Informational basis of Ukrainian financial security management in conditions of sustainable development

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Abstract. The purpose of the article is to decide the possibilities of Ukrainian financial security management in the conditions of military and political instability through adaptation of the indicators for the current methodology of the state financial security calculating in order to achieve the goals of sustainable development. The authors use general scientific and special methods, in particular dialectical, abstract logical, system analysis, economic and statistical. The authors in terms of the system approach and the allocation of material and information basis consider financial security. The authors formalize the process of informational support for the management of state financial security. Analysis of statistical data suggests that the determination of the Ukrainian financial security takes place because of political and military instability. Every component of financial safety includes factor of war influence, which as a result correlates the integral index of financial safety. The authors investigate factors that include expenditures for army forces support, aggressor state exchange rate expenditures, volume of monetary mass of the aggressor state in national economics, participation of the aggressor state capital in the banking capital structure, volume of financial resources loss of the aggressor-state.

1. Introduction

According to The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, the creativity, knowhow, technology and financial resources from all of society is necessary to achieve the Sustainable Development Goals in every context [1]. In view of this, in the context of the integration of the SDGs, financial security is a basic component without which due consideration the SDGs will be unattainable. It can be compared to “circulatory system” of economics and it has an influence on all its components.

The assessment of Ukrainian financial security has an important macroeconomic sense with regard to the need for the adoption of adequate management measures to neutralize threats and to create sound monetary and fiscal policies. At the same time, the actual achievements estimation of financial security should be based on a reliable informational basis which is a key factor for further analysis and forecasting. The informational base of financial safety indicators has been summarized. An adequate assessment of the integral level of financial security is possibly provided to aggregate indicators of the state financial system to be fully covered. At the same time these factors will be of great importance in conditions of military and political instability especially in the context of the hybrid war which is currently taking place in Ukraine and greatly undermines the state’s financial stability.
As peace, justice and strong institutions are one of the goals of sustainable development, financial security management in the conditions of hybrid war in Ukraine is an important factor of economic growth. This reinforces the relevance of research aimed at improving the methodological aspects of the evaluation of financial security additional indicators, taking into account the prevailing hostilities and political factors.

2. Literature review

Adequate management decisions at the macro level to enhance the state financial security should be based on a reliable and relevant information basis.

Foreign and Ukrainian scientists have been thoroughly working out the structure of financial security, its indicators, factors, threats to financial security, ways of their neutralization. The works of scientists Baldwin D [2], Yong J [3], Nesadurai H [4,5], Nanto D [6], Ronis S [7], Wang Z [8] and etc. have a fundamental nature. The authors consider the structure and concepts of financial security support, possible threats and directions for their neutralization basing on the example of the countries all over the world.

As Reutov V, Burkaltseva D at al says, implicit usage of other authors' methods to calculate the financial security level, as well as adhering to benchmarks only are not sufficient to conduct a comprehensive analysis of the state's financial security [9].

A number of Ukrainian scientists believe that lack of consideration of the household’s financial state is another problem (Diachek S and Legenchuk J [10]), referring to the fact that foreign authors, in particular from the US, consider financial security as a sufficient amount of money from citizens and households, which allows them to fit their needs as much as possible. The reason is that the stable functioning of the financial system of the state is ensured. In the research by Piotrowska M [11] the index of financial security has been constructed and was used to determine the level of financial security experienced by working-age families in Poland.

Basing on the analysis of the key balance of payments accounts and several proposed financial security indicators, a ranking of the analyzed economies is suggested by Siemiątkowski P. It is based on the Financial Security Index, which uses linear alignment methods [12]. External financial security of the European Union member states outside the Eurozone.

According to relatively recent events concerning the violation of military-political stability in Ukraine, a limited number of scientific researches in Ukraine [13; 14] devoted to the impact of these events on the state of economic security. This determines analysis of this issue, taking into account the many-side multidisciplinary approach.

In the structure of indicators of financial security Methodology for calculating the level of economic security, approved by the order of the Ministry of Economy of Ukraine [15], there have been following categories as budget, monetary, currency, debt, insurance, fund, banking. Due to the updated Methodology for calculating the level of economic security of Ukraine, approved by the order of the Ministry of Economic Development and Trade of Ukraine [16], the indicated groups of indicators have been saved. However, insurance and equity security are grouped under the category "Security of the non-bank financial market".

Vlasiuk O considers methodological approaches to assessing the financial security of the state in terms of indicators used in world practice, in particular, the World Bank, the International Monetary Fund, the agency Moody's, the leading scientists in this field. The author identifies the main stages of the functioning of the State Financial Security Assessment System. They are the formation of an information base and a system of financial security indicators for the public finance sector; monitoring and analysis of financial security of the public finance sector; the formation of a report on the state of financial security of the public finance sector and the formulation of recommendations for policy adjustments in order to strengthen the sustainability of the public finance sector of Ukraine and to prevent the consequences of the negative impact of financial crises [17].

Information for the development of a database for assessing the financial security of the state should be strategic (Jermoshenko M, Ghorjacheva K [18]). Its obligatory characteristics should be
reliable and adequate. In addition to internal information that would enable the identification of financial security indicators, information on the experience of providing financial security abroad should also be available.

Influence of information on state financial security under a slightly different visions considers Zaharij V [19].

The use of the multiple linear regression model revealed that, among the factors selected by Shkolnyk I, Kozmenko S et al [20] for the analysis – Freedom from corruption, Property rights, Fiscal freedom, Business freedom, Labor freedom, Trade freedom and Investment freedom – two factors with the highest influence on the country's financial security were identified: for Poland – Freedom from corruption and Business freedom, due to high correlation between all factors and the signs of multi collinearity; and for Ukraine – Business freedom and Trade freedom, due to low correlation among all factors.

Lepers E & Serrano A allow that the financial system of the emerging economies has substantially developed and deepened. They construct an index of vulnerabilities in emerging countries, relying solely on data available at international organisations. The authors group indicators around four poles: valuation and risk appetite, imbalances in the non-financial sector, financial sector vulnerabilities, and global vulnerabilities [21].

Among the Goal Targets of Sustainable Development are the following: by 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime; substantially reduce corruption and bribery in all their forms [1].

As noted Meidutė-Kavaliauskienė I, Dudzevičiūtė, G, Maknickienė N, military and demographic estimations and future projections allow government to incorporate information into planning and sustainable development policy [22].

Research (1) focused on security effects of military spending, because a stable security situation is essential in respect of market efficiency [23-24].

Given the multidisciplinary nature of financial security, as well as the lack of a unified approach to its evaluation, the issue of establishing the basis of financial security indicators as an informational base for its management, remains opened. This requires a clear generalization of the influence of military and political instability factors at the state of financial security, which should be expressed in the formulation of additional indicators that would characterize this influence [25-26].

3. Material and Methods

The purpose of the article is to reveal the influence of military and political instability on the state of financial security of Ukraine and the corresponding adaptation of information provision for the calculation of financial security for the needs of public administration.

The authors consider financial safety as a system with a need for system analysis. Because of using the number methods during the system analysis, the same it is underlined by expert evaluations. In this article it has been formulated models of the system of financial state safety informational security, and also the number methods used approve some separate aspects of such system functioning. This way, not only authors’ subjective opinion has been used but also objective data achieved in the process of investigation.

To assess the impact of military and political events on the state financial security the authors analyzed the impact of defense spending on the integral level of financial security through the method of correlation-regression analysis. Using the Fischer criterion and Student's criterion, the adequacy of the model was checked.

The management of state financial security should combine elements of such approaches as procedural, systemic, functional and situational. In our opinion, it should be based on regulations on which the financial security as a system is defined.

The material basis of financial security as a system is a set of its components, grouped by economic content and security levels (Fig. 1).
Figure 1. The role of the information basis in the functioning of the financial security system.

The material basis determines the status of financial security, which is formed basing on the influence of economic and noneconomic factors. This impact can be both positive (to produce...
opportunities for strengthening financial security) and negative (to promote the emergence of threats to financial security).

The informational basis of financial security ensures the ordering of the system. Informational basis provides management of the processes determining the integral level of financial security. With the help of the informational basis, the following functions of the financial security system have been ensured:

1. Formation of system memory. The database of safety indicators allows, basing on their analysis, to identify key trends in the development of the system and to simulate economic processes.

2. Collection, processing and analysis of primary information. Obtaining information of the activities of business entities as the primary links of the economic system, in relation to the implementation of macroeconomic indicators, is a prerequisite for determining the state of financial security.

3. Production of new information on the status of the system. The current information and databases of previous periods, based on the developed models of development of key subsystems, allow carrying out short-term and long-term forecasts of the functioning of the system, and also provide the opportunity to make management decisions at the macroeconomic level.

4. The information basis is exposed to factors that may distort information. Consequently, the data on the state of financial security will be misleading which in turn leads to incorrect management decisions. Another group of factors affecting the information base are the factors of military and political instability. In particular, sharp exchange rate fluctuations significantly change the cost performance. The growth of defense spending leads to the so-called "displacement effect", it is the replacement of other items of expenditures with defense of these expenditures. This in the future has consequences for other areas of activity that have not received financing in connection with military events. The formation of an information base should also take into account the share of capital of the aggressor country in the financial sector. Even with satisfactory financial stability indicators, its high share may lead to unpredictable consequences for financial system of the country.

4. Material and Methods

In the conditions of the current military and political situation in Ukraine, it is reasonable to use this method to identify weaknesses in economic security in general and in financial security, in particular, due to military events. This will make it possible to have a relevant information base for political and economic decision making at the macro level.

The significance of the influence of military-political factors on the state of financial security of Ukraine is characterized by the dynamics of indicator of financial security (Fig. 2).

As we see from the figures, the value of financial security deteriorated significantly in 2014. This is due to the deepening economic crisis which appeared on the basis of both political factors connected with the revolution of dignity in Ukraine, and as a result of the annexation of the Crimea, the partial occupation of the East and the hybrid war between Russia and Ukraine. In accordance with these processes the share of military expenditure in GDP of Ukraine has increased dramatically since 2014 (Fig. 3).

Results of the correlation-regressive analysis of the dependence between financial safety from the military expenditure level show close connection between the investigated sighs (Table 1).

The authors’ investigations seem that correlation coefficient is 0.66, that determines close connection between financial safety and defense financial expenses level. Index of determination 0.44 shows that model data corresponds the reality. Standard error in the financial safety level evaluation is – 0.019. According to the criterions of Fisher and Student, $F_{fact} > F_{crit}$, $|t_{fact}| > t_{crit}$, the achieved line model is significant.
Figure 2. Dynamics of financial security indicator of Ukraine in 2010-2020.

Source: formed on the basis [27].

Figure 3. Dynamics of the military expenditure of Ukraine in 2010-2020.

Source: formed on the basis [27].
Table 1. Results of the correlation-regressive analysis of the dependence between financial safety from the military expenditure level.

| Index                        | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Financial security (Y)       | 42   | 47   | 47   | 50   | 40   | 35   | 38   | 40   | 45   | 42   | 40   |
| Military expenditure (% of GDP) (X) | 1,902| 1,534| 1,613| 1,579| 2,245| 3,251| 3,15 5 | 2,884| 3,192| 3,522| 4,129|
| Correlation coefficient      | 0,66 |      |      |      |      |      |      |      |      |      |      |
| Determination coefficient    |      | 0,44 |      |      |      |      |      |      |      |      |      |
| Standard error               |      | 0,019|      |      |      |      |      |      |      |      |      |
| F test results               |      |      |      |      |      |      |      |      |      |      |      |
| $F_{fact}=6,97, F_{crit}=5,11$ |      |      |      |      |      |      |      |      |      |      |      |
| T-test results               |      |      |      |      |      |      |      |      |      |      |      |
| $|t_{fact}|=2,6, t_{crit}=1,83$ |      |      |      |      |      |      |      |      |      |      |      |

Consideration of the factor of military-political instability for the state financial security management should be carried out in the following sequence: determination of the list of military-political factors influencing financial security; the formation of a list of indicators that would describe the impact of identified factors; determining the nature of the indicators (stimulator, where the stimulator); providing indicators of critical values; adjustment of weighting factors for computing financial security components taking into account new indicators; substantiation of the sources of formation of input information for the calculation of indicators; an assessment of the adequacy and reliability of the primary information to determine aggregate indicators.

Each component of financial security will have factors of the war influencing, which one way or another will ultimately adjust the integral indicator of financial security. From the author’s point of view, the Methodology for calculating the level of economic security, needs additional indicators, which will be formed basing on the factors of the military security influences, with certain critical values. Informational basis for calculating aforementioned indexes is depicted in the Table 2.

Table 2. Informational basis for calculating indicators of financial safety, connected with military-political instability

| Index, proposed by authors                                      | Index calculating order                                      | Informational basis for index calculating                  |
|----------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|
| The share of costs for maintaining armed forces to GDP, percentages | State budget expenses for the defence, million UAH/ GDP, million UAH x 100 | Indexes of State budget execution, ‘Ukrainian GDP’        |
| The share of capital of an aggressor country in the structure of bank capital | Sum of inserted capital of aggressor-state in the banking capital of Ukrainian banks, million UAH / General banking capital, million UAH | Money-credit statistic, National Bank, Information of statistic service ‘Ukrainian GDP’ |
| Total amount of financial resources exportation to the aggressor country, billion US dollars | -                                                                 | Calculations of Ministry of Economics and development,    |
| The ratio of external debt to the aggressor country to GDP, percent | The volume of outer debt for aggressor-state, mln dollars USA x medium course grivna to dollar / GDP, million UAH x 100 | Gross outer debt of Ukraine, National Bank, ‘Ukrainian GDP’, Medium gryvna course, National Bank |
| The share of the capital of an aggressor country in the capital of insurance companies, as a percentage | Sum of aggressor-state capital in the insurance companies capital, million UAH / general capital of insurance companies, million UAH | Main indexes of insurance market, Nat committee of financial services |
The indicated indicators according to the Methodological recommendations [16] are indicators of type B, that is, de-stimulators, which means the feedback between the indicator-de-stimulator and the integral estimate.

This is particularly important in today's conditions for Ukraine, while the aggressor country is uniquely identified. For the preventive purposes, it would be advisable to take into account such factors for other countries with the closest economic relations, which can be traced in order to identify possible threatening of economic dependence (Table 3).

Table 3. The values of indicators for rationalization of indicators related to the impact of military and political instability.

| №  | Title of the indicator, unit of measurement | Characteristic values of the indicator |
|----|------------------------------------------|--------------------------------------|
|    |                                          | $X_{krp}^L$, $X_{небезп}^L$, $X_{нездв}^L$, $X_{здв}^L$, $X_{опт}^L$, $X_{R}^R$, $X_{небезп}^R$, $X_{нездв}^R$, $X_{здв}^R$ |
| 1  |                                          | 3 4 5 6 7 8 9 10 11 12               |
| 9.1.1.8 | The share of capital of an aggressor country in the structure of bank capital | 5 10 15 20 30 |
| 9.2.25 | The share of the capital of an aggressor country in the capital of insurance companies, as a percentage | 5 10 15 20 30 |
| 9.3.6  | The ratio of external debt to the aggressor country to GDP, percent | 10 15 20 25 30 |
| 9.4.5  | The share of costs for maintaining armed forces to GDP, percentages | 1,4 1,6 1,8 2 2,1 2,2 2,3 2,4 2,5 |
| 9.6.7  | Total amount of financial resources exportation to the aggressor country, billion US dollars | 0,5 1 3 5 8 |

Note: $L$ (left-hand side) - for indicators that are stimulators, normalization occurs according to the criteria of the left part; $R$ (right side) - for indicators that are de-stimulators, normalization occurs according to the criteria of the right-hand side.
For completeness of integration of the given indicators in the current Methodological recommendations [16] it is necessary to establish critical values according to the scheme given in the specified normative document.

Rationing is carried out by assigning each indicator of characteristic values, in particular:

- $x_0$ is the magnitude of the indicator, which is characterized as a minimum or absolutely dangerous level of economic security and in which the level of economic security is equal to 0;
- $x_{krit}$ is the magnitude of the indicator, which is characterized as a critical level of economic security and where the level of economic security is equal to 0.2, or 20% of the optimal value;
- $x_{nebezpeck}$ is the magnitude of the indicator, which is characterized as a dangerous level of economic security and where the level of economic security equals 0.4 or 40% of the optimum value;
- $x_{nezd}$ is the indicator of an unsatisfactory level of economic security, in which the level of economic security is equal to 0.6 or 60% of the optimal value;
- $x_{zd}$ is the indicator of an indicator, which is characterized as a satisfactory level of economic security, in which the level of economic security is equal to 0.8 or 80% of the optimal value;
- $x_{opt}$ is the magnitude of the indicator, which is characterized as an optimal level of economic security and where the level of economic security is equal to 1, that is equal to the optimal value.

It should be noted that the characteristic values of indicators such as the share of capital of an aggressor country in the structure of bank capital, the country's aggressor capital in the capital of insurance companies, the ratio of external debt to the aggressor country their GDP, the total amount of financial resources exported to the aggressor country offered within the limits of those values defined by the Methodological Recommendations [16] for similar indicators calculated for all foreign capital.

As for the indicator of the cost of maintaining armed forces to GDP, in peacetime, defense expenditures amount to about 1-2%, according to research, is sufficient to maintain defense capability. After the value of this indicator exceeds 2.5%, the effect of the "replacement effect" [27] begins, which negatively affects the financial system of the state [28].

5. Conclusion
The study of modern aspects of the formation of information bases for assessing the financial state security within military-political instability allows to form the following conclusions.

1. Financial security can be considered as a system with its material and informational basis. The material basis of financial security is a set of its components, such as budget, monetary, currency, debt, banking securities, security of the non-bank financial market and both grouped by economic content and security levels. Informational basis of financial security is the non-material essence that ensures the ordering of the system. The financial security information base has been formed by the indicators which produce subsystems of accounting and control, summarized in the system of statistical observation. Informational basis provides management of the processes to determine the integral level of financial security.

2. Formalization of the process of information provision of state financial security management uses such forms: collection and processing of information from primary business entities; the formation of a database for the calculation of indicator indicators; obtaining information on the status of indicators; determining the level of financial security. The financial security of the state as a security of the macroeconomic level which in accordance with the hierarchical approach should aggregate information on the financial security of households, as well as public and private sector entities.

3. The analysis of the indicators of state financial security during the period before the beginning of Russia's military aggression against Ukraine and after that gives reason to believe that the components of state’s financial security are exposed to the factors of military events. Basing on the correlation-regressive analysis, authors proved the connection between financial safety state and state expenses for defense. Therefore, for adequate information security management of financial security, we proposed to make additions to the Methodological Recommendations to adapt these to military conditions. Among such indicators, the authors proposed: the share of expenditures for maintaining the armed
forces in the structure of the state budget expenditures; index of changes in the official rate of the national currency to the monetary unit of the aggressor country; share of capital of an aggressor country in the structure of bank capital; total amount of financial resources exportation to an aggressor country; the ratio of external debt to the aggressor country to GDP; the share of capital of an aggressor country in the capital of insurance companies. Authors proposed methodic of calculating the depicted indexes and informational basis for these calculations.

The following scientific researchers will be devoted to substantiation of the indicated critical boundaries of indicators based on world experience, normative legal basic of Ukraine and authors’ point of view.

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