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BANKRUPTCY RISK ASSESSMENT FOR INSURANCE COMPANIES UNDER UNCERTAINTY

ABSTRACT

The insurance market is an integral part of the country's financial system and is therefore extremely important for economic development. Any shocks in the insurance market may cause a slowdown in economic growth and development and have a negative impact on the country's financial system. The stability of the insurance market is ensured by the companies operating in it. That is why our analysis focuses on assessing the risk of insurance companies' bankruptcy and analyzing the main factors that affect the situation in the insurance market.

This article analyzes the main approaches to assessing the risk of insurance companies depending on the size of the risk premium. A simple dynamic risk assessment model was applied.

Our analysis of the literature has shown that general approaches to assessing the risk of insurance company failure depend on the overall situation in the country and the market itself. In countries with more frequent force majeure events, more complex and sophisticated models have been introduced to assess the required amount of risk premium to avoid bankruptcy.

The market situation in Ukraine had been stable for a long time, but with the onset of the pandemic, certain problems began to arise. An analysis of one of the leading insurance companies in the market showed that before the war started, it had a bankruptcy risk close to zero. Unfortunately, it should be noted that military actions, which are force majeure circumstances, complicate the quantitative analysis, as Ukrainian companies do not have effective mechanisms to cover this type of risk.

It is established that a company cannot arbitrarily determine the amount of risk premium based on its own needs. This value will also be influenced by external macroeconomic factors that will affect not only the overall economic situation but also all participants in the insurance market, including consumers of insurance services.

Keywords: bankruptcy risk assessment, insurance companies, premiums, driving factors, regression analysis, insurance market, insurance regulation

JEL Classification: G22

INTRODUCTION

The insurance industry is one of the most important sectors of the economy, providing financial protection and risk management for individuals, businesses, and society as a whole. However, the insurance industry also faces significant challenges and uncertainties in times of force majeure emergencies, such as natural disasters, pandemics, wars, or terrorist attacks. Such events are unforeseeable, unavoidable, and beyond the control of the parties involved, and that may affect the performance or validity of contracts. As such in these situations, insurance companies may have to deal with increased claims, reduced premiums, disrupted operations, regulatory changes, reputational risks, ethical dilemmas and other issues.

The insurance market plays an important role in the financial system of the state. It performs the functions of financial intermediation on the financial market and ensures efficient distribution of capital in the economy; performs the function of risk diversification, prevention and reduction of the general level of risk, and redistributes risks in the

economic system. It is worth noting that the functioning of the insurance market can not only have a positive effect on the financial system of the country but also carry a potential threat to the sustainable development of the state's economy, which also requires a detailed study and determination of the possibilities of minimizing the negative impact on the financial security of the state from the side of the insurance market.

The war in Ukraine led to a comprehensive economic crisis affecting all spheres of the national economy. In today's conditions of numerous challenges, risks and threats, insurance services play an important role in risk management. The insurance market as part of the financial market contributes to the minimization of threats to economic and financial security at all levels, post-crisis recovery and economic development.

Challenges to the economic stability of Ukraine, provoked by the full-scale invasion of Russia, led to tangible changes in the activity of all spheres of the economy, in particular the insurance market. According to the results of a survey conducted by the National Bank of Ukraine, as of March 2022, most insurance companies continued their activities remotely and moved to other safer regions with their employees. However, insurance companies in Ukraine faced a number of fundamentally new challenges. In connection with the temporary occupation of the territory, physical destruction of real estate objects, and relocation of business entities, the number of customer service centres is reduced. For risk insurance, it is problematic to organize the settlement of insurance cases in regions where hostilities are taking place, to conduct inspections of vehicles, to obtain and properly prepare original documents for submission to companies in order to receive insurance payments, etc. At the same time, life insurance companies report significant reductions in premiums and fixed activity limits. All this makes the process of making insurance payments more difficult and longer.

The Government of Ukraine is trying in every possible way to promote the development of the insurance market, as this will allow to reduce the state expenses for the prevention and liquidation of the consequences of extraordinary events. Unfortunately, not all insurance companies that were successful before the start of hostilities remained financially stable. In particular, on the market as a whole, according to the results of a survey conducted among the participants of the Association "Insurance Business" regarding activities under martial law, it turned out that only 5% of companies continue to work stably, while 37% cannot resume their activities completely or even partially. This shows that assessing the risk of bankruptcy of insurance companies is necessary for both investors and those who wish to use their services.

LITERATURE REVIEW

A fair bit of current literature analyzes how insurance companies behave and respond to force majeure emergencies, and what factors impact their decisions and actions. In order to understand this topic a thorough literature review of the existing research on this topic was conducted, covering both theoretical and empirical studies from various disciplines and perspectives.

There are different approaches to the topic, depending on the most probable cause of emergency. For example, several groups of authors, including Bjarnason et al. [1], Zhao et al. [2], Kousky, Kunreuther [3], and Paleari [4] described a modelling method used by Iceland Catastrophe Insurance for the assessment of possible risks that have to do with earthquakes.

Another authors, such as Tatar et al. [5], Ferland [6], Chopra [7], Wood [8], Granato and Polacek [9] in their works analyzed a completely different issue for insurance companies, specifically digital force majeure or cybersecurity attacks. Authors conclude that while this issue is still relatively new and the insurance companies having a hard time coping with this issue compared to others, as an IT infrastructure continues to infiltrate the world serious cyberattacks will be possibly more problematic to humanity than typical environmental disasters.

The COVID-19 pandemic has posed unprecedented challenges and uncertainties for the insurance industry, as well as for the economy and society at large being one of the most unpredictable challenges to ever face humanity. The pandemic has affected both the demand and supply sides of the insurance market, as well as the regulatory and supervisory frameworks. Several researches, conducted by Puławska [10], Barbara et al. [11], Moreno et al [12], Eling and Schaper [13], and Siopi and Poufinas [14] have analyzed the financial stability of European insurance companies during this period. It was noted that insurance companies have reduced their operating costs and increased their liquidity ratios to cope with the pandemic's impact. Different companies have adopted different strategies depending on their business segments. Life insurers have focused on increasing their solvency ratios and reducing their risk exposure, while non-life insurers have tried to maintain their profitability and market share. Not only that but also location of business operation played a significant role as companies have faced different challenges depending on their country of origin. For example, German and Italian insurers have experienced a significant drop in their return on assets, while Belgian and French insurers have seen

a decline in their solvency ratios. But there was also a positive effect where, as an example, Polish insurers have been relatively unaffected by the pandemic and have increased their market share in Central and Eastern Europe.

In other research, Dionne [15] and Pandian [16] were studying risk management after World War II. According to the article, insurance companies faced several challenges during wartime, such as increased losses, reduced premiums, limited reinsurance capacity and government intervention. The author mentions that some insurance companies were nationalized or expropriated by the enemy during WWII. It is also noted that some large companies with diversified portfolios of physical assets began to develop "self-insurance" against risks, which they covered as effectively as insurers for many small risks. Self-insurance became a form of risk management where a company sets aside funds to cover its own losses instead of buying insurance from an external provider. Over all after WWII a lot of new risk management tools and strategies came about, that are being utilized to this day by insurance companies. In a way, such a hard environment created a net positive effect for the business in the form of the emergence of this adaptation.

Additionally, another work by Grinberg [17] focused on the trade policies of states and how they affect the flow of goods and services between enemy belligerents. The author explains that insurance is one of the factors that influences the conversion time of a product into military capabilities. The article defines conversion time as "the time it takes for a product to be converted into military capabilities by the enemy". It is argued that products with longer conversion times are more likely to be traded during the war because they pose a less immediate threat to the security of the state. For example, cotton, which has a long conversion time because it requires processing, manufacturing and transportation before it can be used for military purposes. It is also noted that insurance can increase the conversion time of a product by reducing the risk of loss or damage during transit. Therefore, insurance companies may indirectly affect wartime trade patterns by influencing the conversion time of products. In that manner, it can be assumed that unlike many other types of businesses during wartime, insurance companies will have a significant advantage in the form of governmental protection for that reason alone. So, while some argue that wartime can be really demanding on the insurance business, it is also true that the survival probabilities of insurance companies are higher during such events compared to other businesses.

Another group of authors (Barthel & Neumayer) [18], Gissing et al. [19], Alstadt et al. [20], McAneney et al. [21], Breckner [22] examined whether there is a significant increase in insured losses from natural disasters over time after adjusting for inflation and wealth accumulation. The authors use a dataset of insured losses from 1973 to 2008 for 29 countries. According to the article, insurance companies behave in different ways during times of natural disasters. Some of them increase their premiums to reflect the higher risk and uncertainty. Others withdraw from certain markets or reduce their exposure to avoid large losses. Some also invest in loss prevention and mitigation measures to reduce the impact of future disasters. Authors argue that these behaviours have implications for the availability and affordability of insurance coverage, as well as for the incentives for adaptation and mitigation of climate change.

AIMS AND OBJECTIVES

The aim of the article is to assess the bankruptcy risks for the insurance companies of Ukraine during the war. To achieve this purpose, it is necessary to determine the risks before the war and to analyze possible ways to mitigate new risks of uncertainty due to the war.

METHODS

As the method of analysis, we will use the classic version of the dynamic model of bankruptcy. We used the model, proposed by Korol [25] for the assessment of the bankruptcy risk of a corporation and adapted it for the analysis of an insurance company. The simplest dynamic model includes only two processes: the process of receipt of premiums and the process of insurance payments. These two processes take place on different time scales and have different measurement scales. Premiums come much more often than lawsuits are filed, and the amount of the premium is much smaller than the amount of the claim. Therefore, if the process of claims is considered the main one, then in the scope of this process, the receipt of premiums can be considered a continuously determined process.

Before the war, Ukrainian insurance companies published their data on their websites. It stopped as a result of the aggression, nowadays most data are general or the results of the surveys. To assess the risk of bankruptcy we will use pre-war data for the leader of the Ukrainian insurance market the Insurance Group TAS available at the site <https://for-insurer.com/>. [26] so we will use the secondary data.

RESULTS

Before the war, the insurance market of Ukraine was mostly sustainable, with a group of clearly defined leaders, offering a wide range of insurance services, boasting a highly diversified portfolio and enjoying success in a stable market. It all changed with the invasion as it brought a condition of uncertainty to the companies' activities. The companies were forced to adapt international practices to combat force-majeure factors as some countries use them constantly due to the circumstances.

As we mentioned, only 5% of the Ukrainian insurance companies declared that they are working successfully during the war [27]. Among them are the leaders of the sector for the pre-war period. We propose to analyze the probability of the bankruptcy of the Insurance Group TAS based on the data for the period of 2008-2020 to determine the financial sustainability of the company before the war. After the start of the war, companies stopped publishing financial data for open access to preserve their activities against the enemy, so our assessment of the company after that is not quantitative.

The company has been operating in Ukraine since October 1998 and is part of the powerful Investment and Financial Group, which also includes a number of financial, trade and industrial structures.

IG "TAS" has an extensive regional network: 29 regional directorates and branches, 450 sales centres, where more than 1,000 full-time employees work and more than 3,000 insurance agents operating throughout Ukraine.

IG "TAS" is a universal insurer that offers consumers more than 80 insurance products under various types of voluntary and mandatory insurance. The products are formed into complex insurance programs, according to which each client - a legal entity or an individual - can insure his risks both individually and in a complex.

The main financial indicators of the company's activity before the war are shown in Table 1.

Year	Insurance claims	Insurance premiums	Insurance reserves	Registered capital	Assets
2020	887 598.00	2 026 920.00	1 614 042.00	696 822.00	2 457 256.00
2019	726 963.00	1 815 100.00	1 380 602.00	610 931.00	2 105 902.00
2018	545 449.00	1 387 745.00	1 078 640.00	450 732.00	1 650 503.00
2017	371 336.80	1 023 863.00	661 799.90	450 208.10	1 157 870.30
2016	262 223.60	763 237.60	446 931.70	387 297.10	864 825.00
2015	212 435.10	607 382.20	328 656.10	276 930.90	629 707.70
2014	176 621.60	426 104.90	228 720.00	370 786.00	625 404.00
2013	174 925.40	396 461.60	210 481.80	322 544.60	558 682.70
2012	194 361.50	361 651.10	215 530.60	272 890.40	560 815.90
2011	181 943.80	379 568.00	248 969.60	185 205.00	704 578.20
2010	126 029.80	346 935.40	226 019.60	182 232.60	504 564.10
2009	138 403.00	285 682.20	218 982.70	16 200.00	321 745.60
2008	141 528.00	380 297.70	234 895.00	220 738.80	551 859.60

To assess the bankruptcy risk we use the simplest dynamic model including only two processes: the process of receipt of premiums and the process of insurance payments. These two processes take place on different time scales and have different measurement scales. Premiums come much more often than lawsuits are filed, and the amount of the premium is much smaller than the amount of the claim. Therefore, if the process of claims is considered the main one, then in the scope of this process, the receipt of premiums can be considered a continuously determined process.

In the simplest case, the receipt of premiums is characterized by one parameter - the speed of the receipt of funds, which will be denoted by c . This means that if at some point in time t the company had capital u_t and until the moment $t+h$ no claims were received, then the company's capital at the moment $t+h$ will be $u_{t+h} = u_t + ch$. Let's note that interest on capital and inflation were ignored in these considerations, so as not to complicate the mathematical analysis.

We will describe the receipt of claims by a certain point process T_1, T_2, \dots , and the values of consecutive claims - by random values Y_1, Y_2, \dots

Now, the change over time in the capital of the company can be described as follows. At the moment $t=0$, the company has a certain initial capital $u_0=u$. By the time T_1 of the receipt of the first claim, the capital will increase (due to the receipt of premiums) to the value $u+cT_1$. However, at time T_1 , the company will pay the claim in the amount of Y_1 and the capital will decrease to the amount of $u+cT_1-Y_1$. By the time T_2 of the receipt of the second claim, the capital will increase by the amount $c(T_2-T_1)$ and will be $u+cT_1-Y_1+c(T_2-T_1)=u+cT_2-Y_1$. At the moment T_2 , a claim in the amount of Y_2 is received and the capital decreases to the amount of $u+cT_2-(Y_1+Y_2)$.

This process continues ad infinitum unless at the time a claim is filed, the company does not have enough funds to pay the claim. In this case, we will talk about the bankruptcy of the company.

Since in the described dynamic model events unfold in time, the mathematical apparatus for its analysis is the theory of random processes and the theory of probabilities. One of the most famous and popular models of insurance company bankruptcy is the classic risk model. Its main advantages are relative simplicity and the possibility of application to a wide class of probability distributions, and at the same time, the ability to accurately describe the real dynamic process of receiving insurance premiums and making insurance payments to the company.

In the classic risk model, the number of payments made by the insurance company forms a sequence of independent random variables $(Y_k, k \geq 1)$, uniformly distributed with the distribution function $F(x)$. We will assume that $F(0) = 0$ (this means that Y_k values are positive), and there are mathematical expectations $MY_k = \mu$ and variance $DY_k = \sigma^2$.

The insurance payment is made in the event that the insurance company receives a claim. Let's make the following assumptions about the nature of receipt of insurance claims:

1. events related to the receipt of insurance claims at time intervals that do not overlap are independent random events;
2. distribution of the number of insurance claims received in the time interval $[t, t+h)$, do not depend on t , but only on h ;
3. the probability that at least one insurance claim will be received in the interval $[t, t+h)$ is equal to $\lambda h + o(h)$, where λ is a constant, and $\lim_{h \rightarrow 0} \frac{o(h)}{h} = 0$;
4. the probability that more than one claim will arrive in the interval $[t, t+h)$ is $o(h)$.

The listed assumptions, on the one hand, impose rather strict mathematical restrictions on the process of receipt of insurance claims. At the same time, such restrictions make it possible to make fairly sound conclusions about the parameters of the insurance company's activity and for some situations even make it possible to calculate the exact values of the probability of bankruptcy of insurance companies.

The results of calculating the probability of bankruptcy with a relative insurance premium using the above-mentioned model are presented in Table 2.

Table 2. Calculation of the probability of bankruptcy of the company with a relative insurance premium of 80%. (Source: constructed by authors based on open data [26])

Year	Average claims, UAH.					
	25 000.00	50 000.00	75 000.00	100 000.00	150 000.00	200 000.00
2020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2015	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.68E-295	1.02E-221
2013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.89E-272	4.06E-204
2012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-278	5.45E-209
2011	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E-241
2010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-292	4.11E-219
2009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.08E-283	2.54E-212
2008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.04E-303	1.12E-227

As we can see, even with a fairly high insurance premium, the probability of bankruptcy with small payments is zero, while the majority approaches zero (numbers of the order of $\sim 10^{-3}$).

Status, reputation and high places in the ratings allow the company to make higher relative insurance premiums. From the calculations in MS Excel, we can see that in recent years the allowance has fluctuated between 80% and 200%. If we take an insurance premium of 150%, then we have the following results (Table 3).

Table 3. Calculation of the probability of bankruptcy of the company with a relative insurance premium of 150%. (Source: constructed by authors based on open data [26])

Year	Average claims, UAH.					
	25 000.00	50 000.00	75 000.00	100 000.00	150 000.00	200 000.00
2020	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2019	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2018	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2017	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2015	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2014	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-299
2013	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-275
2012	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.18E-282
2011	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2010	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-295
2009	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-286
2008	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.64E-307

So, from the calculations, we can conclude that the company, as one of the market leaders, has a very close to zero probability of bankruptcy, even with low insurance premiums and average payouts of UAH 100,000.

In the case when the payments of the insurance company have a different probability distribution, it is almost impossible to specify the exact formula for the probability of bankruptcy $\psi(u)$.

Until recently, the insurance market of Ukraine was rather sheltered so there was no need to implement special models and strategies to protect the insurers. It started to change as a result of the COVID-19 pandemic, but as life insurance is not the most widespread sector, the companies were not faced with too many claims. It all came crashing down with the start of the war. The introduction of uncertainty to the insurance market of Ukraine led to the bankruptcy of small companies and new requirements for the leaders of the market. Our research shows that during the period of stability the TAC, one of the leading companies, had almost zero probability of bankruptcy. The armed aggression meant that the insurers suddenly were faced with all kinds of claims and the ability to pay the premiums all but vanished. As a result, only major market players managed to stay afloat and they must overcome the challenges that new reality presents.

DISCUSSION

Until recently, Ukrainian companies had no reason to implement different practices to mitigate the risks of uncertainty. As a result, to adapt to the changing conditions it will be necessary to modify international models and methods to offset unfavorable conditions. For example, insurance companies in Iceland are regulated by the Financial Supervisory Authority (FME), which oversees compliance with the Insurance Act and other relevant laws and regulations. According to the Act, some classes of insurance are compulsory in Iceland and Iceland catastrophic insurance (ICI) is one of them. The ICI is a government-owned agency that provides compulsory insurance for natural perils such as earthquakes, volcanic eruptions, snow avalanches, landslides and floods. The ICI functions as an insurance company and collects premiums from policyholders based on the valuation of their properties. Since Iceland has a special insurance system in place that deals with these natural disasters by inspecting and evaluating the damage incurred by the insured properties and paying out claims, unlike many countries, a probabilistic risk assessment model was constructed that would take into account the location of buildings, their vulnerability and other parameters, that would in the future help analyze a possibility of paying out to the owners in case of such a disaster [1; 4]. This model has significantly helped ICI reassess their insurance policy in case of severe environmental disasters which is one of the adaptive mechanisms that insurance companies resort to. It is possible

to adapt this model to create a special insurance system for the results of the destruction of property during military aggression and to implement unified standards regarding the activities of the insurance companies.

Another problem that has become widespread in Ukraine is the cybersecurity against enemy attacks. Cybersecurity insurance is a type of insurance that covers losses and damages caused by cyberattacks, such as data breaches, ransomware, denial-of-service attacks, or identity theft. It is different from physical insurance in several ways. First, cybersecurity risks are more dynamic and unpredictable than physical risks, as they depend on the constantly evolving threat landscape and the changing IT infrastructure of the insured. Second, cybersecurity losses are more difficult to measure and quantify than physical losses, as they may involve intangible assets such as reputation, customer trust, or intellectual property. Third, cybersecurity claims are more challenging to verify and settle than physical claims, as they may require complex investigations and evidence collection to determine the cause, extent, and responsibility of the cyber incident. Therefore, cybersecurity insurance requires more specialized knowledge and expertise than physical insurance, both from the insurers and the insured. As such a need for a concise insurance policy in this field is needed and will probably soon be covered under traditional ones.

It should be noted that Ukrainian insurance companies were forced to confront a rather abrupt challenge. Ukraine was rather sheltered from natural disasters and armed conflicts were all but non-existent. As such, it became a real challenge to overcome as the insurance companies were not prepared for a country-scale disaster. As a result, there is very little research on the impact of large-scale emergencies on Ukrainian insurance companies. The most researched topic in this field is the consequences of the COVID-19 pandemic. For example, a group of authors (Polinkevych & Kamiński) [23] noted that anti-crisis development strategies of insurance companies are changed and consolidated considering the specifics and risks that arise in the process of companies' work. Key strategies during the COVID-19 period include an effort concentration strategy, an innovation strategy, and a strategy for maintaining an adequate level of financial sustainability. These three strategies are core and partially combine the anti-crisis strategies that companies implemented before the COVID-19 pandemic.

Another group of authors (Pikus et al.) [24] offered a solution for insurance companies during a crisis. In the period of economic instability, the insurance market, as part of the financial system, undergoes significant changes: a drop in demand for insurance companies, the emergence of new products and new insurance options, adjustments in investment policy, etc. Insurance companies are forced to implement such changes in order to maintain their financial sustainability which is exposed to a large number of external and internal factors. In such circumstances, it is particularly important to ensure the most effective use of the available resources and potential of the insurance company by developing an effective risk management strategy of the limiting financial sustainability risk of insurance companies. The more effective the management of financial sustainability of the insurance company is, the more independent the latter from unexpected changes in market conditions, and, therefore, the lower the risk of inability to meet its obligations to customers and, consequently, the likelihood of being on the verge of bankruptcy.

CONCLUSIONS

The insurance market is an integral part of the country's financial system and is therefore essential for its stability. In the face of uncertainty, insurance companies face additional risks, depending on the causes of uncertainty. There are many examples of insurance systems in the world that are focused on overcoming force majeure. Given that the war in Ukraine has brought unfavourable conditions for all insurance companies, it becomes necessary to determine further directions for their development and adaptation to new conditions.

Our analysis shows that force majeure is vastly different in its nature for insurance companies. As such earthquakes and other natural disasters will cause a completely different behavioural pattern in the insurance business compared to something like wartime. Not only that, as the world gets more digitalized there are new threats are emerging that are not yet covered by traditional insurance companies as they are not yet as common, for example, cyberattack insurance, but that pose potentially as big of a risk as other calamities. Depending on company size, location, age, speciality and many other factors behaviour will be different, and that should be also taken into account.

It was determined that during the period of stability, Ukrainian insurance companies leading the market had a very low probability of bankruptcy. Using the dynamic model of bankruptcy, we calculated the probability of bankruptcy for the market leader meaning the TAS insurance group. As the war started, the situation in the insurance market became critical, as only 5% of the participants were able to continue their activities without external help.

It was suggested that to mitigate the uncertainty it is necessary to change the general rules of the market. The state should implement general rules and standards to create a separate segment to insure, assess and cover the damages caused by war to the properties, businesses etc.

Another possible solution is to improve the digitalization of the sector. It means that the insurance companies should offer to cover the risks of cybersecurity. As most of the firms in all sectors are constantly under hackers' attacks, they are interested enough to pay the required premiums.

As a further topic of research, we propose to facilitate the access of Ukrainian companies to reinsurance at the international markets to improve their stability.

ADDITIONAL INFORMATION

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ОЦІНКА РИЗИКУ БАНКРУТСТВА СТРАХОВИХ КОМПАНІЙ В УМОВАХ НЕВИЗНАЧЕНОСТІ

Страховий ринок є складовою фінансової системи країни, тому він надзвичайно важливий для розвитку економіки. Будь-які потрясіння на страховому ринку можуть спричинити сповільнення економічного зростання та розвитку, негативно вплинути на фінансову систему країни. Стабільність страхового ринку забезпечується компаніями, що діють на ньому. Саме тому проведений нами аналіз зосереджений на оцінці ризику банкрутства страхових компаній, а також аналізі основних факторів, що впливають на ситуацію на страховому ринку.

У цьому дослідженні було проведено аналіз основних підходів до оцінки ризику страхових компаній залежно від величини премії за ризик. Було застосовано просту динамічну модель оцінки ризику.

Проведений аналіз літератури дозволив визначити, що загальні підходи до оцінки ризику банкрутства страхових компаній залежать від загальної ситуації в країні та на самому ринку. У тих країнах, де частіше виникають форс-мажорні обставини, запроваджено більш складні й досконалі моделі оцінки необхідної величини премії за ризик, щоб уникнути банкрутства.

В Україні тривалий час зберігалася стабільна ситуація на ринку, але з початком пандемії почали виникати певні проблеми. Аналіз діяльності однієї з провідних страхових компаній на ринку показав, що до початку війни вона мала ризик банкрутства, близький до нуля. На жаль, слід зауважити, що воєнні дії, що є форс-мажорними обставинами, ускладнюють проведення кількісного аналізу, оскільки компанії України не мають ефективних механізмів для покриття такого типу ризиків.

Установлено, що компанія не може довільно визначати величину премії за ризик, виходячи з власних потреб. На цю величину мають вплив також зовнішні макроекономічні фактори, які впливають не лише на загальну економічну ситуацію, але й на всіх учасників страхового ринку, включаючи споживачів страхових послуг. Проведений регресійний аналіз показав, що на величину премії за ризик на страховому ринку України впливає низка макроекономічних факторів, зокрема обсяг реального ВВП, ВВП на душу населення, середня заробітна плата та рівень інфляції. Ці фактори накладають певні обмеження на страхові компанії при визначенні величини премії за ризик. Розраховане нами рівняння регресії дозволяє визначити оптимальний рівень премії за ризик, що сприятиме уникненню банкрутства.

Ключові слова: оцінка ризику банкрутства, страхові компанії, премія за ризик, рушійні фактори, регресійний аналіз, страховий ринок, регулювання на страховому ринку.

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