


THE IMPACT OF THE AGE STRUCTURE OF THE POPULATION AND THE PRICE OF HOUSING ON THE SAVINGS OF THE POPULATION: AN EMPIRICAL STUDY FROM CHINA

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| ARTICLE INFO | ABSTRACT |
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| <p>Article history:</p> <p>Received 26 June 2023</p> <p>Accepted 21 September 2023</p> | <p>Purpose: The purpose of this paper is to explore the relationship between housing prices, population age structure and savings rate by analyzing the variables of housing prices, population age structure and savings rate, which is of great theoretical and practical significance for the formulation of policies to alleviate the aging population and childlessness in China.</p> |
| <p>Keywords:</p> <p>Housing Price; Old-Age Dependency Ratio; Child Dependency Ratio; Household Savings Rate; The VAR Model.</p> | <p>Theoretical framework: Most of the studies on the relationship among the consumer price of commercial housing, the old-age dependency ratio, the child dependency ratio, and the savings rate of the residents in China are based on the GMM model, while this study constructs a quadratic VAR model to empirically analyze and test the four variables of the consumer price of commercial housing, the old-age dependency ratio, the child dependency ratio, and the savings rate of the residents, and to study whether there is a long-term stable relationship among these four variables and other general patterns that exist among these four variables. other general laws that exist among these four variables.</p> |
|  | <p>Design/Methodology/Approach: This study decides to start from the perspective of residents' saving rates. It conducts descriptive statistical analysis and empirical analysis by using 33 macroeconomic data (samples) from 1990-2022, official data of the National Bureau of Statistics (NBS), and housing price data from Jurassic Data Network (JDN). The hypotheses are initially set up by descriptive analysis, and then the VAR function model is constructed to analyze and test the hypotheses empirically.</p> <p>Findings: It is found that the sales price of commercial housing is positively correlated with the savings rate of residents; the child dependency ratio is positively correlated with the savings rate of residents; the old-age dependency ratio is insignificantly correlated with the savings rate of residents; and there is a long-term and stable correlation among the four variables of the sales price of commercial housing, the child dependency ratio, the old age dependency ratio and the savings rate of residents.</p> <p>Research, Practical & Social implications: This study improves the relevant theoretical research of economics, demography, sociology and other interdisciplinary disciplines, complements the existing research paths and methods of empirical analysis, and obtains relevant empirical research conclusions. The significance of the study is to provide assistance to the formulation of national macroeconomic and monetary policies, and to contribute to the adjustment of population policies, the reform of the pension security system, and the revision of the medical security system. It also contributes to the adjustment of the population policy, the reform of the pension security system, and the revision of the medical security system.</p> <p>Originality/Value: The study is able to enrich the research practices on the sales price of commercial properties, the dependency ratio of young children, the dependency</p> |

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ratio of the elderly and the savings rate of the population, and make a new contribution to the improvement of people's livelihood, the development of the real estate industry's transformation and upgrading, and the formulation of rational population and economic policies.

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O IMPACTO DA ESTRUTURA ETÁRIA DA POPULAÇÃO E DO PREÇO DA MORADIA NA ECONOMIA DA POPULAÇÃO: ESTUDO EMPÍRICO REALIZADO NA CHINA

RESUMO

Objetivo: O objetivo deste documento é explorar a relação entre os preços da habitação, a estrutura etária da população e a taxa de poupança, analisando as variáveis dos preços da habitação, a estrutura etária da população e a taxa de poupança, o que é de grande importância teórica e prática para a formulação de políticas para aliviar o envelhecimento da população e a falta de filhos na China.

Estrutura teórica: A maioria dos estudos sobre a relação entre o preço ao consumidor da habitação comercial, a relação de dependência da velhice, a relação de dependência da criança e a taxa de poupança dos residentes na China são baseados no modelo GMM, enquanto este estudo constrói um modelo VAR quadrático para analisar e testar empiricamente as quatro variáveis do preço ao consumidor da habitação comercial, a relação de dependência da velhice, a relação de dependência da criança e a taxa de poupança dos residentes, e estudar se há uma relação estável de longo prazo entre essas quatro variáveis e outros padrões gerais que existem entre essas quatro variáveis.

Projeto/Metodologia/Abordagem: Este estudo decide começar pela perspectiva das taxas de poupança dos residentes. Realiza análise estatística descritiva e análise empírica usando 33 dados macroeconômicos (amostras) de 1990-2022, dados oficiais do National Bureau of Statistics (NBS) e dados de preços de habitação da Jurassic Data Network (JDN). As hipóteses são inicialmente configuradas por análise descritiva e, em seguida, o modelo de função VAR é construído para analisar e testar as hipóteses empiricamente.

Constatações: Constatou-se que o preço de venda da habitação comercial está positivamente correlacionado com a taxa de poupança dos residentes; o rácio de dependência infantil está positivamente correlacionado com a taxa de poupança dos residentes; o rácio de dependência da velhice está insignificamente correlacionado com a taxa de poupança dos residentes; e há uma correlação estável e de longo prazo entre as quatro variáveis do preço de venda da habitação comercial, o rácio de dependência infantil, o rácio de dependência da velhice e a taxa de poupança dos residentes.

Pesquisa, Implicações práticas e Sociais: Este estudo melhora a pesquisa teórica relevante da economia, demografia, sociologia e outras disciplinas interdisciplinares, complementa os caminhos de pesquisa existentes e métodos de análise empírica, e obtém conclusões relevantes de pesquisa empírica. A importância do estudo é prestar assistência à formulação de políticas macroeconômicas e monetárias nacionais e contribuir para o ajuste das políticas populacionais, a reforma do sistema de segurança de pensões e a revisão do sistema de segurança médica. Contribui também para o ajustamento da política demográfica, a reforma do sistema de segurança das pensões e a revisão do sistema de segurança médica.

Originalidade/Valor: O estudo é capaz de enriquecer as práticas de pesquisa sobre o preço de venda das propriedades comerciais, o rácio de dependência das crianças pequenas, o rácio de dependência dos idosos e a taxa de poupança da população, e dar uma nova contribuição para a melhoria da subsistência das pessoas, o desenvolvimento da transformação e modernização da indústria imobiliária, e a formulação de políticas racionais de população e economia.

Palavras-chave: Preço da Habitação, Taxa de Dependência da Velhice, Taxa de Dependência da Criança, Taxa de Poupança das Famílias, O Modelo VAR.

EL IMPACTO DE LA ESTRUCTURA DE EDAD DE LA POBLACIÓN Y EL PRECIO DE LA VIVIENDA EN EL AHORRO DE LA POBLACIÓN: UN ESTUDIO EMPÍRICO DE CHINA

RESUMEN

Propósito: El propósito de este trabajo es explorar la relación entre los precios de la vivienda, la estructura de edad de la población y la tasa de ahorro mediante el análisis de las variables de los precios de la vivienda, la estructura de edad de la población y la tasa de ahorro, que es de gran importancia teórica y práctica para la formulación de políticas para aliviar el envejecimiento de la población y la falta de hijos en China.

Marco teórico: La mayoría de los estudios sobre la relación entre el precio al consumidor de la vivienda comercial, la relación de dependencia de la vejez, la relación de dependencia infantil y la tasa de ahorro de los residentes en China se basan en el modelo GMM, mientras que este estudio construye un modelo cuadrático VAR para analizar

empíricamente y probar las cuatro variables del precio al consumidor de la vivienda comercial, la relación de dependencia de la vejez, la relación de dependencia infantil y la tasa de ahorro de los residentes, y para estudiar si existe una relación estable a largo plazo entre estas cuatro variables y otros patrones generales que existen entre estas cuatro variables.

Diseño/ Metodología/ Enfoque: Este estudio decide partir de la perspectiva de las tasas de ahorro de los residentes. Realiza análisis estadístico descriptivo y empírico utilizando 33 datos macroeconómicos (muestras) de 1990-2022, datos oficiales de la Oficina Nacional de Estadística (ONE), y datos de precios de vivienda de Jurassic Data Network (JDN). Las hipótesis se configuran inicialmente mediante análisis descriptivo, y luego se construye el modelo de función VAR para analizar y probar empíricamente las hipótesis.

Hallazgos: Se encuentra que el precio de venta de la vivienda comercial se correlaciona positivamente con la tasa de ahorro de los residentes; la relación de dependencia infantil se correlaciona positivamente con la tasa de ahorro de los residentes; la relación de dependencia de la vejez se correlaciona insignificadamente con la tasa de ahorro de los residentes; y hay una correlación estable y a largo plazo entre las cuatro variables del precio de venta de la vivienda comercial, la relación de dependencia infantil, la relación de dependencia de la vejez y la tasa de ahorro de los residentes.

Investigación, Implicaciones prácticas y Sociales: Este estudio mejora la investigación teórica relevante de la economía, la demografía, la sociología y otras disciplinas interdisciplinarias, complementa las trayectorias de investigación existentes y los métodos de análisis empírico, y obtiene conclusiones empíricas relevantes de la investigación. La importancia del estudio es prestar asistencia para la formulación de políticas macroeconómicas y monetarias nacionales y contribuir al ajuste de las políticas demográficas, la reforma del sistema de seguridad de las pensiones y la revisión del sistema de seguridad médica. También contribuye al ajuste de la política demográfica, la reforma del sistema de seguridad de las pensiones y la revisión del sistema de seguridad médica.

Originalidad/Valor: El estudio es capaz de enriquecer las prácticas de investigación sobre el precio de venta de las propiedades comerciales, la relación de dependencia de los niños pequeños, la relación de dependencia de los ancianos y la tasa de ahorro de la población, y hacer una nueva contribución a la mejora de los medios de vida de las personas, el desarrollo de la transformación y la mejora de la industria inmobiliaria, y la formulación de políticas demográficas y económicas racionales.

Palabras clave: Precio de la Vivienda, Tasa de Dependencia de la Vejez, Tasa de Dependencia Infantil, Tasa de Ahorro de los Hogares, Modelo VAR.

INTRODUCTION

Most scholars regard China as a relatively typical country with a high savings rate. Since the reform and opening up of China, its economy and science and technology have been developing rapidly, and the per capita disposable income in China has also been growing rapidly so that the residents have more money to save. The savings rate is an important economic indicator for a country or region, reflecting the quality of social development and the living standard of the residents. Yan Zewen's (2021) study found that in the 1990s, the savings rate of residents remained relatively stable. However, after 2000, China's residents' savings rate continued to rise, reaching a peak in 2010, and then began to decline again, falling to 34.8% in 2018. From a large amount of literature, we can see that scholars at home and abroad are highly concerned about the change in China's residential savings rate. The change in China's residents' savings rate has been a high concern for scholars at home and abroad.

As for the real estate industry, it can be traced back to the 1990s, when China implemented the economic policy of expanding domestic demand. This industry was recognized as the new focus of expanding the consumption level of the residents in order to

stimulate the consumption of the residents; China began a series of reforms to the housing system. In 1998, China began to implement the monetization of housing, completely ending the previously established welfare housing system. Since then, housing prices have been able to reflect the supply and demand of real estate in China's market, marking the basic embarkation of China's real estate industry on the road to marketization. Thus, against this background, commercial housing prices in China have soared. So, against this background, the price of commercial housing in China soared. The average sales price of commercial properties has risen from 702.86 yuan per square meter in 1990 to a peak of about 10,139.13 yuan per square meter in 2021. 10,139.13 yuan/square meter. In the face of this situation, to curb the phenomenon of "property speculation fever," the Chinese Government has continuously introduced a series of regulatory policies to prevent property prices from rising. In the face of this situation, to curb the phenomenon of "property speculation fever," the Chinese Government has continuously introduced a series of regulatory policies to prevent property prices from rising too rapidly.

Not only that, the changes in the age structure of China's population are also very distinctive, and the period from the founding of New China to the present can be briefly summarized in three phases: in the first phase, from the founding of New China to the 1970s, the mortality rate of China's population declined significantly, while the birth rate of the population continued to rise. The combined effect of these two factors has led to a rapid increase in China's population. During this period, the child dependency ratio increased significantly. In the second stage, from the 1970s to the 1990s, the rapidly growing population brought about problems in food, employment, economy, and society. The Chinese Government felt unprecedented pressure and began formulating and implementing family planning policies. After implementing the policy, China's population was effectively controlled, and the birth rate was eased. However, a new problem emerged: the aging population in China began to appear. At this stage, the growth rate of the child dependency ratio slowed down, but it was still very high; the old-age dependency ratio was still running at a low level. In the third stage, after the 1990s, the family planning policy implemented after China's reform and opening up has achieved remarkable results. However, the birth rate of newborns began to decline, leading to a series of problems; with the number of births even lower than the number of deaths, China's demographic dividend weakened, and the country launched the policy of two separate births, which, as can be seen from Niu (2022) analysis, has led to the emergence of a "deep aging" of the population in China. From the analysis of Niu (2022), it can be seen that China has already

entered the society of "deep aging" and "old age and aging" and is facing the serious problem of childlessness.

The savings rate is an important economic indicator that plays an irreplaceable role in the economic and social development of a country and the lives of its inhabitants. In this era of economic globalization, a country's savings not only impact its economic production and construction but also transform into international capital and increase investment, affecting other countries' economic performance. From another point of view, a high national savings rate indicates that a country's population is using more of its wealth to save than to purchase and consume. Lower consumer demand leads to lower supply, which in turn affects the performance of other countries' economies. A decrease in consumer demand leads to a decrease in supply, which affects the production and development of the country's real economy.

Since the financial crisis 2008, China has implemented a loose monetary policy. To stimulate economic development, the government and enterprises have invested in infrastructure construction and the real estate market through large-scale borrowing to promote economic development. At the same time, some speculators saw the dividends of the industry and put their savings into the real estate industry. The speculation in real estate increased, and the price of housing rose yearly. As a result, real estate has not only consumer attributes but also financial attributes. In such a situation, China's economy is facing serious security risks, the bubble of the real estate market has affected every Chinese, soaring housing prices have given birth to a generation of "house slaves," people in order to buy a house, reduce consumer spending, and people in order to buy a house in the future to save money in advance, which affects the production of residents' lives; Not only that, but some people have to use their housing loans to buy a home, so little of their income is spent on savings, and many young people have become "moonlighters." Thus, housing prices have an uncertain impact on savings rates. Therefore, housing prices have an uncertain impact on the savings rate.

The age structure of the population is also an important reason affecting the savings rate of residents. Based on the life cycle hypothesis theory, people will allocate their consumption and savings to smooth out their life cycle, choosing to save a part of their income during their young and middle-aged years and use it for consumption in their old age. Nowadays, China has already entered the society of population aging. However, the domestic pension system is still developing, and most residents will save to cope with future medical care and consumption, which has a certain degree of impact on the savings rate of Chinese residents. This has a certain degree of impact on the savings rate of Chinese residents.

The purpose of this paper is to analyze the variables of housing price, population age structure, and residents' savings rate in China and to explore the relationship between housing price, population age structure, and residents' savings rate, which will help to formulate a plan to alleviate the aging population in China. It is of great theoretical and practical significance for formulating policies to alleviate China's aging population and childlessness.

The theoretical significance of this study is to improve the relevant theoretical research in interdisciplinary disciplines such as economics, demography, sociology, etc., to supplement the existing research paths and research methods in the empirical analysis, and to obtain relevant empirical research conclusions. The practical significance lies in assisting in the formulation of national macroeconomic policies and monetary policies and assistance to the adjustment of population policies, the reform of the pension security system, and the revision of the medical security system. It also contributes to the adjustment of the population policy, the reform of the pension security system, and the revision of the medical security system.

THEORETICAL REFERENTIA

First of all, we review the past literature on the concept of population age structure: Wei Yigang et al. (2019) argue that the age structure of a country or region's population can usually be expressed as the proportion of the number of people in different age groups to the total number of people in the country or region, and therefore, according to this definition, we can categorize the age structure of the population into young, adult, and old, and the age structure of a country or region can be expressed in more than one way. Mohd Siti Nur Ain et al. (2021) believe that more than one indicator can be used to measure, calculate, and express the age structure of the population of a country or region. Zha R et al. (1992) found that, among the many different indicators, the dependency ratio is the most important indicator that can be used to measure and express the changes in the age structure of a country or region and where it is. The population dependency ratio is an important indicator that can measure and express how the age structure of a country or region is changing and at what period. Then, regarding the domestic and international studies on the impact of population age structure on savings rate, this paper explains the micro and macro aspects. The earliest micro theory put forward by Modigliani (1954) and others is the life cycle theory, and he used cross-country cross-section data to validate his point of view. The main points of this theory are: since the under-age children and older adults who are not able to work have no means of earning income if the proportion of children and older adults in the total population increases, the level of

consumption of the whole society will increase, and an increase in the level of consumption will lead to a decrease in the rate of saving, provided that income remains constant; the middle-aged people of working age have a stable income, and if their proportion increases, then the savings rate will decrease; and those who are of working age have stable income, and if their proportion increases, then the savings rate will decrease. If the proportion of middle-aged people in the working-age population has a stable income, then the society's total income will increase. If the consumption level remains unchanged, the savings rate will increase. Leff (1969) also used cross-country cross-section data, then built a Leff model and verified Modigliani's conclusions, and finally proved that an increase in the proportion of the elderly population hurts the savings rate and has a significant effect. Loayza (2000) and others built a large database of 102 countries. They found that the elderly dependency ratio is negatively correlated with the savings rate of the population, with a change of 1.75:1. In terms of macro theory, Cutler (1990) argued that in the short run, a decrease in the proportion of the working population in the total population leads to a decrease in the savings rate, because of a decrease in the disposable income, the previously accumulated wealth is partially used for consumption, and the total consumption increases; in the long run, a decrease in the savings rate is caused by a decrease in the proportion of the working population in the total population. In the long run, a decrease in output leads to a decrease in aggregate consumption, but technological progress can slightly mitigate the decrease in output and increase consumption [9]. Ultimately, the savings rate depends on the outcome of the combination of these two effects. Weil (1999) argues that a sustained decline in the birth rate will eventually lead to a lower labor force, and if the capital stock per capita stays constant, consumption per capita will rise, leading to a subsequent reduction in the aggregate savings rate of the society. Furthermore, a reduction in the birth rate will indirectly affect the proportion of older people, leading to an increase in consumption demand. The decrease in the working population and the increase in the elderly population together determine the rise and fall of total consumption demand, which also affects the change in the total savings rate. The study of Yang Hongru (2020) shows that both the child dependency ratio and the old-age dependency ratio positively impact residents' consumption, and the effect is significant. Among them, the change in the child dependency ratio also positively impacts the residents' saving rate. However, the effect of the old-age dependency ratio on the residents' saving rate is not significant. Cai Fang (2009) found that in China, under different age structures of the population, the impact of the savings rate on economic development is different and that the changes in the child dependency ratio, the old-age dependency ratio, and the savings rate

are subject to inertia, so it can be predicted that the trends of the child dependency ratio, the old-age dependency ratio, and the savings rate will not change significantly in a very short period.

Summarizing the theories and research of scholars from both micro and macro perspectives, it is found that the impact of population age structure on the savings rate has not yet formed a unified conclusion, and the correlation results are divided into many categories, so there is still room for further research. Many scholars have studied the correlation between housing prices and residents' savings rates. However, the conclusions are not unanimous, and the author summarizes that there are the following three main views:

- Housing prices have a positive correlation with the savings rate.
- Housing prices have a negative correlation with the savings rate.
- Housing prices do not correlate with the savings rate.

Regarding the positive correlation between housing price and saving rate, many scholars believe that residents save to purchase houses, i.e., when the housing price increases, people save more in order to be able to afford to buy a house. Hoynes et al. (1994) studied the PSID data from 1984-1989. The results showed that the increase in the housing price increases the saving rate, and for every one percentage point increase in housing price, the saving rate increases by 0.25%, the saving rate increases by 0.25%, and the saving rate increases by 0.25%. Hoynes et al. (1994) study the PSID data for 1984-1989 and show that higher housing prices increase the savings rate, and for every one percentage point increase in housing prices, the savings rate increases by 0.25 percentage points. Li Chunfeng et al. (2014) regard the house as a consumer good, and the housing price increases the cost of consuming the house, so to buy a house, they have to expand their savings. Xu Xiaoying (2012) thinks that there is a precautionary saving effect in society; that is, the increase in housing prices makes residents increase precautionary savings out of caution, leading to an increase in the savings rate and the short-term effect of precautionary savings is smaller than the long-term effect. Luo Zuchun et al. (2014) studied the panel data of 31 provinces and cities in China from 1999 to 2011. They found a negative correlation between housing prices and savings rates, and the effect is significant. Zhao Yang (2012) found that the wealth effect of real estate is positive in the long run but negative in the short run. The real estate wealth effect refers to the fact that when housing prices increase, residents will use housing to speculate and profit from the increase in housing prices. If residents invest much money in housing, the savings rate will decrease accordingly.

For the view that there is no correlation between housing prices and savings rates, Hayashi (1986) studied the relationship between housing prices and savings rates in Japan from the 1960s to the 1980s and found that there was no significant effect between housing prices and savings rates [Wang (2012) studied cross-regional data, and did not find that there was a relationship between the two]. Tian Zhihua et al. (2014) conducted an empirical study based on inter-provincial panel data from 2006 to 2011 using the GMM research method. The results showed that the impact of higher housing prices on residents' savings rate is not obvious because residents will adjust their savings according to their savings in the previous period. They will reduce their savings in the current period if their savings in the previous period are too high.

METHODOLOGY

The raw data used in this study are the official data published by the National Bureau of Statistics of China (NBS) for the years 1990-2022. Based on the data of the National Bureau of Statistics (NBS) on the savings rate and age structure of the population, and the supplementary data on the consumer price of housing, the data can be calculated by certain formulas to show the indicators of the four variables. The data were then analyzed empirically using SPSSAU software, and conclusions were finally drawn.

The main variables in this study are described below:

With regard to the savings rate of the population, there are three types of savings rates defined in general economic studies: the national savings rate, the corporate savings rate and the savings rate of the population. Considering the purpose of the study, we finally choose to use the savings rate of residents, which has a strong correlation with the age structure of the population, as the explanatory variable, and the savings rate of residents = (per capita disposable income - per capita consumption expenditure) / per capita disposable income.

Regarding the age structure of the population: according to the analysis of the literature review, the indicators related to the age structure of the population are the old-age dependency ratio and the child-rearing ratio, so the main descriptions of the explanatory variables adopted for the age structure of the population and the specific calculation formulas are as follows:

- (1) Old-age dependency ratio: Generally refers to the ratio of the number of people aged 65 and above to the number of people aged 15-64 in a country or region, which is not only used to show the number of elderly people to be supported per 100 working people, but also reflects the degree of aging of the population in the country or region.
- (2) Child Dependency Ratio: Generally refers to the ratio of the number of people aged

0-14 to the number of people aged 15-64 in a country or region, which not only shows the number of children to be supported per 100 working people, but also reflects the burden of child rearing in a country or region.

Regarding the consumer price of commercial real estate: after 2000, the National Bureau of Statistics of China has specific data on the consumer price of commercial real estate, but before 2000, there were only data on sales of commercial real estate and sales area of commercial real estate in the Juhui Data Network, so the data before 2000 were processed, and the consumer price of commercial real estate = sales of commercial real estate / sales area of commercial real estate. Because the data of consumer price of commodity housing is large, after logarithmic treatment, the data will have some good characteristics compared with the original data, so I have logarithmic treatment for the variable series of consumer price of commodity housing before conducting the smoothness test. The descriptive statistics of this paper are shown in Table 1.

Table 1 Descriptive statistics for variables

| Name | N | Min | Max | Mean | Standard deviation | Median |
|----------------------------------------------------------|----|--------|----------|----------|--------------------|---------|
| Sales price of commercial properties (yuan/square meter) | 33 | 702.86 | 10139.13 | 4361.447 | 2989.491 | 3366.79 |
| Elderly dependency ratio (%) | 33 | 8.3 | 21.9 | 12.3 | 3.6 | 11 |
| Child dependency ratio (%) | 33 | 22.2 | 41.8 | 30.2 | 7.2 | 27.3 |
| Resident savings rate (%) | 33 | 13.5 | 34.1 | 23.8 | 5.2 | 23.2 |
| ln Commercial property sales price (yuan/square meter) | 33 | 6.555 | 9.224 | 8.119 | 0.772 | 8.122 |

Source: data processed with SPSSAU

According to the previous literature review, it can be found that few studies by other scholars link housing prices, age structure of the population and savings rate of the population. Therefore, based on the previous studies in sociology, demography and economics, as well as the intuitive results of the descriptive statistical analysis, this paper puts forward the following four propositional hypotheses.

Hypothesis 1: The sales price of commercial properties is positively related to the savings rate of residents.

Hypothesis 2: The child dependency ratio is negatively related to the savings rate.

Hypothesis 3: The elderly dependency ratio is positively related to the savings rate.

Hypothesis 4: There is a stable and long-term relationship between the variables of savings rate, real estate sales price, old age dependency ratio, and child dependency ratio.

RESULTS AND DISCUSSION

The Vector Autoregressive (VAR) model is an approach to empirical research proposed by Sims in 1980 based on the statistical nature of the data. This approach empirically analyzes all the variables involved in empirical research as a system (i.e., the VAR model), and therefore, the model is more convenient for understanding how shocks to the variables affect the system. The basic form of the model is as follows The basic form of the model is as follows:

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + Bx_t + \varepsilon_t, \quad t=1, 2, \dots, T$$

Where:

y_t is a vector of n -dimensional endogenous variables at time t , x_t is a vector of m -dimensional exogenous variables at time t , matrices A_1, \dots, A_p and matrix B are the coefficient matrices to be estimated, p is the lag order, ε_t is the random perturbation variable, and T is the number of time samples. T is the number of time samples.

For the results of the descriptive statistics analysis, this study continues to take the relationship between the variables of residential savings rate, child dependency ratio, old age dependency ratio and the sales price of commercial real estate as the object of study in the empirical analysis section, and establishes a VAR model that can reflect the relationship between the four. After comprehensive analysis, it is decided to establish the following VAR model, whose expansion formula is expressed as follows:

$$\begin{pmatrix} S \\ YR \\ OR \\ \ln \end{pmatrix}_t = \alpha_1 \begin{pmatrix} S \\ YR \\ OR \\ \ln \end{pmatrix}_{t-1} + \dots + \alpha_p \begin{pmatrix} S \\ YR \\ OR \\ \ln \end{pmatrix}_{t-p} + \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \varepsilon_3 \\ \varepsilon_4 \end{pmatrix}$$

Where:

S refers to the residential savings rate, YR refers to the child-rearing ratio, OR refers to the old-age-rearing ratio, and \ln HP refers to the logarithm of the sales price of commercial properties.

Smoothness Test of Variables

According to the definition of cointegration, if there is a cointegrating relationship between the residential savings rate, the child dependency ratio, the old age dependency ratio and the sales price of commercial properties, all four variables must be single-integrated of the same order. Therefore, before conducting the cointegration test, it is necessary to determine the

Before conducting the cointegration test, it is necessary to determine the order of single integrality of each variable to analyze the smoothness.

In this study, the ADF test is used to test the smoothness of the four variables: savings rate (S), child dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP), and the first-order differences of the four variables: savings rate (S), child dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are tested for smoothness. The results are shown in Table 2.

Table 2 ADF test data for each factor

| Variable | Differential order | t | p | Critical value | | | Test Result |
|-------------------------------------------------------------|--------------------|--------|-------|----------------|--------|--------|-------------|
| | | | | 1% | 5% | 10% | |
| Residential savings rate (S) | 0 | -0.982 | 0.76 | -3.654 | -2.957 | -2.618 | not smooth |
| First order difference in savings rate (d.S) | 1 | -3.073 | 0.029 | -3.738 | -2.992 | -2.636 | smooth |
| Child dependency ratio (YR) | 0 | 0.643 | 0.989 | -3.654 | -2.957 | -2.618 | not smooth |
| First-degree variance of the child-rearing ratio (d.YR) | 1 | -4.536 | 0 | -3.661 | -2.961 | -2.619 | smooth |
| Old age dependency ratio (OR) | 0 | 0.834 | 0.992 | -3.724 | -2.986 | -2.633 | not smooth |
| First order difference in old age dependency ratio (d.OR) | 1 | -5.866 | 0 | -3.724 | -2.986 | -2.633 | smooth |
| Sales price of commercial properties (lnHP) | 0 | 2.329 | 0.999 | -3.654 | -2.957 | -2.618 | not smooth |
| First-degree of commercial real estate sales price (d.lnHp) | 1 | -4.252 | 0.001 | -3.661 | -2.961 | -2.619 | smooth |

Source: data processed with SPSSAU

The ADF test verifies whether the time series is smooth, and its original hypothesis is that the series is not smooth. Generally, if the p-value is less than 0.1 (or 0.05), it means that the original hypothesis is rejected at the 0.1 level, i.e., the series is stable; if the series is not stable, then the ADF test is performed again after the first-order or second-order differencing until the series is stable. The ADF test for the four variables shows that the p-value of the variables: savings rate (S), child and youth dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are all greater than 0.1, which means that the hypothesis cannot be rejected, i.e., the variables: savings rate (S), child and youth dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are not stationary.

The p-value of the first-order difference of the four variables is less than 0.01. The p-value of the first-order difference of the four variables is $p=0.029 < 0.05$, which is more than 95% certain to reject the hypothesis, and the p-value of the first-order difference of the four variables is less than 0.01. The p-value of the first-order difference of the four variables is less

than 0.05. The p-value of the first-order difference of the four variables is less than 0.01. The first-order difference forms of child support ratio (YR), old age support ratio (OR) and real estate sales price (lnHP) are all p less than 0.01, which is more than 99% certain to reject the original hypothesis, and the series are smooth, i.e., the variables of residents' savings rate (lnsx), old age support ratio (lnlf), and children's support ratio (lnf) are first-order monotonic.

In summary, the empirical test results of ADF show that the first order differences of the variables residential savings rate (S), child dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are all smooth, i.e., the variables residential savings rate (S), child dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are single integer of the same order, and the variables residential savings rate (S), child dependency ratio (YR), old age dependency ratio (OR), and real estate sales price (lnHP) are single integer of the same order. The savings rate (S), child dependency ratio (YR), old age dependency ratio (OR) and real estate sales price (lnHP) are monotonic of the same order, so the variables can be related. Although the ADF test shows that the variables can be linked, the covariance test is conducted to be on the safe side. Although the ADF test shows that the variables can be linked, to be on the safe side, a cointegration test is conducted to determine whether the VAR model can be constructed.

Cointegration Test of Variables

There are two general approaches to test for serial cointegration: the Engle-Granger two-step approach based on the unit root test of the regression residuals, and the Johansen test based on the regression coefficients. The Engle-Granger two-step approach is simpler to use, but it requires that the regression equations be unilinear regression models, and it is only suitable for estimating and testing a single cointegrating relationship. The Engle-Granger two-step method is easier to use, but it requires a single linear regression model and is only suitable for estimating and testing a single cointegrating relationship. However, the Johansen test is less complicated in that it is able to test the cointegration of multiple variables, even if the causal relationship between the variables is not obvious.

In this study, we decided to use Johansen cointegration test to test whether there is a cointegration relationship among the four variables, namely, residents' savings rate (S), child-rearing ratio (YR), old-age rearing ratio (OR) and sales price of commercial properties (lnHP), and the Johansen cointegration test can be performed using either the "trace statistic" or the "maximum characteristic root". "Maximum Eigenroot" method can be used to determine.

Table 3 Johansen cointegration test (Trace)

| H0 | eigenvalue | Trace | 10% | 5% | 1% |
|-------------------------|------------|--------|--------|--------|--------|
| None (no cointegration) | 0.755 | 80.591 | 44.493 | 47.855 | 54.681 |
| Up to 1 cointegration | 0.528 | 35.579 | 27.067 | 29.796 | 35.463 |
| Up to 2 cointegration | 0.278 | 11.557 | 13.429 | 15.494 | 19.935 |
| Up to 3 cointegration | 0.035 | 1.15 | 2.705 | 3.841 | 6.635 |

Source: data processed with SPSSAU

Table 4 Johansen Cointegration Test (Max-Eigen)

| H0 | eigenvalue | Trace | 10% | 5% | 1% |
|-------------------------|------------|--------|--------|--------|--------|
| None (no cointegration) | 0.755 | 45.012 | 25.124 | 27.586 | 32.717 |
| Up to 1 cointegration | 0.528 | 24.021 | 18.893 | 21.131 | 25.865 |
| Up to 2 cointegration | 0.278 | 10.407 | 12.297 | 14.264 | 18.52 |
| Up to 3 cointegration | 0.035 | 1.15 | 2.705 | 3.841 | 6.635 |

Source: data processed with SPSSAU

The lag order of the VAR model is chosen to be 1st order, as shown in Table 3 above. The first step is the trace test in Johansen's cointegration test, in which the original hypothesis "at most 1 cointegration" means that there is at most 1 cointegrating relationship between the variables, and if the original hypothesis is rejected, it means that at least 1 of the variables does not have cointegration, and the number of cointegrating relationships is the variable term-1. Significance is implied if the absolute value of the trace statistic is greater than the absolute value of the critical value, e.g. the absolute value of the trace statistic is greater than the absolute value of the critical value of 10% implies significance at the 10% level, and the hypothesis is rejected if significance is shown. The result is that the hypotheses "None (no cointegration)" and "at most 1 cointegration" are rejected at 1% level. For the hypotheses "at most 2 cointegration" and "at most 3 cointegration", the absolute values of the trace statistics are lower than the absolute values of the respective critical values, which means that the two hypotheses are accepted.⁴ The conclusions of the four tests are that there is at least 1 cointegration, more than 1 cointegration, less than or equal to 2 cointegration, less than or equal to 3 cointegration, and more than 1 cointegration, less than or equal to 2 cointegration. The four tests concluded at least 1 cointegration, greater than 1 cointegration, less than or equal to 2 cointegration, and less than or equal to 3 cointegration, which means that there is a cointegration relationship between the four research variables in this case.

Next is Table 4, the maximum eigenvalue test in Johansen's cointegration test, the same analysis process as the trace test, the result is 1% level rejects the hypothesis of "None (no cointegration)", 5% level rejects the hypothesis of "up to 1 cointegration", for the hypothesis of "up to 2 cointegration", the hypothesis of "up to 1 cointegration" is rejected, and the hypothesis of "up to 2 cointegration" is rejected. For the hypotheses "up to 2 cointegration" and "up to 3

cointegration", the absolute value of the largest eigenroot is lower than the absolute value of the respective critical value, implying the acceptance of the two hypotheses.⁴ The conclusions of the four tests are, respectively, that there is at least 1 cointegration, more than 1 cointegration, less than or equal to The four tests concluded at least 1 cointegration, more than 1 cointegration, less than or equal to 2 cointegration, less than or equal to 3 cointegration, which means that there is a cointegration relationship among the four research variables in this case.

In conclusion, through the results of ADF test and cointegration test, it can be known that these four variables can be constructed in the VAR (1) model.

Determination of Lag Order and Eigenvalue Stability of VAR Models

The empirical results in Table 5 show the determination of the lag order of the VAR model. It can be seen that the AIC criterion should be based on order 5, the BIC criterion on order 1, the FPE criterion on order 5 and the HQIC criterion on order 5. Since the higher the lag order, the lower the degree of freedom, and the smallest value of the four indexes is the 1st order, the VAR model is finally constructed with the 1st order (P=1) in this study.

From Figure 1 AR eigenroot diagram, it can be seen that all the eigenroot values fall within the unit circle, which means that the constructed VAR model is more stable.

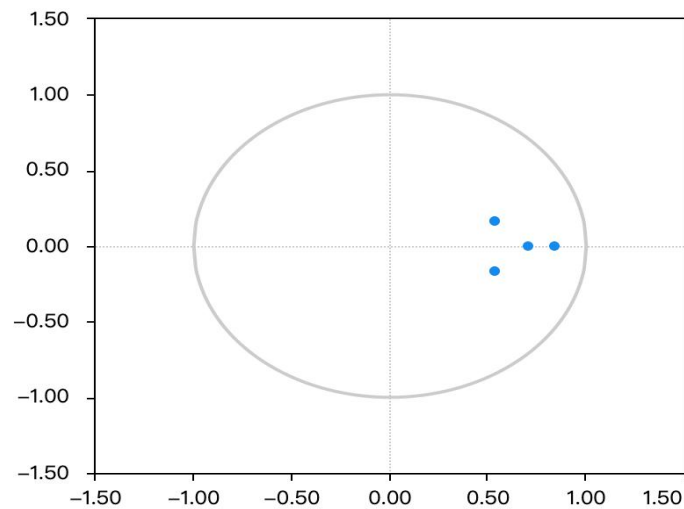
Table 5 Determination of the lag order

| Order | AIC | BIC | FPE | HQIC |
|-------|----------|----------|--------|----------|
| 0 | -32.535 | -32.154 | 0 | -32.419 |
| 1 | -36.857 | -35.715* | 0 | -36.508 |
| 2 | -37.180 | -35.277 | 0 | -36.598 |
| 3 | -37.428 | -34.763 | 0 | -36.613 |
| 4 | -38.299 | -34.873 | 0 | -37.251 |
| 5 | -39.688* | -35.501 | 0.000* | -38.408* |

Remarks: * represents the number of steps under this item.

Source: data processed with SPSSAU

Figure 1 AR Characteristic Root Maps
Inverse Roots of AR Characteristic Polynomial



Source: data processed with SPSSAU

Granger Causality Test

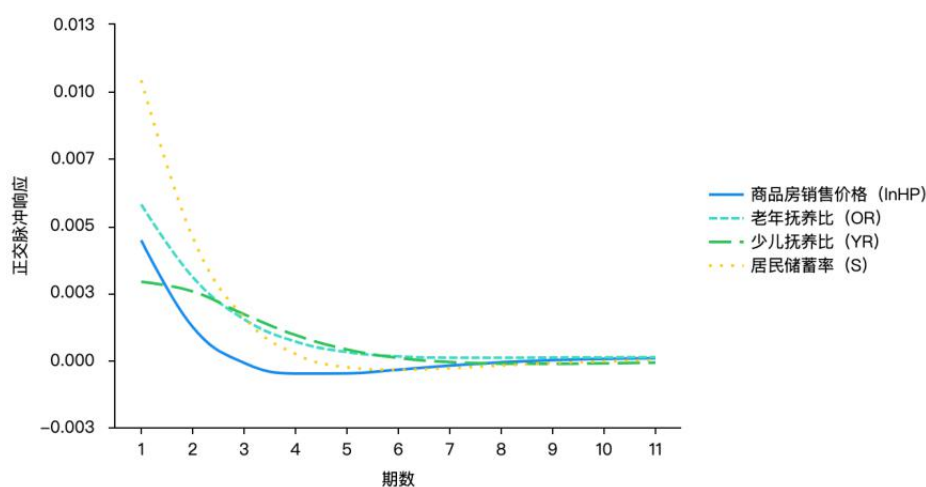
In this study, the Granger causality test is used to verify whether there is a causal relationship among the variables of savings rate (S), child-rearing ratio (YR), old-age rearing ratio (OR), and the selling price of real estate (lnHP). The results of the Granger causality test show that: (1) in the equation with the savings rate (S) as the explanatory variable, it can be observed that neither the child-rearing ratio (YR) nor the old-age dependency ratio (OR) is the Granger cause of the savings rate (S) ($p\text{-value} > 0.05$); the selling price of real estate (lnHP) is the Granger cause of the savings rate (S) ($p\text{-value} < 0.05$). (2) In the equation with the child-rearing ratio (YR) as the explanatory variable, it can be observed that the savings rate (S), the old-age-rearing ratio (OR) and the sales price of real estate (lnHP) are the Granger causes of the child-rearing ratio (lnsf) ($p\text{-value} < 0.05$). (3) In the equation with old-age dependency ratio (OR) as the explanatory variable, it can be observed that the pediatric dependency ratio (YR), the savings rate (S), and the sales price of housing (lnHP) are not the Granger causes of the old-age dependency ratio (OR) ($p\text{-value} > 0.05$). (4) In the equation with real estate sales price (lnHP) as the explanatory variable, it can be observed that neither the child support ratio (YR) nor the old age dependency ratio (OR) is the Granger cause of real estate sales price (lnHP) ($p\text{-value} > 0.05$), and that the savings rate of the population (S) is the Granger cause of real estate sales price (lnHP) ($p\text{-value} < 0.05$).

To summarize, there are some Granger reasons and some non-Granger reasons between the variables in this study.

Impulse Response Function Analysis

Based on the VAR model with a time lag of 1 period (unit: year), this study conducts the impulse responses of the explanatory variable residents' saving rate (S) and the explanatory variables of children's dependency ratio (YR), old age dependency ratio (OR) and the sales price of commercial properties (lnHP) respectively, and plots the corresponding impulse response functions. The impulse responses of the explanatory variables (S) and the explanatory variables (YR), OR and the sales price of housing (lnHP) are plotted.

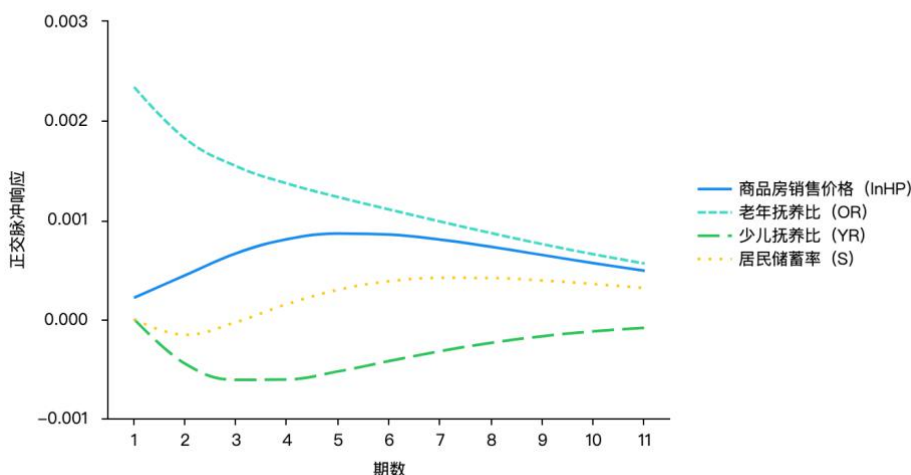
Figure 2 Resident Savings Ratio (S) Orthogonal Impulse Response
Orthogonal Impulse Response from 居民储蓄率 (S)



Source: data processed with SPSSAU

Figure 2 reflects the dynamic impact of the variable savings rate (S) on itself or other variables. It can be seen that: (1) For the impact of the residential savings rate (S) on itself, the impact is positive and larger than other variables in the first three periods, and the decrease in response disappears after the fourth period. (2) For the impact of the savings rate (S) on the sales price of real estate (lnHP), the impacts are positive in the first two periods, and the decrease in response disappears after the third period. (3) For the impact of residents' savings rate (S) on the old age dependency ratio (OR), the impacts are positive in the first four periods, and the reduction in response disappears after the fifth period. (4) For the impact of the savings rate (S) on the child-rearing ratio (YR), the impacts are positive in the first four periods, and the reduction in the response disappears after the fifth period.

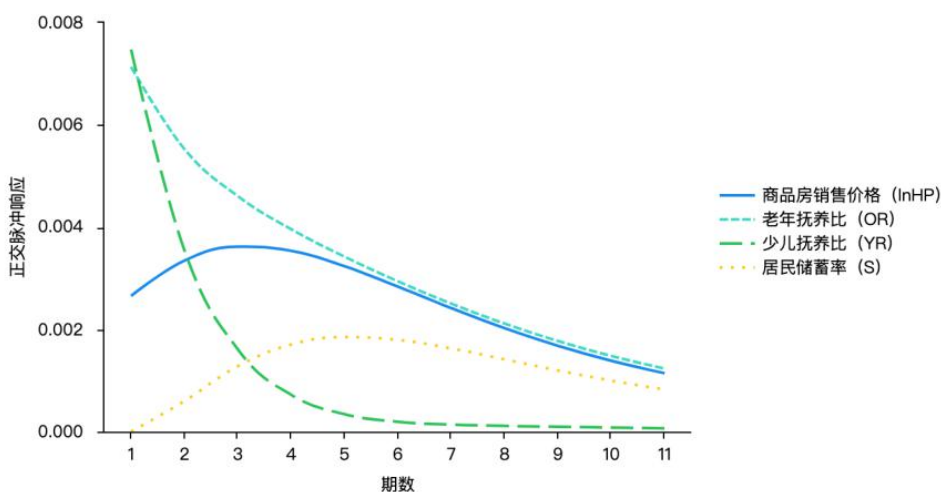
Figure 3 Old Age Dependency Ratio (OR) Orthogonal Impulse Response
Orthogonal Impulse Response from 老年抚养比 (OR)



Source: data processed with SPSSAU

Figure 3 reflects the dynamic effects of the old-age dependency ratio (OR) on itself or on other variables. It can be seen that: (1) For the impact of the old-age dependency ratio (OR) on itself, the effect is positive and slowing down. (2) For the impact of the old-age dependency ratio (OR) on the sales price of housing (lnHP), it is a positive impact, which gradually intensifies and slows down after the fifth period. (3) For the impact of the old-age dependency ratio (OR) on the child dependency ratio (YR), it is a negative shock that gradually strengthens until it weakens and disappears after the third period. (4) In the case of the impact of the old-age dependency ratio (OR) on the savings rate (S), the impact is negative in the first two periods, and then turns into a positive effect after the third period and then weakens.

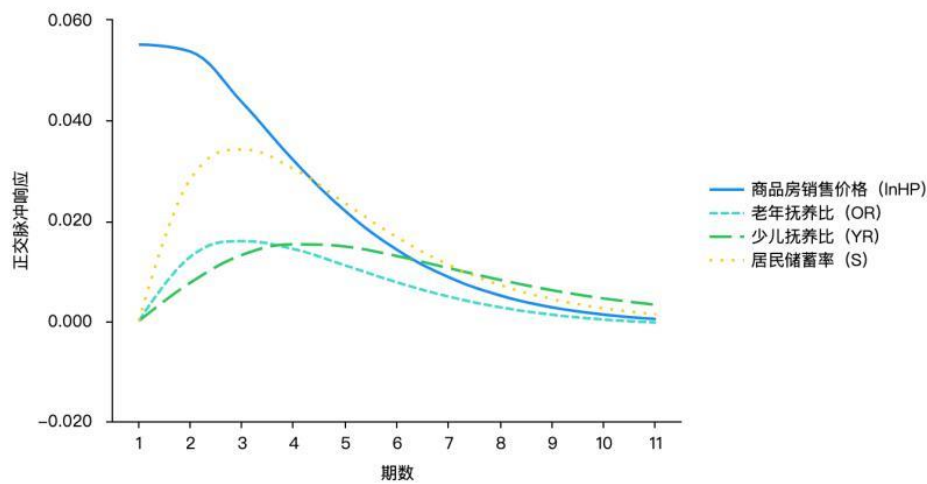
Figure 4 Child Dependency Ratio (YR) Orthogonal Impulse Response
Orthogonal Impulse Response from 少儿抚养比 (YR)



Source: data processed with SPSSAU

Figure 4 shows the dynamics of the impact of the child dependency ratio (YR) on itself or on other variables. It can be seen that: (1) For the impact of the child dependency ratio (YR) on itself, the effect is positive and slows down gradually. (2) The impact of the child dependency ratio (YR) on the old-age dependency ratio (OR) is positive and slows down gradually. (3) For the impact of the child dependency ratio (YR) on the sales price of housing (lnHP), the impacts are positive and gradually strengthened, and the response slows down after the third period. (4) For the impact of the child support ratio (YR) on the savings rate (S), the impacts are positive, gradually intensifying and slowing down after the fifth period.

Figure 5 Sales price of commercial properties (lnHP) Orthogonal impulse response
Orthogonal Impulse Response from 商品房销售价格 (lnHP)



Source: data processed with SPSSAU

Figure 5 reflects the dynamic impact of the sales price of housing (lnHP) on itself or other variables. It can be seen that: (1) For the impact of the sales price of housing (lnHP) on itself, the effect is positive and slows down gradually. (2) For the impact of the sales price of housing (lnHP) on the old-age dependency ratio (OR), it is a positive impact, which gradually strengthens and slows down after the third period. (3) For the impact of real estate sales prices (lnHP) on the child-rearing ratio (YR), the impacts are positive, gradually intensifying and then slowing down after the fourth period. (4) For the impact of the sales price of commercial properties (lnHP) on the savings rate (S), the impacts are all positive, gradually intensifying and then slowing down after the third period.

Variance Decomposition Analysis (VDA)

The variance decomposition table shows the variance decomposition of the prediction error in order to analyze the proportion of the influence of different variables of the order, the

higher value of the variance decomposition means the higher proportion of the influence, and the value of the variance decomposition is close to 0 means the influence is very small.

The results of the variance decomposition of the variable residents' savings rate (S) show that the residents' savings rate (S) has a high variance decomposition rate for itself, basically greater than 60%, that is to say, it shows that the residents' savings rate (S) has a strong explanation of itself is relatively stable. As for the sales price of commercial properties (lnHP) and the child-rearing ratio (YR), the explanatory power of the residents' savings rate (S) is limited, basically around 10%, but the explanatory power of the former shows a decreasing trend in the first three periods, and that of the latter gradually increases, and then stabilizes after the third period. Finally, the variance decomposition of the savings rate (S) for the old-age dependency ratio (OR) is not very strong at around 20%.

The results of the variance decomposition of the variable child-rearing ratio (YR) show that the variance decomposition of the child-rearing ratio (YR) gradually decreases, indicating that the explanatory effect decreases over time. For the old-age dependency ratio (OR), it basically stays around 48%, indicating that the effect of the child dependency ratio (YR) on the old-age dependency ratio (OR) has a continuous and stable explanatory effect. For the sales price of housing (lnHP), the explanatory effect increases gradually over time. Finally, the variance decomposition of the old-age dependency ratio (OR) on the savings rate (S) is very limited, basically close to 0, which means that the old-age dependency ratio (OR) explains very little of the changes in the savings rate (S).

Variance decomposition results of the variable old age dependency ratio (OR) show that the old age dependency ratio (OR) for its own variance decomposition rate is basically greater than 70%, that is to say, shows that the old age dependency ratio (OR) for its own explanation of the strength of a very strong and relatively smooth. For the sales price of housing (lnHP), the explanatory power of the old-age dependency ratio (OR) is limited in the first four steps, which is less than 10%, but the explanatory power shows a trend of increasing gradually, which means that the old-age dependency ratio (OR) has a continuous and stable explanatory effect on the sales price of housing (lnHP), and with the change of time, the explanatory effect will be increased gradually. The explanatory power of the old-age dependency ratio (OR) is limited for the child dependency ratio (YR), and it tends to stabilize after the 4th order. Finally, the variance decomposition of the old-age dependency ratio (OR) on the savings rate (S) is very limited, basically close to 0, which means that the old-age dependency ratio (OR) explains very little of the changes in the savings rate (S).

The results of the variance decomposition of the variable commercial real estate sales price (lnHP) show that the variance decomposition rate of commercial real estate sales price (lnHP) is basically greater than 60%, which means that the explanation of commercial real estate sales price (lnHP) is stronger than the variance decomposition rate of commercial real estate sales price (lnHP). For the old-age dependency ratio (OR) and the child-rearing ratio (YR), the decomposition rates of the variance of the sales price of commercial real estate (lnHP) are both lower than 10%, which means that the sales price of commercial real estate (lnHP) has a relatively limited impact on the old-age dependency ratio (OR) and the child-rearing ratio (YR). Finally, the variance decomposition of the sales price of commercial real estate (lnHP) on residents' savings rate (S) shows that the explanatory effect will gradually increase with the change of time.

Residual Normality and Autocorrelation Test

In general, the VAR model needs to satisfy the requirements of residual normality and no autocorrelation, firstly, the residual normality test is conducted, the original hypothesis of this study is to satisfy normality, if the original hypothesis is rejected (p-value is less than 0.05), it means that the residuals don't satisfy normality, and vice versa, it means that the residuals satisfy normality. Then use Portmanteau test for residual autocorrelation test, its original hypothesis is no autocorrelation, if the original hypothesis is rejected (p-value is less than 0.05), then it means that the residuals have autocorrelation, and vice versa, it means that the residuals do not have autocorrelation problem. The test in this study proves that the residuals of the VAR model satisfy the quality of normality and have no autocorrelation.

CONCLUSIONS

The research object of this study is the relationship between housing price, population age structure and residents' saving rate, so we selected the statistical survey data from 1990 to 2022, firstly conducted descriptive statistical analysis, then conducted empirical analysis based on VAR model, and finally verified the four hypotheses in the previous section.

First, in the descriptive statistical analysis can be obtained: During the period of 1990-2022, China's commercial real estate sales price (lnHP) has been increasing year by year; China's child dependency ratio (YR) has been on a downward trend overall, with a slight rebound only in the last few years; the old-age dependency ratio (OR) has been on a relatively gentle upward trend, and this trend has an impulse to accelerate in the later period; the savings

rate (S) has been on a fluctuating upward trend, and the saving rate (S) has been on a fluctuating upward trend, and the savings rate (S) has been on a fluctuating upward trend. Resident savings rate (S) shows a fluctuating upward trend, and eventually stays at a high level and in an oscillating state. This implies that there may be a relationship between the above variables. This implies that there may be a correlation between the above variables.

Secondly, in the empirical analysis, we draw the following conclusions:

Hypothesis 1: The sales price of commercial real estate is positively related to the savings rate of residents. (TRUE)

Hypothesis 2: Child dependency ratio is negatively related to the savings rate. (NOT TRUE)

Hypothesis 3: The elderly dependency ratio is positively related to the savings rate. (NOT TRUE)

Hypothesis 4: There is a long-term stable relationship between the variables of savings rate, real estate sales price, old-age dependency ratio, and child dependency ratio. (TRUE)

From the conclusion, housing prices will significantly increase the savings rate of the population. Analyzing the reasons, firstly, in the current social background, in the face of high housing prices, housing prices rose, income did not rise, people who have the will to buy a house can only reduce consumption expenditure, save more money to realize the dream of buying a house. Moreover, housing prices have increased residents' wealth and stimulated their desire to consume. However, in the process of housing price increases, there are differences in the responses of different household situations. For households owning only one home, although the value of their assets has increased, they cannot realize their assets immediately and are uncertain about their future expectations, so their savings rate has increased. Higher-income households with multiple homes enjoy higher levels of income as asset values and rental income increase. Considering the practices of different households with zero housing, with only one property, and with more than one housing unit in response to higher housing prices, it can be concluded.

Therefore, the first step should be rationalizing and reforming our land system. In recent years, housing prices in China have been on a trend of abnormally high. The irrationality of the land system is one of the most important reasons for the rise in housing prices. Since land is like public ownership, local governments can sell land at high prices for financial income. This mode of "land finance" has, to a certain extent, made up for the fiscal deficit but has also pushed

up the unreasonable rise in housing prices. In order to solve this problem, we should start reforming the land system to curb the excessive rise in land prices.

In addition to the land system, the real estate supply structure must also be optimized. Real estate developers are more inclined to provide high-grade housing because families with smaller homes are thinking of moving to bigger homes. The Government should increase capital investment, for example, through fiscal policy and tax incentives to actively guide the real estate industry to participate in the construction of affordable housing and other housing to restore the market failure to its original State to meet the housing needs of the majority of residents.

In addition, credit policies also need to be improved. In the past, loose credit policies have facilitated the purchase of housing, but they have also created some problems. The subprime mortgage crisis in the United States is a cautionary tale in which the abnormal rise in housing prices led to frequent blind speculation in housing. Therefore, when formulating credit policies, it is necessary to consider supporting the purchase of housing by people with no housing and avoiding speculation by investors.

Finally, regarding controlling financial risks, excessive investment by banks in the real estate sector is unfavorable and needs to be strictly controlled by the Government. Excessive accumulation of capital may lead to the formation of a bubble, and once the bubble bursts, a devastating disaster will befall banks and other financial institutions. Therefore, the Government can consider measures such as raising the interest rate for real estate financing. Only through the effective implementation of these measures can the benign development of the housing market be realized.

Implications and policy recommendations regarding the age structure of the population are as follows:

From the conclusion, it is easy to see that the population's age structure in the child support ratio and residents' savings rate is positively correlated, and the correlation between the old age support ratio is not significant. On the one hand, with the improvement in education level and social development in China, parents pay more attention to improving their children's quality in all aspects so that most families will save funds for their children's education. Moreover, in the "patriarchal" society of China, most parents have to prepare a certain amount of savings support for their children to consider their children's future marriage and starting a family, thus increasing the residents' savings rate. On the other hand, the aging of the population will increase people's attitude toward saving, and the working population will average their

income and expenses over their lifetime, increasing the level of saving to prevent expenses in old age. However, at the same time, the increase of diseases in old age inevitably leads to high medical expenses. At the same time, however, the increase in illnesses in old age inevitably leads to high medical expenses, so the medical consumption of the elderly population is significantly increased, which in turn reduces the level of savings.

Therefore, the State should improve the social security system. First, it can further improve the construction of the medical system, expand the scope of urban and rural medical insurance coverage, solve the problem of "difficult access to medical care" in rural areas, and build a diversified medical system that meets the medical needs of people with different kinds of illnesses and at different levels; second, the Government should increase investment, actively guide and encourage enterprises to raise the level of old-age care institutions and support the establishment of a new model of community-based old-age care. Secondly, the Government should increase investment, actively guide and encourage enterprises to raise the level of elderly care institutions and support the establishment of new community care models. This will enable the elderly to have a safe and stable living environment, receive the necessary old-age protection, and reduce the number of people in the middle.

This will provide the elderly with a safe and stable living environment and the necessary old-age protection and reduce the incentive for the middle-aged and the elderly to make precautionary savings.

In addition, encouraging childbearing is also an important way to alleviate the problem of social aging. By controlling the population's age structure, increasing the proportion of young people in the population, and enlarging the future workforce, we can stabilize the savings rate and increase consumption, thus promoting economic development. First, we can strengthen support in terms of policies, such as increasing maternity leave and maternity subsidies, so that young people will "dare to give birth." We can continue to improve the conditions of medical care, education, and employment, reduce education costs, and increase employment opportunities to prevent an increase in the willingness to save for their children so that young people will "dare to raise children." The Government should continue to improve conditions relating to health care, education, and employment, reduce education costs and increase jobs, and prevent the increase in the willingness to save for children so that young people will "dare to give birth. Vigorously resolving livelihood issues, solving young people's worries, and improving their quality of life will also help improve the people's quality of life. Vigorous efforts to address livelihood issues will solve young people's worries and improve their quality

of life. They will also lay a solid foundation for the sustainable development of society in the future.

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