

Monitoring segment in modeling the level of financial security of a modern entrepreneurial entity

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Abstract. The article is devoted to the monitoring segment in modeling the level of financial security of a modern entrepreneurial entity, attention is drawn to the content of the problems that motivate change. The economic and mathematical model "Monitoring and correcting segment" with establishment of principles of its adaptation is offered in scientific development. The author's vision of the stages of implementation of economic-mathematical models (EMM) with detailing the actions of performers is given. The components of the five-factor model of criteria for assessing the level of financial security of entrepreneurial entities are identified and the coefficient of the monitoring and correcting segment is proposed, which provides the formation of information flow for management decisions based on the updated database. To improve the quality of management decisions in the field of financial security, a scale for assessing the level of deviations according to the criterion of the monitoring and correcting segment has been developed for entrepreneurial entities. The expediency of introduction of the offered changes in system of an estimation of financial safety of entrepreneurial entities is proved, and the directions of the further researches are established.

1 Introduction

Modernity proves that the entities of the entrepreneurial sector of the economy suffer from uncertainty in solving problems caused by the influence of negative factors on their activities. It is a question of existence of imperfection of the legislative regulators acting as a basis of their activity. At the same time, the issue of protection of the business sector from quarantine measures generated by COVID-19 has not been resolved at the legislative level. In addition, the level of financial security of the business sector of the economy is reduced

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by unregulated tariff policy, which significantly affects the financial performance of their activities. Such factors can be called many as they arise from existing global problems.

Of course, the qualification level of entrepreneurial entities and their teams should not be overlooked. Their adaptation to modern challenges in the country's economy is very slow. The time has come when it is necessary to reconsider not only the system of financial security of business structures, but first of all, to turn to scientific developments, methods of economic and mathematical modeling, innovative approaches to management decisions, and to provide the possibility of implementing own initiatives based on existing business experience. Taken together, such measures should change the situation for the better, but without effective monitoring of the implementation of the planned changes, the effectiveness will not have a full return on investment. Only the control of each stage of the financial security system will allow the entrepreneurial entity to timely adapt innovations with the level of greatest utility for their own business.

This problem has not lost relevance for quite some time, but the existing proposals and developments need to be updated, especially when determining the results of business structures in comparison with previous periods.

Recently, the attention of scientists has been focused on a comprehensive study of the problems of financial security of a modern entrepreneurial entity, which has suffered from the impact of negative factors on its development. Undoubtedly, small and medium-sized businesses received significant losses from the quarantine measures imposed because of COVID-19. At the same time, a significant number of scientific developments of both domestic and foreign scientists reveal a number of other problematic aspects that affect the level of financial security of entrepreneurs.

It is fair to note that most scientific studies reveal the peculiarities of the country's financial security; but the content of the elements of the financial security system of the business sector is rather limited. Among the scientists who have devoted a number of monographic studies to the chosen subject of research should be noted M.M. Yermolenko and K.S. Horyacheva [1], A.A. Mazaraki [2], O.S. Bilousova, V.I. Harkavenko, A.I. Danylenko and others [3], Z.B. Zhyvko [4], O.V. Moroz, N.P. Karachyna and A.A. Shyian [5], O.M. Liashenko [6], V.I. Franchuk [7], N.L. Pravdiuk, T.O. Mulyk, Ya.I. Mulyk [8] and others. In their research, domestic scientists reveal various theoretical and methodological approaches to assessing the impact of various factors on the level of financial security of enterprises, but they have limited coverage of the monitoring aspect of this system, which emphasizes the feasibility of in-depth study of the problem.

It is worth noting that foreign scientists are also concerned about the problem chosen for research. We believe that the scientific developments of such foreign scientists as James Stoner and Edwin Dolan [9], Eugene Brigham [10], Kieran Walt [11], Glen A. Welsh and Daniel G. Short [12] and others deserve attention. The value of scientific developments of foreign scientists lies in the applied aspect of the works, which reveal the financial and accounting levers of the board of enterprises of various spheres of business.

Given the interest in the problem chosen for the study, we believe that its modernity is beyond doubt.

Currently, the problem is exacerbated by the existing negative factors influencing the performance of businesses. The system of financial security does not withstand them, management decisions do not have the required level of rationality, and as a result, there is a decrease in the number of business structures, especially small and medium-sized businesses. Only these factors already indicate the existence of such a negative situation in business structures, which leads to losses on both sides. The entrepreneurial entity loses a significant share of revenue, and the country's budget will not receive a tax payment, which leads to underfunding of current socio-economic issues that need to be addressed immediately. Experience has shown that entrepreneurial entities also do not pay enough

attention to the process of monitoring the planned level of financial criteria, and ultimately receive negative results of their activities.

However, it is obvious that the control system, if any, no longer has the effectiveness that was inherent in the planned economy, ie there is a question of improving the quality of supervision and control, which together can change the situation for the better. In other words, without an effective monitoring program for all parts of financial security, it is almost impossible to achieve more or less suitable development results. This raises the question of modernizing existing financial security systems based on those scientific developments that have an innovative element. Given the above, the chosen direction of research has signs of relevance and modernity.

The main objectives of scientific development are as follows: to determine and justify the feasibility of introducing a monitoring segment at all stages of assessing the financial security of the entrepreneurial entity; development of economic and mathematical model "Monitoring and correcting segment" with the establishment of the principles of its adaptation; inclusion in the criteria for assessing the level of financial security of the coefficient of the monitoring and correcting segment; development of a scale for evaluating the proposed coefficient; substantiation of expediency of introduction of the offered changes in system of an estimation of financial safety of entrepreneurial entities.

2 Materials and methods

Modernity proves that there is an urgent problem of changing approaches to the development of financial security for entrepreneurial entities in Ukraine. This statement emerges from the following: every year, domestic entrepreneurial entities lose their share of business, which is accompanied by a significant reduction in jobs and a decrease in the level of tax payments to the state budget; the number of negative factors that affect the development of the enterprise in Ukraine is constantly increasing; the effectiveness of existing financial security systems for small and medium-sized businesses is low, and as a result, it is almost impossible to predict future developments for a selected entrepreneur; adaptation of scientific developments on innovative segments of business development in the field of entrepreneurship is almost absent due to the lack of own financial resources and significant interest rates on borrowed resources, etc. These are just the main characteristics that outline the situation in the business sector of the country.

Undoubtedly, the scale of the decline in the number of small and medium-sized businesses in Ukraine over the past two years is impressive. One of the rather influential factors that contributed to this situation in Ukraine and in many countries around the world was COVID-19. It must be acknowledged that the business sector of the economy was not ready for such challenges. Limited business activities, a significant decline in demand for products, goods, services, financial insolvency of the population, which also suffered from quarantine restrictions, led to a significant decline in income of entrepreneurial entities. However, we believe that there are positive moments in the situation in the business sector. The negative effects of quarantine restrictions should encourage entrepreneurial entities to take more action on future development. The effectiveness of the financial security system of entrepreneurial entities did not live up to their expectations. At some point, there was a failure, which highlighted its shortcomings, and therefore entrepreneurial entities have received information on how to improve their own financial security.

Given the fact that Ukraine is actively implementing the main segments of the digital economy, which proves and justifies its feasibility at all levels of business, it becomes clear that in this area, entrepreneurial entities must actively involve existing levers of management. In particular, domestic scientists V. Kotkovskiy, V. Zaluzhny, V. Kadala, O. Huzenko and others revealed the role aspect of the digital economy, its influence on the

formation of the system of financial security of entrepreneurship in their scientific developments [13]. At the same time, V. Kadala and O. Huzenko [14] in their scientific works revealed not only some aspects of financial security of enterprises, but also provided quite substantial justifications for it as a component of economic security of enterprises in general. Scientists drew attention to the existing problems in the development of economic security of enterprises and justified the directions of their solution, given the current state of development of the country in general.

In addition, as a result of research by V. Kadala, O. Huzenko and E. Pavlichenko [15], it was proposed to introduce the conceptual category of "monitoring the assessment of financial security." Its essential content is as follows: a comprehensive segment of the financial security management system of enterprises, which is able to assess the status of each representative of the management cycle based on the principles of systematic observations and timely processing of financial information for tactical management decisions.

3 Results

Returning to the chosen subject of research, we believe that the modern entrepreneur, regardless of the country where he does business, should reconsider approaches to the formation and development of their own financial security. We propose to adapt the economic-mathematical model "Monitoring and correcting segment" (hereinafter – EMM "Monitoring and correcting segment"). We propose to base the EMM on a number of principles:

- prompt response to existing financial problems;
- periodicity of assessment and adjustment of changes in the value of the selected financial criteria;
- market orientation of adapted corrective actions.

Each of the proposed principles has its own meaning, which is based on the actions of the performers. Without prompt response to existing financial problems, the entrepreneurial entity not only loses its own income, but also minimizes the financial result, which negatively affects the tax revenue for the state budget. In turn, executors should clearly outline the frequency of studying the situation with the behavior of financial criteria, given the current business situation, and adjust the value of financial indicators based on the interests of their own business. As the results of the research show, it is almost impossible to achieve high-quality management decisions if there is no updated information flow. The principle of "market orientation of adapted corrective actions" should occupy a significant place in the development of an effective system of financial security of an entrepreneurial entity. We believe that this principle should encourage the actions of performers not only to adjust the size of the financial criteria, but above all, to establish the appropriateness of the selected changes in view of the situation covered by the market regulator in the chosen field of activity.

We believe that the EMM "Monitoring and Correcting Segment" may have the following stages of adaptation with the disclosure of the content of the actions of the direct performers:

1. The preparatory stage includes: decision-making by the entrepreneurial entity on the use of economic and mathematical model; determining the composition of specialists of the financial-analytical group, that will have the authority and be responsible for the timely adaptation of the tools of the economic-mathematical model, and on this basis will form the information base for management decisions; establishment of an information base for calculations (decisions on the choice of criteria that participate in the existing system of financial security of the entrepreneurial entity); establishing the frequency of evaluation and

corrective actions by executors.

The criteria for assessing the level of financial security of the entrepreneurial entity is proposed to include: the coefficient of financial independence; coefficient of financial dependence; return on equity; coefficient of stability of economic growth; payback period of equity. We believe that in the conditions of limited own financial resources, these indicators can answer the question of the level of financial security of the business entity.

2. Evaluation and corrective stage includes: determining the actual value of financial criteria based on the results of reporting; development of a five-factor model for assessing the financial security of the business entity; comparison of the actual value of the financial criteria with the planned, which is set for the current period of activity of the entity; compilation of a comparative analytical table that takes into account the planning and financial criteria; calculation of the coefficient of the monitoring and correcting segment $M_k(c)$, which is based on the comparison of the actual value of the financial criteria with the estimated development plan of the entrepreneurial entity. In economic terms, the coefficient $M_k(c)$ can be considered a delta that reveals the existing changes. The algorithm for determining the coefficient $M_k(c)$ can have a fairly extended species structure depending on the type of selected financial criteria for the strength of financial security.

3. The final stage includes: substantiation of the obtained results of the actual value of the criteria for assessing the level of financial security of the entrepreneurial entity; formulation of conclusions and proposals to increase the strength of financial security and future business development.

The economic and mathematical component of the proposed model "Monitoring and correcting segment" is presented in table 1.

Table 1. The main components of EMM "Monitoring and correcting segment"*.

EMM criteria	Algorithm for determining EMM criteria	Definition in the algorithm	Directions of positive changes of criteria
Coefficient of financial independence, (F_{in})	WK/PP	WK – equity; PP – liabilities of the enterprise	max
Financial dependency ratio, (F_{dep})	PP/WK	-	min
Return on equity, (R_{wk})	NP/WK	NP – net profit	max
Payback period of equity, ($Powk$)	WK/NP	-	min
Coefficient of stability of economic growth, (S_{eqr})	RP/WK	RP – reinvested earnings	max
Monitoring and correction segment ratio, ($M_k(c)$)	FFP/PLF	FFP – the actual value of the financial criterion; PLF – the planned value of the financial criterion	min

*Source: compiled by the authors themselves

In order to more deeply assess the level of financial security of the entrepreneurial entity, we propose to expand the actions of performers through the use of the following five-factor model for assessing the level of financial security $M(FBo)$:

$$M(FBo) = WK/PP \times PP/WK \times NP/WK \times WK/NP \times RP/WK \rightarrow \max, \quad (1)$$

With this model, the entrepreneurial entity will receive additional information flow to decide whether to adapt to changes in improvement. The model transforms its appearance in the case of adapting the coefficient of the monitoring and correcting segment $M_k(c)$. The expanded algorithm of the model can have the following form:

$$M(FBo)M_k(c) = [(WK/PP \times FFP/PLF) \times (PP/WK \times FFP/PLF) \times (NP/WK \times FFP/PLF) \times (WK/NP \times FFP/PLF) \times (RP/WK \times FFP/PLF)] \quad (2)$$

In addition, the general type of financial security model of the entrepreneurial entity, taking into account the coefficient of the monitoring and correcting segment will be as follows:

$$M(FBo) M_k(c) = [(Fin \times M_k(c)) \times (Fdep \times M_k(c)) \times (Rwk \times M_k(c)) \times (Powk \times M_k(c)) \times (Seqr \times M_k(c))] \quad (3)$$

We believe that the adaptation of the EMM "Monitoring and Correction Segment" has a number of key advantages, namely:

- the entrepreneurial entity receives additional information flow to make management decisions in the field of financial security;
- it is possible to assess the factor impact on the level of financial security of the entity, and as a consequence, to avoid future risks and stop the decline in the size of financial criteria;
- the establishment of an evaluation period and direct executors will provide an opportunity to adapt the rules of the monitoring segment, namely to exercise not only control but also constant supervision over changes in the financial security of the business.

In order to make management decisions in the field of financial security, we propose the following recommendation limits $M_k(c)$ (Table 2).

Table 2. Recommended scale for estimating deviations by criterion $M_k(c)$.

Corrective criterion, $M_k(c)$	Scale of possible deviations, $M_k(c)$, %	The level of threats to the financial security of an entrepreneurial entity, $R(zfb)$	Directions of change for management decisions, $N(zur)$
Monitoring and corrective segment ratio, $M_k(c)$	0.5 – 10	minimum $R(zfb)$	Carrying out adjustments 1-2 Fkr *
	11 – 20	moderate $R(zfb)$	Carrying out adjustments 1-3 Fkr *
	21 – 30	average $R(zfb)$	Change management policy in Wkp **
	31 and more	critical $R(zfb)$	Change management policy Fbp ***

Note: * Fkr – financial criterion; ** Wkp – equity of the entrepreneur;

*** Fbp – financial security of the entrepreneur.

Source: compiled by the authors themselves

4 Discussion

A number of conclusions should be drawn from the results of the research. First, the existing problems in the activities of entrepreneurial entities motivate them to change their approaches to the development of a financial security system, which should be based on the monitoring segment. Secondly, to improve the process of assessing the level of financial

security of entrepreneurial entities, an economic and mathematical model "Monitoring and corrective segment" is proposed, which should be based on a number of principles: prompt response to existing financial problems; periodicity of assessment and adjustment of changes in the value of selected financial criteria and market orientation of adapted corrective actions. Third, the criteria for assessing financial security are proposed to include the coefficient of the monitoring and adjustment segment, which will adjust the planned value of the financial criteria in relation to the actual situation in the business at the time of the report. Fourth, a five-factor model of financial security assessment based on key criteria that determine the rational use of equity has been proposed for entrepreneurial entities. In this case, to improve the quality of management decision-making, a scale for assessing the level of deviations according to the criterion $M_k(c)$ was developed. Fifth, the adaptation of the model will provide an opportunity not only to reveal the negative factors affecting the level of financial security, but above all, will ensure a rational and sound management decision based on the generated realistic information flow.

Prospects for further research should be an applied aspect of the problem in order to provide more substantive ways to solve it.

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