THE ACADEMY OF ECNOMIC STUDIES OF MOLDOVA

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INTERNATIONAL FINANCIAL INSTITUTIONS AND THEIR ROLE IN THE DEVELOPMENT OF THE ECONOMIC SYSTEM OF THE REPUBLIC OF MOLDOVA

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The abstract

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CONTENTS

1. CONCEPTUAL GUIDELINES FOR THE RESEARCH

The relevance of the research topic. In modern financial and economic conditions, the role of International Financial Institutions (IFIs) in ensuring stability and progressive development of the world economic system is objectively increasing. The global economic crisis of 2008 and the consequences of the COVID-19 pandemic caused a serious reflection on the policy of both the entire system of the global world economy and its financial component. IFIs, which were created to regulate international economic relations with the basic goal of developing international cooperation and ensuring the sustainable development of the world economy, were not quite ready to prevent the spread of such global crisis phenomena. In connection with these challenges, it became necessary to reform the institutional foundations of the international financial system, primarily global IFIs, not only taking into account the interests of developed countries, but also taking into account the interests and characteristics of the economic development of countries with emerging market economies.

In the conditions of global crisis phenomena, countries with developing market economies are the first to find themselves in a very difficult financial and economic situation. In this regard, the Republic of Moldova, in the process of reforming the economy, in order to solve the urgent financial and economic problems that have arisen, as well as to conduct an effective financial and economic policy, objectively needs the support of IFIs on acceptable terms and related recommendations for the development of its economic system, which determines the **relevance** of the research problem.

The degree of scientific development and identification of problems of the research topic. International financial institutions occupy an important place in the development of the economic systems of all countries, which determines the conduct of research in this area by scientific centers and research institutions of the European Union, the USA, Japan, Russia, Romania and, of course, the Republic of Moldova. International and national research centers in the field of economics and finance that were directly involved in the development of this topic are: the Research Department of the World Bank and the European Bank for Reconstruction and Development; Center for Socio-Economic Research, Organization for Economic Cooperation and Development, National Institute for Economic Research of the Romanian Academy of Sciences; Institute of Financial and Monetary Studies „Victor Slăvescu"; Institute of World Economy and International Relations of E.M. Primakov of the Russian Academy of Sciences; Institute of the United States of America and Canada of the Russian Academy of Sciences; Financial University under the Government of the Russian Federation; National Research University Higher School of Economics; National Institute for Economic Research of the Republic of Moldova; Moldovan Academy of Economics; Moldovan State University; Polytechnic Institute of the Republic of Moldova, etc.

The most significant contribution in the framework of the problems of international financial relations was made by such scientists as L. I. Abalkin, J. Attali, J. Baghvati, G. Balasha, I. I. Dumoulin, P. Lindert, J. Sachs, M. Porter, L. Klein, J. Tobin, K. Arrow, L. Taylor, M. Interligater, J. Pinder, S. Fisher, J. Stiglitz, J. Eatwell, L. Altman, S. Cutter, M. Lavigne, F. Perroux, I. P. Faminsky, N. P. Shmelev and others.

Among the scientific works, reflecting the essence of the international movement of capital and foreign direct investment. the most famous are the scientific works of such economists as M. Porter, R. Vernon, K. Akamatsu, as well as the works of such modern researchers as J. Dunning, J. Markusen, E. Helpman, K. Ekholm, J. Tobin.

In addition to the scientific works of foreign researchers, the theoretical basis of this work was the works of leading domestic experts: G. Belostechnik, E. German, D. Moldovanu, L. Kobzar, S. Kirke, B. Kistruga, P. Rosca, highlighting the role of IFIs in the development of the economic system both in the Republic of Moldova and in other emerging market economies.

The study of the role of international financial flows in stimulating the economic growth of the Republic of Moldova was carried out by: S. Bilookaya, G. Iliadi, R. Hincu, O. Stratulat.

The study of the regularity of the investment process both in the Republic of Moldova and in the world is devoted to the works of domestic scientists: Timush A., Bunu M., Gumovski A., Daskalyuk D., Ulyan G., Sukhovich A.

The issues of assessing the financial stability of the Republic of Moldova were studied by R. Perchun and T. Petrova.

Scientific studies developed by the above authors are fundamental developments of a theoretical and practical character. At the same time, the topics studied in the thesis provide us with ample opportunity to study and develop new aspects.

The analysis of scientific research on the topic of the thesis work helped the author to formulate his own opinion on the issues under study, to develop and propose possible methods for the effective use of financial resources of IFIs in the context of the consequences of economic crises and the current geopolitical transformations in the world.

The field of study is determined by the need for efficient use of financial resources of IFIs in ensuring economic sustainability and development of the Republic of Moldova.

The object of the study are IFIs, in particular: the International Monetary Fund (IMF); the World Bank group (The World Bank) consisting of: International Bank for Reconstruction and Development, International Development Association, International Finance Corporation, Multilateral Investment Guarantee Agency; International Center for the Settlement of Investment Disputes.

The subject of the study is the role of the International Financial Institutions in supporting the sustainable development of the economic system of the Republic of Moldova. The research is based on the hypothesis that it is possible to ensure the sustainability of the economic development of the Republic of Moldova by increasing the efficiency of using the financial resources of IFIs.

The purpose and objectives of the study. **The main purpose** of this thesis is to study the role of IFIs in the development of economic systems of countries with developing market economies (on the example of the Republic of Moldova) in terms of determining methods for increasing the efficiency of using financial resources received from these organizations.

To achieve the formulated goal, the following tasks are solved:
1. Analysis of the impact of IFIs on ensuring economic sustainability and development of countries with different levels of economic development.
2. Study of the financial support of the Republic of Moldova to IFIs and trends in its development.
3. Development of a system of key indicators characterizing the economic stability and economic development of modern states.
4. Consideration and development of the main methodological aspects of ensuring economic sustainability and development of the Republic of Moldova in terms of interaction with IFIs.

5. Determination of the degree of influence of financial resources received from IFIs on the economic stability and economic development of countries with developing market economies.

Formulating recommendations and ways to improve the efficiency of using financial resources of IFIs to ensure economic sustainability and development of the Republic of Moldova.

In the process of solving the presented problems, it is supposed to use the following **research methods**:

• statistical data analysis, economic and mathematical tools and the use of economic analysis to characterize the interdisciplinary and fundamental-applied type of research;
• the method of induction and deduction, empirical research, analogy, ranking, measurement, decomposition and synthesis to analyze key indicators characterizing the economic sustainability of the country's economic development, as well as to study the degree of influence of IFI financial resources on them. In this case, the study will be of a causal nature;
• Quantitative and qualitative analysis of data to study the economic and financial state of the country;
• system analysis, providing disclosure of the essence of economic processes; generalization and identification of connections and patterns.

Among the special methods, economic and mathematical methods were used in the process of analyzing and assessing the stability of the banking system of the Republic of Moldova.

The scientific novelty. The most significant results with scientific novelty are as follows:

1. Based on the systematization of scientific works on IFIs, it is proposed to supplement the considered theoretical apparatus with the following concepts (developed in this study), which reflect an increase in the effectiveness of IFI cooperation with emerging market economies:
• determination of the current and forecast scientifically-based assessment of the sustainability of the country's economic system;
• assessment of financial support of IFIs based on indicators of sustainability and development of the country's economic system.
2. The system of financial and economic indicators of the effectiveness of the use of international financial assistance has been adapted, which makes it possible to assess the optimality of the structure of individual sectors of the economy and the economy of the country as a whole.
3. A methodology has been developed for calculating the economic efficiency indicators of international financial assistance in the form of investment projects in which forecast parameters are modeled by fuzzy numbers.
4. A methodology is proposed for assessing the stability of economic systems described by economic cenoses to determine the effectiveness of the use of financial resources of IFIs. An indicator of the stability of economic systems has been developed.
5. A method for optimizing the structure of individual sectors of the country's economy and the country's economy as a whole is proposed, based on minimizing the developed indicator of the stability of economic systems.

6. Recommendations are formulated to increase the efficiency of the use of IFI financial resources and increase the stability of the economic system of the Republic of Moldova on the example of its banking sector based on the cenological analysis and calculation of its economic stability in relation to the key financial and economic parameters of banks: interest income and assets.

The theoretical significance of the study lies in the fact that in order to assess the effectiveness of credit instruments (CI) of the WB and IMF groups, the methodology based on:

- on the predictive parameters of CI - in this case, these parameters are presented in the form of fuzzy numbers, as well as the calculated efficiency indicator;
- on actual, confirmed parameters – carried out during the implementation of the CI for its monitoring and after the implementation of the CI for its actual assessment;
- taking into account the impact of the implementation of clinical trials on the economic, financial and social spheres of the country.

To assess the stability of the structure of economic systems, a methodology based on the procedures for the cenological analysis of the country's economy and its industries, considered in the form of models - economic cenoses, is presented. Within the framework of this methodology, the author has developed an indicator of the stability of economic systems.

A system of financial and economic indicators has been formulated that makes it possible to evaluate the optimality of the structure of sectors and the country's economy as a whole, reflecting the efficiency of using international financial assistance for its development.

The practical significance of the study lies in the fact that the results of the study can be used by countries with developing market economies (including the relevant state structures of the Republic of Moldova) to improve the efficiency of using financial resources received from IFIs in the process of reforming their economies, conducting an effective financial and economic policy and to solve emerging urgent financial and economic problems.

Approbation of scientific results of thesis research. The results of the thesis research are reflected in the materials of international and national specialized scientific conferences: International Symposium Experience. Knowledge. Contemporary Challenges Romania in the Year of the Centenary. The European and global socio-economic Context" (Bucureşti, 2018); 8th International Conference on Application of Information and Communication Technology and Statistics in Economy and Education (Sofia, 2018); Materials of the International Scientific and Practical Internet Conference "Trends and Prospects for the Development of Science and Education in the Context of Globalization": Collection of scientific works. Issue. 53. 506 p. (Pereyaslav, Ukraine, 2019); International scientific and practical conference "Internal Control in Financial Institutions in the Context of the New Regulatory Framework and Technology Challenges" (Chisinau, 2019); XXIX International scientific conference EUROPEAN RESEARCH (Penza, Russia, 2020).

The structure of the thesis. The thesis consists of an introduction, three chapters, conclusions and suggestions, bibliography, appendices.

The key words: International Financial Institutions, international finance, international financial assistance, emerging markets, economic system, economic stability, performance indicator, economic cenosis, rank parametric distribution, hyperbolic *H*-distribution, fuzzy numbers.

2. CONTENT OF THE THESIS

The first chapter of the thesis research „Conceptual foundations for the need for the participation of International Financial Institutions in the economic development of countries" considers the theoretical and conceptual foundations for the formation and development of IFIs, their classification, as well as their current state, goals and foundations of activities in the development of economic systems. An analysis of the financial support of the Republic of Moldova by international financial institutions was carried out.

The theoretical foundations for the formation and functioning of IFIs at the present stage of economic development, as part of the global financial system, are determined by its current macroeconomic concepts of economic and financial relations, including international capital flows. It is believed that the founder of modern macroeconomic theory and the conceptual basis of the international movement of capital is John Maynard Keynes, who outlined the basic concepts and principles that are still relevant to modern macroeconomics. He determined that the movement of financial flows between countries mainly arises from the inequality of their balance of payments. Followers of the Keynesian school believe that the international movement of capital mainly depends on the values of interest rates.

In accordance with modern neo-Keynesian theory, financial assistance to developing countries stimulates business activity, both in the countries of export of capital and in importing countries. Since this export is hampered by significant risks (economic, political, etc.) in many developing countries, Western governments need to implement protectionist measures for the export of capital.

The well-known economist J. Stiglitz, a supporter of modern Keynesianism, substantiated that for unprepared countries, namely those who do not have a "correct financial and economic policy", the free international movement of capital in relation to them can lead to significant negative economic and financial consequences.

The representative of the neoclassical direction of the theory of monetarism and neoliberalism in the economy M. Friedman believes that the state should interfere as little as possible in market economic relations, and regulate only the amount of money in circulation in the financial and economic system.

The considered macroeconomic theories, in the conceptual framework of which MFIs operate, are in continuous development and modernization in accordance with changes in the current world economic and financial relations. The consequences of the recent global financial and economic crises (2008, COVID-19) and the ongoing geopolitical transformations in the world have shown that the main current, so-called orthodox (mainstream) macroeconomic theories (Keynesian and neoclassical schools, monetarism) are not fully reflect the ongoing real economic processes. As the practice of recent financial and economic crises has shown, market mechanisms do not automatically bring a perturbed economic system into equilibrium after being exposed to exogenous perturbations (external factors) in the form of crisis phenomena.

In this regard, a heterodox direction of economic theory has arisen, in which the economic system is considered to be continuously evolving and subject to constant changes. To maintain a dynamic balance and progressive development of the economic system, the „heterodoxes" propose using administrative measures - non-market methods of anti-inflationary policy.

In this regard, it is proposed to supplement the considered theoretical apparatus with the following concepts developed in this study, which reflect the increase in the efficiency of financial cooperation between IFIs and countries with developing market economies:

- determination of the current and predictive scientifically based assessment of the sustainability of the country's economic system;
- evaluation of the financial support of MMI based on indicators of sustainability and development of the country's economic system;
- Formation of recommendations on financial cooperation with IFIs, focused on obtaining specific results, taking into account the specifics of the country's economic development.

The thesis analyzes the international financial institutions that are directly related to the objectives of the thesis and have a fairly strong impact on the economy of the Republic of Moldova: International Monetary Fund, IMF; The World Bank group (Table 1).

Table 1. The main global IFIs: the IMF and the World Bank Group, formed as a result of the Bretton Woods Conference.

Date of foundation	Name	Specialization, headquarters
1944	International Monetary Fund, (IMF)	Specialized agency of the United Nations, Washington
1944	International Bank for Reconstruction and Development (IBRD)	World Bank Group, United Nations Specialized Agency, Washington
1945	The World Bank	World Bank Group, Washington
1956	International Finance Corporation, (IFC)	World Bank Group, Washington
1960	International Development Association, (IDA)	World Bank Group, Washington
1966	International Centre for Settlement of Investment Disputes, (ICSID)	World Bank Group, United Nations Specialized Agency, Washington
1988	Multilateral Investment Guarantee Agency, (MIGA)	World Bank Group, United Nations Specialized Agency, Washington

Source: Made up by the author based on data from the official websites of the IMF and the World Bank Group

The well-known Nobel laureate in economics, J. Stiglitz, criticized the activities of the IMF and the World Bank. In his opinion, the policy of the World Bank and the IMF, pursued in relation to developing countries, is erroneous and does not bring the desired results. To substantiate his arguments, he cites the practical example of Russia and China. In the 1990s, the Russian government followed the recommendations of these

organizations in everything and experienced a sharp drop in real incomes of the population, and China rejected these recommendations and, as a result, is experiencing an economic boom.

Financial support of the Republic of Moldova to IFIs began immediately after its entry into these organizations. Currently, the Republic of Moldova has agreements on almost all special IMF lending facilities:
- Compensatory and Contingency Financing Facility (CCFF);
- Systemic Transformation Facility (STF);
- Stand-by (SBA);
- Extended Credit Facility (ECF);
- Rapid Financing Instrument (RFI)
- Rapid Credit Facility (RCF).

ECF and EFF loans are applied by the IMF in order to correct a serious imbalance in the balance of payments, reduce poverty and promote economic growth. Since 1996, these credit facilities have been regularly used by the IMF for lending to Moldova. The last lending for them was made on December 20, 2021. Accordingly, the use of these credit mechanisms shows that from 1996 to the present, the problem of the imbalance of payments and poverty reduction in Moldova has not been finally resolved.

Figure 1 shows the graph of changes in the debt on the IMF loan of the Republic of Moldova in SDR (the means of payment issued by the fund - as of 19.08.2022, the SDR rate was 1.30909 US dollars).
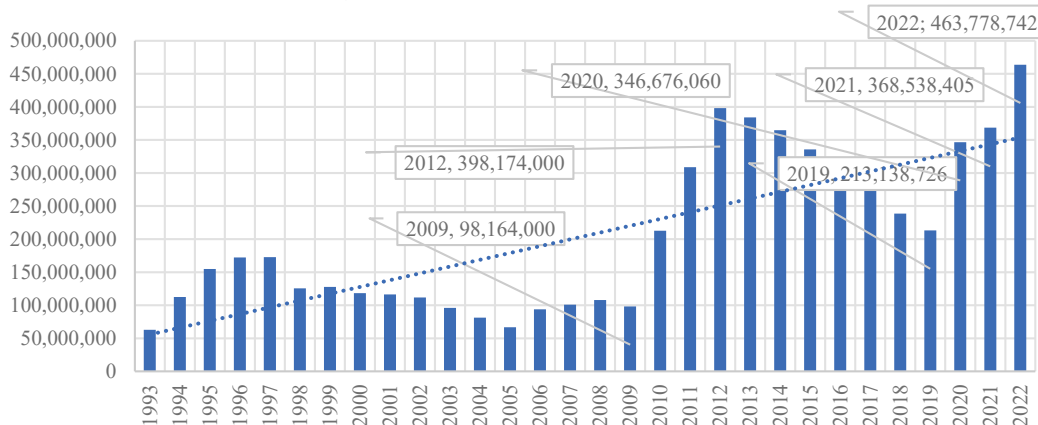

Figure. 1. Change in the total debt of Moldova under the IMF loan
Source: made up by the author based on the data from Moldova, Republic of:
IMF Credit Outstanding (2022)

The data of the graph in Figure 1 show that since 1993 the total debt of the Republic of Moldova under various IMF loans has an upward trend. For the incomplete 2022, as of July 31, 2022, the debt reached an absolute maximum and amounted to 463.779 million SDR. The consequences of the global economic crisis of 2008 affected the financial and economic situation of the country - the debt to the IMF increased sharply: from 98.164 million SDR in 2009 to 398.174 million SDR in 2012 (the second maximum for the entire time of partnership with the IMF). The economic and social consequences of the COVID-19 pandemic and geopolitical tensions in 2022 led to a significant increase in Moldova's debt to the IMF compared to the pre-crisis 2019. In seven months of 2022, as of July 31, 2022, the country's debt on IMF loans reached all-time high of 463.79 million SDRs

($615.8 million). Thus, during periods of crisis and financial instability in 2008, 2019 and 2022, in order to solve the urgent financial and economic problems of Moldova and pursue a policy to stabilize its economic system, the IMF sharply increases its financial support to the country. The growth of this financial assistance is reflected by a significant increase in the total amount of the Republic of Moldova's debt to the IMF after 2008, 2019, 2022 and the continuation of its general upward trend, which indicates that the goal of stabilizing its economic system has not been fully achieved.

Also, there is an upward trend in the volume of overdue obligations and projected payments of the country on loans to the IMF. As of 31/07/2022, the maximum payment volumes are forecast for 2024 at 85.5 million SDRs, which is 111.93 million USD at the exchange rate as of 19/08/2022. Such a significant amount of payments on overdue obligations means that in the future the country may experience certain economic and financial problems. Moreover, if borrowing from the IMF does not lead to a significant development of the Moldovan economy, then these problems will grow every year. Therefore, the financial resources received by the country from IFIs must be used for its economy with maximum efficiency.

Significant support to Moldova is provided by the World Bank Group, which from 1993 to the present has taken and is taking part in financing 120 projects in various sectors of the country's economy. As of August 21, 2022, the total funding for these projects amounted to USD 2,156.014 million.

The graph in Figure 2 shows that WB Group lending to projects in Moldova since the beginning of the COVID-19 crisis has increased significantly compared to previous years. And the most significant increase in lending volumes occurred in 2022. For 4 months of 2022, WB lending to projects in Moldova has already reached its absolute maximum values. The World Bank is trying to stop the negative factors associated with the conflict in Ukraine and geopolitical crises.
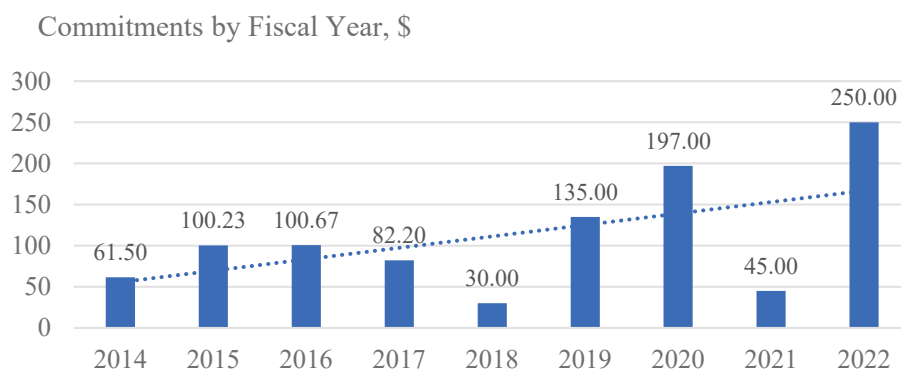

Figure 2. Commitments of the Republic of Moldova by financial years to the World Bank Group
Source: made up by the author according to Moldova Overview: Development news, research, data. The World Bank Group (2022)

The largest number (39) of WB-financed projects falls on agriculture, the key sector of the Moldovan economy. In second and third place are projects related to climate change (16) and competition policy regulation (15). The number of other financed projects on economic topics is approximately equal. Recently, the bulk of the WB financial resources have been directed to the implementation of urgent medical projects and projects related to the elimination of the consequences of the socio-economic crisis from the COVID-19 pandemic, as well as projects on emergency response policy, the country's resilience and

competitiveness in response to crises related to the conflict in Ukraine. This enables the government not to divert significant financial resources from other important socio-economic programs for the development of the economy.

The second chapter „Methodological foundations for the participation of International Financial Institutions in ensuring the sustainable development of countries" considers the specifics of financial support of IFIs for countries with different levels of economic development, proposes a system of indicators and indicators of economic sustainability and economic development of modern states, develops methods for: calculating indicators of the economic efficiency of using financial resources for the implementation of investment projects in which forecast parameters are modeled by fuzzy numbers; assessing the stability of economic systems described by economic cenoses. An indicator of the stability of economic systems is formulated. The IMF and the WB Group take into account in their financial cooperation with client countries their level of economic development, which is determined on the basis of a criterion equal to the Gross National Income (GNI) for the year per capita (GNI per capita - GNIpc) in US dollars. Table 2 shows the classification of countries according to this criterion as of FY 2019 (FY 2018 data in parentheses). New values of the levels of economic development of countries are determined by the WB as of July 1 of each year and remain fixed for 12 months.

Table 2. Classification of countries according to their level of economic development

The name of the level of economic development of the country.	Values of nominal GNI in US dollars per capita per year (GNI per capita)
Low income	GNIpc ≤ 995 (1,005)
Lower middle income	996 (1,006)< GNIpc ≤ 3,895 (3,955)
Upper middle income	3,896 (3,956)< GNIpc ≤ 12,055 (12,235)
High income	12,055 (12,235)< GNIpc

Source: compiled by the author according to The World Bank Group website.

Based on the Development Policy Lending Regulation OP/BP 8.60, introduced in 2004, the WB carries out financial transactions for economic development. Since 2014, these loans have been called Development Policy Financing (DPF). Lending under these loans is carried out on an urgent basis for a period of 1 to 3 years in order to support the structural and institutional reforms necessary for the sustainable economic development of the country.

In response to crises, changing economic conditions, and the needs and requirements of partner countries, the IMF is constantly improving its financing methods. Currently, the IMF lending tools are mainly used to provide financial support to countries affected by the recent crises (2008, 2019 and 2022), as well as to prevent and prevent the consequences of these crises. Existing IMF lending instruments are designed to meet the varying needs of the balance of payments, as well as to respond to the specific financial and economic circumstances of various partner countries.

IMF lending instruments are divided into non-concessional lending instruments for emerging market economies and concessional lending instruments for low-income countries.

The procedure for allocating financial assistance to member countries by the Fund is based on two methods of macroeconomic analysis: "ex ante" - predictive modeling of economic phenomena based on theoretical concepts in order to determine the formation of predictive macroeconomic parameters; "ex post" - determines the macroeconomic state of the economy in the past and current period based on actual (confirmed) economic parameters.

Currently, the loans implemented by the WB group and the IMF for client countries with developing market economies represent almost the entire possible range of financing to provide financial assistance for the development of the economy and economic institutions, as well as for various aspects of the socio-economic development of these countries.

To assess the results of the implementation of loans, their impact on the economic stability and economic development of the country, a system of indicators is formed that characterizes the main (key) parameters of the economy in question. However, there is still no generally accepted definition of the concept of "economic sustainability". There are also no uniform methodological developments and methods for measuring and evaluating it. Obviously, economic development is not feasible without economic sustainability.

Taking into account the existing definitions of economic sustainability in modern economic literature, we formulate the concept of sustainability and the development of the country's economic system. *Under the economic stability and development of the economic system (economy) of the country for a certain period of time is understood its ability to maintain the values of the main (key) economic indicators that characterize its progressive development at this time stage due to the achieved economic potential and the implemented structure of the economy, as well as the corresponding state regulation.*

The existing systems of indicators for assessing the economic stability and economic development of countries do not fully allow for the assessment of the real economic state and the optimality of the structure of their economies (in the sense of the functioning of the economy with maximum economic stability). Therefore, the author proposes to modify the existing systems of indicators by supplementing them with an assessment of the stability and development of the structure of the country's economy based on the cenological theory, in which the economic system is considered as an economic cenosis.

The assessment of the stability of the economic system under consideration is carried out by comparing the constructed rank parametric distribution of the economic cenosis, built on the basis of empirical data on the key economic indicators of companies in the economic system (revenue, free cash flow, net profit, etc.) and the optimal, so-called classical hyperbolic H– distributions:

$$P(r) = P_1 / r^\beta, \qquad (1)$$

where: *P(r)* is the economic indicator of a company with rank r; P_1 is a constant value equal to the maximum value of this indicator (company with rank 1); β is a rank coefficient that determines the degree of steepness of the *H*-distribution hyperbola. As long-term practice of statistical observations shows, economic cenoses, in the process of their self-organization and evolution in conditions of free market competition, over time tend to a stable hyperbolic *H*-distribution with a rank coefficient $\beta \in [0.5; 1.5]$ (Figure 3).
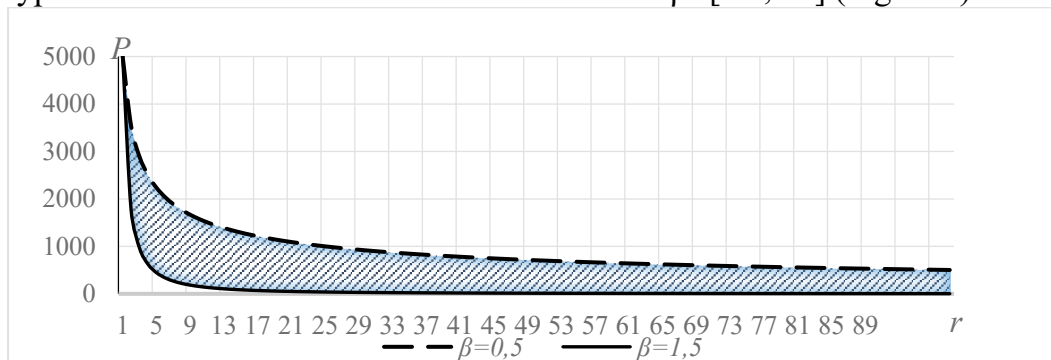

Figure 3. Stability area for rank parametric distributions of economic cenoses.
Source: made up by the author based on formula (1).

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The area in Figure 3 between the curves β=1.5 and β=0.5 is considered stable for the rank parametric distributions of economic cenoses. Economic cenoses reach the most stable states in the case of the so-called "decile ratio" - the ratio of the sum of the highest economic indicators for 10% of companies to the sum of the lowest economic indicators for 10% of companies does not exceed 10.

The proximity of the obtained empirical values of the rank parametric distribution of companies to the hyperbolic *H*-distribution function approximating it is determined using well-known approximation methods (for example, the method of least modules and least squares). The parameters and structure of the constructed rank parametric distributions of the selected economic cenoses of the country and individual economic sectors can serve as an indicator of structural changes in these economies, and can also be used to assess their sustainability.

The study examines the methodological aspects of the participation of IFIs in ensuring the economic sustainability and development of the Republic of Moldova. In order to ensure the economic stability and development of the country, the state structures of the Republic of Moldova face the task of optimal use of the received credit resources, and from the IMF and WB of the optimal implementation of the credit instrument.

The optimal use of the received credit resource is understood as its implementation with maximum efficiency. The effectiveness of the credit resource will be measured by an indicator equal to the difference (ratio) between the achieved (expected) results and the money spent (forecast) to achieve these results in the process of implementing this credit resource. It is believed that the results of the implementation of the credit resource are representable in monetary form.

The implementation of the credit instrument of the WB and the IMF is mainly carried out in the form of projects financed by them, aimed at achieving certain results. In the process of achieving these results, corresponding positive and negative cash flows (Cash Flow - CF) are generated. To determine their effectiveness, methods for evaluating the effectiveness of investment processes are usually used. The most common of these is the Net Present Value (NPV) method.

According to the above definition and taking into account the discounting procedures, the credit resource efficiency indicator will be written as:

$$P_d = \sum_{t=1}^{T} \frac{R_t}{(1+r_t)^t} - \sum_{t=1}^{T} \frac{Z_t}{(1+r_t)^t}, \qquad (2)$$

$$P_r = \sum_{t=1}^{T} \frac{R_t}{(1+r_t)^t} / \sum_{t=1}^{T} \frac{Z_t}{(1+r_t)^t}, \qquad (3)$$

where P_d and P_r are the performance indicators of the credit resource in the form of the difference (2) and the ratio (3) of the expected results discounted at the rate - R_t and the costs - Z_t generated by the CI in the process of its implementation during the time T.

Formulas (2) and (3) are usually used to evaluate the performance indicator at the very beginning of the implementation of a credit resource - in the process of forming an investment project. In this case, the parameters R_t, Z_t and r_t are non-deterministic and have predictive values. Such parameters are usually represented as fuzzy numbers. Upon completion of the project, it seems possible to calculate using formulas (2) and (3) to evaluate its performance indicator by the actual (confirmed) parameters: R_t, Z_t and r_t. As a result of this calculation, we will obtain the actual estimates of the efficiency indicator of the implemented project.

For a general assessment of the economic stability and development of the country, it is advisable to use indicators that reflect the stability and change in the structure of its economic system. The definition of such indicators is carried out on the basis of the

cenological theory, in which the economic system is considered as an economic cenosis. The natural selection and self-organization of the most efficient enterprises of the economic system in the economic cenosis occurs under the influence of a changing external environment, in conditions of market competition for access to the necessary resources and markets. The values of these indicators make it possible to identify the most problematic places, both in individual sectors of the economy and in the entire economic system of the country as a whole.

The study of sustainability and development of the country's economic system based on its models - economic cenosis and rank parametric distribution includes:

- assessment of the dynamics of change in the considered historical time period of the rank parametric distribution and its hyperbolic *H*-distribution;
- identification of key changes in the structure of the economic cenosis based on the analysis of rank parametric distributions;
- assessment of the stability of enterprises in the sector of the country's economy that form an economic cenosis (testing two stability conditions: the parameter β of the approximating hyperbolic *H*-distribution satisfies the inequality $0.5 \leq \beta \leq 1.5$ and the decile ratio is satisfied);
- establishment of causal relationships (if any) between the implementation of the credit resource and the change in the structure of the economic cenosis.

With regard to the economy of the Republic of Moldova, for price analysis it is advisable to consider the enterprises of the most developed agricultural sector, as well as the enterprises of the banking sector, which play a major role in the financial stability of the country.

In the third chapter, "The Impact of International Financial Institutions on the Development of the Economic System of the Republic of Moldova", on the basis of regression analysis, the correlation dependence of the country's GDP and the indicator of the stability of its banking sector on the volume of financial assistance to the Republic of Moldova from the IMF and the WB Group was assessed. An assessment of the economic efficiency of the investment project for the improvement of local roads in the Republic of Moldova, implemented with the WB Group, was obtained. On the example of the banking sector of Moldova, a price analysis and calculations of its economic stability in relation to the key financial and economic parameters of banks: interest income and assets were carried out. Based on these assessments, recommendations are formulated for the implementation of increasing the stability of the banking structure.

This section of the thesis presents a method for generating an information database for calculating the economic indicators of the effectiveness of the use of international financial assistance to the Republic of Moldova based on the methods developed earlier. The information database is formed on the examples of:

- the current targeted investment project on „improvement of local roads" implemented by the WB group in the Republic of Moldova to calculate its performance indicator;
- set of licensed organizations of the banking sector of the Republic of Moldova to calculate indicators characterizing changes in the structure of this industry, as well as its economic stability and development.

On the example of these reports of the banking system of the Republic of Moldova on annual interest income, a method for assessing its economic stability is presented:

- construction of rank parametric distributions of empirical data of the banking system of the Republic of Moldova;

- approximation of rank parametric distributions by hyperbolic *H*-distributions with rank coefficient in the interval β∈[0.5;1.5];
- assessment of the proximity of rank parametric distributions to the optimal hyperbolic *H*-distribution. Figure 4 illustrates an example of approximation of the rank parametric distribution of the interest income of banks in the Republic of Moldova by hyperbolic *H*-distributions.
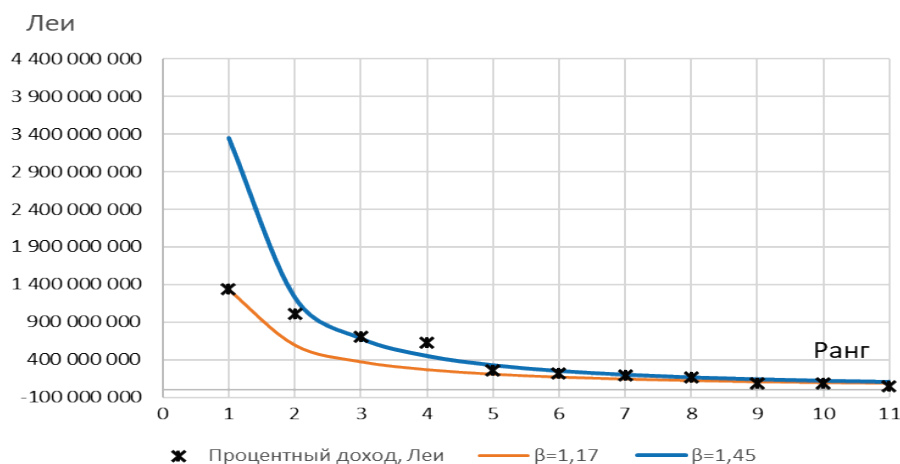

Figure 4. Approximation of the rank parametric distribution of interest income by hyperbolic *H*-distributions.
Source: made up by the author based on data from the reports of the banking system of the Republic of Moldova.

The parameters of the approximating function of the hyperbolic *H*-distribution P1 and β in Figure 4 are determined using the procedures of the least squares method:

$$min \sum_{r=1}^{N}[P_f(r) - P_1/r^\beta]^2, \tag{4}$$

where P_f is the actual data of the financial indicators of the interest income of Moldovan banks for the financial year. If P^*_1 and β^* satisfy condition (4), then the indicator of proximity (deviation) from the optimal (financial and economic stable) structure of the country's banking system in terms of the interest income parameter is determined from the expression:

$$\Pi = \sum_{r=1}^{N}[P_f(r) - P_1^*/r^{\beta^*}]^2, \tag{5}$$

where P_1^*/r^{β^*} is a hyperbolic *H*-distribution with rank coefficient in the interval β∈[0.5;1.5].

This indicator can serve as an indicator of the economic stability of the banking sector, the lower it is, the closer the structure of the banking sector cenosis is to the optimal one. Recall that the optimal structure of the economy is understood as such a structure of the economic system that functions with maximum economic stability.

An analysis of the change in this indicator over the time period of the international financial support to the Republic of Moldova makes it possible to assess its effectiveness in influencing the banking sector as a whole. Meanwhile, the assessment of the deviation of the economic cenosis of banks from the optimal structure of the country's banking system, calculated by formula (4), is not quite correct, because is not dimensionless and depends on the absolute values of the relevant financial indicators, which can vary significantly from year to year. Therefore, the author proposes to introduce a *normalized assessment* of the deviation of the actual economic cenosis from its optimal structure in the form of a stability indicator:

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$$\Pi_n = \sum_{r=1}^{N}[P_f(r) - P_1^*/r^{\beta^*}]^2 / (\sum_{r=1}^{N} P_f(r))^2. \qquad (6)$$

Here, the denominator of formula (5) is the square of the sum of the considered actual financial parameter of the entire banking sector for the corresponding year.

Based on the information base of WB-financed projects in the Republic of Moldova and the methodology for calculating economic efficiency indicators using formulas (2, 3), the economic efficiency is evaluated in fuzzy numbers (interval form) of the investment project implemented by the WB group: Local Roads Improvement Project, P150357 (Project for improving roads local value).

The graph of changes in the values of the economic efficiency indicator in the interval form for given 1% and 4% uncertainties of the initial forecast data is shown in Figure 5.
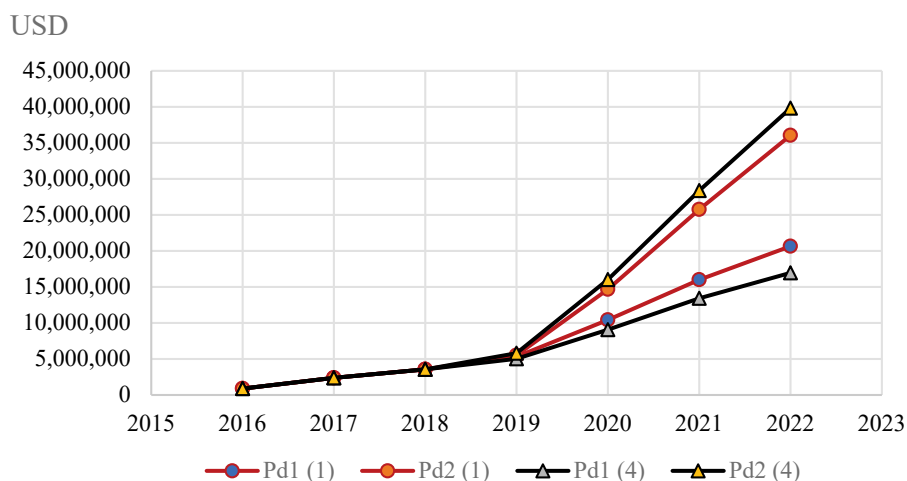

Figure 5. Dynamics of project economic efficiency indicators for given 1% and 4% uncertainties in the initial forecast data.
Source: made up by the author based on WB data and calculations

The graphs of the dynamics of project economic efficiency indicators presented in Figure 5 show that these indicators increase in accordance with the accumulated investments in the project and reach their maximum at the end of the project. This behavior of indicators of economic efficiency is associated with the model used here of the dependence of GDP growth on investment, based on the concept of the Keynesian multiplier. This model gives a fairly rough estimate of the impact of investment on a country's GDP. Nevertheless, the use of this model in this case demonstrates the functionality of the developed methodology for assessing the economic efficiency of various projects implemented by the WB, with limited availability of initial data. Such data include, for example, tax revenues to the budgets of various levels of the country's financial system, due to the implementation of this project. An increase in the calculated predictive interval indicator of economic efficiency is interpreted as an increase in uncertainty with an increase in the forecast time. Calculations of the economic efficiency assessment using this methodology make it possible to identify the most effective projects implemented by the WB Group in the Republic of Moldova and assess their impact on the country's economy.

On the example of the banking sector of the economy of the Republic of Moldova, with the help of the developed methods of price analysis, an assessment of its economic stability and economic development is carried out. For this, the initial database of

informatively accessible key values of annual financial and economic indicators from 2014 to 2020 of the banks of the Republic of Moldova is used.

For each year from 2014 to 2020 and the value of the interest income indicator for the year, rank parametric distributions of the banking sector of the Republic of Moldova are constructed. Based on these rank parametric distributions, a table of changes in ranks by the parameter interest income for the year from 2014 to 2020 is formed (Table 3).

Table 3. Change in ranks (parameter interest income per year) of banks in the Republic of Moldova since 2014 by 2020

№	Name of the bank	Rank 2014	Rank 2015	Rank 2016	Rank 2017	Rank 2018	Rank 2019	Rank 2020
3	B.C. „VICTORIABANK" S.A.	3	3	3	3	4	4	4
4	B.C. „UNIBANK" S.A.	4	--	--	--	--	--	--
5	Banca de Economii S.A.	5	--	--	--	--	--	--
6	BC „BANCA SOCIALA" S.A.	6	--	--	--	--	--	--
7	BC „MOBIASBANCA" S.A.	7	4	4	4	3	3	3
8	B.C. „ProCredit Bank" S.A.	8	5	5	5	5	6	6
9	B.C. „EXIMBANK" S.A.	9	6	6	6	7	7	7
10	„FinComBank" S.A.	10	7	7	7	6	5	5
11	B.C. „ENERGBANK" S.A.	11	8	8	8	8	8	8
12	BCR Chisinau S.A.	12	9	9	10	9	9	9
13	B.C. „COMERTBANK" S.A.	13	10	10	9	10	10	10
14	BC „EuroCreditBank" S.A.	14	11	11	11	11	11	11

Source: compiled by the author according to the reports of the banking system of the Republic of Moldova

On October 16, 2015, the National Bank of Moldova revoked the licenses of the following banks: Banca de Economii A.O., C.B. „BANCA SOCIALĂ" S.O. and K.B. „UNIBANK" S.O. An analysis of the changes in the ranks of the banking sector (Table 3) showed that during the period from 2014 to 2020, there were significant changes in the structure of the banking cenosis - all banks in Moldova, with the exception of the two first in rank (BC „MOLDOVA – AGROINDBANK" S.A. and BC „Moldindconbank" S.A.),

changed their ranks. Typically, such changes in the rank parametric distributions of the economic system are associated with the processes of formation of economic cenoses under the significant influence of constantly changing financial and economic conditions, both external and internal. It should be noted that even in the crisis years (2019 and 2020) associated with the COVID-19 pandemic, the rank distributions of interest income in the banking sector underwent only minor changes. This means that the banking sector of Moldova has basically formed an economic cenosis.

The analytical form of the approximating functions of the rank parametric distributions of the interest income of banks in the Republic of Moldova is determined by the parameters P1min and βmin, which provide the minimum values to expression (4). The parameters P1min and βmin, approximating the curves of the hyperbolic H-distribution for the rank parametric distributions of interest income of banks from 2014 to 2020, as well as the indicators of deviation from the optimal structure of the country's banking system (sustainability indicators), calculated by formula (6), are presented in the resulting Table 4.

Table 4. Parameters *P1min u βmin*, approximating curves of the hyperbolic *H*-distribution for rank parametric distributions of interest income of banks and stability indicators Пn

Parameters P_{1min}, β_{min}. Stability indicator, Π_n	2014	2015	2016	2017	2018	2019	2020
P_{1min}	1 234 600 000	1 673 900 000	1 850 900 000	1 463 600 000	1 365 000 000	1 459 971 905	1 460 851 758
β_{min}	0, 41	0.8643	0,8385	0,8851	0,9127	0.9321	0,9621
Π_n	0,00774	0,01384	0,01475	0,00860	0,00748	0.00675	0.0064

Source: compiled by the author based on the solution of problem (3) of calculations according to formula (5) according to the reports of the banking system of the Republic of Moldova

The data of Table 4 shows that the approximating curves of the *H*-distribution for the rank parametric distributions of the interest income of Moldovan banks with were optimal — their rank coefficients were in the range β∈[0.5; 1.5]. Accordingly, the banking sector of the Republic of Moldova, in relation to interest income from 2014 to 2020 inclusive, had a relative financial stability, even despite the ongoing crisis associated with COVID-19. An objective assessment of the degree of optimal stability of the banking sector is determined by the value of the Pn indicator - the smaller the value of this indicator, the more financially stable the considered banking system of Moldova. Figure 6 shows a graph of the dynamics of the indicator Пn. according to its annual values from 2014 to 2020 inclusive.
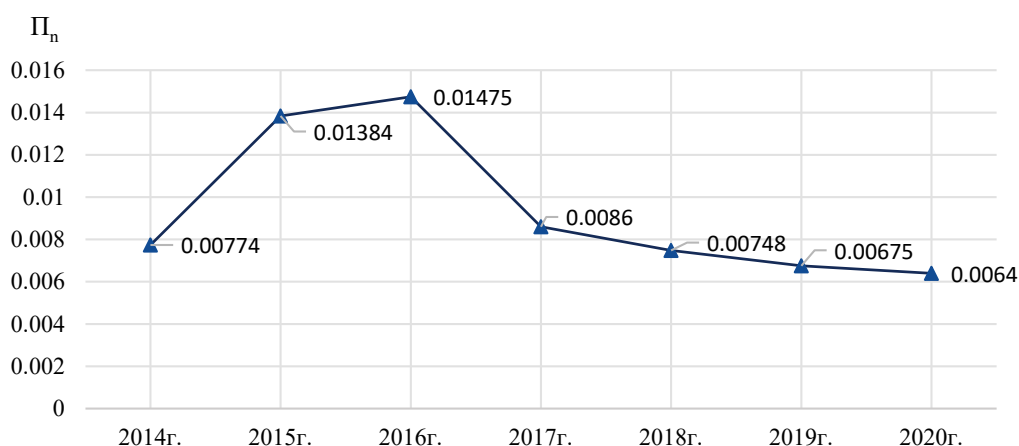
Figure. 6. Indicator of sustainability (in relation to interest income) of the banking sector of the Moldovan economy
Source: made up by the author based on the data in Table 4

The data in Table 4 and the graph in Figure 6 show that the stability indicator reached its maximum values in 2016 (0.01475) after 10/16/2015. The National Bank of Moldova revoked the licenses of 3 leading banks of the country: Banca de Economii A.O., C.B. „BANCA SOCIALĂ" S.O. and K.B. „UNIBANK" S.O. It is obvious that such an external impact has affected the banking sector of Moldova and its financial stability. After this incident, the resilience indicator declined year by year and reached its minimum value in 2020, the crisis year of the COVID-19 pandemic. This behavior of the financial stability of the banking sector of Moldova shows that in these years the banking sector had sufficient financial stability in relation to the interest income parameter, even despite the covid crisis of 2020. This increase in financial stability can be explained by a significant increase in Moldova's financial support to IFIs in 2019-2020, i.e. the developed indicator of sustainability is an indicator of the objective state of the economic system.

The thesis assesses the degree of influence of financial assistance on the main macroeconomic indicators of the country. For this, a standard regression analysis package implemented in Microsoft Excel 2016 is used. Based on a linear regression model, the regression dependence of the country's GDP and the stability indicator of its banking sector on the volume of financial assistance to the Republic of Moldova from the IMF and the WB Group is estimated. The volumes of financial assistance to the Republic of Moldova from IFIs are considered as parameters of influencing factors for calculating the regression. The result of the regression analysis of the assessment of the significance of the correlation between the volume of financial assistance from IFIs to the Republic of Moldova and GDP (PPP), as well as indicators of the stability of the banking sector of Moldova, showed that the assistance provided by IFIs has a rather significant impact on its economic system. This influence is reflected in the macroeconomic indicators and the structure of the Moldovan economy. Therefore, the effective targeted use of financial assistance from IFIs in problem sectors of the country's economy can have a rather significant positive impact on its development and economic sustainability.

Of particular scientific interest is the behavior of the banking sector during the socio-economic covid crisis of 2020. The problem of determining the values of interest income of banks in Moldova for 2020 is being solved, at which the stability indicator (6) takes on the minimum values, and the banking structure reaches its maximum stability. An analysis of the data of the rank parametric distribution by interest income from the curve

approximating it for 2020 shows that there are several (hypothetical) ways to improve the structure of the Moldovan banking system. The most noticeable difference between the actual rank parametric distribution by interest income and the curve approximating it is observed in the bank „FinComBank" S.A. with rank 5 and bank B.C. „VICTORIABANK" S.A. with a rank of 4. Also, less noticeable differences between them are banks with ranks 1 and 6. Accordingly, the problem arises of determining such values of the interest income of banks with ranks 1, 4, 5, and 6, provided that this parameter remains unchanged for other banks, for which the stability indicator (6) takes the minimum value:

$$min \sum_{r=1}^{N}[P_f(r) - P_1^*/r^{\beta^*}]^2 /(\sum_{r=1}^{N} P_f(r))^2. \tag{7}$$

Problem (7) is solved using the developed program code and the method of successive approximations (iterations). The results of calculations of the minimum value of the stability indicator of the banking system of Moldova for various options for hypothetical changes in the interest income of banks with ranks 1, 4, 5 and 6 are presented in Table 5.

Table 5. Data from the recommendations of various options for changing the interest income of Moldovan banks with ranks 1, 5 and 6 for 2020 to improve their sustainability

№	1	2	3	4
P1	1 378 253 851		1 459 863 149	1 457 540 741
b		0,8798	0,9360	0,9160
P4	543 674 550			
P5	202 120 635	334 507 448	324 214 537	333 698 794
P6	194 365 585	284 934 860		282 373 242
Pn	0,00644	0,00577	0,00575	0,00539

Source: compiled by the author based on the solution of problem (7)

An analysis of changes in interest income in columns 2, 3 and 4, compared with their actual (empirical) data in column 1 for 2020, shows that the least cost of changes in interest income to improve the stability of the banking system is represented by data in column 3.

The initial data and results of calculations of the improved (recommended) structure of the rank parametric distribution of interest income of the banking sector of Moldova for 2020 are presented in Table 6:

- the first column contains the actual data of the rank parametric distribution by the interest income parameter;
- in the second - the calculated recommended data obtained by increasing the interest income of banks with ranks 1 and 5, at which the stability indicator takes a minimum value;
- the third column contains the calculated data for constructing an approximating curve of hyperbolic type to the recommended rank parametric distribution.

Table 6. Improved structure of the rank parametric distribution of the banking sector of Moldova by the parameter interest income for 2020, and calculated data of the approximating curve of the hyperbolic *H*-distribution

Rank	Name of the bank	Interest income, MDL, 2020	Recommended interest income, MDL, 2020	P1=1459863149, β=0,936017, Pn=0,00575
1	BC „MOLDOVA-AGROINDBANK" S.A.	1 378 253 851	1 459 863 149	1 459 863 149
2	BC „Moldindconbank" S.A.	894 206 596	894 206 596	763 032 110
3	Mobiasbanca - OTP Group S.A	653 558 903	653 558 903	522 057 479
4	B.C. „VICTORIABANK" S.A.	543 674 550	543 674 550	398 816 835
5	„FinComBank" S.A.	202 120 635	323 641 364	323 641 361
6	B.C. „ProCredit Bank" S.A.	194 365 585	194 365 585	272 865 727
7	B.C. „EXIMBANK" S.A.	157 287 271	157 287 271	236 203 118
8	B.C. „ENERGBANK" S.A.	117 648 996	117 648 996	208 451 081
9	BCR Chisinau S.A.	88 816 948	88 816 948	186 691 479
10	B.C. „COMERTBANK" S.A.	77 119 306	77 119 306	169 158 836
11	BC „EuroCreditBank" S.A.	60 711 588	60 711 588	154 721 409

Source: compiled by the author based on the calculations of problem (7)

For comparison and analysis, Figure 7 shows the graphs:
- the actual rank distribution of the interest income of Moldovan banks for 2020, and the approximating curve to it with the parameters: P1=1,460,851,758, β=0.9621, Pn=0.00644;
- hypothetical (recommended) rank distribution of interest income of banks in Moldova (interest income of banks with ranks 1, 5 is changed so that the stability indicator (6) takes the minimum value in the given structural configuration), and an approximating curve to it with parameters: P1=1459863149, β=0.936017, Pn=0.00575.
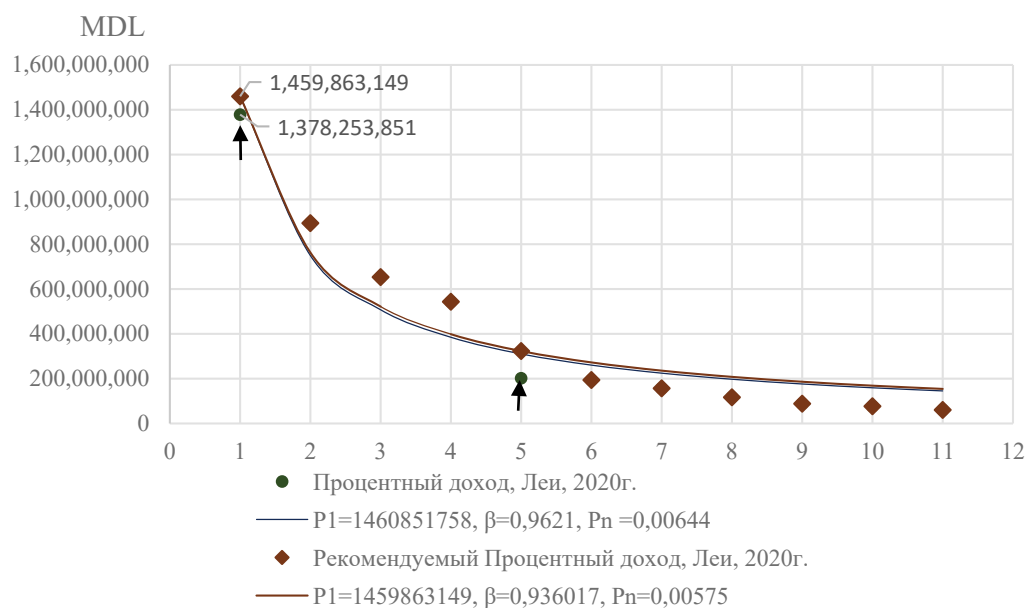

Figure 7. Actual and recommended rank distributions of interest income of banks in Moldova for 2020, and curves approximating them

Source: made up by the author based on the data in Table 6

Table 6 shows that in order to increase the stability of the banking sector of Moldova in 2020 by approximately 12%, it is recommended to increase the interest income of a bank with rank 1 (BC „MOLDOVA – AGROINDBANK” S.A.) by 81,609,298 lei and a bank with rank 5 („ FinComBank” S.A.) by 122,093,902 lei – by a total of 203,703,200 lei, which is 11,480,958 US dollars. The calculated data shows that despite the impact of the covid crisis, the actual banking structure of Moldova in 2020 is more stable in relation to the interest income indicator than in 2018 in relation to the interest income indicator. A similar problem is solved for the bank financial indicator „assets”. The values of the assets of Moldovan banks for 2020 are determined, at which the stability indicator (6) takes the minimum values, and the banking structure reaches its maximum stability. Based on these results, recommendations are given to improve the structure of the rank parametric distribution of assets of the banking sector of Moldova for 2020 (Table 7, Figure 8).

Table 7. Improved structure of the rank parametric distribution of the banking sector of Moldova by the asset parameter for 2020, and calculated data of the approximating curve of the hyperbolic *H*-distribution

№	Banks	Assets, MDL, 2020	Recommended assets, 2020	P1 = 32619013208, b =0,85394, Пn = 0,00673
1	BC „MOLDOVA - AGROINDBANK” S.A.	30 415 135 672	32 619 013 208	32 619 013 208
2	BC „Moldindconbank” S.A.	21 277 906 876	21 277 906 876	18 047 229 173
3	B.C. „VICTORIABANK” S.A.	15 374 901 646	15 374 901 646	12 765 561 021
4	Mobiasbanca - OTP Group S.A.	14 339 259 844	14 339 259 844	9 985 050 092
5	B.C. „ProCredit Bank” S.A.	4 945 089 275	8 252 685 937	8 252 685 976
6	B.C. „EXIMBANK” S.A.	4 586 688 491	7 062 844 188	7 062 844 109
7	„FinComBank” S.A.	3 842 156 666	3 842 156 666	6 191 720 752
8	BCR Chisinau S.A.	3 015 003 120	3 015 003 120	5 524 461 644
9	B.C. „ENERGBANK” S.A.	2 917 239 576	2 917 239 576	4 995 845 433
10	B.C. „COMERTBANK” S.A.	1 807 829 608	1 807 829 608	4 565 990 827
11	BC „EuroCreditBank” S.A.	1 402 360 937	1 402 360 937	4 209 091 236

Source: compiled by the author based on the calculations of problem (7)

As the graphs in Figure 8 show, in order to increase the stability of the banking sector of Moldova relative to the asset indicator in 2020 by about 16%, it is necessary (recommended) to increase the assets of a bank with rank 1 (BC „MOLDOVA-AGROINDBANK” S.A.) by 2,203,877,536 lei, bank with rank 5 (B.C. „ProCredit Bank” S.A.) for 3 307 596 662 lei and bank with rank 6 (B.C. „EXIMBANK” S.A.) for 2 476 155 697 lei - total for 7 987 629 895 lei, or at the rate of 17, 7427 lei per US dollar (as of May 21, 2021) 450,192,468 US dollars, which is quite a significant amount.
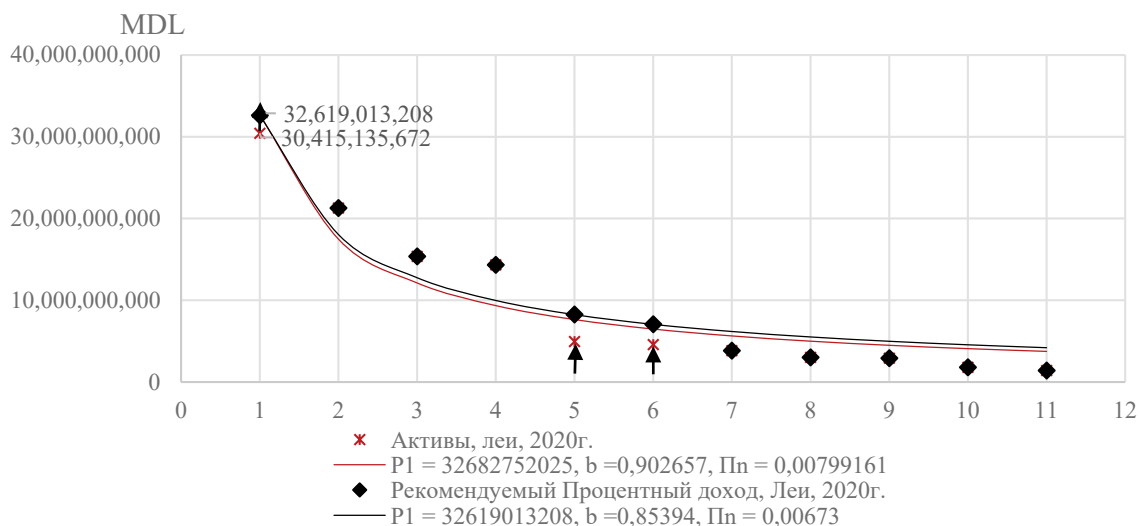
MDL

40,000,000,000

30,000,000,000 — 32,619,013,208
30,415,135,672

20,000,000,000

10,000,000,000

0

0 1 2 3 4 5 6 7 8 9 10 11 12

✗ Активы, леи, 2020г.
—— Р1 = 32682752025, b =0,902657, Пn = 0,00799161
◆ Рекомендуемый Процентный доход, Леи, 2020г.
—— Р1 = 32619013208, b =0,85394, Пn = 0,00673

**Figure 8. Actual and hypothetical rank distributions of assets
of Moldovan banks for 2020, and curves approximating them**
Source: built by the author based on the data in Table 6

The proposed methods of cenological analysis make it possible to identify problem areas that negatively affect the stability of the economic cenosis of the considered sector of the national economy. Calculation of the stability index to evaluate the degree of stability in comparison with the optimal structure of the cenosis.

Let us formulate recommendations on the effective use of financial resources of IFIs to increase the stability of the economic system of the Republic of Moldova:

- selection of the most efficient options for the implementation of IFI investment projects based on the calculation of their economic efficiency index. The option with the highest economic efficiency indicator calculated on the basis of the developed methodology is selected. Such a choice makes it possible to increase the efficiency of the use of IFI financial resources, not only in terms of achieving the project's target indicators, but also in improving the structure of the relevant sector of the economy, and as a result, the national economy as a whole;

- based on the price analysis and the developed methodology for assessing the stability of the economic system, problem areas that affect the stability of its structure are identified, and the optimal structure of the economic cenosis of the considered sector of the national economy is calculated. Based on the results obtained and data on problem areas, a choice is made of a way to increase the sustainability of the considered sector of the economy through the targeted use of financial resources of IFIs.

The recommended increase in the bank's interest income and assets over a short period of time seems unlikely in the real economic conditions of the Republic of Moldova. As practice shows, it will take some time for the economic cenosis (in this case, the banking sector) in the conditions of market competition for access to resources and sales markets, under the influence of factors of the internal and external environment, by self-organization, to pass into the state closest to the optimal - to hyperbolic H – distribution. However, the state structures of Moldova can accelerate this process by purposefully using financial assistance from IFIs to improve the overall financial and economic situation in the country and to eliminate the identified problem areas in the banking sector. Improving the structure of the banking system of Moldova, as a key sector of its economy, will have an impact on the entire economic system of the country - on improving its structure and economic stability.

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3. GENERAL CONCLUSIONS AND SUGGESTIONS

As a result of the study, the originally set goal was achieved, namely, a study of the role of International Financial Institutions in the development of economic systems of countries with emerging market economies (on the example of the Republic of Moldova), as well as ways to ensure the sustainability of the economic development of the Republic of Moldova by increasing the efficiency of the use of financial resources of international financial institutions.

Conclusions

1. The first chapter of this study shows that the considered IFIs in the composition of: and the WB Group were not prepared for the consequences of the recent global economic crises, the consequences of the COVID-19 pandemic and the geopolitical transformations taking place in 2020. The crisis phenomena revealed the lack of effective methods for forecasting and early warning of crisis phenomena in these financial institutions, on the basis of which appropriate adequate protective measures would be taken for developing countries in particular and the world economy as a whole. All these factors point to the need to reform IFIs and, for developing countries, to more efficient use of financial resources received from these institutions.

2. It was revealed that financial assistance from IFIs is regularly provided to reduce poverty and promote economic growth, as well as to eliminate the deficit in the country's balance of payments generated by adverse changes in the structure of its economy. These dynamics of the total amount of debt to IFIs, overdue liabilities and projected payments of the Republic of Moldova to the IMF, allow us to conclude that their upward trend is due to the periods of crisis and financial instability in 2008 and 2019. The continuation of this trend in the future may lead to certain economic and financial problems if borrowing from IFIs does not lead to a significant development of the Moldovan economy.

3. It has been established that the IFI financial assistance provided for activities and projects to reduce poverty and promote economic growth, as well as to improve the balance of payments and the structure of the economy of the Republic of Moldova, did not increase the standard of living of the country's population in an appropriate way. In this regard, there is a need to form essential target indicators that reflect the effectiveness of financial resources allocated by IFIs, as well as indicators that characterize the stability and optimality of the economic system of the Republic of Moldova. Such a system of financial and economic indicators will make it possible to assess the effectiveness of the use of financial resources of IFIs adequately to economic realities.

4. The second chapter of the study shows that at present the allocation of financial resources of the IMF and the WB Group for countries with developing market economies (including the Republic of Moldova) is based on their level of economic development, which is measured by gross national income (GNI) in US dollars per year per capita. The provision of loans is mainly based on the values of the macroeconomic indicators of these countries and does not take into account the structural configuration of their economic sectors and the economy as a whole.

5. In section 2.2 of the second chapter of the thesis, the author's definition of the concept of sustainability and development of the economic system of the country was formulated: *"economic stability and development of the economic system (economy) of the country for a certain period of time is understood as its ability to maintain the values of the main (key) economic indicators, characterizing its progressive development at this time stage due to the achieved economic potential and the realized structure of the economy, as*

well as the corresponding state regulation". The author's definition of the concept of the optimal structure of the country's economy is also given there: *"the optimal structure of the economy is understood as such a structure of the economic system that functions with maximum economic stability."*

6. An analysis of the existing systems of indicators and indicators of economic sustainability and economic development of countries has shown that these systems of indicators do not fully allow assessing the real state of the economy and the optimality of its structure. It was found that in order to assess the results of the implementation of financial resources allocated by IFIs, their impact on the economic stability and economic development of the country, it is necessary to form a system of indicators that characterizes not only the main macroeconomic parameters of the economy in question, but also the parameters of its economic structure responsible for economic sustainability. Therefore, it is proposed to modify the existing systems of indicators by supplementing them with an assessment of the stability and development of the structure of the country's economy based on the cenological theory, in which the economic system is considered as an economic cenosis. The parameters of the structure of the selected economic cenoses of the country and individual economic sectors can serve as indicators of the evolution of structural changes in these economies, and can also be used to assess their stability.

7. In the second chapter of this study, methods have been developed:
- calculation of indicators of economic efficiency of international financial assistance to countries in the form of investment projects, in which forecast parameters are modeled by fuzzy numbers;
- assessment of the stability of economic systems described by economic cenoses, within which the author formulated an indicator of the stability of such economic systems (formula 3.11).

The study of financial assistance provided in the form of projects confirms the feasibility of using the proposed econometric procedures based on the mathematical apparatus of fuzzy number theory to calculate the economic efficiency indicators of projects funded by IFIs. The presented method of calculation using fuzzy numbers, in comparison with traditional approaches, most adequately meets the economic realities of the implementation of investment projects, since the forecast parameters of such projects, as a rule, have a high level of uncertainty, which makes it impossible to accurately determine their future state. The developed indicator of the stability of the structure of the economic cenosis makes it possible to assess the stability in the process of its development (evolution). Such an assessment makes it possible to determine the degree of influence of external factors (for example, investment projects and allocated financial resources of IFIs), acting at different time stages, on a separate economic sector and on the country's economy as a whole. This sustainability indicator can be used to assess the sustainability of any economic cenosis.

8. The methodology for assessing the indicators of economic efficiency of international financial assistance to countries in the form of investment projects makes it possible to identify the most effective of them, and the methodology based on the cenological analysis of economic systems makes it possible to determine key changes in the structure of the country's economy (industry) as a whole, as well as to determine indicators characterizing its economic stability and development. Using the procedures of the presented methods, the following tasks are also solved:

- determination of the degree of influence of financial assistance in the form of investment projects of IFIs on the economic stability and development of the country, sectors of the economy;
- improving the structure of the country's economy and/or the structure of the economic sector, through the implementation of appropriate investment projects or with the help of financial support from IFIs that improve their problem areas.

9. The third chapter of the thesis shows that the financial resources allocated by IFIs to borrowing countries with developing market economies that have small economies (such countries include the Republic of Moldova) have a rather strong impact on their economic system. The conducted regression analysis from 2010 to 20120 inclusive of assessing the significance of the correlation between the volume of financial assistance from IFIs to the Republic of Moldova and GDP (PPP), as well as indicators of the stability of the banking sector, found that the financial resources allocated by IFIs have a rather significant impact on its economic system, and this influence is reflected in its macroeconomic indicators. Therefore, the effective targeted use of financial assistance from IFIs in problem sectors (places) of the country's economy can have a rather significant positive impact on its development and economic stability in general. In this regard, it was concluded that in order to solve the problem of determining the degree of influence of financial assistance from IFIs on the economic sustainability and development of such countries, it is necessary, using a price analysis, to determine the change in sustainability indicators over a certain period of implementation of the allocated assistance. Moreover, when choosing a time interval for assessing these indicators, it is necessary to take into account the inertia of macroeconomic processes. Since the impact of financial assistance from IFIs on the economic stability and development of the country will occur with some time delay.

10. The application of the proposed methodology for calculating economic efficiency indicators in the form of projects was carried out on the basis of the Local Roads Improvement Project (P150357) currently being implemented (from 2016 to 2022) by the WB group in the Republic of Moldova. The initial information base of the forecast parameters of this investment project is modeled in the form of different intervals of their possible values, which makes it possible to take into account future forecast risks in the development of the economic situation. The larger the interval values of the initial parameters, the larger the calculated predictive value of the interval of economic efficiency indicators. The data generation scheme presented in section 3.1 of the study and the methodology for calculating the performance indicators of this investment project can be applied to completed, operating and emerging investment projects within the framework of financial support from the IFIs of the Republic of Moldova.

11. On the example of the banking sector of the economy of the Republic of Moldova, with the help of the developed methods of cenological analysis of economic systems and the stability indicator formulated by the author, an assessment of its economic stability was carried out. The obtained estimates of the stability of the banking sector for each year from 2014 to 2020 make it possible to perform a comparative analysis of the degree of influence of external factors in the form of financial support, investment projects, as well as global economic crises on the stability of the banking system of the Republic of Moldova. Comparative price analysis based on calculations of stability indicators of the banking sector of the Republic of Moldova before the socio-economic crisis associated with the COVID-19 pandemic and on time showed that despite the very negative impact of the crisis on the country's economy, its banking sector in 2020 turned out to be more stable in terms of its key indicators: interest income and assets than in 2018. This behavior

of the banking system is explained by the fact that in the pre-crisis and crisis years, IFIs significantly increased financial support to Moldova. Within the framework of the method of cenological analysis of economic systems, a method is proposed for optimizing the structure of the economy and the economic sector of the country, based on minimizing the sustainability indicator (formula 3.11). On the example of the banking sector of the economy of the Republic of Moldova, calculations of its optimization were made.

Thus, in this study, some existing methodological gaps in improving the efficiency of the use of financial resources allocated by IFIs to the Republic of Moldova were filled. Their significant role is noted as a source of the most accessible financial resources for ensuring the economic stability and development of the country, especially during periods of crisis and economic instability. In this regard, the generalization and comprehension of the obtained results of the conducted scientific research allows the author to formulate proposals that are recommendatory in nature.

Suggestions

1. In order to effectively use the financial resources of the International Financial Institutions allocated to the Republic of Moldova and increase the stability of its economic system, we recommend applying the methods developed by the author:

calculation of indicators of economic efficiency of IFI investment projects;

- assessing the sustainability of economic systems described by economic cenoses. In order to increase the sustainability and development of the economic system of the Republic of Moldova on the basis of IFI support, within the framework of the developed methods, it is proposed to carry out (perform):
- selection of options for the implementation of IFI investment projects with maximum economic efficiency indicators, which will increase the efficiency of using IFI financial resources not only in terms of achieving project targets, but also in improving the structure of the relevant sector of the economy, and as a result, the national economy as a whole;
- cenological analysis of organizations in the sectors of the country's economy, carried out to identify problem areas in their economic structure that affect its sustainability;
- Calculation of indicators of sustainability of sectors of the country's economy for each analyzed time period (at least 3 years);
- performing a comparative analysis (for example, using a regression analysis to assess the significance of a correlation) of the degree of influence of external factors in the form of financial support, investment projects, as well as global economic crises on the stability of the sectors of the economy under consideration;
- determination of a hypothetical optimal structure of economic cenoses of the sectors of the economy under consideration, on the basis of which a choice is made of a way to increase their sustainability through the targeted use of financial resources of IFIs.

2. The study of rank parametric distributions in the pre-crisis 2018 of the banking cenosis for key financial indicators (interest income and bank assets) showed that the easiest way to improve the structure of the identified problem areas of the banking sector of the Republic of Moldova, affecting its stability, is to increase these indicators for bank with rank 1 (BC „MOLDOVA – AGROINDBANK" S.A.).

3. Analysis of various options for the rank parametric distributions of the banking cenosis by key financial indicators (interest income and bank assets) during the 2020 crisis

associated with the COVID-19 pandemic showed that the simplest and least costly way to improve the structure of identified problem areas of the banking sector of the Republic of Moldova and influencing its stability, is:

- increase in interest income of a bank with rank 1 (BC „MOLDOVA - AGROINDBANK" S.A.) and a bank with rank 5 („FinComBank" S.A.) – interest income for the financial indicator;
- increase in the assets of a bank with a rank of 1 (BC „MOLDOVA-AGROINDBANK" S.A.), a bank with a rank of 5 (B.C. „ProCredit Bank" S.A.) and a bank with a rank of 6 (B.C. „EXIMBANK" S.A.) - for the financial indicator bank assets.

4. To determine the value of increasing these financial indicators, it is necessary to solve the problem of minimizing the stability indicator (formula 3.11). Those. determine such values of interest income and assets of the bank with rank 1, at which the stability indicator takes the minimum values.

5. As practical observations show, in order for the economic cenosis of the banking sector, as a result of evolution in the conditions of market competition, to move into a state closest to optimal, it will take quite a long time. In this regard, it is proposed to speed up this process by purposefully using the allocated financial resources of IFIs to improve the overall financial and economic situation in the country, as well as to eliminate the identified problem areas in the banking sector. Improving the structure of the banking system of Moldova, as a key sector of its economy, will have an impact on the entire economic system of the country and its economic stability.

The developed methodological bases for assessing the stability of economic systems and the efficiency of using international financial resources, ways to optimize the structure of economic systems within the framework of the topic of this thesis "International financial institutions and their role in the development of the economic system of the Republic of Moldova" are important and relevant not only at the present time and for countries with developing market economy. In the context of the ongoing global financial and socio-economic transformations, for each country objectively there is a need to assess the sustainability of its economy and increase the efficiency of the use of international financial resources to solve the urgent financial and economic problems that have arisen. Therefore, the results of this study will not lose their relevance and relevance over time, and can also be used for countries of any form of market economy. Based on the coenological theory, it seems appropriate to develop the following possible directions for future research on the developed topic:

- dependence of the stability of the country's economic system as a whole on the stability of individual sectors of its economy;
- assessment of the purposeful impact of international financial resources on the key sectors of the country's economy;
- ways to optimize the structure of the country's economic systems based on the effective use of international financial resources.

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АННОТАЦИЯ

к диссертации на соискание ученной степени доктора экономических наук
«Международные Финансовые Институты и их роль в развитии экономической
системы Республики Молдова», Ступачев Сергей Александрович,
научная специальность 522.01 Финансы, Кишинев, 2023

Структура диссертации: введение, три главы, общие выводы и рекомендации, библиография из 187 источников, 37 таблиц, 20 рисунков и 22 приложения. Полученные результаты опубликованы в 11 научных публикациях.

Ключевые слова: Международные Финансовые Институты, международные финансы, международная финансовая помощь, развивающиеся рынки, экономическая система, экономическая устойчивость, экономический ценоз, ранговое параметрическое распределение, гиперболическое H–распределение, нечеткие числа.

Область исследования: 522.01 Финансы

Цель исследования: исследование роли Международных Финансовых Институтов в развитии экономических систем стран с развивающейся рыночной экономикой.

Задачи исследования: определение методов повышения эффективности использования финансовых ресурсов, полученных от Международных Финансовых Институтов для обеспечения экономической устойчивости в развитии страны.

Научная новизна и оригинальность работы заключаются в адаптировании системы финансово-экономических показателей, позволяющей оценивать оптимальность структуры секторов экономики и экономики страны в целом, отражающей эффективность использования финансовых ресурсов МФИ; в разработке методики расчета показателей экономической эффективности международной финансовой помощи; в предложении методики оценки устойчивости экономических систем и формулировании показателя их устойчивости; в предложении способа оптимизации структуры экономического сектора страны; в модифицировании модели системы экономических показателей эффективности использования международной финансовой помощи для развития экономики Республики Молдова; в формулировании рекомендаций по росту эффективности использования финансовых ресурсов МФИ и повышения устойчивости экономической системы Республики Молдова на примере банковского сектора.

Важная научная проблема, разрешённая в процессе исследования, заключается в изучении и формулировании с учетом специфики экономики Республики Молдовы методов повышения эффективности использования финансовых ресурсов, выделяемых МФИ, что определяет их значительную роль, как источника наиболее доступных финансовых средств для обеспечения экономической устойчивости и развития страны.

Теоретическая значимость исследования заключается в разработке методик, позволяющих увеличить эффективность использования финансовых ресурсов МФИ, выделяемых Республике Молдова, и определить пути повышения устойчивости ее экономической системы.

Практическая значимость исследования: Результаты исследования могут применяться странами с развивающейся рыночной экономикой для повышения эффективности использования финансовых ресурсов, полученных от МФИ в процессе реформирования своих экономик, проведения эффективной финансово-экономической политики и для решения возникших неотложных финансово-экономических проблем.

Внедрение научных результатов: значимость полученных результатов проведенного исследования была подтверждена Министерством Финансов Республики Молдова и Национальной Комиссией по Финансовому Рынку.

ADNOTARE

la teza pentru obținerea titlului științific de doctor în științe economice cu tema „Instituțiile Financiare Internaționale și rolul lor în dezvoltarea sistemului economic al Republicii Moldova",
Stupachev Sergey Aleksandrovich, Specialitatea 522.01, Finanțe, Chișinău, 2023

Structura tezei: introducere, 3 capitole, concluzii generale și recomandări, bibliografie din 187 surse bibliografice, 37 tabele, 20 figuri și 22 anexe. Cercetarea este reflectată în 11 publicații științifice.

Cuvinte cheie: Instituții Financiare Internaționale, finanțe internaționale, asistență financiară internațională, piețe în curs de dezvoltare, sistem economic, stabilitate economică, cenoză economică, distribuție parametrică de rang, distribuție H- hiperbolică, numere fuzzy.

Domeniul de studiu: 522.01 Finanțe

Scopul cercetării: cercetarea rolului Instituțiilor Financiare Internaționale în dezvoltarea sistemelor economice ale țărilor cu o economie de piață în curs de dezvoltare.

Obiectivele cercetării: determinarea metodelor de creștere a eficienței utilizării resurselor financiare, primite de la Instituțiile Financiare Internaționale pentru a asigura stabilitatea economică.

Noutatea și originalitatea științifică constă in adaptarea unui sistem de indicatori economico-financiari, care permit evaluarea structurii sectoarelor economiei, precum și a economiei în ansamblu care reflectă eficiența utilizării resurselor financiare ale FMI; în elaborarea metodelor de calcul a indicatorilor de eficiență economică a asistenței financiare internaționale; în propunerea de metode de evaluare a sustenabilității sistemelor economice, și în formularea indicatorului stabilității acestora; în propunerea modalității de optimizare a structurii sectorului economic al țării; în modificarea modelului sistemului de indicatori economici care demonstrează eficiența utilizării ajutorului financiar internațional în vederea dezvoltării economiei Republicii Moldova; în formularea recomandărilor privind creșterea eficienței utilizării resurselor financiare ale FMI și a stabilității sistemului economic al Republicii Moldova în baza sectorului bancar.

Rezultatele obținute care contribuie la soluționarea problemei științifice importante, se referă la formularea unor metode de eficientizare a utilizării resurselor financiare alocate de FMI, ținând cont de specificul economiei Republicii Moldova în vederea asigurării stabilității și dezvoltării economice a țării.

Semnificația teoretică a cercetării: constă în elaborarea unor metode de eficientizare a procesului de utilizare a resurselor financiare ale FMI alocate Republicii Moldova și identificarea posibilităților de creștere a sustenabilității sistemului economic al acesteia.

Valoarea aplicativă a cercetării: rezultatele cercetării pot fi aplicate de economiile emergente în vederea creșterii eficienței utilizării resurselor financiare primite de la FMI în procesul de reformare a economiilor acestora, realizării unor politici financiare eficiente în vederea soluționării de probleme financiare și economice existente.

Implementarea rezultatelor științifice: Rezultatele cercetării au fost prezentate autorităților de resort în domeniu, fiind susținute și apreciate de Ministerul Finanțelor al Republicii Moldova și Comisia Națională a Pieței Financiare.

ANNOTATION

to the thesis to obtein the scientific degree of doctor in economic sciences „International financial institutions and their role in the development of the economic system of the Republic of Moldova", Stupachev Sergey Aleksandrovich, Speciality: 522.01 Finance, Chisinau, 2023

Thesis structure: introduction, 3 chapters, general conclusions and recommendations, bibliography including 187 sources, 37 tables, 20 figures and 22 annexes. The study is reflected in 11 scientific publications.

Keywords: International Financial Institutions, international finance, international financial assistance, emerging markets, economic system, economic stability, economic cenosis, rank parametric distribution, hyperbolic H–distribution, fuzzy numbers.

Field of study: 522.01 Finance.

Research goal: to study the role of International Financial Institutions in the development of economic systems of countries with developing market economies in terms

Research objectives: determining methods for increasing the efficiency of using financial resources received from these organisations to ensure economic sustainability.

Scientific novelty and originality: adaptation of the system of financial and economic indicators that makes it possible to assess the optimal structure of the sectors of the economy and the economy of the country as a whole; in developing a methodology for calculating the economic efficiency indicators of international financial aid in the form of investment projects; in the proposal of a methodology for assessing the sustainability of economic systems; in the proposal of a method for optimizing the structure of the economic sector of the country; in modifying the model of the system of economic indicators of the effectiveness of the use of international financial assistance for the development of the economy of the Republic of Moldova; in formulating recommendations for increasing the efficiency of using financial resources of IFIs and increasing the stability of the economic system of the Republic of Moldova based on the example of the banking sector.

Results contributing to the solution of an important scientific problem: is to study and formulation, taking into account the specifics of the economy of the Republic of Moldova, the methods for increasing the efficiency of the use of financial resources allocated by IFIs, which determines their significant role as a source of the most accessible financial resources to ensure economic sustainability and development of the country.

Theoretical significance: in developing methods to increase the efficiency of the use of financial resources of IFIs allocated to the Republic of Moldova, and to identify ways to increase the sustainability of its economic system.

Applicative value: the results of the study can be used by countries with developing market economies to improve the efficiency of using financial resources received from IFIs in the process of reforming their economies, pursuing an effective financial and economic policy, and solving urgent financial and economic problems that have arisen.

Implementation of scientific results: the need to implement the results of the study was confirmed by the Ministry of Finance of the Republic of Moldova and the National Commission for the Financial Markets.

STUPACHEV SERGEY ALEXANDROVICH

INTERNATIONAL FINANCIAL INSTITUTIONS AND THEIR ROLE IN THE DEVELOPMENT OF THE ECONOMIC SYSTEM OF THE REPUBLIC OF MOLDOVA

522.01 - FINANCE

Summary of the doctoral thesis in Finance