A Review of Research on Domestic Reverse Mortgages for Housing

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Abstract: *With the further deepening of population aging, the pressure of social old-age persion increases, and the traditional old-age pension mode can no longer completely solve the existing old-age pension problems in China. Housing reverse mortgage as a new style of old-age mode has been developed in developed countries, which provides an effective way to learn from China to alleviate the social pressure on old-age. This paper reviews the literature on the feasibility, operation, risk management and pricing of reverse mortgages in China, and seeks to provide references for the implementation and development of the reverse mortgage market in China.*

Keywords: *home reverse mortgage, reverse mortgage, homeownership*

1. Introduction

Since the end of the twentieth century, the process of ageing in China has been accelerating: during the Fourteenth Five-Year Plan period, the number of people aged 60 and over will exceed 300 million, accounting for more than 20 per cent of the total population, and will enter the stage of moderate ageing. According to the United Nations forecast, by 2035, the population aged 60 and above will reach 477 million, accounting for 34. 9% of the total population and entering the stage of heavy aging. And a large part of our country's families are homeowners, property is one of the most important assets of our families, and dealing with the housing problem of the elderly is an important way to cope with the aging of the population. Therefore, in recent years, China has begun to study and implement housing for the elderly on the basis of foreign experience in housing for the elderly, combined with China's national conditions, in order to carry out a new type of housing for the elderly model to help solve the problem of old age in China. In order to promote the further study of this financial product, as soon as possible to make the housing reverse mortgage business "Chinaization", and truly ease the pressure of China's old age, this paper focuses on the research results from domestic and foreign scholars to sort out and summarize.

2. Connotation and Theory of Reverse Mortgage

2.1. Meaning of reverse mortgage for housing

The reverse mortgage system originated in the Netherlands. Reverse mortgages were introduced by the Dutch financial sector to support the secondary housing market and to increase the source of retirement income for the elderly, but they were not institutionalized at that time. In the United Kingdom and the United States, the scheme was institutionalized in the 1960s. The Housing Reverse Mortgage, also known as "Home Pension", it is a new type of retirement financial product that combines real estate with a life-long pension, targeting elderly people aged 60 and above who have full property rights in their homes. Elderly people who participate in this loan still have the right to live in, use and earn income from the house before they die, and the financial institution of the product has the right to dispose of the mortgaged property after the death of the elderly person, and the funds obtained from the disposal will be used to pay back the relevant pension loan fees as a priority. In the event of the death of the policyholder or the fulfillment of the agreed conditions, the lending company is able to recover the loan fees to the extent of the value of the property. The mortgaged property is a guarantee to the lender for the policyholder's "pension loan fees" and therefore no premiums are payable.

2.2. Theory of reverse mortgage for housing

First, life cycle theory. Some scholars have combined the housing life cycle theory and households to prove that reverse housing mortgages can optimize the allocation of household wealth and maximize utility (Chai Xiaowu, 2008) [1] , there are also based on the life cycle theory studied the role of housing reverse mortgage as a financial tool, systematically elaborated the reverse mortgage can reduce the impact of income and expenditure imbalance on the individual life cycle, and pointed out the obstacles to the implementation of housing reverse mortgage in China (Gu Xianhua, 2011) [2]. By studying the feasibility of a loan model combining housing reverse mortgages, commercial loans and healthcare, it provides a new perspective on the problem of old age in China (Zhang Xi et al. , 2014) [3]. Second, family wealth intergenerational theory. Chen Jing (2014) studied that the concept of family wealth transfer is a major obstacle to the development of reverse housing mortgages [4]. Finally, about the actuarial theory of loans. Based on actuarial theory, scholars assumed the impact of the borrower's life expectancy, the estimated value of the house, and the loan interest rate on the implementation of housing reverse mortgages, and came to the conclusion that housing reverse mortgages have a certain degree of feasibility, and the amount of the loan can ensure the basic quality of life of the elderly (Liu shuibin et al., 2016) [5] .

3. Feasibility study on reverse mortgage for housing

In 2002, Dr. Meng Xiaosu was the first to put forward the concept of "housing for the elderly" and suggested the introduction of annuity-based reverse mortgage products[6]. Reverse mortgage has become a mature financing model in developed countries, and in China, where private housing accounts for 80% of the housing stock, there are feasibility and good market conditions for housing finance in China (Zhang Lingyan and Zhao Jingyan, 2004) [7]. According to the situation in China, lending institutions can favor relatively new and larger houses by providing reverse mortgage products (Ma Siyuan, 2014) [8]. Meanwhile, based on the requirements of the former China Insurance Regulatory Commission for lending institutions participating in the pilot program, combined with the institutions' own circumstances, it is feasible for lending institutions to engage in this business. As for the possibility of implementing reverse mortgage loans, Shen Panpan (2017) discusses the pension problems involved and provides ideas for solving the pension problems in China [9]. Housing reverse mortgage is a good model for solving China's aging problem, and it can be improved in terms of publicity efforts, government support, and pension financial system to solve this dilemma (Cui Lunjuan, 2020) [10] .

4. Study on the operation mode of reverse mortgage loans for housing

Despite the obstacles in the implementation of the design and role of the reverse mortgage model in China, Chen Peihan and Song Zhihua et al. (2008) argue that the housing reverse mortgage model not only improves the quality of life of the elderly, but also reduces the pressure on social security, and plays an important role in perfecting the traditional old-age pension [11]. For the factors that mainly drive the demand for housing reverse mortgages, Liu Huimin, and Chen Jiani (2011) analyzed and proposed a regional development path for the introduction of housing reverse mortgages in China [12]. The conditions and impediments to the implementation of "housing for the elderly" in China, increasing the popularity of the model, improving government incentives, and sounding relevant laws are important countermeasures to sustain the development of the model (Ding Xia and Hu Wenqian 2018) [13]. There are numerous risk factors in the current operation of housing reverse mortgages in China, which require avoiding land ownership risks and promoting cooperation among intermediaries (Wang Yingxin 2020) [14]. Based on the many factors found in the operational model, Liu Haojia and Zhu Ziqi et al. (2023) proposed a mutual-aid "housing for retirement" model based on innovative commercial retirement, which improves the inefficiency of the current retirement model by providing real value through increasing the expected annuity and the value growth, helping the elderly to secure the basic needs of life in the post-retirement period. Providing for the basic needs of the elderly in their retirement years [15].

5. Research on Risk Control and Pricing of Reverse Mortgage Loans for Housing

5.1. Risk control

Earlier studies on the risks of reverse home mortgages analyzed the main risks that reverse home

mortgages may pose to financial institutions (banks, lending companies, etc.) and concluded that reverse home mortgages are a risky business and that financial institutions should be cautious and have the tools to manage the potential risks (Weilin Li, 2007) [16]. According to Cao Qiang and Yu Wenmei et al. (2017), housing reverse mortgages are targeted at elderly people aged 60 and above, which means that elderly people face "longevity risk" (i. e. , uncertainty about their expected remaining life expectancy), and that elderly people and financial institutions may conceal their health status when signing a contract, and that repairing their homes after signing the contract may be subject to moral hazard [17]. Another important issue that needs to be considered in practice is the default risk of reverse housing mortgages. For this reason, Jiang Yuxin and Sang Xiaopeng (2015) argue that this problem can be solved by improving laws and regulations, introducing penalties, clarifying the rules of property ownership, and introducing different modes of reverse housing mortgages [18]. In addition, China can also implement multifaceted risk management by introducing loan risk-sharing mechanisms, establishing dynamic assessment pricing contracts, and appropriate operational controls (Zhang Jie, Zhang Wenhan et al. 2019) [19] .

5.2. Pricing

In terms of pricing models for home reverse mortgages, existing pricing models include with or without foreclosure pricing models, chi-square martens chain scenario non-foreclosure models for home values, and Monte Carlo simulation pricing models. Neglecting the liquidity risk associated with the possibility of foreclosure will undoubtedly lead to loan pricing distortion. Lin Feng and Sun Peiliang (2014) established an actuarial repricing model with foreclosure mortgages, which enables lenders to avoid losses from mismatch risk to a certain extent [20]. On the basis of a three-factor static actuarial valuation model, Xixi Zhang et al. (2013) established a dynamic pricing model for home reverse mortgages, and the empirical results showed that reverse mortgages were more sensitive to changes in loan interest rates and asset depreciation rates, but less sensitive to changes in expense ratios [21]. Zhang Yingqi and Wei Hu (2017) used the Black-Scholes method to price housing reverse mortgages and studied the longevity risk of housing reverse mortgages in China [22]. In addition, Zhou Yan and Shen Fei et al. (2020) analyzed the Black-Karasinsk binomial tree model based on interest rate arbitrage to optimize the pricing model of the product "Happy Housing" [23].

6. Study on the willingness to participate in reverse housing mortgages

Domestic scholars have also found that another key factor in the implementation of reverse mortgage loans is the willingness of residents to participate. In recent years, most of the studies in the literature have been conducted from the perspective of willingness to participate. Zhang Ran and Fan Ziwen (2009) established a multiple choice model based on the research data of Beijing, and the results show that the direct factors affecting the participation in reverse mortgage are gender, age, education, etc. , and the indirect factors are the way of old age, local customs, etc. [24]. Bian Yingqi and Zhu Liyou et al. (2019) conducted an empirical study on the demand willingness of reverse housing mortgage and its influencing factors by using a binary logistic model with the research data of elderly residents in Nanjing, Jiangsu Province. The results show that age and education level are positively and significantly related to the willingness to accept this product, while the number of children and other factors are negatively and significantly related to the willingness to accept this product [25].   Sun Ruiting and Xiong Xueping (2023) analyzed the hierarchical structure of the influencing factors using ISM with the sample data of Wuhan survey and found that the concept of old age and attitude towards property are the direct influencing factors of the willingness to participate in reverse mortgage, while the risk attitude, understanding of the policy, financial ability and the number of properties are the indirect influencing factors [26] .

7. Policy recommendations

7.1. Increase product supply and publicity efforts

First, specific target groups, such as those belonging to a certain class or family structure, can be opened up in product marketing. Secondly, innovative products should be developed to meet the different needs of the elderly. At the same time, policy interpretation and publicity should be strengthened so that the elderly can better understand and appreciate this new model of old age. And the advanced experience of foreign countries can be promoted to help the elderly better understand the situation of housing for the

elderly. At the same time, the elderly should be encouraged to participate in retirement planning, understand the housing market and better manage their assets. Finally, the service system for the elderly should be optimized to create additional demographic dividends. Improving the overall well-being of the elderly by meeting their needs, linking elderly services to other services, and optimizing service quality (Chen Mengyao, 2021) [27]. In order to address the difficulty of implementing "housing for the elderly", the policy design could be more flexible, taking into account the risks associated with possible changes in real estate prices in the future. Loan companies can actively consider providing appropriate supporting services for the mobility-impaired elderly, such as home maintenance and elderly care services. More attentive services can enhance the loyalty of existing customers and also attract potential customers, effectively coping with the double pain point brought about by ageing.

7.2. Encourage the active participation of all types of financial institutions and improve risk control mechanisms

The National Housing Act adopted by the United States specifically establishes the Federal Housing Administration, the Consumer Financial Protection Bureau and other governmental agencies to supervise and protect the rights and interests of financial institutions and elderly groups, and to legally safeguard the healthy development of society. Against this background, China can learn from the successful experience of the United States and establish a government credit promotion mechanism with Chinese characteristics that is adapted to the current situation of the country and its people, and further diversify the credit risks of financial institutions through various means such as guarantees or loan mechanisms. Consider securitizing housing reverse mortgages into mortgage products by diversifying and transferring the risks associated with low cash flows and credit losses, and increasing the liquidity of such products in the market (Guan Fenna, 2022) [28]. The government can learn from international experience and innovate the development of pension loan programs, such as government guarantees, to reduce the risk of participating entities due to factors such as fluctuations in housing prices.

7.3. Improve relevant policies and regulations to provide institutional safeguards and policy support efforts

Obligations and powers of financial institutions and applicants should be defined, a detailed list of homeownership and values should be developed, flexibility in homeownership should be increased, Chinese attitudes towards homeownership should be addressed, and housing reverse mortgages should be developed in accordance with Chinese national values in order to improve them and enable people to actively participate in reverse housing mortgages. At the same time, the government should provide policy support and be actively involved, with key roles in risk management, product pricing, and protection of the rights of the elderly, as well as strong policy leadership and support in product testing and development (Sun Ruiting,2023) [26]. Happy Life's "housing for the elderly" business admits that the tax on reverse mortgage business has not been supported by the national government in a favorable manner, making it difficult for the business to develop in a healthy way. For example, the tax on loan interest income is exempted, and the tax on business transactions is exempted.

8. Conclusions

Domestic research on reverse mortgages has focused on analyzing feasibility, operational models, risk and pricing, and willingness to participate. China's pilot experience with reverse mortgages is limited, and reference can only be made to similar implementation models in developed countries. The institutional design of most of the research literature is limited to making recommendations to the government to provide appropriate incentives and improve laws and regulations. In addition, although there is clarity in the market for the participating entities, their roles and business development mechanisms are not very clearly defined. By combing the existing literature, the author believes that for the research gaps in the literature are as follows:

First, the conditions for earnings dependence have been less well explored. Many researchers consider China to be an "old-before-rich" country with no resources for old age. However, systemic reforms in China's housing market have resulted in homeownership for the majority of the population. Therefore, they believe that there is already a foundation for the implementation of reverse mortgage pilots. It should be noted, however, that reverse mortgages, as a financial product, in most cases can only mature if they generate new profits for participating institutions.

Secondly, the market for older persons is not segmented. Market segmentation is the division of users of certain products into different groups with different needs and characteristics according to certain criteria. China has a large number of elderly people, who differ in age, marital status, own assets and other aspects. Financial institutions offering reverse mortgages should segment the elderly market for different types of elderly people. However, few domestic researchers have studied the segmentation of the elderly market.

Finally, there is little research on economic and social impacts. Much of the literature on reverse mortgages for housing analyzes mortgages from a supply and demand perspective, with most researchers assuming that seniors are on the demand side of the product and financial institutions are on the supply side, making the product viable. However, few researchers have analyzed the economic and social impacts of reverse mortgages and the broader context in which these products are designed and developed.

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