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Analysis of Factors Affecting Premium Income from Life Insurance

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Abstract

The degree of development of the insurance sector has a significant influence on how the national economy functions as a whole. China's insurance sector developed relatively late, following a period of rapid expansion, and is now at a level somewhat lower than that of other developed nations. The human body and life as the subject of insurance account for a significant amount of the life insurance business in China's insurance market at present. This paper aims to empirically analyze the impact of the gross national product, mortality rate, total population, number of medical institutions, and per capita consumption level on China's life insurance premium income by provinces in 2021, based on the theoretical viewpoint of factors affecting life insurance premium income. The econometric model is parameterized, tested, and adjusted using Stata software by creating a theoretical model and gathering pertinent data. Lastly, the economic implications of the results are examined.

Keywords

Life Insurance; Premium Income; Influence Factors.

1. Background and Significance of the Study

People's quality of life has increased with the rapid development of the social economy; however, because high-speed economic development was pursued at the expense of environmental pollution in previous years, the living environment is becoming worse and worse, leading to a variety of major illnesses in recent years, a rise in the number of young people who are ill, the high cost of medical care has increased people's awareness of insurance, and the commercial insurance market has seen significant growth. Life insurance has gradually become the subject of research in all spheres of life as a result of the intense competition that has accompanied the growth of the commercial insurance market. In the future, life insurance's utility and function will be strengthened by the community to better serve the real needs of social and economic development.

The insurance sector is vital to both social life and the country's economy, acting as both a "stabilizer" of social growth and an "enabler" of the economy. Based on the type of coverage they provide, insurance products fall into one of two categories: personal insurance or property insurance. The China Banking and Insurance Regulatory Commission reports that the total asset size of China's insurance industry reached RMB 24.89 trillion in 2021, up 6.8% from the previous year. This suggests that the industry is still growing in terms of total asset size. Regarding initial premium revenue, the insurance sector in China saw a rise from RMB 2.43 trillion in 2015 to RMB 4.53 trillion in 2020 before seeing a 0.88% annual reduction to RMB 4.49 trillion in 2021. In 2021, RMB 116.71 billion was the initial premium income from property insurance or 25.99% of the entire share; RMB 33,229 billion was the initial premium income from personal insurance, or 74.01% of the total. Between 2019 and 2021, the insurance business in China is expected to have 49.54 billion, 52.63 billion, and 48.9 billion policy pieces, respectively. Regarding business and management fees, the insurance sector in China is

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expected to see a CAGR of 11.4% from 2015 to 2020, rising from RMB333.67 billion to RMB572.8 billion, before declining by 8.8% annually to RMB522.5 billion in 2021. The insurance industry as a whole is expanding in the current economic climate, but there is still a significant gap between it and the developed world. The insurance industry also faces opportunities and challenges, particularly with the upcoming slowdown in 2021. Since the development of the life insurance business is influenced by a variety of factors, this paper gathers data from 2021 and empirically analyzes it to identify the key variables that influence life insurance income.

2. Literature Review

Insurance is defined as follows: when faced with unforeseen risks, the policyholder and the insurer must come to a mutual agreement and the policyholder must pay a specific amount of money for the purchase of insurance funds by the agreement's provisions to receive a certain amount of compensation for the fund's loss. The concept of life insurance is predicated on the definition of insurance interpretation. Based on this definition, the content of life insurance can be specifically interpreted as follows: an agreement between the policyholder and the insurer, in which the policyholder's and the insurer's rights and obligations are stipulated and requirements; the policyholder, in compliance with the requirements of the agreement, pays a certain amount of money regularly for insurance funds as a body of investment within a certain amount of time; the policyholder has the right to enjoy certain benefits, like dividends, surrender, policy loans, etc.; these rights are obtained by the policyholder following the policyholder's fund payments. Simultaneously, the insured is entitled to a certain amount of insurance benefits if the policyholder experiences an insurance accident during the insurance period, such as a disease, disability, or death. This illustrates the importance of life insurance and the value of its very existence.

Because premium income directly responds to citizens' desire for insurance, one might reframe the study of factors influencing premium income as an investigation of factors influencing insurance demand. Numerous national and international literary works examine the impact of life insurance demand. Among these, Yarri (1965) noted in his paper "Lifespan Uncertainty, Life Insurance, and Consumer Theory" that, according to the expected utility theory paradigm, people tend to purchase insurance now because they are unsure of how long they will live in the future. However, Alhassan et al. (2016) contended that demographic traits have a greater impact on life insurance than financial considerations; Using the Middle East and North Africa as an example, Zerriaa M et al. (2016) discovered that while the pace of urbanization has no bearing on the demand for life insurance, the region's income, inflation rate, interest rate, and degree of financial development all encourage it. Utilizing a random effects model, Meko et al. (2019) examined the variables affecting the demand for life insurance in four Ethiopian insurance companies between 2001 and 2016. They discovered that the real interest rate, the dependency ratio, inflation, and urbanization all significantly increased the demand for life insurance.

In contrast to overseas studies, local research on the factors driving the growth of the life insurance industry was initiated later. The study of insurance consumption was first undertaken by He Xiaoyun and Sheng Yafeng in 1992. Their findings demonstrate that: the demand for life insurance increases with economic development; insurance consumption, particularly life insurance consumption, can be improved with the growth of residents' income; and when residents' income levels rise, the rate at which residents' insurance consumption increases is faster than the rate at which residents' income levels rise. The empirical study of social welfare spending, GDP, resident consumption, and life insurance demand variables, according to Huang Shan and Cao Weili (2008), has a major impact on driving up demand for

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life insurance as well as demographic characteristics. The need for life insurance in China will be boosted by isotropic changes in the country's overall population, urbanization rate, educational attainment, old population dependence ratio, and percentage of workers in secondary and tertiary industries. According to Li Ding, Ding Junsheng, and Ma Shuang (2019), social connection can greatly boost family commercial insurance participation and enhance people's willingness to purchase commercial insurance.

3. Factors Affecting Life Insurance Premium Income

According to conventional insurance theory, the primary theoretical determinants of life insurance income are the degree of national economic development, resident consumption, demographics, and the extent of financial regulation in the country.

3.1. Level of National Economic Development

Insurance develops in tandem with the growth of social productive forces and is a byproduct of their development to a certain point. The growth of the national economy and the insurance sector in China are inextricably linked. One way to look at it is that the growth of the national economy since the reform and opening up has released and increased demand for insurance; on the other hand, the rise in income levels has also resulted in changes to the overall amount and structure of insurance demand. These factors have contributed to the rapid development of insurance in the last ten years. One could argue that a nation's insurance business develops based on its level of national economic development. In general, life insurance revenue increases in lockstep with economic expansion.

3.2. The Population's Disposable Income

In the field of economics, the desire and purchasing power of a consumer determine the demand for a good or service. This is also true for insurance, and the population's level of consumption can demonstrate this genuine purchasing capacity. As a result, the growth of the insurance sector will be aided by a nation's higher level of consumer spending. The amount of per capita consumption is reflected in disposable income. Since insurance is a commodity, money drives up demand for insurance because larger disposable incomes are spent more on consumer goods.

3.3. Demographic Factors

Since China is the most populous country in the world and the life insurance market has significant potential, the population's size and demographic makeup also have a significant impact on premium income. Life insurance is based on the body and life of the insured person.

3.4. Consumer Price Index CPI

Life insurance has a long-term nature, in the event of an insurance accident, the insurer's insurance benefits lag behind the time of the premium payment, during which the occurrence of inflation will have a certain impact on the level of premium income.

In this paper, we only study the factors affecting the premium income of short-term life insurance as well as due to the limitations of other factors, so we have selected five factors to be analyzed in this paper: the population, mortality rate, gross regional product, disposable income per capita of all the residents, and the number of healthcare institutions in each province in 2021.

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4. Empirical Analysis

4.1. Modelling

The following model was created to investigate the relationships between the total premium revenue and the population, death rate, gross regional product, disposable income per capita of all residents, and the number of medical facilities:

$$Y=C+\beta 1X1+\beta 2X2+\beta 3X3+\beta 4X4+\beta 5X5+\mu \quad (1)$$

The following table shows the meaning of each variable:

Table 1. Meaning of variables

Y	Gross premium income ($bn)
X1	Year-end resident population (10,000)
X2	Mortality rate (‰)
X3	Gross regional product (billion yuan)
X4	Per capita disposable income of the population as a whole (yuan)
X5	Number of medical establishments (number)
βi	pending parameter
μ	randomized perturbation term
C	constant term

4.2. Regression Analysis

The data were regressed using the Stata software and the results were obtained as shown in Table 2, from which the initial model was obtained as:

$$Y = -0.032536X1 + 37.3337X2 + 0.024130X3 + 0012426X4+0.004205X5 -569.977. \quad (2)$$

Table 2. Regression results

Y	Coefficient	Std.err	t	P>|t|
X1	-0.0325358	0.0898557	-0.36	0.720
X2	37.33367	61.4741	0.61	0.549
X3	0.0241303	0.0069793	3.46	0.002
X4	0.0124263	0.0061456	2.02	0.054
X5	0.0042047	0.0061312	0.69	0.499
_cons	-569.9769	515.2058	-1.11	0.279
R-squared	0.8895	Adj R-squared	0.8674	
prob	0.0000	F-statistic	40.26	

Judging by the regression results, it is found that R2 = 0.8895, and the whole model has high goodness of fit, but the variables X1, X2, X4, and X5 pass the t-test, and the coefficient of X1 is negative, which is contrary to the common sense, because in general, from the point of view of the demand for insurance, when the number of the population is increasing, more people's bodies and lives are exposed to the risk, and people's needs for the business of protection, savings, investment and so on will increase, making the demand for life insurance even stronger. In summary, it can be initially considered that the model has multicollinearity.

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4.3. Multicollinearity Test and Correlation Test

Table 3. Results of multiple covariance test

Variable	VIF	1/VIF
X1	25.81	0.038783
X3	14.93	0.066967
X5	7.28	0.137368
X4	2.40	0.416248
X2	1.58	0.631035
Mean VIF	10.40	

The model's inflation factor has a mean value of 10.40, as indicated in Table 3, which is significantly higher than the actual value of 2. It follows that there is probably significant multicollinearity in the model.

Table 4. Results of the correlation test

	X1	X2	X3	X4	X5
X1	1.0000				
X2	0.1137	1.0000			
X3	0.8724	-0.1741	1.0000		
X4	0.0513	-0.5057	0.4088	1.0000	
X5	0.8525	0.3463	0.5688	-0.1863	1.0000

Then, test the correlation between the variables. The results are displayed in Table 4, where it is evident that X1 and X3 and X1 and X5 have relatively large correlation coefficients, and that the sign of the X1 coefficient is opposite to the economic significance. As a result, for the regression analysis, X1 is removed first, followed by X3 and X5. The outcomes are as follows:

Table 5. Regression results with X3 removed

Y	Coefficient	Std.err	t	P>|t|
X2	-81.98473	102.0131	-0.80	0.429
X4	0.034657	0.0079087	4.38	0.000
X5	0.022206	0.0041683	5.33	0.000
_cons	-364.5501	870.3128	-0.42	0.679
R-squared	0.6468	Adj R-squared	0.6075	
prob	0.0000	F-statistic	16.48	

Table 6. Regression results with X5 removed

Y	Coefficient	Std.err	t	P>|t|
X2	52.06534	55.14036	0.94	0.353
X3	0.0233003	0.0019278	12.09	0.000
X4	0.0120351	0.0048307	2.49	0.019
_cons	-638.2525	490.6897	-1.30	0.204
R-squared	0.8870	Adj R-squared	0.8744	
prob	0.0000	F-statistic	70.63	

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When Tables 5 and 6 are compared, Table 6's effect is much greater than Table 4's in terms of R2, adjusted R2, F-value, and the overall fitting degree effect. It also performs better in the T-test of individual explanatory variables, thus X5 is eliminated and X3 remains among X3 and X5. The t-tests for variable X2 have failed, suggesting that the explanation of Y is not significant, as can be shown by combining Tables 5 and 6. As a result, X2 was eliminated and a new regression was conducted, yielding the following outcomes:

Table 7. Final Regression Results

Y	Coefficient	Std.err	t	P>|t|
X3	0.0233756	0.0019224	12.16	0.000
X4	0.0098297	0.0042203	2.33	0.027
_cons	-195.6007	144.6587	-1.35	0.187
R-squared	0.8832	Adj R-squared	0.8749	
prob	0.0000	F-statistic	105.91	

From Table 7, R2 and adjusted R2 are larger, indicating a better fit, and the T-values of X3 and X4 are less than 0.05, both passing the T-test. Then the final model obtained is Y = 0.0233756X3 + 0.0098297X4 - 195.6007.

4.4. Heteroscedasticity Test

Table 8. Heteroscedasticity test

Source	Chi2	df	p
Heteroskedasticity	20.73	20	0.4131
Skewness	4.59	5	0.4685
kurtosis	1.69	1	0.1939
Total	27.01	26	0.4090

White's test is the most often used method for determining heteroscedasticity. Based on the test results (Table 8), which show that P=0.4090>0.05 indicates that the original homoscedasticity hypothesis was not rejected, it may be considered that heteroscedasticity does not exist.

5. Conclusion

Many factors influence the revenue from life insurance premiums, such as economic, social, demographic, and natural factors. In this work, we develop the multiple linear regression model and choose the theoretically significant features to be examined. Based on the findings of the aforementioned analyses, the three factors—mortality rate, total population, and number of medical institutions in each province—are eliminated because of the multicollinearity between them and the gross regional product and number of medical institutions in each province. Additionally, the X2 corresponding variable has no discernible impact on the premium income of life insurance. Finally, the gross regional product (X3) and the per capita disposable income of all residents (X5) are the explanatory variables that influence the variable province average total premium income (2021) Y. If the gross regional product increases by 100 million yuan, the premium income will rise by 2,337,560 thousand yuan. Alternatively, if the per capita disposable income of all residents increases by 1 yuan, the premium income will rise by 982,970 thousand yuan, provided that the gross regional product remains unchanged. Ninety-two million yuan. The following conclusions about economic analysis can be made throughout the entire modeling process:

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(1) GNP's effect on premium revenue

The insurance industry's growth and structural modernization are rooted in the progress of the country's economy. The national economy's rapid and steady growth combined with the population's steady decline in Engel's coefficient have allowed China's insurance industry to maintain a growth rate of over 30% annually in this country's emerging insurance market. The growth of life insurance premium income is even more evident.

(2) The effect of per capita income on premium revenue

Our people's level of living has increased dramatically, which has decreased the population's Engel's coefficient of consumption and increased a variety of hazards. People's needs for safety and security have increased after their essential needs have been met, which has fueled the growth of life insurance.

6. Suggestion

Empirical investigations reveal that the level of consumption and national economic development have a significant impact on premium revenue. Consequently, there is a need to expedite the development of life insurance and raise the amount of premium income derived from these two elements. Life insurance needs to protect people's lives, enterprises, and every facet of the country's economic architecture to continue its rapid development. As the country's economy expands, the insurance sector strengthens and becomes more integrated into the national economy, creating a positive feedback loop that benefits both the insurance sector and the country's overall economic growth.

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