Research on Interest Spread Risk of Commercial Pension Insurance in the Context of Negative Interest Rates

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Abstract: In the current low-interest-rate environment, the high-quality development of the life insurance industry faces many challenges. Among them, interest rate spread risk has a significant impact on the stable operation and long-term healthy development of the life insurance industry. Interest rate spread risk has characteristics such as long-term nature, hidden potential, and systematic impact. When severe, it can lead to the bankruptcy of insurance companies and bring about systemic crises in the industry. This article redefines negative interest rates and the risk of interest rate spread loss in commercial pension insurance, and reviews related literature.

***Keywords*:** negative interest rates, interest spread losses, commercial pension insurance

1. Introduction

In recent years, the interest rate level in China has gradually decreased. The adjustments of interest rates and monetary policies over the years indicate that China has followed the global trend of declining interest rates and is heading towards a "low interest rate era" where negative interest rates are not uncommon. Long-term low or even negative interest rates will affect the solvency of insurance companies, increase the provision of reserves by insurance institutions, and squeeze operating profits of insurance institutions. At the same time, it will reduce the investment income of insurance companies and increase reinvestment risks. Given the long-term nature of life insurance operations, the role of the time value of money makes interest rate spread risk the main risk source of life insurance business. In recent years, China's retirement policies such as delayed retirement, individual pension, and common prosperity for the elderly have brought changes to the traditional pension model, and the attention to commercial pension insurance has gradually increased. Based on this, this paper starts from the impact of negative interest rates on China's commercial pension insurance, and combined with data calculation, proposes countermeasures for the development of China's commercial pension insurance under a negative interest rate environment.

2. Redefinition of Related Concepts

2.1 Negative Interest Rates

Interest is the payment made for the use of capital, which is the remuneration charged by the supplier of funds for ceding the right to use funds during a certain period of time. It is the time value of money and the increase in borrowing capital. The interest rate refers to the proportion of the amount of interest collected per unit period to the total amount of the capital used, reflecting the degree of capital appreciation. The interest rate commonly mentioned, such as the deposit and loan interest rate, is actually one of many interest rates and plays a practical role in credit loans, asset pricing, etc. between commercial banks and micro private sectors.

In general, interest rates should not be less than zero to become negative interest rates. However, in real economic life, due to objective and subjective reasons, interest rates may become negative, resulting in negative interest rates. One situation is policy-driven, where nominal interest rates are set as negative interest rates; the other situation is market-driven, where due to a large increase in prices on the market, inflation causes currency depreciation, and the increase in borrowing capital is negative, resulting in actual negative interest rates.

The earliest scholars to study negative interest rate policies believed that the essence of negative interest rates is to stimulate the economy by taxing money and increasing money supply through commercial banks (Gesell, 1958). The existence of negative interest rate policy can be divided into three types: first, the nominal interest rate is positive but the actual interest rate is negative, which is due to a high inflation rate; second, the nominal interest rate is negative but the actual interest rate is positive due to deflation; third, both the nominal and actual interest rates are negative (Wang Guogang, 2019).

This paper divides negative interest rates into two forms: nominal negative interest rates and actual negative interest

rates. Nominal negative interest rates refer to the central bank directly setting the deposit interest rate and the interest rate target range as negative values, implementing nominal negative values on the excess reserve ratio of commercial bank deposits, or the government issuing bonds with nominal interest rates lower than zero under quantitative easing policies. According to the Fisher effect (Irving Fisher, 1911), the nominal interest rate is approximately equal to the sum of the actual interest rate and the inflation rate. Therefore, the actual negative interest rate refers to the negative interest rate obtained by excluding the inflation component from the nominal interest rate. In this case, the inflation rate is higher than the bank deposit interest rate. If money is deposited in a bank, wealth will not increase but rather shrink due to the rising price level.

By taking the one-year deposit rate announced by the central bank as the nominal interest rate and subtracting the inflation rate (measured by the CPI) for that year, the actual interest rate level of China from 1990 to 2023 is as follows:

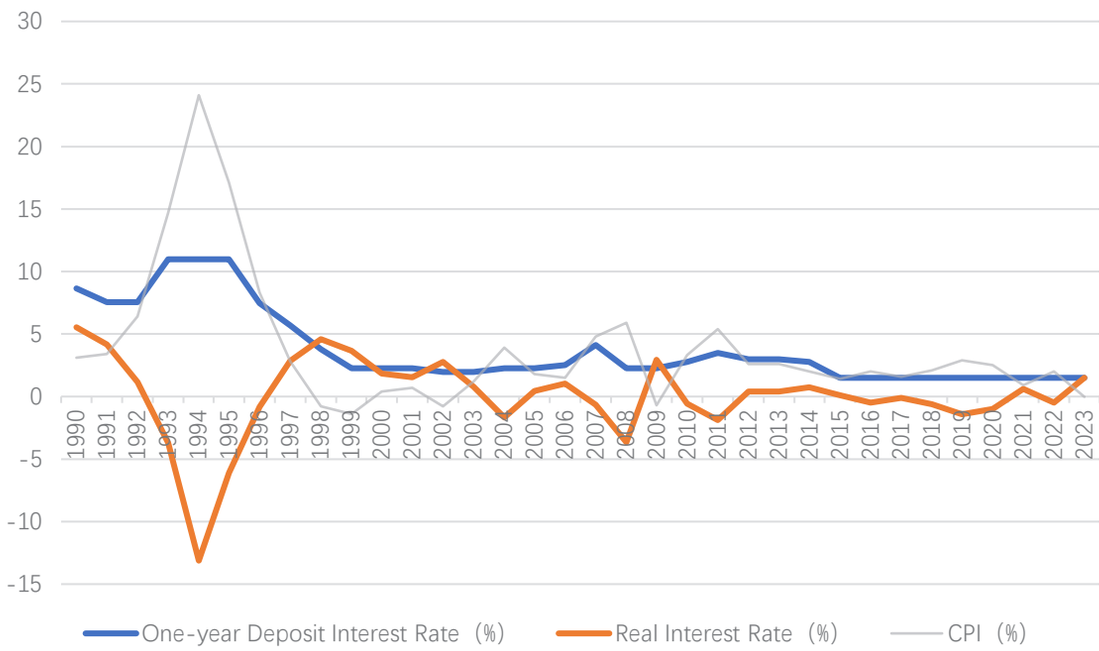

Figure 1. Trends of Nominal and Real Interest Rates in China from 1990 to 2023 (Data Source: World Bank; National Bureau of Statistics)

From the above chart, it can be seen that in the past decade, the actual interest rate in China has basically been at a negative level, and China has long entered the era of negative real interest rates.

2.2 Commercial Pension Insurance Interest Rate Risk

Risk refers to the uncertainty of losses occurring. Based on the concept of risk, there are two key factors: Firstly, losses occur, and the uncertainty of events usually results in three outcomes: generating losses, generating profits, or offsetting gains and losses. Risk management institutions do not need to intervene excessively in the latter two situations because risk management itself incurs costs. Following the principle of cost-benefit optimization, institutions should focus on loss compensation in risk control. Secondly, there is uncertainty in the occurrence of outcomes. Simply put, we usually predefine an expected value for a research object. If the actual observed value deviates from the expected value, the event did not develop as expected. In other words, the occurrence of the event is uncertain. However, we can analyze variables such as the probability of the event occurring and the consequences of losses to increase the certainty of the event and reduce its uncertainty. This enhances the ability to control risks.

The "three differentials" that are crucial to the operating profit of insurance companies refer to the expense differential, mortality differential, and interest rate differential. From the perspective of risk uncertainty, they respectively represent the deviation between the actual premium rate, actual mortality rate, and actual interest rate from the expected premium rate, expected mortality rate, and expected interest rate, resulting in income or loss.

Interest rate differential risk refers to the risk that affects the profitability of insurance companies through differential income. It specifically refers to the possibility of losses caused by the deviation between the actual investment yield generated by the company's fund utilization and the policy's predetermined interest rate (Zhuo Zhi, 1999). The main focus of this study is the commercial pension insurance business of insurance companies. Commercial pension products are products that provide customers with functions such as pension fund management and risk protection, helping customers achieve the goals

of preserving and increasing the value of pension funds and risk protection. The deviation mentioned here should refer to the difference between the actual investment yield of fund utilization and the predetermined interest rate of pension insurance policies. This represents the first key factor mentioned above in the definition of risk, which is the occurrence of losses.The predetermined interest rate refers to the interest rate used when calculating insurance premiums and policy reserve funds for life insurance products based on the predicted yield. Essentially, it is the return provided by the insurance company to the customer due to the use of the customer's funds, compounded on an annual basis. In simple terms, it is the rate of return offered by the insurance institution to the customer. This interest rate is determined by each company based on factors such as bank deposit rates, inflation rates, historical investment returns, and future economic development levels, taking into account different types of products. It is a hypothetical interest rate.If we consider the predetermined interest rate as a prior expectation of future fund yields, the greater the deviation from the actual investment yield, the higher the possibility of incurring losses, and the higher the level of uncertainty, which corresponds to the second key factor in the definition of risk.

3. Literature Review

Although negative interest rate policies may further stimulate economic growth, implementing this economic policy can also have adverse effects on the profitability of insurance companies. Some scholars believe that the yield of insurance companies will decrease as interest rates decline (Berends et al., 2013). If the yield deviates too much from the predetermined interest rate, it will bring spread risk to insurance companies. Many scholars have conducted related research on spread risk faced by life insurance companies in China. The research shows that domestic life insurance companies should use mature interest rate measurement tools to quantify interest rate risk and manage it accordingly (Lin et al., 2003). Some scholars analyze the spread loss of foreign life insurance companies and believe that long-term life insurance policies with high predetermined interest rates pose significant interest rate risks to life insurance companies (Chen & Cao, 2001). Li discusses the impact of interest rate risk on domestic life insurance companies and proposes preventive measures, suggesting that life insurance companies should increase the sales of pure protection products and reduce the proportion of fixed return products (Li, 2001).

Based on the current low-interest-rate market environment, it is both an opportunity and a challenge for life insurance companies, requiring them to transform and provide better policies to more customers (Guo & Ouyang, 2020). In a low-interest-rate environment, life insurance companies face pressure on both the liability side and the asset side, increasing the difficulty of asset-liability management. Ling (2020) summarizes and analyzes the asset-liability management experience of overseas life insurance companies in response to a low-interest-rate environment and provides asset-liability management strategy recommendations for the life insurance industry in China. Zhang (2004), Fan (2006), and others discuss the formation and control of spread risk faced by the life insurance industry in China from an actuarial perspective, providing suggestions for dealing with spread risk from the perspectives of operational management and regulatory policies.

4. Summary

The article redefines negative interest rates and the interest spread losses in commercial pension insurance, reviews the current state of related research, and lays a theoretical foundation for further in-depth study.

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