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Likhonosova Ganna
Doctor of Economic Science, Professor,
Professor of the Management and Business Administration Department
National Aerospace University «Kharkiv Aviation Institute»
61070, Kharkiv, Manka Street, 17
email: g.likhonosova@khai.edu
ORCID ID: 0000-0001-6552-8920

Management of public financial debt in conditions of unbalanced supply and demand of energy resources

Abstract. Financial debt management in the context of the energy crisis is an urgent problem that requires a strategic approach in countries with an unstable energy system. The imbalance between the supply and demand of energy resources generation creates a trap in which the growth of energy shortages leads to increased import costs, higher prices for end consumers and increased financial burden on the state. This, in turn, can provoke inflationary pressure, a decrease in the competitiveness of the national economy, an increase in public debt and social tension due to an increase in the cost of living and a decrease in the level of energy security. The research used the methods of scenario analysis, descriptive statistics, econometric, monographic and comparative analysis. The purpose of the article is to analyze the impact of energy crises on the state of state financial support, to determine ways to minimize risks and ensure financial stability. In the course of the study, the degree of influence of the imbalance of demand and supply of energy resources on the state financial debt was determined through the use of such tools as: analysis of market conditions, assessment of the level of demand and supply for energy resources. The paradigm of an integrated approach to the management of public debt in the context of energy crises is characterized, which is based on an integrated, multidimensional analysis and management of interrelationships between various economic, financial, social and political factors. It is emphasized that consideration of the energy sector should not take place in isolation, but in the context of its interaction with the financial capabilities of other sectors of the economy. Practical recommendations include risk assessment models related to energy crises and methods of stabilizing public finances, which can be used in the operational management of the state's financial debt. The method of integration and coordination of energy, economic, fiscal and social indicators is proposed for determining effective financial instruments and mechanisms for optimizing budget expenditures. It is concluded that in the conditions of imbalance of energy demand and supply, management of financial debt requires a strategic approach based on investments in clean energy, improvement of energy efficiency and accurate forecasting.

Keywords: *public debt, energy needs, financial recession, risk management, level of state indebtedness, dependence of debt on energy, level of energy generation.*

Fig.: 1, tabl.: 1, bibl.: 16;

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Introduction. Financial debt management in the context of the energy crisis is an urgent problem that requires a strategic approach in Ukraine with an unstable energy system. The change in supply and demand for energy resources affects the financial condition of enterprises, their ability to provide a stable tax base and income to the revenue part of the state budget, which requires the development of effective debt management mechanisms. In recent years, a number of studies have been conducted that analyze the impact of the energy crisis on the economy and financial stability of the country. For example, the International Energy Agency (IEA) notes in its reports that the energy crisis is causing significant changes in energy demand and supply, forcing governments and companies to adapt to new conditions through investments in clean energy and energy efficiency improvements (Outlook for energy demand, 2020).

Ukraine faces additional challenges due to its dependence on energy imports and the imbalance between existing consumer demand and the ability to ensure energy supply as a result of military operations on its territory. According to a study conducted by the CSIR, countries with low energy efficiency are particularly sensitive to fluctuations in energy prices, which can lead to an increase in public debt (Roro, 2023).

The authors of the article (Biondi, 2017). discuss the various aspects of public debt management, including fiscal policies and their implications on economic stability, which can be linked to the challenges posed by energy consumption imbalances.

This study by the Cato Institute (Salmon, 2021) analyzes the relationship between public debt and economic growth, highlighting how debt management strategies can influence economic outcomes, particularly in contexts of unbalanced energy markets. This article explains how studies were identified for the survey sample, provides an overview of the theories of how public debt impacts economic growth, reviews the findings of the 40 studies in the survey sample, and concludes with some recommendations for future research.

The report by the International Energy Agency provides insights into the financial challenges and opportunities within the energy sector, discussing how energy investments and market dynamics affect public debt and fiscal policies (World Energy Investment 2022).

The authors of the study provide current data on the sustainability of the state debt and dependence on energy carriers (Katsikas, et al., 2023). The focus is on the feedback loop between the dynamic stability of public debt and interest rates, discounted by economic growth, in conjunction with budget deficits during tranquil and turbulent periods. Using the GMM panel dynamic model, the results show that dynamic stability was the case before the global financial crisis (GFC), while from GFC to the pandemic, dynamic instability prevailed and persisted in the evolution of public debt

Current research is mostly focused on the role of gross public debt in financial stability. Two contrasting views of economic sustainability have emerged in academia: strong sustainability, which requires the separate preservation of all environmental assets, and weak sustainability, which allows for a high degree of interchangeability between produced capital, human capital, and natural capital. The authors of the study (Ouedraogo, 2022), which focuses on weak stability, offer an alternative point of view. While debt accumulation can finance capital spending, debt service can increase pressure on natural resources needed for a sustainable economy, affecting all components of adjusted net savings or the inclusive welfare index, both of which measure economic sustainability.

In the conditions of the imbalance of the existing demand for energy resources and the possibilities of their generation, the urgent issue of ensuring energy stability and financial stability is the improvement of supply and demand forecasting. The use of modern methods of forecasting energy needs and financial capabilities of the state is given in the study (Eksoz, C. (2020). The author characterizes the methods of modern forecasting, which allows for more accurate planning of purchases and production of energy resources, which reduces financial risks.

Therefore, the issue of managing the state financial debt in the conditions of unbalanced supply and demand of energy resources is becoming urgent for Ukraine. The world economy is experiencing significant fluctuations caused by objective factors, among which the imbalance of supply and demand for energy resources plays a significant role. In recent years, there have been significant shifts in the global structure of demand for energy resources. Growing demand for energy from developing countries, along with reduced supply due to political and economic crises in producing countries, creates instability in energy markets (Ushenko, et al., 2023; Likhonosova, 2024). Geopolitical conflicts, sanctions, as well as changes in international relations also significantly affect the availability of energy resources. For example, sanctions against key energy suppliers can lead to shortages that affect prices and, as a result, public debt. The global transition to clean energy sources also brings its share of uncertainty. States are forced to invest in new technologies and infrastructure, which can affect their financial stability.

In these conditions, effective management of public financial debt becomes a key task. It is necessary to develop strategies that will reduce the negative impact of energy crises on public finances. An important aspect is the optimization of budget expenditures and the improvement of the efficiency of the use of public funds. Governments must consider energy risks when formulating budgets and planning expenditures. The use of various financial instruments (government bonds, loans from international financial organizations) can help stabilize the financial situation. It is also important to develop protection mechanisms against currency and price fluctuations in energy markets.

Taking into account the above, research in the field of public financial debt management in the conditions of unbalanced supply and demand of energy resources is extremely relevant. This will make it possible to find effective solutions to ensure the financial stability of states and minimize the negative consequences of energy crises for national economies.

The purpose of this scientific article is to develop theoretical and practical recommendations for the effective management of public financial debt in conditions of unbalanced supply and demand of energy resources, namely: analysis of the impact of energy crises on the state of public financial support, determination of ways to minimize risks and ensure financial stability.

Based on this, the tasks of the research are:

- Determining the influence of the imbalance of demand and supply of energy resources on the state financial debt;
- Assess the influence of factors affecting the imbalance of supply and demand of energy resources on the financial stability of the state;
- Develop a comprehensive approach to public debt management in the context of energy crises;
- Identify effective financial instruments and mechanisms for optimizing budget expenditures and strategic planning in conditions of instability in the energy markets.

The proposed methodology for integrating energy factors into the public debt management model can be considered a scientific novelty of the study, which allows more accurate risk assessment and the development of effective strategies. A comprehensive approach is proposed, including both financial instruments and strategic planning for public debt management in the context of energy crises.

Practical recommendations include risk assessment models related to energy crises and methods of stabilizing public finances, which can be used in the operational management of the state's financial debt.

Therefore, in the conditions of imbalance of energy demand and supply, the management of financial debt requires a strategic approach based on investments in clean energy, improvement of energy efficiency and accurate forecasting. These measures will help to stabilize the financial condition of enterprises and ensure the economic stability of Ukraine in the long term.

Thus, the current state of financial debt management in conditions of critical energy consumption includes a complex relationship between financial development, energy security and environmental sustainability.

Literature review. The main trends in the dependence of the state's financial sector on its energy balance are given in the publication (Energy Industry in Ukraine and the World..., 2024). The study contains the determination of the impact of stabilization of electricity supply on the economic growth of Ukraine in 2023-2024. In particular, it is noted that one of the key factors influencing the growth of the economy is the stability of the energy sector, which contributes to improving the financial stability of the state.

The authors of the article (Konechenkov, 2022) analyze the development of renewable energy in Ukraine, including the impact of military operations on this sector. It is noted that Europe's political will to reduce dependence on imported energy resources has a positive effect on the Ukrainian renewable energy market, which contributes to the overall economic and financial stability of the state.

The main directions of the development of the financial sector of Ukraine in conditions of macro-financial instability and challenges related to energy dependence are considered in the Strategy for the Development of the Financial Sector of Ukraine until 2025 (Strategy of the Financial Sector ..., 2024). The article emphasizes the importance of integrating renewable energy sources to ensure a stable financial environment in the country.

A study by the National Institute for Strategic Studies (Review of Support Tools..., 2023) provides an overview of financial stability support tools under martial law conditions in Ukraine. The authors examine measures taken by the regulator to strengthen the financial stability of Ukraine's banking system during martial law, including public debt management and macro-financial stability.

Ukrainian authors confirm that Ukraine faces complex challenges in the field of financial debt and energy security. The financial debt reality of the country is characterized by significant foreign debt and the instability of the currency market (Odylivana, (2019).

The analyzed sources can become the basis for a deeper understanding of the problem and the development of new approaches to the management of financial debt in the conditions of unbalanced supply and demand of energy resources.

At the same time, energy instability caused by geopolitical risks and dependence on imported energy sources creates permanent threats to the economic stability and financial stability of the country. In such conditions, the management of the country's financial debt becomes a key element of ensuring national security and further economic development.

Purpose, materials and methods. Methods of analysis and synthesis were used to study the literature on risk management, financial debt and energy instability. Descriptive statistics methods were used to analyze the dynamics of Ukraine's financial debt, debt structure, exchange rates, economic growth and energy imports. The data were obtained from official sources such as the State Statistics Service of Ukraine, the Ministry of Finance of Ukraine, the National Bank of Ukraine and the International Energy Agency.

The method of scenario analysis was used to model possible scenarios of the development of the situation with financial debt and energy security of Ukraine. Various scenarios of economic growth, energy price fluctuations, political changes and introduction of energy-saving technologies were taken into account. Scientific articles, monographs, research reports and reviews on the topics of risk management, financial stability and energy security were analyzed. The experience of other countries that had similar problems, as well as the recommendations of international organizations, were taken into account.

In order to assess the impact of the imbalance of demand and supply of energy resources on the state financial debt and to study the experience of other countries in the management of state debt in the conditions of energy crises, econometric and comparative analysis was used, namely, the

collection of statistical data on the state debt, energy resources, macroeconomic indicators, analysis strategies and policies implemented in various countries to stabilize public debt. Based on the received data, a synthesis of best practices and recommendations for implementation in Ukraine was carried out. Using these methods will allow you to get a comprehensive view of the problem and develop effective strategies for managing public financial debt in the context of energy challenges.

The application of a comprehensive approach, which includes quantitative and qualitative methods, made it possible to comprehensively investigate the problems of financial debt and energy instability of Ukraine and to develop effective directions of risk management.

Research results. At the end of 2021, the national debt of Ukraine was only 48.9% of GDP (Dynamics of the total national debt, 2024), that is, the country was in a fairly stable debt situation. The average debt service rate was about 9% per year for domestic debt and 4% for external debt (Medium-term strategy for public debt management, 2024). The total cost of servicing the debt was 2.9% of GDP. But the decline of the Ukrainian economy due to the military conflict, as well as a significant increase in public spending, which increased from 40% to 75% of GDP from 2021 to 2023, significantly increased both internal and external debt. As a result, according to the results of 2023, the state debt amounted to 84.4% of GDP (Table 1) (Dynamics of the aggregate state debt, 2024).

Table 1. Dynamics of the aggregate state debt and GDP of Ukraine from 2009 to 2024 (million hryvnias)

State debt (total)				Gross domestic product (GDP)				State debt / GDP
December 2009	316 885			for 2009	913 345			34.7%
December 2010	432 235	115351	36.4%	for 2010	1 082 569	169224	18.5%	39.9%
December2011	473 122	40886	9.5%	for 2011	1 316 600	234031	21.6%	35.9%
December 2012	515 511	42389	9.0%	for 2012	1 408 889	92289	7.0%	36.6%
December 2013	584 114	68604	13.3%	for 2013	1 454 931	46042	3.3%	40.1%
December 2014	1 100 564	516450	88.4%	for 2014	1 566 728	111797	7.7%	70.2%
December 2015	1 572 180	471616	42.9%	for 2015	1 979 458	412730	26.3%	79.4%
December 2016	1 929 759	357579	22.7%	for 2016	2 383 182	403724	20.4%	81.0%
December 2017	2 141 674	211916	11.0%	for 2017	2 982 920	599738	25.2%	71.8%
December 2018	2 168 627	26953	1.3%	for 2018	3 558 706	575786	19.3%	60.9%
December 2019	1 998 275	-170352	-7.9%	for 2019	3 974 564	415858	11.7%	50.3%
December 2020	2 551 936	553660	27.7%	for 2020	4 194 102	219538	5.5%	60.8%
December 2021	2 671 828	119892	4.7%	for 2021	5 459 574	1265472	30.2%	**48.9%**
December 2022	4 071 683	1399856	52.4%	for 2022	5 191 028	-268546	-4.9%	78.4%
December 2023	5 519 484	1447801	35.6%	for 2023	6 537 825	1346797	25.9%	**84.4%**
May 2024	6 115 264	595780	10.8%	for 2024				

Source: developed by authors based on Dynamics of aggregate public debt, 2024

This indicator would have been even worse if the US had not filled Ukraine's budget with $22.85 billion in the form of grants, not loans, in 2022-2023. (Grant funds provided on non-refundable terms, 2023). In 2022, the government of Ukraine agreed with creditors to postpone the payment of principal and interest on Eurobonds for 2022–2023 (Kharlamov, 2023). However, the situation will be different in 2024. This year, Ukraine does not have Western grant support, and it is time to pay interest on Eurobonds immediately in three years (2022-2024).

This situation has led to an unprecedented increase in public debt servicing costs to 6.3% of GDP, or almost $12 billion in 2024 (Medium-Term Strategy for Public Debt Management, 2024). And by the end of the year, the state debt will reach almost 100% of GDP (Chupak, 2024). At the same time, the policy of high interest rates of the National Bank of Ukraine led to an increase in the average domestic debt service rate from 9% to 13% in two years (Medium-term strategy of public debt management, 2024).

Debt service to the IMF and other creditors Ukraine, having signed a four-year program with the IMF, is now replacing $10 billion of debt to the IMF (debt received until 2022 at rates of 2% and 3% per year) with another IMF loan in the amount of $15.6 billion (The interest rate is already 8.5% per annum). As a result, already in 2024, in addition to repaying the principal amount of the loan under the old IMF programs, Ukraine will have to pay about $900 million in interest for IMF debt service. According to calculations, having received $5.4 billion in IMF loans in 2024, Ukraine will need to increase payments only for debt service (without reducing the amount of the debt) in 2025 to $1.1–1.2 billion.

In addition, there are securities of Ukraine tied to the GDP of 2015, which are valid until 2041. In 2015, Prime Minister A. Yatsenyuk and Finance Minister M. Yaresko signed an agreement with creditors, which slightly reduced the amount of debt in exchange for securities, the payments of which are mandatory (Vygovska, 2015), if Ukraine's economic growth exceeds 3% of GDP starting in 2019. Moreover, the conditions contain obligations: the greater the GDP growth, the greater the payment. The motive behind the signing of such an agreement by the government of Ukraine remains a mystery. However, in the conditions of post-war recovery, payments on these obligations can reach $1-2 billion per year and more for the nominal amount of securities of $3.2 billion.

In 2023, the Ukrainian economy grew by 5.3%, which means that already in 2025, Ukraine will have to pay about $700-$800 million "tax on the growth of the Ukrainian economy" for the benefit of creditors, to which the Ukrainian government signed a corresponding agreement.

Thus, approximately half of the US and EU aid to Ukraine in 2024 will go to service the debt of creditors inside and outside of Ukraine.

In order to reduce the burden on the state budget, in May-June 2024, the Ministry of Finance of Ukraine and its creditors held negotiations on the restructuring of the $20 billion debt (Eurobond) and the modification of securities tied to GDP (Parashchiy, 2024). So far, the negotiations have not led to any joint decision. If debt restructuring fails by August 1, 2024, Ukraine will have to pay about $3.75 billion in interest on Eurobonds by the end of 2024.

The GDP of Ukraine in 2023 was UAH 6.5 trillion in nominal terms (Dynamics of the aggregate state debt, 2024). The amount of international aid is 1.5 trillion. UAH or 23% (Medium-term strategy for public debt management, 2024). This money goes mainly to cover the budget's social expenses: pensions, salaries of budget employees, benefits, scholarships, etc. In dollar equivalent, the situation is approximately similar: the GDP of 2023 amounted to 160 billion dollars. in the equivalent, aid - 40 billion dollars. or 25% (Medium-term strategy for public debt management, 2024).

However, if you look at the actual data, the effect of foreign aid is broader. This money is used to pay social transfers, which, in turn, are used to purchase social goods and services, mainly of national production. That is, solvent demand is formed (Likhonosova, 2024). Therefore, the multiplier effect of budget and consumer spending is included.

It can be assumed that up to 30% of GDP is directly or indirectly formed at the expense of external international aid, and without it, the gross product of Ukraine last year would hardly have exceeded 100 billion dollars.

But, in addition to the state budget, there is also a balance of payments factor. Thus, the deficit of the trade balance last year approached the mark of 40 billion dollars, although the balance of payments itself remained in surplus, including due to the positive balance of the financial account (by almost +20 billion dollars) and current transfers (+24 billion dollars) (Balance of payments in 2023, 2024).

That is, if it were not for the grants that go to transfers and credits that go to the assets of the financial account, the balance of payments of Ukraine would have a "hole" of 40 billion dollars. and a deficit of 25-30 billion dollars. And this would lead to a deep devaluation of the hryvnia at least at the level of 2022. Which, in turn, would lead to a revaluation of the currency equivalent of nominal

GDP and a reduction of currency GDP to 70-80 billion dollars. In addition, there is nothing unusual about this for the Ukrainian economy: in 2015, the GDP of Ukraine was already falling from 183 billion dollars. in 2013 to 90 billion dollars. (Dynamics of the aggregate state debt, 2024).

In 2022, real GDP in hryvnia decreased by 28.8%, and in 2023 it increased by 5.3%. The currency equivalent in 2023 was 160 billion dollars. — this is 80% of the level of 2021 (then a historical maximum of $200 billion was recorded). But in such a method of determining the ratio of GDP and public debt there are certain destructive factors in the form of a huge influence that forms external financial assistance.

Measuring energy consumption indicators as a method of determining GDP growth rates. To determine GDP growth rates, we use the so-called "electrical method", that is, the method of determining GDP growth rates based on the dynamics of electricity production and consumption.

One of the modern indicators of GDP sustainability is the indicator of its energy intensity. At the same time, its growth is not always a positive dynamic for the state, because the energy intensity indicator of GDP is a peculiar sign of high energy costs for production using outdated technologies.

The indicator of energy availability of the country's economy and population has a different connotation. Its growth indicates positive development trends. Because the more available and cheap energy, the more opportunities and incentives for development, although the energy factor alone is necessary but not sufficient.

Nikola Tesla determined the development of civilization by the level of energy consumed (Kresoja, 2024). In the natural sciences, there is the Kardashev Scale, which defines three types of space civilizations (Holdren, 2003):

The first type uses all available energy resources on the home planet;

The second type is a civilization that uses all the energy of its star, in our case, the Sun.

The third type is a civilization that uses the energy of its galaxy.

So, let's track, based on actual data, how energy consumption reflects the level of strategic development of the country. On a per capita basis, China compared the indicators of the level of primary energy production with the volume of the entire EU. In turn, the EU level decreased significantly: from approximately 45,000 kWh per year to 35,000 kWh per year per capita (Primary and final energy consumption in Europe, 2024). And in China, the same indicator, on the contrary, grew significantly: starting from significant energy poverty of the population to more than 30,000 kWh per year (Statistical Review of World Energy, 2024) (Figure 1).

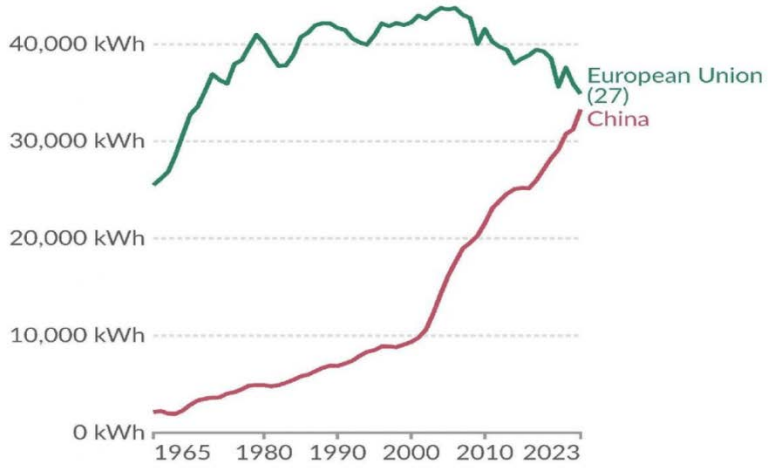

Figure 1. Levels of primary energy production per capita in the EU and China
Source: Statistical Review of World Energy, 2024

10H**Discussion.** The indicator of energy production per capita shows the level of complexity of the economy, how many machines and equipment can be used in everyday life and production for the strategic development of the country and the quality of life of its population.

As for Ukraine's indicators of primary energy production, there are no statistical data to date. In 2023, electricity production amounted to 96.8 billion kWh per year (Ukraine Electricity Generation 2023 vs 2022, 2024) with a population of about 30 million people (Population Reduction Forecasts, 2023). It is worth noting that this is not consumption, it is production per capita of purely electricity, without taking into account other energy resources.

That is, the indicator of energy generation per capita in Ukraine is about 3,200 thousand kWh per year. In 2024, it is safe to say that electricity production may drop to 90 billion kWh per year, and the per capita production rate may fall to 3,000,000 kWh or lower. And if its citizens who left at a constant electricity generation start returning to Ukraine, this figure will drop to 2,500 kWh per year.

This level indicates total energy poverty. After all, even with a complete shutdown of industry from energy supply, taking into account critical infrastructure, one person will be able to consume about 100 kWh per month. This is sufficient for minimum needs, but it will be an economy with commercial consumption completely disconnected (industry, service sector, trade, etc.). In order to ensure the stable life of the country, such obstacles are impassable rather than realistic.

According to Ember and Energy Institute (Per capita electricity generation, 2023), electricity production per capita in 2023 in the USA is 16,600, in Germany - 6,000, in the Russian Federation - 8,000, in China - 6,600, in Japan - 8,200 kW - h per year. In Ukraine by 2023, there was 2,800 kWh per year (Per capita electricity generation, 2023).

Based on these indicators, to ensure an above-average level of development, taking into account the population of about 30 million, Ukraine needs to generate at least 180 billion kWh per year. In other words, taking into account the current level, Ukraine needs to at least double its electricity generation.

At the same time, it is necessary to understand that no decentralized generation will fulfill the task. Only the increase of basic, stable generation, and what is important for Ukraine - on an available energy resource. And today, for Ukraine, it is no longer coal or gas. Alternative sources of generation, or rather their level of development in Ukraine today, are also unable to cover the necessary indicators. The only source available so far is uranium, i.e. energy generation by nuclear plants.

It can be assumed that the root of the problem lies in the deep structural degradation of Ukraine's economy. Virtually complete deindustrialization and dependence of GDP on the raw material sector (agriculture), banking and services sector, where there is no direct relationship between production growth and electricity consumption. Plus an increase in the contribution to GDP of tax revenues.

All these segments of the economy (except agriculture) are directly dependent on the amount of foreign aid: taxes, finance, and the service sector (including trade) function thanks to foreign financial aid.

Among the positive effects of such a structural transformation, only the narrowing of the gap between production and consumption can be mentioned: if in 2021 consumption was 77% of production, then in 2023 it will be 81%. (Okhrimenko, 2024).

That is, up to 4% of electricity production, which previously "disappeared" in the form of losses in networks, is now officially consumed. This effect can be explained by the decrease in the "shadow electricity" market, which involved large enterprises that have simply been sent to function today.

In other words, the Ukrainian economy is becoming less energy-rich. Not energy-intensive (which would be a completely positive phenomenon), but less energy-rich. In this format, the

economy and security of Ukraine in the horizons of post-war structural transformations (if they will occur at all) become more and more hazy.

Conclusions. So, to get a chance for recovery, the economy of Ukraine should be directed, first of all, to social programs. Something like the repatriation of the population following the example of Israel. But for this, it is necessary to completely remove the existing repressive tools in the relations between society and the state, restart the social contract, form a relationship to the country's resources as a general potential and opportunity for growth, guarantee the impossibility of dismantling basic human rights and freedoms, launch well-known models of dynamic economic growth based on knowledge economy and the formation of own added value, not only raw materials and agricultural products, create jobs and ensure entrepreneurial freedoms. This task is extremely difficult, but it cannot be said that it is impossible, of course, under the conditions of its formation.

Thus, the research makes it possible to determine the degree of influence of the imbalance of demand and supply of energy resources on the state financial debt through the use of such tools as: analysis of market conditions, assessment of demand and supply for energy resources: current and forecasted volumes of consumption, main consumers of energy resources (industry, transport, households); analysis of price changes for energy resources on the domestic and world markets; regulatory initiatives to support stability in the energy resource market; the impact of international sanctions or trade agreements on the availability of energy resources; the use of statistical data to assess historical trends and their impact on public financial debt.

The developed paradigm of an integrated approach to public debt management in the context of energy crises is based on an integrated, multidimensional analysis and management of interrelationships between various economic, financial, social and political factors. Consideration of the energy sector should not take place in isolation, but in the context of its interaction with other sectors of the economy (industry, transport, agriculture).

The integration and coordination of energy, economic, fiscal, and social policies to achieve agreed goals and create integrated strategies, including financial plans, political measures, and regulatory initiatives, is very important for determining effective financial instruments and mechanisms for optimizing budget expenditures.

Appropriate long-term planning may include: developing long-term debt management plans that take into account possible energy crises; creation of reserve funds and mechanisms for rapid response to crisis situations; the use of econometric and mathematical models for forecasting possible scenarios of the development of energy crises and their impact on public debt; creation of "what if" scenarios to assess the risks and consequences of various political decisions; assessment and management of financial risks related to energy crises, including currency risks, interest rate risks and liquidity risks; using insurance instruments and hedging to protect against possible losses.

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Ліхоносова Ганна
доктор економічних наук, професор,
Професор кафедри менеджменту та бізнес-адміністрування
Національний аерокосмічний університет ім. М. Є. Жуковського «Харківський авіаційний інститут»
61070, м. Харків, вулиця В. Манька, 17
email: g.likhonosova@khai.edu
ORCID ID: 0000-0001-6552-8920

Управління державним фінансовим боргом в умовах незбалансованості попиту та пропозиції енергоресурсів

Анотація. Управління фінансовим боргом в умовах енергетичної кризи є актуальною проблемою, яка потребує стратегічного підходу в країнах з нестабільною енергосистемою. Дисбаланс між попитом і пропозицією генерації енергоресурсів створює пастку, в якій зростання дефіциту енергії призводить до зростання витрат на імпорт, підвищення цін для кінцевих споживачів і збільшення фінансового навантаження на державу. Це, у свою чергу, може спровокувати інфляційний тиск, зниження конкурентоспроможності національної економіки, зростання державного боргу та соціальної напруги через зростання вартості життя та зниження рівня енергетичної безпеки. У дослідженні використовувалися методи сценарного аналізу, описової статистики, економетричного, монографічного та порівняльного аналізу. Метою статті є аналіз впливу енергетичних криз на стан державного фінансового забезпечення, визначення шляхів мінімізації ризиків та забезпечення фінансової стабільності. У ході дослідження ступінь впливу дисбалансу попиту та пропозиції енергоресурсів на державний фінансовий борг визначено за допомогою таких інструментів, як: аналіз кон'юнктури ринку, оцінка рівня попиту та пропозиції на енергетичні ресурси. Охарактеризовано парадигму інтегрованого підходу до управління державним боргом в умовах енергетичних криз, яка ґрунтується на комплексному, багатовимірному аналізі та управлінні взаємозв'язками між різними економічними, фінансовими, соціальними та політичними факторами. Підкреслено, що розгляд енергетичного сектора має відбуватися не ізольовано, а в контексті його взаємодії з фінансовими можливостями інших секторів економіки. Практичні рекомендації включають моделі оцінки ризиків, пов'язаних з енергетичними кризами та методи стабілізації державних фінансів, які можуть бути використані в оперативному управлінні фінансовим боргом держави. Запропоновано метод інтеграції та узгодження енергетичних, економічних, фіскальних і соціальних показників для визначення ефективних фінансових інструментів і механізмів оптимізації бюджетних видатків. Зроблено висновок, що в умовах дисбалансу попиту та пропозиції енергії управління фінансовим боргом потребує стратегічного підходу, який ґрунтується на інвестиціях у чисту енергетику, підвищенні енергоефективності та точному прогнозуванні.

Ключові слова: *державний борг, енергетичні потреби, фінансова рецесія, управління ризиками, рівень державної заборгованості, залежність боргу від енергії, рівень генерації енергії.*

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