Approaches to quantifying the conditions of national financial security

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Abstract. In modern conditions, all states of the world face the problem of ensuring national security. The importance of ensuring financial security is a priority for preserving the national integrity of any State. Security as a state of protection from possible threats, in violation of which negative events occur in the external environment and internal structures. Of course, the key component of economic security is the financial security of the financial system, which affects all spheres of economic activity through monetary, commodity-monetary and financial relations. The study reveals an approach to identifying the problems of ensuring the financial security of the state and the factors influencing it. Also, through an ontological approach, the content of financial security itself is considered and attention is paid to quantifying the level of national's financial security; indicators and their limiting quotas are selected and justified. Theoretical and methodological provisions and mechanisms for ensuring the financial security of the state are being developed.

1 Introduction

In modern scientific literature, there is an active discussion on various aspects of ensuring financial security - from defining the essence and content to developing applied models for assessing its level. New trends in the digital and sustainable economy justify the relevance of addressing the national financial security (NFS) issues, which is confirmed by the Presidential Decree issued in December 2015 "On National Security of the Russian Federation". Also, continuing the relevant topic, in 2017 the "Strategy of Economic Security of the Russian Federation for the period up to 2030" was adopted.

The complexity of ensuring economic security is manifested in the multicomponence of one system, including the financial security subsystem, which itself consists of many aggregate characteristics, qualitative and quantitative assessments. To assess the level of NFS, the study shows that it is proposed to use a variety of groups of indicators and indicator parameters, at the same time determining the problem of choosing the right one at a given time and in a given system. The works of Dankiewicz R., Balawejder B., Chudy-Laskowska K., & Britchenko I. (2022), Ahmad S.Y., Sabri M.F. (2014), Lyons A., Grable J., Joo S.-H. (2018), Grigoreva E., Garifova L. (2015), Vaitkus R., Vasiliauskaitė A. (2021), Ermakova E.P. (2017), Burkaltseva D.D., Borsch L.M., Blazhevich O.G., Frolova

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E.E., Labonin I.V. (2017), Alifanova E.N., Evlakhova Yu.S. (2017), Mura L., Daňová M., Vavrek R., Dubravská M. (2017) and many other scientists were devoted to the study of this issue.

2 Materials and methods

In the process of searching for confirmation of the research hypothesis, methods of induction, deduction, analytical and synthetic approach and non-numerical mathematical tools were used. A study was also organized and conducted, during which the expediency of applying the proposed approaches to quantifying the conditions of national financial security (NFS) was substantiated. In addition, methods of analogy and logical inference were used to form the necessary indicators and main conclusions.

3 Results

Ahmad Siti Yuliandi and Sabri Mohamad Fazli [1] in their work conduct a critical analysis of the financial security essence and prove that financial security exists not only at the macro-economic level (state), but also at the micro-economic level (individual or consumer). As a result of the study, S.Y.Ahmad and M.F. Sabri comes to the reasonable conclusion that the definition of the term "financial security" remains vague and controversial.

Robertas Vaitkus and Asta Vasiliauskaitė [2-18] consider financial security as the most important factor in ensuring economic well-being. When choosing specific instruments and methods of public policy, it is necessary to take into account that financial security is formed at both the microeconomic and macroeconomic levels. The authors believe that sustainable economic well-being can be achieved through the use of such models as the threat countermeasures model, the preventive model, and the financial literacy model; model of balance of power, information and resource distribution.

Robertas Vaitkus and Asta Vasiliauskaitė [19] note that until now the category of financial security is unsettled, and also that some scientists introduce the concept of financial insecurity to clarify it.

Eka Ermiskova [9] conducts a comprehensive analysis of scientific approaches to determining the essence of the NFS and comes to the conclusion that financial security is a multidimensional concept that can be viewed from several points of view: as a body of scientific knowledge, as an essential element of national and economic security, as a quantitative parameter of national security, as a certain state of the state's financial system, as well as the economic and political course of the country. It should be noted that the author does not provide his own interpretation of financial security concept.

In our opinion, the NFS is a state of financial relations at the micro- and macroeconomic level that allows one to effectively ensure the conditions for economic growth, well-being, stability of the national financial independence and the system.

Ekaterina Grigoreva and Liliya Garifova [10] focus on the issue of ensuring the economic (and including financial) security of the state by improving institutional support. The authors study the factors of ensuring economic security and its institutional contradictions.

Angela Lyons, John Grable and So-Hyun Joo [13] examine the impact of population aging on the NFS. The authors pay attention to both the general saving behavior of the population and the availability of financial services, digitalization of finance and other factors.

Irina Vaslavskaya and Irina Koshkina [20] consider the formation of NFS by ensuring the sustainable functioning of the national payment system. The authors emphasize that, in accordance with the Decree of the President of the Russian Federation of May 13, 2017 "On the economic security strategy of the Russian Federation for the period until 2030," ensuring the effective functioning of the national payment system is one of the strategic government objectives.

Ladislav Mura, Monika Daňová, Roman Vavrek, Mariana Dubravská [14] note that from a historical point of view, security reflects the state's ability to ensure autonomy and stability and is associated with creating conditions for economic growth. The authors also justify the feasibility of calculating the index of economic freedom, and argue that the financial and economic security of the state depends on the level of economic freedom in the country. The authors also found that the level of the economic freedom index does not depend on GDP or inflation, but is linearly correlated with the amount of public debt. This allows us to conclude that one of the most important factors in the financial security of the state is the amount of public debt.

Robertas Vaitkus and Asta Vasiliauskaitė [19] point out that the NFS depends on regulations and can largely be ensured by improving legal regulation. The authors' use of "panel regression methods" showed that legal regulation in the economic sphere and the state's capacity to combat corruption have a statistically significant impact on financial security and ensure sustainable economic development.

Diana Burkaltseva and co-authors [4] argue that the NFS is impossible without ensuring the financial security of business.

Accordingly, we can conclude that the NFS is an extremely complex characteristic of the country's economic system, depending on a significant range of factors, sometimes not directly related to the financial and economic block.

A separate scientific and applied problem is the quantitative assessment of the NFS. Research by Robert Dankiewicz, Bartłomiej Balawejder, Katarzyna Chudy-Laskowska and Igor Britchenko (2022), Robertas Vaitkus and Asta Vasiliauskaitė (2022), Alifanova E.N., Evlakhova Yu.S. was devoted to this issue. (2017), Nadežda Semjonova (2016), A.A. Zharikov (2021), E.I. Kuznetsova (2023), a team of researchers led by I.V. Manakhova (2019) and other scientists and practitioners. At the same time, there is no agreed approach to assessing the NFS in the specialized literature. Comparative characteristics of the methods for assessing the NFS e studied in this work are given in Table 1.

In Russia, state security issues are regulated by relevant regulations. Thus, the National Security Strategy of the Russian Federation, approved by Decree of the President of the Russian Federation of July 2, 2021 No. 400, regulates the directions and tasks of ensuring national security [15]. In the sphere of ensuring the economic security of Russia, modernization of the Russian economy, creation of high-tech industries, increasing the competitiveness of the national economy, eliminating territorial imbalances, forming an independent financial and banking system, intensifying investment activity, ensuring energy security, reducing the withdrawal of capital abroad, reducing the use of the US dollar carrying out foreign economic activities, increasing the efficiency of using budget funds, etc.

It is assumed that 40 indicators should be used to assess the state of economic security, and this list can be refined if necessary. The economic security indicators include various parameters reflecting the state of social, energy, production, technological, resource, foreign economic and financial components.

Analysis of the list of indicators regulated in [16] showed that the assessment of the state's ability to service public debt, diagnostics of the state of the national financial system, including the banking sector, as well as tax security, security of the insurance and

stock markets remain beyond the scope of attention. A separate problem is the absence in [16] and other regulations of threshold values for indicators of the NFS.

The Federal State Statistics Service of the Russian Federation has posted information on the official website of the department for analyzing indicators of the state of economic security in Russia [11]. This section contains information about the subject of official statistical accounting that generates official statistical information for each indicator, which significantly simplifies obtaining the necessary information. The list of indicators corresponds to the list regulated by the Economic Security Strategy of the Russian Federation for the period until 2030. However, the Federal State Statistics Service of the Russian Federation has not classified the indicators; the threshold values of financial security indicators are not indicated. L.G. Vorona-Slivinskaya and M.V. Lobanov explore the evolution of the Russian scientists views on the selection of quantitative indicators of economic security and the determination of their threshold values. The authors have compiled a list of tasks in the field of ensuring a system of the state economic security indicators [21].

Table 1. Comparative characteristics of methods for assessing the NFS.

NFS indicator	Economic Security Strategy of the Russian Federation for the period until 2030 [16]	A.A. Zharikov [22]	The team under the leadership of I.V. Manakhova [6]	Experts of the Russian Security Council [8, 12]	Center for Financial and Banking Research of the Institute of Economics of the Russian Academy of Sciences [12]	O.G. Blazhevich, S.V. Zhupanova [3] [2)]	Robertas Vaitkus and Asta Vasiliauskaitė [19]	Robert Dankiewicz, Bartłomiej Balawejder, Katarzyna Chudy-Laskowska and Igor Britchenko [5] [3)]	Nadežda Semjonova [17]
Volume of investments as a percentage of GDP	–	–	+	25	–	–	–	–	–
Volume of investments in fixed capital as a percentage of GDP	+	25 [1)]	–	–	25-30	+	–	–	–
Domestic debt as a percentage of GDP	–	30	+	30	–	+	–	–	–

Federal budget deficit, including non-oil and gas federal budget deficit	Budget deficit as a percentage of GDP	Ratio of government external and internal debt as a percentage of GDP	External debt of the Russia, including state external debt	Volume of external debt as a percentage of GDP	Internal public debt of the Russia, public debt of the constituent entities of the Russia and municipal debt
+	+	–	+	–	+
–	–	–	–	25	–
–	+	–	–	+	–
–	5	–	–	25	–
–	3	≤ 60	–	–	–
–	–	+	–	+	–
–	–	–	–	–	–
–	–	+	–	–	–
–	3	60	–	–	–

Inflation rate, % per year	Spending on science as a percentage of GDP	Defense spending as a percentage of GDP	Volume of foreign currency in cash to volume of cash rubles	Money Supply Index (M2)	Money supply as a percentage of GDP	Deficit of the consolidated budget of the constituent entities of the Russia
+	–	–	–	+	–	–
–	2	3	25	–	50	–
+	–	–	+	–	+	–
20	2	5	25	–	50	–
3-4	–	–	–	–	50-70	–
–	+	–	–	–	+	+
–	–	–	–	–	–	–
+	–	–	–	–	+	–
+1,5 p.p [4)]	–	–	–	–	x 2 [4)]	–

Share of non-repayments in the total volume of consumer and mortgage loans as a percentage of the total volume of loans	Ratio of gold and foreign exchange reserves of the Russia to the volume of imports of goods and services	Amount of gold and foreign exchange reserves, billion dollars	Share of external borrowings to cover the budget deficit, %	Current need for servicing and repayment of internal debt, % of budget tax revenues
–	+	–	–	–
–	–	–	–	–
–	–	–	+	+
–	–	–	30	25
≤ 10	–	250	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	–
–	–	–	–	x 2 [4)]

Long-term interest rate of the government bond	Z-score of (threat of bankruptcy)	Banks' return on equity (ROE)	Banks' return on assets (ROA)	Bank capital adequacy ratio	Banking system assets to GDP	General index of legal regulation	Legal regulation (economic index zone)	Corruption Perception Index
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	+	+	+	+	+	+	–
–	–	–	–	–	–	+	–	+
–	+	+	+	+	+	–	–	–
+2 p.p [4)]	–	–	–	–	–	–	–	–

External government debt / Total government debt	–	–	–	–	–	–	–	–	60
GDP per capita	–	–	–	–	–	–	–	–	X 2 [4]
A comprehensive model for assessing financial security	–	–	–	–	–	+	+	+	+

+ - the indicator is considered by the author, but the threshold value is not specified;
[1] indicator is classified by the author as a safety parameter in the industrial sector;
[2] authors consider a significant number of indicators of the financial security of the state (56 indicators), most of which are beyond the scope of this table;
[3] authors do not consider threshold values of indicators, limiting themselves to studying the average levels of indicators.
[4] author set the threshold value by adjusting the average value of the three best indicators in the EU.

One of the tasks scientists see is the need to form a set of indicators of two groups: 10-15 key indicators, on the basis of which the state's economic strategy will be developed, and 30-40 indicators that will be used to predict the economic development of the country. In addition, the authors draw attention to the absence of threshold values for financial security indicators in legal acts and strongly recommend their approval at the state level. But the authors did not propose a specific list of indicators for assessing the financial security of the state.

A.A. Kharikov [22] considers three groups of the state economic security indicators - production, financial and indicators of population living standard. The author includes the following parameters of financial security: volume of domestic debt as a percentage of GDP; volume of external debt as a percentage of GDP; budget deficit as a percentage of GDP; money supply as a percentage of GDP; the volume of foreign currency in cash to the volume of cash rubles. In addition to the listed indicators, the author also includes among the parameters of financial security the volume of defence expenditures as a percentage of GDP and the volume of expenditures on science as a percentage of GDP. The author pays attention to the study of threshold values of the federal financial security indicators. From our point of view, the author's interpretation of the low level of economy monetization is controversial. The scientist believes that the insufficient value of the ratio of the M2 money supply to GDP indicates investors' distrust of banks, the population's low propensity for organized forms of savings, and the insufficient development of non-cash payments. However, it is necessary to take into account that one of the elements of the M2 monetary aggregate is cash in circulation, and it is the cash shortage that can provoke an insufficient level of the M2/GDP indicator. It is also advisable to take into account the speed of money circulation in the national economy. In accordance with I. Fisher's equation, provided that

the real volume of GDP and the velocity of money circulation are stable, the excess money supply will cause the activation of inflationary processes:

$M \cdot V = P \cdot Q = PQ$,

where M is the money supply in circulation;

V is velocity of money circulation in the national economy;

P is price level (inflation index);

Q is real GDP volume (in comparable prices);

PQ is the nominal volume of GDP (in current prices).

Therefore, in our opinion, the threshold value of the M2 money indicator ratio supply to GDP requires careful justification. It should also be noted that the inflation rate, the country's ability to service internal and external debt, and some other aspects of the NFS were left out of sight according to the method [22].

A team of scientists led by I.V. Manakhova [6] proposes using a set of 24 indicators to assess the economic security of the state, which is somewhat inconsistent with the provisions of the "Economic Security Strategy of the Russian Federation for the period until 2030". The security characteristics of foreign economic relations and some other parameters remained outside the scope of attention. The authors did not pay attention to the study of financial security indicators threshold values.

E.I. Kuznetsova [12] notes that various threshold values of the financial security indicators are common in the specialized literature. The author examines the indicative list of economic security indicators developed by experts of the Russian Federation Security Council, and also studies the list of the financial security indicators proposed by specialists from the Center for Financial and Banking Research of the Institute of Economics of the Russian Sciences Academy. The author studied threshold values for both sets of indicators. As follows from the materials in Table 1, the methods under consideration differ significantly from each other both in the range of indicators and their threshold values.

The team of authors under the leadership of S.A. Konovalenko [8] also studies the range of the state economic security indicators, including its financial component, proposed by experts of the Russian Federation Security Council. The authors note that the methodology for calculating critical values of financial security indicators is extremely complex, and the threshold values of these parameters are quite subjective. Scientists note that the values of indicators for individual developed countries (or a group of them), the best historical values for the Russian economy, or independent assessments of various authors are sometimes taken as limiting values, which, of course, significantly complicates the diagnosis of the NFS level.

The authors included the growth rate of such indicators as GDP, real household consumer spending, central bank assets and assets of other depository organizations, monetization coefficient, public debt, consumer price index, national stock indices, etc. as basic indicators of national financial security. In the second specific block, the authors propose to include indicators that reflect the country context, national interests and threats to national security.

As a result of a critical analysis of the works of L.G. Vorona-Slivinskaya and M.V. Lobanova (2009), A.A. Zharikova (2021), I.V. Manakhova at al. (2019), E.I. Kuznetsova (2023), S.A. Konovalenko at al. (2023), E.N. Alifanova and Yu.S. Evlakhova (2017) we have established that these scientists consider only individual indicators of theNFSor their group; the authors do not develop a comprehensive integrated model for assessing the NFS. From our point of view, the use of the method of integral methodology for assessing the NFS significantly improves the quality of analytical research, as it allows us to give a consistent, comprehensive picture. The values of individual indicators may provide contradictory information about of the NFS level (for example, the expansion of

inflationary processes may occur against the backdrop of an increase in the monetization level of the economy).

In his work O.G. Blazhevich and S.V. Zhupanova [3] present the results of an in-depth scientific study aimed at studying the essence, features and principles of the NFS, the structure of government bodies providing it in the Russian Federation, the main components of theNFSand assessment methods. The authors also note that it is possible to construct a model of an integral indicator of theNFSusing a graphical method (that is, by calculating the area of the NFS polygon).

Robertas Vaitkus and Asta Vasiliauskaitė [22] propose a model for assessing the NFS, which is based on the corruption perception index, the legal regulation index (economic zone), and the general legal regulation index. The authors also assess the influence of the time factor on changes in the level of NFS.

Robert Dankiewicz, Bartłomiej Balawejder, Katarzyna Chudy-Laskowska and Igor Britchenko [5] point out that the concept of financial security is basic, as it characterizes the current state of the country, public finances, and the functioning financial system. However, in the process of research, the authors note that the key element of the state's financial system is the banking sector, and focus on studying the performance indicators of the banking system. In our opinion, the model developed by the authors for assessing the NFS seems somewhat controversial. The authors propose to use the ratio of banking system assets to GDP as a measure of theNFS[5]. Without denying the significant role of the banking sector in the country's financial system, it is also necessary to remember such areas as public (or state) finance, household finance, as well as finance of enterprises and organizations, but their operating parameters have been beyond the attention of scientists. In addition, the authors, in the process of regression analysis, found that the greatest relationship was found between the resulting indicator (Y) and:

- level of monetization X2 (correlation coefficient was 0.89);
- ratio of total public debt to GDP X1 (the correlation coefficient was 0.76);
- capital adequacy ratio X3 (correlation coefficient was 0.58);
- annual inflation rate X7 (correlation coefficient was 0.54).

However, variable X1 was not included in the final model, and variable X3 was included with a negative sign, although a direct interdependence was revealed. Also, the developers did not propose threshold values for the resulting indicator. These circumstances make it difficult to practically apply the authors' model to diagnose the level of NFS, although, of course, this work has a scientific perspective.

In our opinion, the work of Nadežda Semjonova [17] deserves special attention. The author has developed a model for assessing the NFS, which is based on such financial and economic indicators as the ratio of public debt to GDP, the ratio of debt servicing costs to tax revenues, the state budget deficit to GDP, the inflation rate, the rate on long-term government bonds, the ratio of external and total government debt, government debt per capita, and money supply to GDP ratio. This allowed the author to take into account various components of NFS - budgetary, tax, inflation, and also take into account the country's ability to service public debt and the dependence of its economy on foreign creditors. For each indicator, the author justified the threshold value, and the model included the relationship between the actual and threshold values of the parameters. By applying the method of expert assessments, scientists determined weighting coefficients for each parameter. The particular value of the model is the possibility of an unambiguous interpretation of the results of its application - if the values of all parameters coincide with the threshold ones, then the value of the summary indicator reaches 1.0. A decrease in the value of the summary parameter will indicate an increase in the financial security of the state, and an increase will indicate an increase in financial instability. The undoubted advantage of the model proposed by the author is its clarity, relative ease of use,

transparency and unambiguity of the results obtained. However, the foreign economic component of financial security, as well as the state of the financial system and the insurance market of the state, remained beyond the attention of the scientist.

As a result of the study, we identified theoretical and applied problems in the field of diagnosing financial security. To solve them, in our opinion, it is necessary to classify the indicators of the NFS, select the most informative parameters, justify the threshold values of theNFSindicators and enshrine them in legislation, as well as develop a comprehensive model that allows diagnosing the level of NFS from negative influences of internal and external factors.

4 Conclusion

A critical analysis of modern domestic and foreign specialized literature has made it possible to identify the main problems in the field of NFS and outline ways to solve them.

1. Until now, there is no consensus among experts regarding the essence and formulation of the NFS. In our opinion, the NFS is a state of financial relations at the micro- and macroeconomic level that allows one to effectively counter internal and external threats, provide conditions for economic growth and well-being, maintain the stability of the national financial system and maintain financial independence.

2. The list of indicators used to assess the level of NFS is very vague. A universal range of indicators that allows us to assess the various components of theNFSas a comprehensive characteristic of the country's security from external and internal financial threats does not exist in world theory and practice to date. The development of a set of theNFSindicators will provide a comprehensive study of theNFSand the factors influencing its level.

3. Determining threshold values of financial security indicators most often remains beyond the attention of scientists. The proposed maximum levels of theNFSindicators differ significantly from each other, which not only makes it difficult to diagnose the level of NFS of a particular state, but also prevents the comparison of different countries in terms of the NFS degree. The formation of a set of indicators threshold values, as well as their approval at the legislative level, will help level out procedural difficulties and ensure transparency, unambiguity, understandability and comparability of the assessment of the NFS.

4. Currently, there is no comprehensive model that allows a comprehensive diagnosis of theNFSlevel. The unconditional feasibility of forming such a model is due to the risk of obtaining conflicting data on the level of NFS based on a study of individual parameters. The formation of integrated models for assessing the NFS will significantly increase the efficiency of diagnosing the NFS of Russia, as well as optimize the development of policies for its provision and maintenance.

In addition, the conducted theoretical analysis of the essence and assessment of financial security can serve as the basis for further empirical research in this area. The development of a range of individual indicators and the formation of an integrated model for diagnosing NFS will be the subject of further scientific research by the authors of this work.

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