Financial Risk Assessment Based on Entropy Weight Topsis Method: Take the Internet Insurance Industry as an Example

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Abstract: According to the 2019 report data of four professional Internet insurance companies and the entropy weight Topsis method, the financial risk of Internet insurance companies is evaluated. The final calculation results show that the financial risk of Zhongan insurance is the least, followed by Taikang online, reassuring insurance, and the largest financial risk is Yi'an insurance, among which the risk safety gap between reassuring insurance and Yi' an insurance is small. Although the asset flow ability of Yi'an Insurance is high, its online operation ability is not strong, its growth ability and profitability are limited, so it leads to the greatest financial risk. In view of this, we should improve the self-hematopoiesis function of capital, establish early warning mechanism of compensation risk, pay attention to scientific and technological research and development, optimize product structure, increase operation efficiency and so on.

Keywords: internet insurance; financial risk; entropy weight Topsis method

1. Introduction

In early 2020, the new crown epidemic spread, many traditional industries suffered a major blow, but the Internet insurance industry ushered in accelerated development. China Insurance Industry Association pointed out that the epidemic will accelerate the online transformation of the insurance industry, Internet insurance trend for a long time. According to the analysis of the epidemic situation, according to "18 findings of China's insurance demand in the post-epidemic period "released by Fudan University and Tencent Microinsurance, the conversion rate of Internet insurance increased by 73% compared with the same period last year before the epidemic in 2020, while the conversion rate of Internet insurance increased by 232% compared with the same period last year. It can be judged that after the epidemic, the insurance industry will speed up the development of offline business to online business, and the Internet insurance industry can develop rapidly under this opportunity.

But as the scale of Internet insurance industry becomes larger, its financial risk also needs to be paid attention to.

Because Internet insurance completes the whole transaction process online through Internet technology, it may also face the financial risk brought by new technology in addition to the financial risk faced by traditional insurance management. Once the financial risk of the enterprise is too large, it is very likely to lead to the bankruptcy of the enterprise. In order to maintain the normal and healthy development of the enterprise, it is very important to evaluate and control the financial risk.

At present, scholars at home and abroad focus on the financial risk evaluation of insurance industry in the field of traditional insurance, but the research on Internet insurance is not much, still in the exploration stage. Inmaculada (2011) Evaluation of the financial risk of social insurance through the calculation of pension substitution rate, intension rate of return, ratio of assets to liabilities, etc [1]. Ding Deshen and Lu Zhiyong (2014) put forward a comprehensive risk early warning index system, which can comprehensively evaluate and understand the risk situation of property insurance companies, taking full account of financial and non-financial indicators [2]. Hou Xuhua et al. (2019) used the fuzzy comprehensive evaluation method and the entropy method combined with the efficacy coefficient method to construct the financial risk evaluation model of the four major Internet insurance in China and to carry out the financial early warning research [3,4].

Compared with entropy weight method and Topsis method, there are few literatures on financial risk evaluation. Domestic scholars tend to use entropy weight method to correct Topsis method. About the entropy weight Topsis method research, in 2012-2018 rapidly increases. However, entropy weight Topsis has not been used in the field of insurance, mainly in other industries financial risk evaluation. Yin Xia Nan et al. (2017) established a comprehensive evaluation model based on entropy weight Topsis method to prove that this method can effectively evaluate the financial risk of enterprises quantitatively [5]. Zhao Teng and Yang Shizhong (2019) used entropy weight Topsis to construct financial risk evaluation index system, analyze the financial risk level from 2010 to 2017, seek the factors that affect the financial risk level, and put forward some suggestions [6]. Hou Xuhua and Peng Juan (2019) used entropy method and efficiency coefficient method to evaluate the financial risk of Internet insurance industry and consider the early warning of financial risk [3].

According to the above literature, the research on the financial risk evaluation methods of insurance companies is also concentrated in the traditional insurance industry, involving very few Internet insurance, less related theories, and lack of specific analysis and solution measures for financial risk. Compared with other financial evaluation methods, entropy Topsis is less used in financial risk evaluation. And most scholars study the application of this method in the field of engineering, the financial field is relatively small, for the Internet insurance industry is very few. Therefore, this paper selects the evaluation index according to the industry characteristics of Internet insurance, uses entropy weight Topsis method to analyze the financial risk of Internet industry, and carries out quantitative risk evaluation based on the financial data---Zhongan Insurance, Taikang online, Anxin Insurance and Yi'an Insurance, and puts forward the financial risk prevention measures in order to promote the research of financial risk management of Internet insurance companies in China, and play a certain theoretical reference and decision-making reference.

2. Construction of Financial Risk Assessment Index System for Internet Insurance Industry

2.1. Method Principle

C.E. Shannon introduced the concept of entropy into information theory in 1948 to measure the uncertainty of information. Assuming that a system is in a different state, the probability of each state is Pi (i=1,2... (n), then the entropy of the system is defined as: The larger the entropy value, the smaller the probability, the more chaotic the system, the less information it contains and the greater the uncertainty.

Therefore, according to the principle characteristics of information entropy, it can be used to measure the index weight of the evaluation process. If the evaluation index is regarded as a different state of the system, the greater the entropy value of the index, the higher the degree of dispersion between the data, the less information given, and the smaller the weight should be given.

Topsis is a common multi-objective decision analysis method, using raw data to obtain the gap between evaluation schemes, according to the distance between the positive and negative theoretical solutions of each scheme to sort, the closest and farthest from the positive theoretical solution is the best. This method is relatively loose in data distribution and sample content, and the method of data calculation is simple and easy.

The entropy weight Topsis method is a combination of entropy weight method and Topsis method. In the process of constructing standardized evaluation matrix by using Topsis method, the objective weight obtained by entropy weight method is used to endow the evaluation index with operation and improve the traditional Topsis model. Reflect the relative importance of indicators, conducive to scientific evaluation. Because there are only four professional Internet insurance enterprises in China, the sample size is limited, but the entropy weight method is not high, so the entropy weight TOPSIS method is used to screen the indexes that affect the financial risk and

improve the reference value of the evaluation work effectively.

2.2. Index Selection

In the financial risk evaluation of Internet insurance companies, the setting of indicators is particularly important, and it is necessary to set up financial indicators that can properly reflect the financial risks of the company. At present, the general financial risk comprehensive evaluation index system includes: solvency, profitability, operating ability, growth ability. At the same time, on this basis, combined with the characteristics of the Internet insurance industry, this paper increases solvency, asset flow capacity, online operation capacity, a total of 7 first-level indicators.

(1) Solvency. Generally speaking, the solvency of an enterprise is directly related to financial risk. The greater the financial risk. Huang Xianhuan et al. (2018) believe that the greater the total allocation of financial assets, the more debt, the greater the financial risk faced by enterprises [7]. Therefore, this paper sets the ratio of assets and liabilities to reflect the structure of enterprise asset allocation. In addition, because the fixed assets since Internet insurance are less, they generally belong to "light assets" companies, and usually rely on equity financing to obtain funds, so this paper sets up property rights ratio to reflect the relationship between debt capital and equity capital. At the same time, the equity multiplier is set to reflect the size of the financial leverage of the enterprise.

(2) Profitability. By using collinearity test and time dependent Cox regression, Li Hongxi and Song Yu (2020) construct dynamic financial early warning model, and find that profitability is the most significant factor affecting enterprise financial risk [8]. The stronger the profitability, the greater the ability of the enterprise to resist financial risks and survive. The main profit of Internet insurance companies comes from premium income, so this paper sets up net operating interest rate to reflect the ability of enterprises to earn net profit from premium income. In addition, the main source of funds for Internet insurance companies is shareholders' investment. Creating higher returns for shareholders is the driving force for enterprises to obtain capital sources and sustainable and healthy development for a long time. In this paper, the return on net assets reflects the income level of shareholders' equity and measures the efficiency of using their own capital. Finally, in order to reflect the profit level of the enterprise, the net interest rate of the total assets is set to evaluate the profitability of the enterprise using all the assets.

(3) Operational capability. Ou Guoliang et al. (2018) constructed the financial risk early warning model of real estate enterprises based on factor analysis, and thought that enterprises with higher risk grade should start with improving the management level and operation strategy of enterprises to improve the financial risk management level [9] In this paper, combined with the characteristics of general enterprises and Internet insurance enterprises, the comprehensive compensation rate, comprehensive

cost rate, business and management rate and total asset turnover rate are selected. The comprehensive compensation rate and the comprehensive cost rate are the special indexes of the insurance industry. The comprehensive compensation rate mainly reflects the ratio of the indemnity expenditure to the earned premium, and evaluates the compensation risk of the insurance company. The comprehensive cost rate mainly reflects the operating expenses of insurance companies. At the same time, because Internet insurance enterprises mainly complete transactions online, although they rely less on fixed assets, their business is complicated and their organizational and management activities are more, they set up business and management rates. Reflect the ratio of business to management expenses to earned premiums. Finally, set the total asset turnover rate to measure the efficiency of the use of enterprise assets.

(4) Growth ability. Bao Xinzhong, Tao Qiuyan et al. (2015) established COX proportional risk model empirical study that growth ability can play an important role in early warning of financial risk [10]. In the aspect of the index selection of growth ability, this paper judges the growth ability of the enterprise from four data: total assets, total premium income, operating profit and shareholder equity, and reflects the level of the enterprise's expanded operation. As a new industry, Internet insurance must increase its growth ability in order to develop healthily for a long time. It is obvious that the main business of Internet insurance companies comes from premium income, so the growth rate of total premium income is set as one of the indicators to evaluate growth ability. At the same time, in order to evaluate its growth ability more comprehensively, it also sets up the growth rate of total assets and the growth rate of operating profit to measure the growth level of total assets and the growth of operating profit, so as to prevent the problem of high asset management expenses. In addition, set up shareholder equity growth rate from the side to measure the growth ability of business efficiency.

(5) Solvency. Insurance management is a kind of debt management, because the basic function of insurance company is economic compensation, solvency is the economic compensation ability of insurance company to undertake insurance liability, therefore, the level of solvency will affect the size of financial risk to a certain extent. Chen Hongguang (2017) used financial ratio analysis method to analyze 5 listed insurance companies. It is found that low solvency of enterprises will lead to increased financial risk, and put forward reasonable allocation of internal funds to stabilize solvency [11]. To ensure that Internet insurers have sufficient compensation and payment capacity to ensure that they have a solvency adequacy ratio of more than 100%, thus achieving long-term sound operation of Internet insurers, this paper sets core solvency adequacy ratio, comprehensive solvency adequacy ratio, reflecting the ratio of real capital to minimum capital, and measures the overall adequacy of insurance companies' capital, unlike the fact that the real capital in the integrated solvency adequacy ratio increases subsidiary capital. In addition, the establishment of a comprehensive solvency premium rate reflects the combined solvency premium to the minimum capital ratio, and also reflects the solvency of its Internet insurance companies.

(6) Asset liquidity. Li Lujia (2019) based on multi-angle financial analysis, it is concluded that ensuring high asset flow ability is the buffer of financial risk in the operation of the company. In order to continue to operate, the company must ensure that there are sufficient working capital on the account to ensure the operation [12]. For Internet insurance products, most of the insurance period is within one year, which means higher asset liquidity is needed to realize the assets. Therefore, set up comprehensive current ratio and liquidity coverage to measure the liquidity risk of enterprises and ensure the stability of their cash flow sources. In addition, setting up the ratio of premium income to the average balance of premium receivable reflects the ratio of premium income to premium receivable, evaluates its asset use efficiency, and indicates its asset flow ability.

(7) Online operation capability. The biggest difference between Internet insurance companies and traditional insurance companies is that all business of Internet insurance companies is done online. Therefore, the online operation ability may directly affect the business and financial situation of the enterprise. This paper sets up the website comprehensive weight to measure the authority value of the Internet insurance company's official website in each major search engine. The higher the weight, the higher the traffic of the website may be, and the stronger the online operation ability. At the same time, as a new industry, Internet insurance is difficult to meet the development needs of its own website traffic, must rely on the third party network platform traffic advantage to expand the volume of business, therefore, it is necessary to set up a cooperative third party network platform quantity index. In addition, online trading is likely to face website security problems, a high security website, more conducive to the transaction, so this article set up website security evaluation of its website security. Finally, this paper sets up the industry ranking index, the higher the Internet insurance company ranks in the industry, the higher the website traffic, which directly proves that its online operation ability is stronger.

Based on the above analysis, the specific indicators are listed below (see Table 1).

Table 1. Financial risk assessment indicators for Internet insurers

	Level I indicators	Secondary indicators
Financial risk assessment indicators	Solvency capacity	Ratio of assets to liabilities
		Equity multiplier
		Property rights ratio
	Profitability	Net operating interest rate
		Net interest rate on total assets
		Return on net assets
	Operational capacity	Comprehensive indemnity rates
		Consolidated cost rate
		Operating and management rates
		Total assets turnover
	Ability to grow	Growth rate of total assets
		Total premium income growth
		Year-on-year growth in operating profits
		Total Shareholder Equity Growth
	Solvency	Core solvency adequacy ratio

Asset liquidity capacity	Comprehensive solvency adequacy ratio
	Overflow rate of integrated reimbursement
	Combined current ratio
	Liquidity coverage
	Turnover of premiums receivable
Online operational capability	Website comprehensive weight
	Website security (sub)
	Industry ranking
	Number of third-party network platforms

3. Example Analysis

3.1. Sample Selection and Data Processing

Because China's Internet insurance started late, so far, only four professional Internet insurance companies --- Zhongan Insurance, Taikang online, Anxin Insurance, Yi' an Insurance. Therefore, this paper selects the data of these four companies in 2019 as a sample, and obtains the calculation results of each financial index according to the corresponding index calculation formula, as shown in Table 2.

Table 2. Calculation of Financial Risk Assessment Index of Internet Insurance Company in 2019

Level I indicators	Secondary indicators	Indicator attributes	Zhongan Insurance	Taikang Online	Anxin insurance	Yi' an Insurance
Solvency capacity	Ratio of assets to liabilities	Negative	46.60%	68.84%	91.92%	53.62%
	Equity multiplier	Negative	1.87	3.21	12.39	2.16
	Property rights ratio	Negative	0.87	2.21	11.39	1.16
Profitability	Net operating interest rate	Positive	-4.22%	-13.03%	-9.85%	-14.70%
	Net interest rate on total assets	Positive	-2.06%	-1.69%	-3.57%	-10.56%
	Return on net assets	Positive	-3.86%	-5.42%	-26.89%	-25.02%
Operational capacity	Comprehensive indemnity rates	Negative	67.40%	58.18%	110.71%	60.18%
	Consolidated cost rate	Negative	45.90%	63.37%	42.86%	90.11%
	Operating and management rates	Negative	43.67%	38.98%	67.95%	74.35%
	Total assets turnover	Positive	0.49	0.13	0.36	0.72
Ability to grow	Growth rate of total assets	Positive	17.34%	88.55%	91.63%	-28.84%
	Total premium income growth	Positive	45.47%	74%	1.38%	0.06%
	Year-on-year growth in operating profits	Positive	68.68%	38%	80.61%	33.61%
	Total Shareholder Equity Growth	Positive	0.19%	122.62%	-22.72%	-15.85%
Solvency	Core solvency adequacy ratio	Positive	502.48%	411.95%	124.66%	247.37%
	Comprehensive solvency adequacy ratio	Positive	502.48%	411.95%	124.66%	247.37%
	Overflow rate of integrated reimbursement	Positive	402.48%	311.95%	24.66%	147.37%
Asset liquidity capacity	Combined current ratio	Positive	152.98%	134.66%	102.26%	304.68%
	Liquidity coverage	Positive	157.13%	190.70%	794.65%	248.07%
	Turnover of premiums receivable	Positive	5.25	4.14	2.6	22.18
Online operational capability	Website comprehensive weight	Positive	12	9	7	5
	Website security (sub)	Positive	85	78	78	78
	Industry ranking	Negative	29	58	73	77
	Number of third-party network platforms	Positive	307	121	104	41

After calculating and calculating the data, in order to eliminate the problem of dimensional and dimensional unit inconsistency of the index, the index value is dimensionless and standardized according to the attributes of each evaluation index. The treatment is as follows:

Standardized treatment of positive indicators (i.e., the greater the value, the lower the financial risk):

$$Y_{i,j} = \frac{X_{i,j} - \min(X_{1,j}, \dots, X_{m,j})}{\max(X_{1,j}, \dots, X_{m,j}) - \min(X_{1,j}, \dots, X_{m,j})} \quad (1)$$

Standardized treatment of negative indicators (i.e. the greater the value, the higher the financial risk):

$$Y_{ij} = \frac{\max\ (X_{1j}, \ldots,\ X_{mj}) - X_{ij}}{\max\ (X_{1j}, \ldots,\ X_{mj}) - \min\ (X_{1j}, \ldots,\ X_{mj})} \tag{2}$$

3.2. Entropy Weight Assignment

(1) Proportion of the j object to be evaluated under the evaluation index of item i.

After standardizing the data of each evaluation index through the above formula, the proportion of each object to be evaluated under each evaluation index is calculated:

$$P_{ij} = \frac{Y_{ij}}{\sum\limits_{j=1}^{n} Y_{ij}} \quad (i = 1,2,\ldots m;\ \ j = 1,2,\ldots,\ n) \tag{3}$$

(2) The entropy value of the i evaluation index.

$$e_i = -\frac{1}{\ln n} \sum_{j=1}^{n} P_{ij} \ln P_{ij} \quad (i = 1,2,\ldots,\ m;\ \ j = 1,2,\ldots,\ n) \tag{4}$$

(3) Determine the weight.

$$w_i = \frac{1 - e_i}{\sum\limits_{i=1}^{m} (1 - e_i)} \tag{5}$$

According to the above three formulas, the weight of each evaluation index is calculated by substituting the processed data. The results are shown in Table 3:

Table 3. Entropy Value and Weight of Internet Insurance under Entropy Weight Method

Level I indicators	Secondary indicators	Entropy Value	Weight	Average weight
Solvency capacity	Ratio of assets to liabilities	0.766535528	0.026242989	0.024389724
	Equity multiplier	0.79126623	0.023463091	
	Property rights ratio	0.79126623	0.023463091	
Profitability	Net operating interest rate	0.637659875	0.040729486	0.039317628
	Net interest rate on total assets	0.788781994	0.023742336	
	Return on net assets	0.601307203	0.044815773	
Operational capacity	Comprehensive indemnity rates	0.790064198	0.023598207	0.028857015
	Consolidated cost rate	0.772265967	0.025598849	
	Operating and management rates	0.669619206	0.037137041	
	Total assets turnover	0.741172521	0.029093963	
Ability to grow	Growth rate of total assets	0.738884303	0.029351175	0.048574965
	Total premium income growth	0.517425132	0.054244687	
	Year-on-year growth in operating profits	0.619978649	0.042716976	
	Total Shareholder Equity Growth	0.395169735	0.067987022	
Solvency	Core solvency adequacy ratio	0.728494852	0.030519019	0.030519019
	Comprehensive solvency adequacy ratio	0.728494852	0.030519019	
	Overflow rate of integrated reimbursement	0.728494852	0.030519019	
Asset liquidity capacity	Combined current ratio	0.575473815	0.047719621	0.060515933
	Liquidity coverage	0.389881614	0.068581443	
	Turnover of premiums receivable	0.419548041	0.065246735	
Online operational capability	Website comprehensive weight	0.709778149	0.032622904	0.058677614
	Website security (sub)	0	0.112406779	
	Industry ranking	0.562276216	0.049203121	
	Number of third-party network platforms	0.639900264	0.040477652	

3.3. Application of Topsis Methods

After using entropy weight method to obtain the weight of each evaluation index, the weighted normalization matrix of Topsis method is constructed to avoid subjective influence as far as possible. The method is as follows: multiply the previously processed data by the weight of each index and construct the matrix.

$$V = \begin{bmatrix} V_{11} & \ldots & V_{m1} \\ \ldots & V_{ij} & \ldots \\ V_{1n} & \ldots & V_{mn} \end{bmatrix} \tag{6}$$

(1) Determine the positive and negative theoretical solution. After the construction of the weighted matrix is completed, the positive and negative theoretical solution should be determined according to the index maximum of different attributes. Positive ideal solutions is v_j^+, negative ideal solutions is v_j^-. Then:

$$V^+ = \left\{ \max_{1 \le j \le n} v_{ij} \middle| j \in J, \min_{1 \le j \le n} v_{ij} \middle| j \in J' \right\} \qquad (7)$$
$$= \left\{ v_1^+, \ldots, v_j^+, \ldots v_m^+ \right\}$$
$$V^- = \left\{ \min_{1 \le j \le n} v_{ij} \middle| j \in J, \max_{1 \le j \le n} v_{ij} \middle| j \in J' \right\} \qquad (8)$$
$$= \left\{ v_1^-, \ldots, v_j^-, \ldots v_m^- \right\}$$

The J is a positive index and the J' is a negative index.

(2) Calculate Euclidean distance. The distance between the positive ideal point and the negative ideal point i each scheme is 1 after calculating the positive and negative ideal solutions l_j^+ and l_j^-. The formula is

$$l_i^+ = \sqrt{\sum_{i=1}^{m} \left(v_{ij} - v_j^+ \right)^2} \qquad (9)$$

$$l_i^- = \sqrt{\sum_{i=1}^{m} \left(v_{ij} - v_j^- \right)^2} \qquad (10)$$

(3) Calculate the relative progress. After calculating the Euclidean distance of each object to be evaluated, the comprehensive evaluation value of the object to be evaluated is based on the index of relative paste progress. The formula for calculating relative progress is:

$$C_j = \frac{l_j^-}{l_j^+ + l_j^-} \left(j = 1,2,\ldots, \ n \right) \qquad (11)$$

(4) Objects to be evaluated. The objects to be evaluated are sorted according to the relative progress C_j. The larger the C_j value is, the farther the object to be evaluated is from the negative ideal solution, the closer the positive ideal solution is, and the smaller the C_j value is, the closer the object to be evaluated is from the negative ideal solution, the farther the positive ideal solution is.

According to the above steps, the standardized value, weighted normalized matrix, evaluation score of each index, distance from each evaluation object to positive and negative ideal solution, and relative progress can be calculated respectively. The final results are shown in Table 4:

Table 4. Relative Distance and Financial Security of Internet Insurers

Company name	l_j^+	l_j^-	C_j (Financial security)	Risk ranking (1 means least risk)
Zhongan insurance	0.116198207	0.177260002	0.604038315	1
Taikang Online	0.167097146	0.128470829	0.434657471	2
Anxin insurance	0.19762439	0.095501973	0.325804789	4
Yi'an insurance	0.195666004	0.099212344	0.336451777	3

The above results show that the financial risk safety degree of Zhongan Insurance, Taikang online, Anxin Insurance and Yi'an Insurance in 2019 is 0.604038315, 0.434657471, 0.325804789, 0.336451777 respectively. The highest financial risk is Yi' an Insurance, followed by Anxin Insurance, Taikang Insurance, and the lowest is Zhongan Insurance. The closer the financial security is to 1, the lower the financial risk is. By using entropy weight Topsis method, the financial risk level of Internet insurance can be judged quantitatively, which is helpful for enterprise managers to make accurate risk control and countermeasures.

3.4. Financial Indicators Validation Model

In order to verify whether the final evaluation results of the entropy weight Topsis model are accurate or not, the operating profit margin and total return rate of 2019 of Zhongan insurance, Taikang online, Anxin insurance and Yi'an insurance are analyzed to check the rationality of the results (see table 5).

Table 5. Main financial indicators for Internet insurers

Company name	Operating profit margin	Full rate
Zhongan insurance	-4.04%	-4.13%
Taikang Online	-12.50%	-18.62%
Anxin insurance	-13.55%	-31.62%
Yi'an insurance	-15.88%	-17.22%

It can be seen from the above table that although affected by insurance policy, it has brought some influence to the development of Internet insurance industry, the operating profit margin and overall return rate of the four companies are negative. But Zhongan Insurance data is always superior to Taikang online and other three companies. Combined with operating profit margin, total rate of return two indicators to compare the remaining three companies, Anxin insurance comprehensive data is the lowest, followed by Yi'an insurance, Taikang online, according to which the judgment is consistent with the results of the risk ranking obtained by the model.

4. Analysis of the Results of Financial Risk Assessment of Internet Insurance Companies

According to the above index weight, combined with the results obtained by the Topsis, it is found that the liquidity coverage rate of the asset flow ability of the Internet insurance company and the turnover rate of the premium receivable occupy the top three of all the indexes, so the asset flow ability has the greatest influence on the ranking results. Secondly, the average weight of online operation ability ranks second among the seven indicators, among which industry ranking and the number of third-party platforms play a greater role. Therefore, this paper will analyze the asset flow ability and the online operation ability.

4.1. Asset Liquidity Analysis

Because of the unpredictability of insurance compensation, claims need to be quickly responded to, which requires that the company's assets can be realized in time and have strong liquidity. At the same time, asset liquidity analysis, also known as short-term solvency analysis, is based on the original data on asset liquidity (see table 2), combined with the solvency adequacy ratio of Internet insurance companies in each quarter of 2019(see table 6). More analysis and understanding of the company's liquidity.

Table 6. Internet Insurers' solvency adequacy ratios for each quarter of 2019

Quarterly	Zhongan insurance	Taikang Online	Anxin insurance	Yi'an insurance
First quarter	549.01%	230.61%	175.31%	153.73%
Second quarter	543.36%	203.24%	181.75%	287.13%
Third quarter	555.39%	157.20%	131.37%	340.92%
Fourth quarter	502.48%	419.93%	124.66%	247.37%

It can be seen from the above table that the solvency adequacy ratio of Zhong'an insurance in the four quarters of 2019 is generally stable, which has been at a high level compared with other companies. Combined with the analysis of the three original data indicators of asset liquidity, the liquidity of Zhongan insurance is strong. However, the solvency adequacy ratio of Anxin insurance in the four quarters of 2019 has been lower than that of other companies. At the same time, combined with the asset liquidity indicators, we can see that although the liquidity risk indicators generally meet the regulatory requirements, there is a certain pressure on cash flow.

Yi An insurance has a higher level of liquidity index in its assets. Besides, its 2019 quarter solvency adequacy ratio is also above average. It can be judged that liquidity monitoring indicators of assets liquidity are normal, and the overall liquidity risk of the company is relatively low.

Taikang online's solvency adequacy ratio fluctuates greatly in the four quarters of 2019, of which the fourth quarter has a significant rise. It is understood that the reason is that during the fourth quarter, Taikang online was approved to increase its registered capital by 2 billion yuan. Therefore, the solvency adequacy ratio is generally

above a certain level. Combined with the three original data indicators of asset liquidity, Taikang online has achieved high quality Current assets can basically cover the cash flow gap in the first quarter of 2020.

According to the requirements of China's second generation solvency regulatory system for traditional insurance companies, the liquidity coverage of the four Internet insurance companies has met the regulatory requirements. However, according to the above business data, the solvency adequacy ratio fluctuates greatly, which indicates that Internet insurance companies have certain vulnerability in solvency. Secondly, the recovery of Taikang online's solvency adequacy ratio in the fourth quarter of 2019 is realized through capital market financing, but its own profitability is still insufficient, which also shows that the Internet insurance company is in the early stage of development, and the business structure is relatively imperfect.

4.2. Analysis of Online Operation Capability

For Internet insurance companies, the sales of their insurance products rely on the Internet. Therefore, the flow of official web pages is very important for Internet insurance companies. Different from the traditional business model of the insurance industry, Internet insurance mainly depends on the development of the business companies operating on the realization of traffic. At present, the main Internet insurance is the result of the integration of multi-channel insurance and Internet: self operated insurance on the official website of insurance companies and online sales through third-party intermediary channels. Data shows that insurance sales channels mainly rely on third-party platforms at present. Therefore, the more third-party platforms Internet insurance companies cooperate with may mean that the companies are more easily known and trusted by the public. It can be seen from table 2 that the number of third-party network platforms of Zhongan insurance is 307, which is far higher than that of the other three companies, while the number of third-party network platforms of Yi'an insurance is the lowest, only 41, and the difference between Taikang online and Anxin insurance is not much, both more than 100. At the same time, there is a certain gap in the industry rankings of the four companies. Zhongan insurance, Taikang online, Anxin insurance and Yi'an insurance rank 29, 58, 73 and 77 respectively. In addition, Zhongan insurance's website comprehensive weight and website security are the first, and the other three have a small gap. According to the comprehensive judgment, Zhongan insurance has the strongest online operation ability, while Yi'an insurance has the lowest.

To sum up, the number of third-party network platforms has a great impact on the online operation capacity of Internet insurance. In the early stage of the development of Internet insurance, we should appropriately increase the number of third-party network platforms, expand the business volume, and improve the online operation ability, but also need to pay attention to cost-effectiveness.

5. Conclusion and Suggestion

5.1. Improve the Self Hematopoietic Function of Capital and Establish the Early Warning Mechanism of Compensation Risk

Internet insurance companies should try their best to develop and create products that meet the needs of consumers, adjust and improve the business structure and improve the business profitability. Internet insurance companies should make full use of the advantages of the Internet, develop the types with high market competitiveness, continue to carry out business, improve the self hematopoietic ability of Internet insurance companies, and finally develop and expand the industry of Internet insurance companies.

At the same time, insurance companies should give full consideration to the sales strategy and market positioning of online insurance products, make statistics on future claims processing according to product types, channels and time limit, establish a scientific risk monitoring system, grasp the overall situation, comprehensively adjust risk verification, and ensure the liquidity of capital channels. Real time monitoring of market trends, strengthening the monitoring of compensation data, regular analysis of data changes, strengthening daily risk analysis, early identification, reporting and control of group risk, to ensure that there is no abnormal centralized compensation event. To assess the risk level of compensation wage, conduct cash flow stress test on company assets regularly, and establish risk assessment mechanism to ensure appropriate pressure and loss under appropriate circumstances.

5.2. Reduce the Dependence of Third-party Network Platform, and Increase Research and Development

Internet insurance companies adopt the pure online operation mode, but due to the limitations of their own technology and service scope, Internet insurance companies rely too much on the third-party network platform, and the technical service fee greatly exceeds the traditional insurance companies, which has become an obstacle for Internet insurance companies to make profits. Therefore, Internet insurance companies should reduce the dependence on the third-party network platform, increase the proportion of direct sales of insurance products, and reduce operating costs. At the same time, we should try our best to choose the platform with high credit in the market for cooperation, maintain a good and stable cooperative relationship, conduct reasonable negotiation on the service price, and at the same time attract the main cooperation platform to become their own shareholders to achieve benefit sharing.

In addition, science and technology enabled insurance is driving the innovation and development of the industry. With the support of science and technology, pricing, underwriting and other links continue to launch new applications, thus improving the insurance efficiency. In order to gain a place in the competition of Internet insurance, we must attach importance to scientific research. According to the data, Zhongan has invested more than 3 billion yuan in R & D. for a technology enterprise, R & D investment can ensure the competitiveness of the enterprise in the future. In the first half of 2020, Zhongan's science and technology output revenue was RMB 119.9 million, and its overseas business expanded to many countries, helping overseas enterprises to transform into digital enterprises.

At the same time, Taikang online is also accelerating the upgrading of science and technology. Data shows that the scientific research investment of Taikang online will increase by 51% year on year in 2019. The "Panshi" property insurance core system independently developed by Taikang online supports large-scale transactions and supports business growth beyond expectations. In 2019, it supports nearly 1 billion policy transactions. Therefore, increasing scientific and technological research and development is conducive to improving the comprehensive competitiveness of Internet insurance companies and accelerating the development of high-quality innovation.

5.3. Optimize Product Structure and Improve Operation Efficiency

Internet insurance products must design insurance types from the target groups. According to the changing needs of the market, it should always keep changing, constantly update and create new products, and continuously adjust the mixed strategy of innovative products. At present, China's Internet insurance products mainly focus on short-term business, and the development of medium and long-term product business is relatively rare. Therefore, on this level, medium and long-term Internet insurance products have certain competitiveness. In addition, if we can improve the design of insurance products according to the characteristics of the Internet and make them more suitable for sale on the Internet platform, it will promote the development of Internet insurance. At the same time, because the construction of China's Internet insurance platform is not perfect, many Internet insurance companies are not enough to provide more and more comprehensive services. Therefore, the Internet insurance companies should optimize the operation process and service, improve the operation efficiency and increase customer satisfaction.

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