

## Reinsurance Management in the Global Financial Market Cyclicity Conditions

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**Abstract.** The globalization of economic relations and the integration of Ukraine into the world financial market have significant impact on decision-making in an insurance company in Ukraine. These aspects actualize the study of the insurance companies' activities in the conditions of world financial market cyclical development, and it determines the purpose of the article. The purpose of the study is to develop theoretical and methodological provisions and practical recommendations for managing reinsurance in conditions of cyclical development of the global financial market. Solving the tasks set in the research was carried out using scientific methods of analysis, synthesis, induction, deduction, and analogy – to study trends in the development of the Ukrainian insurance market; logical generalization – to determine the peculiarities of reinsurance management in conditions of cyclicity of global financial markets; comparative and statistical analysis – for analyzing the share of premiums belonging to non-resident reinsurers; Fourier analysis – for analyzing the cyclicity of the development of the global financial market and the reinsurance market in Ukraine. Global business activity develops cyclically. The first cycle is long-term and consists of 14 quarters. Within the long-term cycle, harmonics of a shorter cycle, namely 1 year, were detected. The reinsurance market in Ukraine also develops cyclically. The length of the cycle is 4 quarters. It was established that the peaks of the harmonic oscillations of the development cycle of domestic reinsurance and the world cycle of business activity are antiphase, that is, the phase of the oscillations differs by half a period. The length of the domestic reinsurance development cycle and the global business activity cycle are equal, and the distance between the extremes of the cycle functions is 2 quarters. The practical value of the obtained results is that the established relationships between the cycles and phases of the global business activity development and the reinsurance market of Ukraine provide a toolkit for making management decisions regarding the modeling of a reinsurance portfolio effective structure in the insurance company

**Keywords:** insurance, reinsurer, economic cycles, business activity

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### ● INTRODUCTION

Insurance occupies an important place in the financial system of the state. In Ukraine, the insurance market is the second in terms of capitalization after the banking market [1]. Insurers are active investors and important participants in the capital market. The stability and active development of the insurance market is an important element of the stability of the economic relations of the state in general and the financial system in particular. The stability of the insurance market is based on many factors, one of which is reinsurance. The risk transfer mechanism ensures financial stability of the insurer regardless of the size of its

capital, assets and insurance reserves. Reinsurance is a risk management tool for primary insurers to reduce the volatility of their losses and relieve them of single peak risks.

The Ukrainian insurance market is quite integrated into the world insurance market. Ukrainian insurance companies transfer risks to reinsurance not only to Ukrainian companies, but also to foreign partners. Any trends in the global financial market in general, and the insurance market in particular, significantly affect the insurance market of Ukraine. The globalization of economic relations and integration of Ukraine into the world financial market actualize

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the issue of managing reinsurance in an insurance company in the conditions of the cyclicity of the world financial market.

Reinsurance is a derivative of insurance, so trends in the development of the insurance market have a significant impact on the reinsurance market. In 2021, the transformation of the insurance market of Ukraine continued. In particular, 55 insurers were excluded from the State Register of Financial Institutions in 2021 [2]. The part of the companies on the insurance market of Ukraine did not conduct any activity for a long time. Thus, 26.5% of insurers left the market. In addition, since July 1, 2020, the National Bank of Ukraine has strengthened the requirements for insurers, namely regarding solvency, so some insurance companies leave the insurance market voluntarily and do not wait for the regulator to do so [3].

In the insurance market of Ukraine, there is a tendency to increase its concentration, strengthen government supervision and competition. During 2018-2021, the number of insurance companies in the Ukrainian market of non-bank financial services decreased by 45% [4], while the volume of assets remained almost unchanged. This indicates that insurance companies that almost did not function and did not provide insurance services are leaving the market. As a result, the stability of the insurance market is achieved, and the quality of the provided insurance services improves.

The Ukrainian insurance market has a very high concentration. In 2021, the top 10 of 142 risk insurance companies accounted for 50% of gross written premiums and 60% of gross disbursements. Ten life insurers in Ukraine accounted for 96.6% of premiums and 100% of disbursements [5].

A peculiarity of the insurance market of Ukraine is its small share in the structure of the world insurance market. Since most insurance companies of Ukraine have a small amount of assets, they must transfer their reinsurance obligations to foreign insurers. The share of premiums transferred to reinsurance was 19%. Of them, 56% belong to non-resident reinsurers [6].

In modern business conditions, the task of managing reinsurance is actualized as a result of the emergence of risks arising because of transformational trends in the Ukrainian market, as well as a result of the convergence and integration of the insurance market of Ukraine with the world financial market, which in turn is affected by cyclical development. In addition, the need to study reinsurance management issues is due to the emergence of new risk minimization tools that allow changing approaches to insurance activity, accepting more specialized and large-scale risks without the threat of losing the solvency of the insurance company.

Many Ukrainian and foreign scientists were engaged in the study of the economic essence, implementation mechanism, problems and development prospects, and the role of reinsurance in the insurance market. So, N.M. Vnukova [7] and O.V. Kneisler, N.Ya. Spasiv, S.V. Korol [8] in their works studied the current trends in the development of the Ukrainian insurance and reinsurance market, as well as the problems of its integration into the world financial market.

The issues of reinsurance management and modeling of the optimal structure of reinsurance are presented in the works of many foreign scientists. Thus, the authors of the work [9] in their study present the problems of affiliated

reinsurance, protection of the insured and regulation of the insurer's capital. The scientists have developed a two-stage structure, according to which the incumbent insurer buys reinsurance from its affiliated reinsurer in the holding company in accordance with the capital regulation. According to the scientists, the survival of an affiliated reinsurer decreases in conditions of strict regulation of the insurer's activity. However, strict regulation of the insurer's capital strengthens the protection of the insured and increases the volume of optimal reinsurance. Strict regulation of the insurer's capital contributes to the stability of the insurance system.

The researchers in the scientific work [10] analyze the potential of reinsurance to avoid the reduction of capital guarantees in life insurance products. By giving the insurer the opportunity to transfer part of the financial risk to the reinsurer, the problem of optimizing the dynamic investment and reinsurance of the insurer is solved. The researchers introduce the concept of guarantee-equivalent profit to compare life insurance products with and without reinsurance. The studies show that optimally managed reinsurance allows the insurer to offer significantly higher capital guarantees to clients without any loss of the activity efficiency expected by the insurer. The longer the investment horizon and the less prone to risk the insurer, the more noticeable is the benefit from reinsurance.

The studies [11] and [12] are also devoted to the issue of optimal proportional reinsurance and investment strategies for an insurance company. The scientists offer an economic-mathematical model for insurance companies that have both normal and catastrophic risks in their portfolio and seek to maximize the expected efficiency of their capital. The optimal reinsurance strategy is proposed for insurance companies in conditions of occurrence of unpredictable environmental factors, changes in the size of aggregate claims and fluctuations in the share price, i.e. such sudden events that have an immediate impact on the financial state of the market and at the same time cause insurance cases.

The optimal structure of reinsurance coverage in the presence of counterparty risk is studied in the work [13]. From the perspective of a risk-averse primary insurer, the scientists derive a cost criterion that indicates the optimality of insufficient, excessive and full hedging of the risk of the counterparty of reinsurers. The scientists also determine optimal diversification strategies between two reinsurers that differ in counterparty risk.

Paying tribute to the developments of scientists in terms of theoretical and practical approaches to the management of optimal reinsurance in an insurance company, the problem of its further development in the conditions of globalization processes and the cyclicity of world financial markets is unresolved, which is the scientific novelty of the results of the presented study.

*The purpose of the study* is the development of theoretical and methodological approaches and practical tools for managing reinsurance in Ukrainian insurance companies under the influence of the cyclicity of the global financial market.

## ● MATERIALS AND METHODS

The scientific methods of analysis, synthesis, induction, deduction and analogy are used to solve the task of the study – to study trends in the development of the Ukrainian

insurance market; logical generalization – to determine the peculiarities of reinsurance management in the conditions of cyclical world financial markets; comparative and statistical analysis – when analyzing the share of premiums belonging to non-resident reinsurers; Fourier analysis – when analyzing the cyclicity of the development of the global financial market and the reinsurance market in Ukraine.

The methods of economic-mathematical modeling are applied to the study of cyclical fluctuations as a way of simplified description of real manifestations of cyclical fluctuations. These economic models make it possible to identify causes, factors and regularities in cyclical fluctuations in the economy. In connection with the non-linear nature of the development of the market economy, the most widespread is the modeling of economic processes using dynamic systems. Harmonic analysis is used to study regular cyclical fluctuations in the economy.

The application of Fourier analysis to the research of cyclical fluctuations in the economy will be carried out with the help of an algorithm. When modeling seasonal and cyclical fluctuations, the approximation of the time series by Fourier series is used. The function specified at each point of the studied time interval can be represented by an infinite series of pairs of sines and cosines – harmonics. Finding the final sum of terms with sines and cosines is called harmonic analysis [14].

The insurance and reinsurance market of Ukraine is well integrated into the world market. This is evidenced by the fact that in the Ukrainian insurance market for 2018-2021 there is a tendency to reduce the amount of premiums transferred for reinsurance to Ukrainian reinsurers [15]. On the other hand, reinsurance among non-residents increased by 37.5% in the fourth quarter of 2021 compared to the first quarter of 2018 (Table 1) [4].

**Table 1.** Structure of premiums due to reinsurers

Observation date, quarter	Premiums due to resident reinsurers, billion UAH	Premiums due to non-resident reinsurers, billion UAH	The share of premiums to non-resident reinsurers in the structure of premiums due to reinsurers
Q1.18	3.5	0.8	18.60%
Q2.18	3.2	0.8	20.00%
Q3.18	2.8	0.5	15.15%
Q4.18	5.4	0.8	12.90%
Q1.19	3.7	0.8	17.78%
Q2.19	3.5	1.0	22.22%
Q3.19	3.2	0.7	17.95%
Q4.19	1.5	0.8	34.78%
Q1.20	1.9	0.9	32.14%
Q2.20	0.4	1.0	71.43%
Q3.20	1.3	0.8	38.10%
Q4.20	1.2	0.9	42.86%
Q1.21	1.1	1.2	52.17%
Q2.21	0.8	1.6	66.67%
Q3.21	0.9	1.2	57.14%
Q4.21	0.9	1.1	55.00%

According to Table 1 the specific weight of premiums to non-resident reinsurers in the structure of premiums due to reinsurers has a steady upward trend. Therefore, it is possible to assert the strengthening of the integration of the Ukrainian insurance market into the global financial market.

Since the insurance market of Ukraine is well integrated into the world market, the cyclical development of the world economy significantly affects the development of the Ukrainian financial market.

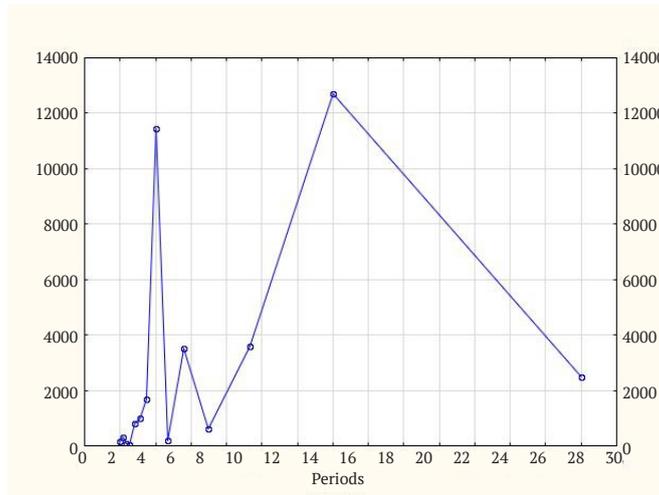
Identifying the period of fluctuations of the economic cycle and the degree of its influence on the insurance market of Ukraine will make it possible to make balanced management decisions in the management of reinsurance in an insurance company based on forecast data of the development of global business activity.

As an indicator of the development of the world economy, the work adopted the global index of business activity [16]. The observation period is 2015-2021, with quarterly frequency of observation. The sample of observation points was formed according to the data of the Federal Reserve of Economic Data [16].

Based on quarterly data on the global index of business activity for 2015-2021, using the Fourier analysis method and packages of the Statistica 10 software complex, the periods of two cycles of the development of the world economy were identified.

## ● RESULTS AND DISCUSSION

The periodogram of the Fourier analysis results for the quarterly global index of business activity for the analyzed period is presented in Figure 1.



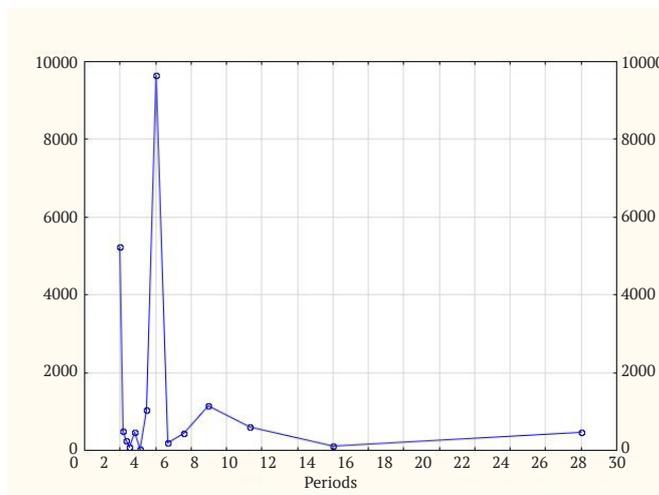
**Figure 1.** Periodogram of the results of Fourier analysis for the quarterly global index of business activity for 2015-2021

Figure 1 shows that global business activity develops cyclically. The first cycle is long-term and consists of 14 quarters. Within the long-term cycle, harmonics of a shorter cycle, namely 4 quarters, were identified.

As the main indicator characterizing the development of outbound reinsurance on the insurance market of Ukraine, the index of the rate of growth of premiums due to non-resident reinsurers has been adopted.

Based on the NBU data [1], the work calculates the

growth rate index of premiums due to non-resident reinsurers. Based on quarterly data on the growth rate index of premiums due to non-resident reinsurers for 2015-2021, using the Fourier analysis method and the packages of Statistica 10 software complex, the period of one cycle of development of the Ukrainian reinsurance market was identified. The periodogram of the results of the Fourier analysis for the quarterly index of the growth rate of premiums due to non-resident reinsurers for the analyzed period is presented in Figure 2.

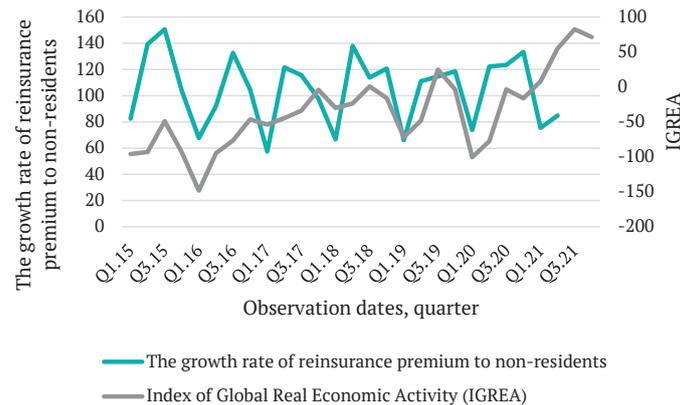


**Figure 2.** Periodogram of the results of the Fourier analysis for the quarterly index of the growth rate of premiums due to non-resident reinsurers for 2015-2021

It can be seen in Figure 2 that the reinsurance market in Ukraine develops cyclically. The length of the cycle is 4 quarters. Thus, it can be concluded that the length of the development cycle of Ukrainian reinsurance and the world cycle of business activity coincide.

At the next stage of the research, it was found that the peaks of the harmonics of the fluctuations of the development cycle of Ukrainian reinsurance and the world cycle of business activity have a coefficient of -1, that is, the fluctuations are antiphase, and the phase of the fluctuations differs by half a period. Since the oscillation period of the cycle is 4 quarters, half a cycle is 2 quarters. Thus, the distance between the extremes of the functions of the above cycles

is 2 quarters. Therefore, it can be stated that the impact of the level of business activity on the global financial market on the Ukrainian reinsurance market is not instantaneous. Changes in trends in the Ukrainian reinsurance market occur with a delay of 2 quarters. Figure 3 presents a graph of the global index of business activity for 2015-2021. The horizontal scale shows the actual data on the dates of observation points (T). Also, Figure 3 presents a graph of the growth rate index of premiums due to non-resident reinsurers for 2015-2021. For this graph, the date values of the observation points are  $t=T-2$ , i.e., on the horizontal axis, the periods are shifted by 2 quarters for the graph of the growth rate index of premiums due to non-resident reinsurers.



**Figure 3.** Comparison of the dynamics of the global index of business activity and the index of the growth rate of reinsurance among non-residents

Figure 3 shows that by shifting the graph of the growth rate index of premiums due to non-resident reinsurers by two quarters to the left, the phase of fluctuations of its harmonics coincides with the phases of fluctuations of the global index of business activity.

The obtained result has significant practical value for forecasting the development of the Ukrainian reinsurance market with a planning horizon of 2 quarters, as well as for making management decisions based on the obtained forecast indicators.

There is a tendency to increase the volume of reinsurance in the global financial market. As of the end of 2021, the total capital directed to the global reinsurance industry was US \$ 728 billion, representing an increase of 8.4% compared to the previous year. In the reinsurance market, the capital for the previous year amounted to 672 billion dollars [17].

Since 2015, the total target capital in reinsurance has increased by 70%, corresponding to an average annual rate of 6%. Also, since 2015, there has been an upward trend in the volume of reinsurance premiums Figure 4.



**Figure 4.** Dynamics of premium growth in the global reinsurance market

Premium growth remained steady throughout 2021 at an average of 17%. This is the strongest growth rate seen since 2015. This is due to higher premium rates and growth of net new business. Return on equity also improved, increasing to 11.4% (2.7% in 2020) and 6.2% (1.3% in 2020) on a reported and underlying basis, respectively [17].

The insurance market of Ukraine was actively developing. In 2021, it increased by 8.2% from UAH 45.2 billion up to UAH 48.9 billion, including life insurance accounted for UAH 5.9 billion, and risk insurance accounted for UAH 43 billion. Insurance payments in risk types of insurance for 12 months increased to UAH 16.2 billion, in life insurance to almost UAH 800 million. The level of payments in the life sector was 13%, non-life 38%. Net life insurance premiums continued to grow rapidly, while risk insurance premiums, on the contrary, somewhat decreased [5].

Thus, it can be concluded that the current development of the insurance market of Ukraine follows the trend

of growth observed by the level of global business activity in the second and third quarters of 2021. However, there is a downward trend in global business activity in the fourth quarter of 2021.

Having analyzed the above, and considering the trend presented in Figure 3, it can be concluded that the current trend towards active growth of reinsurance will be replaced by a decline in the first half of 2022. The tendency towards a break in the trend line of the growth of business activity in the world is outlined, and therefore it is possible to predict a decrease in the volume of outbound reinsurance from non-resident reinsurers on the Ukrainian insurance market in the first half of 2022.

In addition to the change in the trend of business activity in the short-term cycle, the world economy is entering a longer cycle of economic decline. According to research by the Swiss Re Institute [18], the intensity and spread of inflation leads to a rapid increase in the costs of

claims. Strong rate hikes in commercial lines and personal lines are supporting profit growth, but increasing requirements reduce profitability.

The Swiss Re Institute forecasts nominal direct premium growth of 8.0% in 2022 and 6.3% in 2023. Risks are shifted to the downside, the average projected return on capital for 2022 is 5.5% and, accordingly, 6.0% for 2023. The impact of high inflation on litigation costs is only partially offset by the investment gains from higher interest rates. Premium growth has been steady over 2015-2021 but is expected to slow in 2023 as the US economy enters a likely recession. The Swiss Re Institute predicts that the development of the insurance industry will slow down, as inflation will weaken the adequacy of the previous year's reserves [18]. In addition, the world economy is entering the recessionary phase of the economic cycle, which will also reduce global economic activity in 2022 [19].

Therefore, in view of the above, it can be concluded that the decrease in global business activity, the expected recession in the world, as well as the acceleration of inflation rates will have a negative impact on the insurance market of Ukraine as a whole, and on reinsurance in particular. In addition, inflationary pressure in Ukraine is more significant, since according to the NBU forecast, inflation will accelerate and reach 31% by the end of 2022 [20]. In 2022, the transfer of reinsurance risks to non-residents will be less profitable for Ukrainian insurers. Acceleration of inflation rates in Ukraine and the world has a double impact on reinsurance for non-residents. In the conditions of increasing rates at non-resident reinsurers due to the acceleration of inflation rates in the world, as well as the projected high level of inflation in Ukraine, the national currency depreciates in relation to settlement currencies, which has a double impact on the efficiency and rationality of reinsurance at non-resident reinsurers.

The conducted scientific research made it possible to develop practical recommendations for managing reinsurance for Ukrainian insurance companies in the conditions of the cyclicity of the global financial market:

- to monitor the level of global business activity and forecast on its basis the rate of growth of outbound reinsurance for non-residents with a planning horizon of 2 quarters. This is explained by the fact that the rate of growth of Ukrainian reinsurance volumes among non-resident insurers is cyclical in nature and the length of the cycle corresponds to the length of the short cycle of the

index of global business activity, and the distance between the extremes of the cycle functions is 2 quarters;

- when developing management decisions regarding the structure of the reinsurance portfolio, be guided not only by the models of formation of the optimal reinsurance portfolio from the point of view of the balance of risks and profitability, but also take into account the cyclical nature of the development of global financial markets;

- when determining the proportion between resident and non-resident reinsurers for the formation of an effective reinsurance portfolio, long-term development cycles of the world financial markets should also be taken into account, since the expected growth of inflation and the forecasted recession significantly increase the insurer's costs for transferring risks to non-resident insurers.

## ● CONCLUSIONS

The results of the above analysis are a convincing proof that the management of reinsurance in Ukrainian insurance companies should be carried out from a review on the integration of the Ukrainian insurance market to the world financial market, as well as on the cyclical development of the latter. The period of the short cycle of the index of global business activity is 4 quarters. The cycle period of the growth rate index of premiums transferred to non-resident reinsurers is also 4 quarters. The distance between the extremes of the functions of the above cycles is 2 quarters.

At the same time, the structure of the insurer's optimal risk diversification strategies depends not only on the objective parameters of the cost, the size of the risk, and the level of risk avoidance, but also on the trends in the development of the world financial market, expected inflation, and forecasts of the development of the world insurance market.

Despite these contributions, some questions remain open. The proportion of reinsurance among residents and non-residents in conditions of cyclical world financial markets may be of interest for further discussion in order to achieve an optimal balance between safety and costs. In this context, it should be noted that this model framework may not take into account all factors that are relevant in practice to the primary insurer's decision-making regarding its reinsurance strategy. Considering that reinsurance with non-residents can influence the solvency ratio of the Ukrainian insurer, future studies can expand this study, taking into account this relationship.

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## Управління перестрахованням в умовах циклічності світового фінансового ринку

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**Анотація.** Сучасні процеси глобалізації господарських відносин та інтегрованість України у світовий фінансовий ринок здійснюють суттєвий вплив на прийняття управлінських рішень в страхових компаній в Україні. Це зумовлює актуальність дослідження діяльності страхових компаній в умовах циклічності розвитку світового фінансового ринку та обумовлює його мету. Метою дослідження є розробка теоретико-методичних положень та практичних рекомендацій до управління перестрахованням в умовах циклічності розвитку світового фінансового ринку. Вирішення завдань, поставлених в дослідженні, виконано з використанням наукових методів аналізу, синтезу, індукції, дедукції та аналогії – для аналізу тенденцій розвитку страхового ринку України; логічне узагальнення – для виявлення особливостей управління перестрахованням в умовах циклічності світових фінансових ринків; порівняльний і статистичний аналіз – для визначення частки премій, що належать перестраховикам-нерезидентам; Фур'є аналіз – для визначення довжини циклів розвитку світового фінансового ринку та українського перестрахового ринку. Ділова активність суб'єктів економічних відносин у світі розвивається циклічно. У роботі встановлено, що довгостроковий цикл розвитку глобальної ділової активності становить 14 кварталів. В межах довгострокового циклу виявлено гармоніки річного короткого циклу. Українському ринку перестраховання теж властива циклічність розвитку. Довжина його циклу становить 4 квартали. У роботі виявлено, що піки гармонік коливань циклу світового циклу ділової активності та циклу розвитку українського перестраховання знаходяться у протифазі, тобто фаза коливань відрізняється на пів періоду. Таким чином, встановлено, що довжина світового циклу ділової активності та циклу розвитку українського перестраховання є рівними, а відстань між екстремумами функцій циклів становить 2 квартали. Практичне значення одержаних результатів полягає у тому, що встановлені взаємозв'язки між циклами та фазами розвитку світової ділової активності та перестрахового ринку України надають інструментарій для прийняття обґрунтованих управлінських рішень щодо формування ефективної структури перестрахового портфеля у страховій компанії

**Ключові слова:** страхування, перестраховик, економічні цикли, ділова активність