

Research on the Impact of the Macroeconomic Environment on the Adjustment of Actuarial Interest Rates

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Abstract: In the context of global economic fluctuations and financial market transformations, this paper discusses how changes in the macroeconomic environment systematically affect the dynamic adjustment mechanism of the actuarial interest rate of the insurance market. The study found that macroeconomic variables affect actuarial interest rates by changing inflation, factor markets, etc., and significantly affect the pricing decisions of insurance companies. In the major fields of economy and finance, people have never stopped macroeconomic research and deeply discuss actuarial interest rates. With the diversification of today's market, some tiny macroeconomic factors will also cause major changes in insurance market. For example, the decline in unemployment and inflation will lead to an increase in actuarial interest rates, and exchange rate fluctuations and economic policies will also cause changes in actuarial interest rates. Furthermore, the reserves, product pricing and risk management in the insurance market will also change accordingly. With these conclusions, we have a theoretical basis for the accurate control of the insurance market, so as to make more favourable decisions.

Keywords: Discount rate, economic environment, economic policy, product pricing, macroeconomics

1. Introduction

With the deepening of global integration, economies inevitably become influenced by the global financial cycle when integrating into the global financial market [1]. The current global economic environment is constantly becoming more complex and diversified, which makes it much more difficult to set the actuarial interest rate, and the change of the actuarial interest rate will inevitably impact the insurance market, creating a cyclical effect. Therefore, linking the two researchers is essential to provide a more scientific and reasonable actuarial interest rate adjustment plan.

This paper focuses on the following aspects:

Firstly, actuarial interest rate and the factors affecting the actuarial interest rate in the current macroeconomic environment. This part will introduce the typical factors that affect the adjustment of actuarial interest rate and their mechanism of action.

Secondly, the impact of the macroeconomic environment on actuarial interest rates. Changes in actuarial interest rate are bound to cause further changes in the insurance market. This part mainly studies these changes.

Thirdly, the current macroeconomic situation and the future prospects of the insurance market. Based on the above research and analyse the current economic situation and the changing trend of the insurance market in the future.

To systematic analyse these issues, this paper employs a combination of qualitative research and case analyse, supplemented by graphical representations to support the conclusions.

By connecting macroeconomic principles with actuarial science, this study explores the intermediary link between these two closely related fields—the directional fluctuations of interest rates—concretizing abstract concepts through rational analysis.

2. Actuarial Interest Rate and the Influential Factors in the Contemporary Macroeconomic Landscape

Currency has a time value. Broadly speaking, most insurance and financial assets rely on this time value to generate returns. In the pricing process, a commonly used calculation is the discount of cash flow. To ensure profitability, an insurance company must ensure that the present value of liabilities (payments) remains lower than the present value of assets (premiums). The actuarial interest rate is integral to these calculations, significantly influencing the insurance market.

Several key macroeconomic factors affect the actuarial interest rate:

2.1. Inflation

Inflation refers to an increase in price levels, and the purchasing power of the same amount of money will decline after experiencing inflation. In other words, "money will become more and more worthless". Using the standard compound interest discount formula:

$$PV=C*(1+d)^{-n} \quad (1)$$

where PV represents present value, C is the future cash flow, d is the discount rate, and n is the number of periods. Holding other variables constant, a decrease in PV necessitates an increase in the discount rate to reflect reduced purchasing power.

In addition, inflation causes the market turbulence. During this period, the market is very unstable, and the risk will increase accordingly. In order to avoid losses caused by high risks, the actuarial interest rate needs to be adjusted in time. Inflation will show similar characteristics under the impact of inflation forecast and interest rate impact, but the interest rate impact will have a short-term reversal before it has a favourable effect [2].

2.2. Economic policy

Interest rates serve as an important financial instrument for national macro-regulation. Interest rate fluctuations are constrained by national macroeconomic policies and will also have an important impact on many aspects of economic and social development [3]. This paper primarily discusses fiscal and monetary policies, with trade policy addressed in a later section.

Taking the expansionary monetary policy as an example, as illustrated by the IS-LM model, increases the money supply and reduces market interest rates, thereby lowering actuarial interest rates. Conversely, expansionary fiscal policy raises government liabilities, leading to higher market interest rates and, consequently, higher actuarial interest rates. In addition, environmental policies, income policies, etc. will also more or less affect the actuary interest rate, and the interaction of these policies will lead to more complex changes.

2.3. Exchange rate fluctuation

In essence, the underlying logic of the exchange rate affecting the actuarial interest rate is still realised by affecting the market interest rate. For example, an appreciation of the domestic currency increases the foreign exchange market's money supply and attracts foreign investment, leading to a decline in domestic market interest rates and, subsequently, lower actuarial interest rates. In addition, for multinational insurance companies and transnational projects of insurance companies, the foreign exchange risk caused by exchange rate fluctuations may make the return not reach the expected level. Therefore, it is necessary to closely monitor the risk premium of foreign exchange in the process and adjust the actuarial interest rate accordingly.

2.4. Population and unemployment rate

According to the Phillips curve, the inflation rate and the unemployment rate are inversely proportional. As established earlier low unemployment rate will increase the actuarial interest rate. Furthermore, there is a certain proportional relationship between population and unemployment. A similar conclusion can be drawn from the perspective of the factor market.

3. The impact of the macroeconomic environment on actuarial interest rates

3.1. Evaluation of reserves

Similar to the problem of reserves discussed in the financial market, the reserves of the insurance industry is divided into statutory reserves and pricing reserves. The amount of pricing reserve is a certain proportion of the price of insurance products. The pricing of insurance products depends on the discounted value of future cash flows, therefore, an inverse relationship exists between the actuarial interest rate and the reserve. The relationship between actuarial interest rates and product pricing will be discussed below. In addition, theoretically, the statutory reserve is stipulated in advance by the regulatory department, when the interest rate changes significantly, insurance companies and the regulatory authorities will also adjust the level of reserve accrual accordingly to align with the market situation.

3.2. Product pricing

For term insurance, when the actuarial interest rate rises, the insurance company expects that the income from the use of funds will increase. When calculating the price of insurance products, the present value of the future insurance premium is relatively reduced, which reduce the price of the product and make the product more competitive in the market; when the actuarial interest rate falls, in order to ensure enough future funds, and the price of the product needs to be increased. On the other hand, the insurance period of whole life insurance is the life of the insured, and the impact of the decline in the actuarial interest rate is more significant. In the process of long-term protection, the lower actuarial interest rate slows down the accumulation of funds. In order to realise the final insurance payment, insurance companies need to charge more premiums throughout the insurance period, leading to a price rise of whole life insurance products.

3.3. Risk management

An appreciation of the domestic currency increases the foreign exchange market's money supply and attracts foreign investment, leading to a decline in domestic market interest rates and, subsequently, lower actuarial interest rates while market interest rate fluctuations cause changes in actuarial interest rates, these changes in actuarial interest rates can also reflect the trend of market

interest rates to a certain extent. Therefore, although the adjustment of interest rates will not significantly affect the amount of assets in the short term, but will immediately increase the present value of liabilities, causing financial pressure. On the asset side, an overreliance on high interest rate assumptions can lead to underpriced products. When the actual investment income does not meet expectations, the profitability of the product will decline cause financial loss. From the perspective of liabilities, the decline in the actuarial interest rate will lead to an increase in the valuation of reserves, thus affecting the company's debt repayment capacityand exacerbating the risk of imbalance in assets and liabilities.

4. The current macroeconomic situation and future prospects of the insurance market

Several factors influence potential economic growth,including the weakening of external demand, the slowdown in population growth, and the decline in per capita capital, external shocks and cost increase shocks [4]. At present, the macroeconomic situation is relatively stable, and the global economy is growing steadily. China is in a stage of long-term low-speed growth. Although the growth rate has decreased, it still surpasses the world average. As many countries control the inflation rate at a very low level, the lower zero limit of the nominal interest rate is likely to become a constraint [5]. Not long ago, the Federal Reserve's interest rate cut also brought short-term turmoil to the economy, improved market liquidity and reduced financing costs. Overall, the global economic situation is relatively favourable.

In terms of interest rates, market interest rates have been maintained at a low level recently. Against the background of the current policy, this trend may continue in the long run. Due to the strong correlation between the actuarial interest rate and the market interest rate, the actuarial interest rate will also change.

Focus on the insurance market, the insurance market is currently developing steadily, the system is relatively perfect, and the popularisation of insurance products is also very extensive, which protects people's lives. Judging from the current market situation, the development of the insurance industry will go to a higher level. First of all, at present, China's population is ageing seriously, and the demand for life insurance, double comprehensive insurance, medical insurance and other products will further expand. Regardless of the standard incremental annuity insurance for a long period, the older the insured is, the less actuary present value paid by the annuity insurance, and the lower the price of the corresponding annuity insurance [6]. The competition in the market will be increasingly intense. On the other hand, with the progress of science and technology, the organic combination of insurance and science and technology will further promote the development of the insurance industry.

5. Conclusion

This study provides an in-depth analysis of the impact of macroeconomic factors on actuarial interest rates. Through qualitative analysis, it draws a convincing conclusion: inflation, economic policy, exchange rate fluctuations, population and unemployment and other factors will affect the adjustment of actuarial interest rates, and further affect the reserve accrual and products of the insurance market. Pricing and risk management, etc. At the theoretical level, it effectively fills the theoretical gap between the relationship between economics and insurance, improves the theoretical system, and provides a new cognitive perspective for the future research of the insurance market. However, there are still some shortcomings in this study in terms of research methods. This study focusses on qualitative theoretical analysis and lacks quantitative data support, which may have a certain impact on the comprehensiveness of the research conclusions. Based on the limitations of

this study, future research can use broader data channels to prove views and further explore the close relationship between economics and actuarials.

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