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FEATURES OF THE ANALYSIS OF FINANCIAL STABILITY OF AUDIT COMPANIES IN UKRAINE IN NON-STATIONARY CONDITIONS

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ОСОБЛИВОСТІ АНАЛІЗУ ФІНАНСОВОЇ СТІЙКОСТІ АУДИТОРСЬКИХ ПІДПРИЄМСТВ УКРАЇНИ В НЕСТАЦІОНАРНИХ УМОВАХ

The article is concerned with determining the peculiarities of analysing the financial sustainability of audit firms in Ukraine in non-stationary conditions. The authors provide their own definition of non-stationary conditions and their importance in the analysis, forecasting and decision-making in dynamic and developing environments. The article describes the main factors of exogenous and endogenous nature that shape modern non-stationary conditions. Among a significant number of enterprises in various sectors of the economy, the authors explain why they focused on enterprises in the audit services sector. This is due to the fact that the analysis of enterprises in the audit services market through the prism of financial stability shows its paramount importance in maintaining the integrity and reliability of financial information in the economic system. The analysis considered the main representatives of the audit community in Ukraine – «The Big Four». The results of the analysis, which were based on public financial statements, show ambiguity in the common interpretation of solvency, profitability and liquidity indicators, which indicates the effects of non-stationary conditions on the performance of the selected companies. At the same time, it should be noted that the analysis of the level of financial scoring of the competitive environment of the audit services market indicates a sufficient level of financial stability during the period under study. This is also evidenced by the analysis of the level of financial scoring of the competitive environment of the audit services market. Given the results obtained, it becomes necessary to consider ways to improve the financial sustainability of audit companies. In addition, the paper considers the models that received the most positive feedback during the modelling of financial sustainability for their further use. In general, the study made it possible to determine the peculiarities of analysing the financial sustainability of audit firms in non-stationary conditions, and its results are of practical importance for the audit services market in Ukraine.

Стаття присвячена визначенню особливостей аналізу фінансової стійкості аудиторських підприємств України в нестаціонарних умовах. Автори наводять власне визначення нестаціонарних умов та їх значення під час аналізу, прогнозування та прийняття рішень у динамічних середовищах, що розвиваються. У статті наведені основні чинники екзогенної та ендогенної природи, які формують сучасні нестаціонарні умови. Серед значної кількості підприємств різних секторів економіки доведено, чому саме автори зосередились на підприємствах сектору аудиторських послуг. Це пов'язано з

тим, що аналіз підприємств ринку аудиторських послуг через призму фінансової стабільності показує його першорядну важливість у підтримці цілісності та надійності фінансової інформації в економічній системі. Під час аналізу були розглянуті основні представники аудиторської спільноти в України – «Велика четвірка». Отримані результати аналізу, які проводились на основі публічної фінансової звітності, свідчить про неоднозначність спільного трактування показників платоспроможності, рентабельності та ліквідності, що свідчить про наслідки впливу нестаціонарних умов на показники діяльності обраних підприємств. Поряд з тим, слід зазначити, що проведений аналіз рівня фінансового скорингу конкурентного середовища ринку аудиторських послуг свідчить про достатній рівень фінансової стійкості впродовж досліджуваного періоду. Про це також свідчить проведений аналіз рівня фінансового скорингу конкурентного середовища ринку аудиторських послуг. З урахуванням отриманих результатів виникає необхідність розглянути шляхи саме підвищення показників фінансової стійкості аудиторських підприємств. Крім того, у роботі розглянуті моделі, які отримали найбільше позитивних відгуків під час моделювання фінансової стійкості задля їх подальшого використання. У загальному підсумку проведене дослідження дало можливість визначити особливості аналізу фінансової стійкості аудиторських компаній в нестаціонарних умовах, а його результати мають практичне значення для ринку аудиторських послуг в Україні.

Keywords: *financial sustainability, non-stationary conditions, analysis, audit services, strategic plan.*

Ключові слова*: фінансова стійкість, нестаціонарні умови, аналіз, аудиторські послуги, стратегічний план.*

Statement of the problem in general and its connection with important scientific or practical tasks. In today's economic environment, characterised by complex dynamics and widespread uncertainty, the financial sustainability of enterprises is of paramount importance. The ongoing hostilities, which are now in their second year, have created a challenging economic landscape characterised by supply chain disruptions, heightened geopolitical risks and an unstable market

environment. These challenges are compounded by the previous challenges caused by the global pandemic, creating a dynamic context that requires a new perspective on the financial stability of audit firms in a volatile business environment.

For audit firms in Ukraine, these conditions are manifested in increased uncertainty in the clients' business, increased volatility in financial markets and a changing regulatory environment. That is why there is a need for a comprehensive analysis of a set of exogenous and endogenous factors that create non-stationary conditions and directly affect the financial condition of enterprises, requiring effective financial management and rapid response to the numerous challenges faced by businesses.

That is why a key aspect of our research is the analysis of audit companies in Ukraine, a sector that is not immune to fluctuations in the economic and regulatory environment. Today, the country's largest audit firms not only withstand uncertainty, but also actively implement strategic policies aimed at mitigating the impact of non-stationary factors on their core business. Such a proactive stance demonstrates the resilience and strategic focus of these companies, which contributes to their adaptability in volatile conditions.

By drawing attention to the practical responses of leading audit firms, we aim to provide relevant information for businesses in similar circumstances. Proactive measures, strategic planning and diversification strategies become practical considerations for businesses seeking to increase their financial resilience.

Analysis of latest research and publications.. The following scholars have studied the process of analysing the financial sustainability of enterprises: Tulchynska S.O., Yuriy E.O., Yakovenko O.G., Rachynskyi O.V., Pigul N.G. and others. At the same time, given the unique economic and political environment of Ukraine, which today determines non-stationary economic conditions, challenges constantly arise that determine the relevance of these studies and provide an opportunity to supplement the existing scientific and practical experience.

Formulation of the objectives of the article (task statement).. The article is aimed at considering the theoretical provisions and developing recommendations for

determining the specifics of the process of analysing the financial sustainability of audit enterprises in non-stationary conditions.

Summary of the main research material. The modern development of individual business entities in the global market environment is impossible without the sustainable functioning of all elements of the economic process. In the context of economic globalisation, when the impact of external factors becomes uncertain and unpredictable, and crisis situations increase, the issue of ensuring financial stability becomes particularly relevant. In turn, unstable conditions are becoming a significant factor that slows down economic progress, requiring companies to make great efforts to ensure their financial sustainability.

Today, individuals and legal entities that have started and maintain their business at a profitable level face new challenges, but minimising the impact of negative exogenous factors is the foundation for the survival of Ukrainian business in today's volatile environment.

The study made it possible to determine that exogenous factors, including market conditions, the economic situation of the state as a whole, political crises, pandemics, changes in consumer preferences and behaviour, etc. have the greatest impact on the financial stability of enterprises in certain conditions. In turn, the influence of endogenous factors on the formation of non-stationary conditions of an enterprise is considered limited and includes such aspects as the type of activity and uniqueness of services, the level of organisation of the management structure, innovation of technologies, resource provision, etc.

Therefore, for the correct perception of the results obtained, it is advisable to consider what exactly the authors mean by non-stationary conditions, namely situations and/or circumstances when the business environment changes over time under the influence of exogenous and endogenous factors, and the factors presented are characterised by instability and may be unpredictable. Non-stationarity can be manifested in various ways, including trends, seasonality or other patterns that indicate a lack of stability in underlying processes. This contrasts with stationary conditions, where statistical properties remain unchanged over time, which facilitates

simpler analysis and modelling. Understanding non-stationary conditions is crucial for accurate analysis, forecasting and decision-making in dynamic and evolving environments.

The financial sustainability of enterprises is characterised by one of the areas of assessment of the financial condition, which is to determine the level of meeting the needs of economic activity with financial resources in terms of their availability, allocation and use [1]. At the same time, it is the results of operating, investment and financial activities that contribute to the sustainability of the enterprise in case of excess of income over expenses, cash flow and economic prosperity and growth in the long term [11].

At the same time, it is worth noting that in order to build a strategic plan that can focus on two main ways of development: increasing the financial sustainability of the enterprise and ensuring its preservation in the long term, the first step is to diagnose and understand the current state of the enterprise.

To do this, it is necessary to assess its financial and economic condition, which is traditionally done by analysing:

- - asset structure, which helps to determine how viable the company is and how they use their resources;
- - dynamics of changes in assets and sources of their formation in order to identify trends and predict possible problems or opportunities
- - liquidity indicators to determine the company's ability to pay its current liabilities;
- indicators of financial condition;
- indicators of business activity in order to determine the efficiency of the company's use of its own resources;
- profitability indicators to determine the level of profitability of the company [1;11].

In turn, the analysis of the above indicators is impossible without taking into account the influence of internal (endogenous) and external (exogenous) factors that directly form non-stationary conditions.

Thus, the financial condition of an enterprise and its sustainability depend on the factors of influence shown in Figure 1.

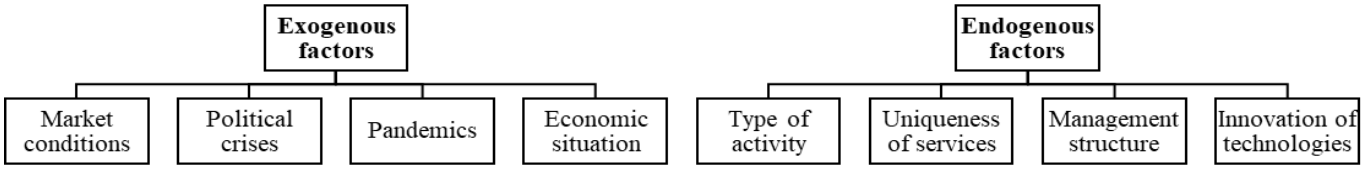

Fig. 1. Main factors of formation of unsteady conditions

Source: built by the authors on the basis of [11].

The analysis of the audit services market through the prism of financial stability shows its paramount importance in maintaining the integrity and reliability of financial information in the economic system. The audit sector plays a key role in maintaining public confidence in financial markets and institutions. Its sustainability is important not only to provide confidence to investors, creditors and stakeholders, but also to mitigate risks, build market confidence and ensure regulatory compliance.

Long-term sustainability, which includes attracting and retaining the best talent, adhering to high ethical standards and continuously improving audit methodologies, is essential for the sector to successfully weather economic downturns and global uncertainty.

In addition, the market for audit services is largely determined by the economic situation in the country and the current preferences and needs of clients. Every year, the variety of professional services provided by auditors increases, which opens up new opportunities for both domestic and international companies to invest in the Ukrainian market. The main representatives of the audit community in Ukraine are various international companies, namely «The Big Four» (PwC, Deloitte, EY and KPMG) [7;8;9;10]. At the same time, other national and regional audit firms are present in the market, which leads to a high level of competition, as national legislation allows many audit firms and independent auditors to conduct audit activities within the country. However, like the vast majority of businesses in today's business environment, the audit services market has faced challenges such as complexity of regulation, corruption risks and the need to improve corporate governance practices. In addition, the analysis of staff turnover based on the data of

the State Statistics Service makes it possible to note that there is an active attraction and retention of qualified specialists by foreign companies [12].

A study of the financial and economic performance indicators of the largest companies in the Ukrainian audit services market, «The Big Four», in 2018-2022 based on public financial statements, shows the ambiguity of the joint interpretation of solvency, profitability and liquidity indicators [7,8,9,10]. Thus, the increase in liquidity by an average of 99% in 2022, which represents the company's ability to quickly repay its liabilities, a significant decrease in the level of profitability (profitability) of the enterprise (-93%) as a result of a decrease in net profit and a drop in equity/working capital ratios by an average of 98% are simultaneously caused by various factors, including the following

- a decrease in demand for audit and consulting services in Ukraine in the first months of the full-scale invasion led to a decrease in profitability in 2022

- the need to attract investment in the domestic economy as a whole due to the closure of a significant share of the service market, which leads to an increase in costs, respectively;

- Diversification of services leads to increased liquidity and reduced risk;

- increased competition and lower prices for market services, which led to a decrease in profitability;

- increased labour costs, utilities, office rent, and technological upgrades due to inflationary processes in the country;

- changes in the exchange rate and foreign exchange markets directly affected the profitability of companies whose main income is derived from international operations;

- increased risks of financial transactions, which leads to an increase in the cost of identifying them and ensuring the accuracy of financial statements;

- economic, political and financial crisis as a reason for the above factors influencing the ambiguity of interpretation of the company's financial statements, which directly affects the liquidity of companies and their ability to conduct business with a high level of manoeuvrability.

The analysis of the level of financial scoring of the competitive environment of the audit services market, shown in Figure 2, confirms the statement that «The Big Four» companies are financially stable during the research period.

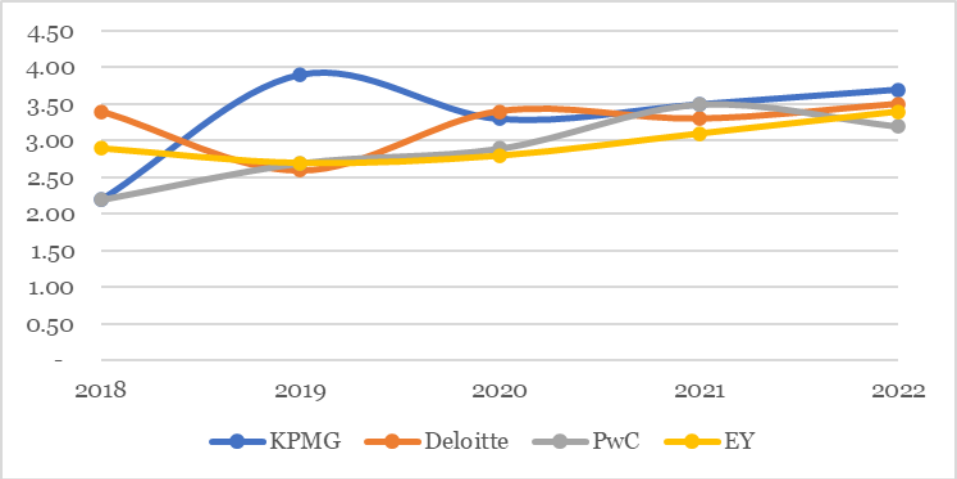

Fig. 2. Analysis of the level of financial scoring of the largest audit companies in the Ukrainian market

Source: built by the authors on the basis of [5;7;8;9;10].

The indicator is based on 20 financial indicators that comprehensively show the state of liquidity, solvency, profitability and business activity of companies. The value of the calculated index can range from 1 to 4, where 4 is the maximum financial strength. Each of the companies has a financial scoring level ranging from 3.1 to 3.7, which indicates a low probability of adverse consequences. As the chart shows, three audit firms, namely KPMG, Deloitte and EY, maintained positive trends in financial sustainability in 2022 despite non-stationary external conditions, the main one being the beginning of a full-scale invasion.

To study market indicators, let's consider the market scoring indicators of the selected companies.

MarketScore is a scoring index of a company's market power calculated by the analytical department of YouControl, which is based on 10 indicators that comprehensively reflect the company's market share, its place in the industry and growth dynamics compared to competitors [5]. The range of index values is from 1

(minimum market power) to 4 (maximum market power), depending on the combination of the company's indicators.

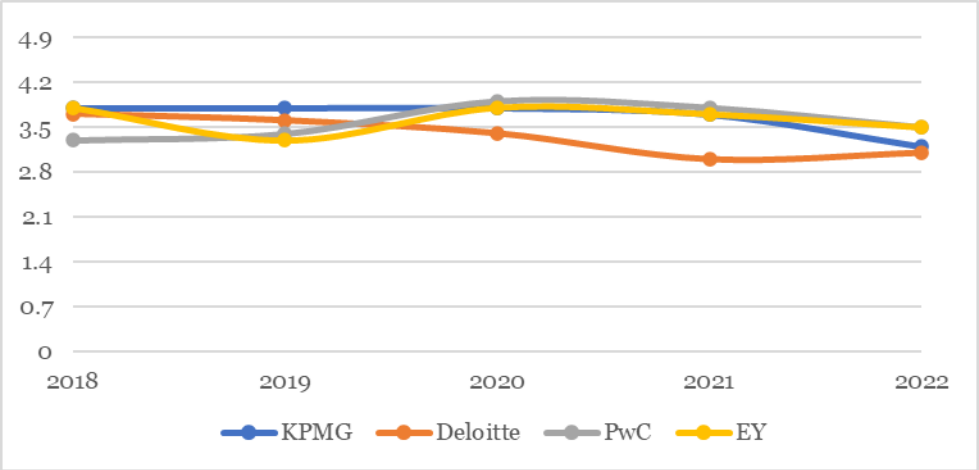

Fig. 3. Analysis of the level of market scoring of the largest audit companies in Ukraine

Source: compiled by the authors based on [5;7;8;9;10].

The analysis of the graph shown in Figure 3 shows that all companies occupy leading positions in the market as of 2022, except for Deloitte, whose indicator shows the potential to develop into a cohort of leaders in case of active development. Negative trends in the development of companies, which are characterised by a drop in the MarketScore by an average of 6% in 2022 compared to 2021, indicate a slight decrease in demand for audit services within the country during the study period.

Based on the above indicators of the companies that hold leadership within the competitive market of Ukraine for the provision of audit and consulting services, it can be argued that despite the unstable conditions and significant fluctuations in 2019-2020 related to the crisis and pandemic, in 2021-2022 the firms continued to operate, provide and diversify services to domestic and international clients.

It should be noted that despite the unstable conditions, companies receive capital investments in the form of investments in professional and technological development, diversification of services, development of the client base and partnerships, which contribute not only to maintaining but also to increasing the level of financial stability of enterprises, as they play a decisive role, which is noted in the strategic plans of audit companies in the domestic market and provides for their

increase in future development due to the rapid economic recovery in the post-war period, However, all this is impossible without the implementation of international standards and improvement of national legislation [13].

Moreover, the crisis state of Ukraine's economy and the described non-stationary conditions emphasise that ensuring and improving the financial stability of the audit industry enterprise becomes not only a strategic problem, but also an operational task for the management of enterprises. That is why, taking into account the existing achievements and results, the increase in financial sustainability indicators is associated with the implementation of the following areas [3;13]:

- diversification or expansion of the range of services;
- implementation of effective cost management;
- implementation of an effective marketing policy;
- strengthening customer relations by maintaining and developing them;
- attracting investments in the development of the technological sphere, updating and modernising the information and technological infrastructure;
- investment in training and professional development of the company's personnel;
- monitoring the regulatory environment, changes in legislation and audit standards;
- creation of an effective risk management system;
- strategic planning with due regard to macroeconomic factors;
- adherence to high standards of ethics and business integrity;
- analysing the competitive environment on a regular basis and developing a competitive advantage strategy.

Given the problems described above, which are only part of the entire set of factors of negative, crisis-forming influence, the stability of the financial system of individual business entities and the economy of Ukraine as a whole is under threat and requires the creation of appropriate relevant approaches to modelling financial stability that would take into account these conditions and provide an opportunity to offset the negative consequences and increase the variability of management

decisions, the most common of which are [2;4]: modelling financial flows; time series; stress

Among the attempts to model the financial sustainability of enterprises, the most favourable reviews were given to the approaches to creating discriminant and logit models for a number of reasons, including forecasting efficiency, ability to work with multidimensional data, clear interpretation of modelling results and sustainability. Classical models include the Beermann model for Germany, Altman for the USA, Tafler and Tishaw for the UK, Springate, Fulmer, Olson, Altman and Sabato, etc. [2].

Of course, each of the models has its drawbacks, including ignoring a number of important factors in the analysis of indicators, taking into account the characteristics of different enterprises, changes in the economic environment, the onset of an economic or political crisis. In addition, important factors that are worth paying attention to are a number of limitations, the presence of multicollinearity of factors, or a too wide range of values of some indicators compared to the range of values of others.

That is why the challenges of today and the shortcomings of existing methods for modelling the financial sustainability of enterprises are forcing the increasing use of machine learning methods, namely artificial neural networks, which are able to detect complex non-stationary relationships in data and automatically adapt to changes in the environment.

The construction of artificial neural networks (ANNs) involves several stages, the main ones being:

1. data collection and preparation, namely removal of anomalies, processing of missing values and normalisation; analysis of the company's financial report;

2. defining the research objective and setting the task;

3. selection of the ANN architecture that best suits the purpose and conditions of the task;

4. division of data into training, validation and test sets;

5. applying the selected architecture to the training data;

6. training the model using its errors and other optimisation methods;

7. evaluating the model performance and adjusting hyperparameters and model architecture to improve the results;

8. testing the model to assess its effectiveness and readiness for use in real-world conditions;

9. validation and verification of real-time operation;

10. monitoring the model in real time and making adjustments as necessary;

11. regular updating of the model to take into account non-stationary factors of influence.

The result of the construction and practical implementation is:

- forecasting of financial indicators of the selected enterprise, such as profit, working capital, liquidity, etc;

- taking into account fluctuating changes in the external environment;

- identification of potential risks and anomalies in financial indicators with the possibility of timely response to them.

The advantages of using this method include adaptability to changing conditions of influence, processing of large volumes of data, the ability to forecast financial indicators and identify complex dependencies between different factors of influence, which is especially relevant in non-stationary conditions.

The disadvantages of the model are the need for a large amount of data for effective work and continuous learning, the tendency to overlearn, the complexity of interpretation, sensitivity to noise in the data, which affects the accuracy of forecasts, and security issues in making complex business decisions [2;4].

Thus, the financial sustainability of an enterprise in non-stationary business conditions depends on various factors of influence, the main of which is the uncertainty of the external environment, which requires competent financial management and quick responses to various challenges.

In turn, the audit market in Ukraine continues to develop and adapt to changes in the economy and regulation. In particular, based on the analysis, it can be concluded that the largest audit companies in the country not only continue to

operate, provide and diversify high-quality and professional services to their clients, but also implement their strategic policy to minimise the impact of non-stationary factors on the core business of enterprises.

As recommendations for analysing the financial sustainability of an enterprise in non-stationary conditions, the authors recommend using the method of artificial neural networks as one of the approaches of economic and mathematical modelling in order to conduct a detailed analysis and assessment of the overall situation, determine the impact of fluctuating changes in the external environment and, as a result, effectively forecast the financial sustainability of a company in the field of audit, taking into account the above endogenous and exogenous factors of influence with the subsequent implementation of correct management.

Conclusions and prospects for further research in this area. Thus, the study made it possible to determine the features of the analysis of financial sustainability of audit firms in non-stationary conditions, and its results are of practical importance for the market of audit services in Ukraine. The application of these methods can help improve strategic management and ensure effective management of the financial sustainability of companies in a changing economic environment. Further research on this issue should be devoted to modelling financial sustainability in non-stationary conditions.

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