Journal of Banking and Finance, 47: 15-28.

Shiller, R. J. (2005). Irrational exuberance (2nd ed.). Princeton University Press.

Silva, E.d.C.e., Silberglitt, R., Machado, L. C., Maia, J. M. F., Cagnin, C. H. (2017). A portfolio analysis methodology to inform innovation policy and foresight. Technological Forecasting and Social Change, 115: 338-347.

Simms, A., & Nichols, T. (2014). Social loafing: A review of the literature. Journal of Management and Practice, 15(1): 58-67.

Sinai, T., & Souleles, N. S. (2005). Owner-occupied housing as a hedge against rent risk. Quarterly Journal of Economics, 120(2): 763-789.

Sit, V. F. S. (2000). A window on Beijing: The social geography of housing in a period of transition, 1985-1990. Third World Planning Review, 22(3): 237.

Skinner, J. (1994) "Housing and saving in the United States" 191-214 in: Noguchi, Yukio and Poterba, James (eds) Housing Markets in the United States and Japan, Chicago: Chicago University Press, for National Bureau of Economic Research: Chicago.

Solo, C. S. (1951). Innovation in the capitalist process: A critique of the schumpeterian theory. Quarterly Journal of Economics, 65(3): 417-428.

Song, B., & Lin, X. (2010). The influence of population age structure change on urban residents' consumption behavior. Population and Economics, (4): 11-17. (In Chinese)

Song, Z., & Coupé, T. (2022). Predicting Chinese consumption series with Baidu. Journal of Chinese Economic and Business Studies, Early Access.

Stevenson, S. (2008). Modeling housing market fundamentals: Empirical evidence of extreme market conditions. Real Estate Economics, 36(1): 1-29.

Su, C. W., Yin, X. C, Chang, .H. L., & Zhou, H. G. (2018). Are the stock and real estate markets integrated in China?. Journal of Economic Interaction and Coordination, 14: 741-760.

Su, X., & Qian, Z. (2020). State intervention in land supply and its impact on real estate investment in China: Evidence from prefecture-level cities. Sustainability, 12(3): 1019.

Sun, X., Su, Y., Liu, H., & Li, C. (2022). The impact of house price on urban household consumption: Micro evidence from China. Sustainability, 14(19): 12592.

Sun, Y., Li, Z. T., & Ma, R. (2008). The research on scientific and technological innovation capability in China. Nankai Economic Studies, (4): 68-85. (In Chinese)

Takats, E. (2012). Aging and house prices. Journal of Housing Economics, 21(2): 131-141.

Tan, Y., Liu, X., Sun, H., & Zeng, C. (2022). Population ageing, labour market rigidity and corporate innovation: Evidence from China. Research Policy, 51(2): 104428.

Tang, Y., Chen, S., & Yuan, Z. (2020). The effects of hedonic, gain, and normative motives on sustainable consumption: Multiple mediating evidence from China. Sustainable Development, 28(4): 741-750.

Tao, L., Hui, E. C., Wong, F. K., & Chen, T. (2015). Housing choices of migrant workers in China: Beyond the Hukou perspective. Habitat International, 49: 474-483.

The Committee of the Ministry of Housing and Urban-Rural Development of CPC. (2008). 30 years of reform and development of urban and rural construction. Economic Daily 26 November, p. 10. (In Chinese)

The General Office of the State Council of China. (1991). Circular of the General Office of the State Council on transmitting the opinions of the leading group for housing system reform of the State Council on comprehensively promoting the reform of urban housing system. Retrieved December 26 2021 from http://www.gov.cn/zhengce/content/2016-10/18/content_5121083.htm (In Chinese)

The Government Administration Council of the Central People's Government of China. (1951). Instructions of the Government Administration Council on confiscating the property of war criminals, traitors, bureaucratic capitalists and counter revolutionaries. Retrieved December 25 2021 from http://www.chinarealestatelaw.com/data/365-9.asp (In Chinese)

The Ministry of Urban and Rural Construction and Environmental Protection of China. (1986). Circular of the Ministry of Urban and Rural Construction

and Environmental Protection on the pilot of subsidized sale of urban public housing. Retrieved December 25 2021 from https://www.66law.cn/tiaoli/148112.aspx (In Chinese)

The People's Bank of China. (2003). Circular of the People's Bank of China on further strengthening the management of housing credit. Retrieved December 27 2021 from http://www.gov.cn/ztzl/2006-06/30/content_323739.htm (In Chinese)

The State Council of China. (1980). The State Council endorsed the document titled "Summary of National Urban Planning Meeting". Retrieved December 25 2021 from http://www.cnki.com.cn/Article/CJFDTotal-GWYB198020006.htm (In Chinese)

The State Council of China. (1984). The State Council endorsed the document titled "Report on Expanding the Pilot of Subsidized Sale of Urban Public Housing" by the Ministry of Urban and Rural Construction and Environmental Protection. Retrieved December 25 2021 from https://law.lawtime.cn/d565179570273.html (In Chinese)

Tian, X., & Wang, J. (2018). Research on spatial correlation in regional innovation spillover in China based on patents. Sustainability, 10(9): 3090.

Tian, X., & Yan, Z. (2010). The relationship between consumption structure and industrial structure: Theoretical framework and empirical analysis. Consumer Economics, 26(3): 20-24. (In Chinese)

Torche, F., & Spilerman, S. (2009). Intergenerational influences of wealth in Mexico. Latin American Research Review, 44(3): 75-101.

Tressel, T., & Scarpetta, S. (2004). Boosting Productivity via Innovation and Adoption of New Technologies: Any Role for Labor Market Institutions?. World Bank Publications.

Tsai, I. (2015). Monetary policy and bubbles in the national and regional UK housing. Urban Studies, 52(8): 1471-1488.

Tse, C., Rodgers, T., & Niklewski, J. (2014). The 2007 financial crisis and the UK residential housing market: Did the relationship between interest rates and house prices change? Economic Modelling, 37: 518-530.

Tu, Y. (2004). The dynamics of the Singapore private housing market. Urban Studies, 41(3): 605-619.

Uhrich, S., & Benkenstein, M. (2012). Physical and social atmospheric effects in hedonic service consumption: Customers' roles at sporting events. The Service Industries Journal, 32(11): 1741-1757.

Usta, A. (2021). The role of sentiment in housing market with credit-led funding: The case of Turkey. Journal of Housing and the Built Environment, 36(2): 577-600.

120

Vinson, P. (2021). House prices and consumption in the United States. Real Estate Economics, 49(2): 635-662.

Wang, W., Liu, Y., & Peng, D. (2015a). Research on effects of population aging on industrial upgrading. China Industrial Economics, (11): 47-61.

Wang, X., Hui, E. C., & Sun, J. (2017a). Population migration, urbanization and housing prices: Evidence from the cities in China. Habitat International, 66: 49-56.

Wang, Y., Liu, X., & Wang, F. (2018). Economic impact of the high-speed railway on housing prices in China. Sustainability 10(12): 4799.

Wang, Y., & Peng, D. (2019). An empirical study on the interaction between industrial structure change and consumption upgrading. Journal of Wuhan University of Technology(Social Sciences Edition), 32(3): 121-129. (In Chinese)

Wang, Y., Yu, Y., & Su, Y. (2017b). Does the tender, auction and listing system in land promote higher housing prices in China? Housing Studies, 33(4): 613-634.

Wang, Z., & Hui, E. C. (2017). Fundamentals and market sentiment in housing market. Housing, Theory and Society, 34(1): 57-78.

Wang, Z., Wang, C., & Zhang, Q. (2015b). Population ageing, urbanization and housing demand. Journal of Service Science and Management, 8(4): 58639.

Wang, Z., & Yang, L. (2014). Indirect carbon emissions in household consumption: Evidence from the urban and rural area in China. Journal of Cleaner Production, 78: 94-103.

Wang, Z., & Zhang, Q. (2014). Fundamental factors in the housing markets of China. Journal of Housing Economics, 25: 53-61.

Weeken, O. (2004). Asset pricing and the housing market. Bank of England Quarterly Bulletin, Spring.

Wei, C., Wang, Z., Lan, X., Zhang, H., & Fan, M. (2018). The spatial-temporal characteristics and dilemmas of sustainable urbanization in China: A new perspective based on the concept of five-in-one. Sustainability, 10(12): 4733.

Wei, J., & Liu, Y. (2015). Government support and firm innovation performance Empirical analysis of 343 innovative enterprises in China. Chinese Management Studies, 9(1): 38-55.

Weil, D. N. (1999). Why has fertility fallen below replacement in industrial nations, and will it last?: Population growth, dependency, and consumption. The American Economic Review, 89(2): 251-255.

Wen, H., & Goodman, A. C. (2013). Relationship between urban land price and housing price: Evidence from 21 provincial capitals in China. Habitat International, 40: 9-17.

Wen, J., Deng, P., Zhang, Q., & Chang, C. (2021). Is higher government efficiency bringing about higher innovation? Technological and Economic Development of Economy, 27(3): 626-655.

Wen, J., Feng, G., Chang, C., & Feng, Z. (2018). Stock liquidity and enterprise innovation: New evidence from China. The European Journal of Finance, 24(9): 683–713.

Wertenbroch, K. (2002). Hedonic interactions between choice and consumption. Advances in Consumer Research, 29: 105-107.

Wong, W. L., Law, S. H., Said, R. and Lee, C. (2015). Consumption and Housing Wealth: A Malaysian Case that Demonstrates a Negative Relationship. International Journal of Economics and Management, 9(S): 163-180.

Wooldridge, J. M. (2015). Introductory econometrics: A modern approach. Nelson Education.

Wu, F., & Liu, R. (2013). Industrial upgrading and independent innovation ability construction- Empirical research based on China's provincial panel data. China Industrial Economics, (5): 57-69. (In Chinese)

Wu, L., & Song, B. (2021). The influence of housing prices on city's innovation capacity: Review and outlook. In: Lu X., Zhang Z., Lu W., Peng Y. (eds) Proceedings of the 25th International Symposium on Advancement of Construction Management and Real Estate. CRIOCM 2020. Springer, Singapore.

Xiang, D., Zhao, T., & Zhang, N. (2021). Does public subsidy promote sustainable innovation? The case of Chinese high-tech SMEs. Environmental Science and Pollution Research, 28(38): 53493-53506.

Xu, K., Lu, Q., & Xu, G. (2020). Land finance, housing price and gap of property income. Journal of Shanxi University of Finance and Economics, 42(3): 1-16. (In Chinese)

Xu, X., Jia, H., Li, J., & Li, J. (2021). Research on the role of housing economy in China's national economic growth. Statistical Analysis on Key Economic Areas of China, 1-28.

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

Yan, N. (2019). Study on the Influence of Monetary Policy on Real Estate Price in China. Journal of Service Science and Management, 12(2): 90470.

Yan, S., & Zhu, G. Z. (2013). "Housing slave effect" or "wealth effect"? A theoretical analysis of the impact of housing price rise on national consumption. Management World, (3): 34–47. (In Chinese)

Yang, C., Xiao, L., & Ling, A. (2021). Does property tax suppress land prices? An empirical research based on micro residential land transaction data in China. Economic Review, (6): 19-33. (In Chinese)

Yang, R., & Bao, J. (2019). Can agglomeration of productive services effectively promote urban innovation?. Modern Economic Research, (4): 80-87. (In Chinese)

Yang, Y. (2015). Sources of income, structure evolution and tourism demand of Chinese rural residents: An empirical research based on panel data from 2000 to 2010. Tourism Tribune, 30(11): 19-30. (In Chinese)

Yang, Z., Fan, Y., & Zhao, L. (2018). A reexamination of housing price and household consumption in China: The dual role of housing consumption and housing investment. Journal of Real Estate Finance and Economics, 56(3): 472-499.

Yang, Z., & Pan, Y. (2020). Human capital, housing prices, and regional economic development: Will "vying for talent" through policy succeed?. Cities, 98: 102577.

Yao, L., Li, J., & Li, J. (2020). city's innovation and intercity patent collaboration: A network analysis of China's national innovation system. Technological Forecasting and Social Change, 160: 120185.

Yekou, Y. (1997). Land Economics (B. Wang, Trans.). Beijing: The Commercial Press. (Original work published 1989).

Yicai Research Institute. (2017). China's urban and industrial innovation report 2017 was released. Retrieved December 15 2021 from https://www.iqiyi.com/v_19rrf0zbu0.html.

Yin, S. (1988). The Research on Consumption Structure in China. Shanghai: Shanghai People's Publishing House (In Chinese).

Yin, S. (2011). On optimizing consumption structure and transforming economic development mode. Consumer Economics, 27(1): 3-9. (In Chinese)

Yu, H. (2011). Size and characteristic of housing bubbles in China's major cities: 1999-2010. China and World Economy, 19(6): 56-75.

Yu, J., Shi, X., & Cheong, T. S. (2021). Distribution dynamics of China's household consumption upgrading. Structural Change and Economic Dynamics, 58: 193-203.

Yu, L., & Cai, Y. (2021). Do rising housing prices restrict city's innovation vitality? Evidence from 288 cities in China. Economic Analysis and Policy, 72: 276-288.

Yu, S., & Zhang, L. (2019). The impact of monetary policy and housing-purchase restrictions on housing prices in China. International Economic Journal, 33,(2): 286-309.

Zang, X., & Liu, D. (2003). Interest rate leverage and household consumption: The analysis of saving substitution relationship. Nankai Economic Studies, (6): 3-8. (In Chinese)

Zhang, D., Cheng, W., & Ng, T-K. (2013). Increasing returns, land use controls and housing prices in China. Economic Modelling, 31: 789-795.

Zhang, H., Li, L., Hui, E. C., & Li, V. (2016). Comparisons of the relations between housing prices and the macroeconomy in China's first-, second- and third-tier cities. Habitat International, 57: 24-42.

Zhang, H., & Liu, Y. (2017). Economic growth and international trade effect on fiscal revenue empirical research in China area. Journal of Finance and Accounting, 5(3): 96-101.

Zhang, H., & Wang, X. (2018). The impact of structural adjustment on housing prices in China. Asian-Pacific Economic Literature, 32(1): 108-119.

Zhang, J., Gao, K., & Lu, W. (2020). Human capital accumulation, innovation and economic growth. Dongyue Tribune, 41(11): 39-48. (In Chinese)

Zhang, Y. (2011). The empirical analysis of the impact of rural population age structure on consumption in Henan province. Population and Economics, (5): 75-79. (In Chinese)

Zhao, Q. (2018). Can the optimization and upgrading of industrial structure promote the efficiency of technological innovation?. Studies in Science of Science, 36(2): 239-248. (In Chinese)

Zhou, J., Luo, J., Ju, F., & Zhu, T. (2020). The study on the influence of industrial structure change on real estate price. Scientific Decision Making, (9): 21-47. (In Chinese)

Zhou, Z., Zhang, T., Wen, K., Zeng, H., & Chen, X. (2018). Carbon risk, cost of debt financing and the moderation effect of media attention: Evidence from Chinese companies operating in high-carbon industries. Business Strategy and the Environment, 27(8), 1131-1144.

Zhou, S. (2016). Prevent rash "low-quality urbanization". Red Flag Manuscript, (8): 37-38. (In Chinese)

Zhu, J. (1994). Changing land policy and its impact on local growth: The experience of the Shenzhen Special Economic Zone, China, in the 1980s. Urban Studies, 31(10): 1611-1623.

Zou, W., & Dai, Q. (2003). Technological imitation, human capital accumulation and economic catching-up. Social Sciences in China, (5): 26-38+205-206. (In Chinese)