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## FISCAL OPERATIONS ON THE WAY OF ENSURING BUDGET SECURITY OF UKRAINE IN CRISIS

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**Abstract.** *Ukraine, like many other countries in the world, aims to ensure sustainable economic growth by comprehensive socio-economic reform. At the same time, the factors that impede the effectiveness of its implementation pose a threat to financial security due to the loss of its stability. Such multifaceted factors include the spread of globalization and digitalization, which, along with new opportunities, create new challenges and threats, which in turn require a reliable economic foundation and support for financial stability, centralized funds and long-term financial resources. An important tool, among others, is budget policy, which combines regulatory and fiscal functions of the budget process. It optimally and continuously supports the creation of resources for the reduction of threats and development of the economy through budget expenditures, and an indicator of its effectiveness is budget security. Thus, the unresolved issues of budget security, as a strategic direction of financial security, in the relationship and interaction with fiscal sustainability led to the choice of research subject, its purpose and objectives. Paying tribute to the contribution of scientists, we should note that the issue of improving budget security in terms of considering the impact of fiscal sustainability on it requires further research. The purpose and objectives of the study are to generalize and systematize the theoretical foundations and methodological approaches to budget security, impact assessment and development of proposals for strengthening budget security by improving budget and fiscal policy, strengthening fiscal sustainability. To achieve this goal, the following tasks were defined: the theoretical foundations of budget security were generalized; the role and importance of fiscal policy and fiscal sustainability in ensuring budget security were described; the diagnostics of budget security in Ukraine were carried out; the level of fiscal sustainability was analyzed and its impact on Ukraine's budget security was assessed; the practical recommendations for strengthening budget security by fiscal sustainability reinforcement were developed.*

**Keywords:** *budget security, fiscal policy, fiscal security, state debt.*

## Introduction

Ukraine, like many other countries in the world, aims to ensure sustainable economic growth by comprehensive socio-economic reform. At the same time, the factors that impede the effectiveness of its implementation pose a threat to financial security due to the loss of its stability. Such multifaceted factors include the spread of globalization and digitalization, which, along with new opportunities, create new challenges and threats, which in turn require a reliable economic foundation and support for financial stability, centralized funds and long-term financial resources. An important tool, among others, is budget policy, which combines regulatory and fiscal functions of the budget process. It optimally and continuously supports the creation of resources for the reduction of threats and development of the economy through budget expenditures, and an indicator of its effectiveness is budget security. Thus, the unresolved issues of budget security, as a strategic direction of financial security, in the relationship and interaction with fiscal sustainability led to the choice of research subject, its purpose and objectives.

**Analysis of recent research and publications.** Theoretical and methodological principles of financial safety, including budgetary safety as its structural component, are given in scientific works of domestic and foreign scientists, in particular, O. Baranovsky, O. Baraetska, I. Babets, V. Bilous, Z. Varnaliia, S. Glazieva, K. Errou, O. Kolisnyk, S. Kuznetsova, J. Stiglitz, S. Fischer, R. Peroti, A. Thornell, R. Haussman, P. Hellier and others. Paying tribute to the contribution of scientists, we note that the issue of improving budget security in terms of considering the impact of fiscal sustainability on it requires further research.

**The purpose and objectives of the research.** The purpose and objectives of the research are to generalize and systematize the theoretical foundations and methodological approaches to budget security, impact assessment and development of proposals for strengthening budget security by improving budget and fiscal policy, strengthening fiscal sustainability.

To achieve this goal, the following objectives are defined:

- to generalize the theoretical foundations of budget security;
- to describe the role and importance of fiscal policy and fiscal sustainability in ensuring budget security;
- to diagnose the budget security of Ukraine;
- to analyze fiscal sustainability and assess its impact on Ukraine's budget security;
- to develop practical recommendations for strengthening budget security by fiscal sustainability reinforcement.

**The object of research** is the process of ensuring budget security.

**The subject matter of research** is theoretical, methodological and applied aspects of fiscal sustainability as a factor influencing budget security.

**The methods of scientific research.** The reliable methodological basics of the research are the statements of modern financial and economic science and methods of scientific knowledge: abstract and logical methods for goals and objectives; the methods of systematic and logical generalization, scientific abstraction, synthesis – the research of budget security and fiscal sustainability, the development of practical recommendations; analytical method; the method of factorial and comparative analysis – the identification of factors and threats; economic and statistical, calculation and analytical, tabular and graphical methods – the calculations and final results of the diagnostics of budget security and fiscal stability.

**The information base of the research** contains regulatory legal acts, informational and analytical reviews, analytical and statistical information, monographs, scientific articles, Internet resources on the theory, foreign and domestic practice of budget security, fiscal policy.

**Scientific novelty of the obtained results.** Some statements of the work have elements of scientific novelty. Thus, the interpretation of the concept of "budget security" due to the synthetic approach, the essential characteristics of fiscal stability have been further developed.

**The practical significance** of the obtained results lies in the outcomes of diagnostics of Ukraine's budget security, in determining the level of fiscal sustainability and assessing its impact on budget security, in developing practical recommendations for strengthening budget security in a COVID-19 pandemic through fiscal incentives, introduction of digital technologies to improve tax administration.

### **Theoretical approaches to budget security**

Budget security is an important component of state financial security. The achievement of the financial well-being of society, the competitiveness of the economy and the national security of the state depend on the degree of its provision. The new reality of financial security resulted from the risks associated with global processes, firstly, political tensions caused by dissatisfaction with economic change and political instability amid growing information openness, mobility and political activity, as evidenced by the spread of protests against government policy. Secondly, there are risks connected with growing stratification of society and the inability of governments to overcome poverty and ensure high quality of life because of chronic budget deficits and rising public debt. Thirdly, there are risks of monopolistic use of technological and financial innovations and the latest digital technologies, the digitalization of the economy and the financial sector with simultaneous growth of vulnerability to failures and cyber threats.

The critical analysis of the scientific discussion provided an opportunity to generalize and present the authors' interpretation of the concept of "budget security": *a synthetic category of economics, finance theory and political science, which is related to the concepts of economic and financial security as their foundation and material basis, financial and budgetary policy as a mechanism and indicator of their implementation, economic pressure and financial stability as a system of countering challenges and threats in order to preserve national interests, strengthen economic independence and financial stability, sustainable socio-economic development.*

For complete disclosure of characteristic features, it is advisable to take into account the components of budget policy (revenue and expenditure policy, debt policy, budget risk management) and a set of factors and political, economic, man-made, environmental, competitive and other threats.

The concept of fiscal sustainability is related to fiscal policy and public debt dynamics. In our opinion, *fiscal sustainability is a policy that, in accordance with current legislation and political decisions, determines the evolution of tax and expenditure ratios, which allows not interfering with the tax system and cost model to prevent debt accumulation over the long term.*

It is obvious that almost all areas of the national economy are marginal under the influence of exogenous and endogenous threats and destructive macroeconomic processes, which introduce a high degree of uncertainty and unpredictable consequences. In turn, it requires measures to strengthen financial stability and ensure sustainable dynamics of economic growth

at the sectorial and regional levels, and the country as a whole. A reliable basis for state budget security is formed by the revenue budget and program-target budgeting in terms of hierarchy and relationship between the implementation of national and regional strategic goals, mission and objectives of financial security, as well as the goals of economic entities achieved by the rational administrative structure for managing the budget process.

### Assessing the impact of fiscal stability on budget security

There is the assessment of fiscal sustainability according to the methodological approach of the European Commission (*European Commission. Fiscal Sustainability Report, 2012*), the formalization of the main indicators in Table 1.

**Table 1. Main indicators of fiscal sustainability of the European Commission**  
*Source: Pashkevich, 2017; European Commission. Fiscal Sustainability Report, 2012*

	Indicator	Calculation formula
1	Short-term objectives are assessed with the indicator S0 (early-detection index of "fiscal stress")	Eleven indicators covering the main sources of macroeconomic imbalances (Roy, Heuty and Letouze, 2007): <ul style="list-style-type: none"> <li>- three-year moving average of the current account of the balance of payments as a percentage of GDP with thresholds of 6 and -4%;</li> <li>- net international investment position as a percentage of GDP with a threshold of -35%;</li> <li>- five-year percentage change in export market share with a threshold of -6%;</li> <li>- three-year percentage change in the nominal value of labor per unit of output with thresholds of 9% for euro area countries and 12% for non-euro area countries;</li> <li>- three-year percentage change in the real effective exchange rate based on the HICP and CPI deflators compared to other industrialized countries (41 countries) with thresholds - / 5% for euro area countries and - / 11% for non-euro area countries;</li> <li>- private sector debt (consolidated) as a percentage of GDP with a threshold of 133%;</li> <li>- the flow of private sector loans as a percentage of GDP with a threshold of 15%;</li> <li>- annual change in house prices taking into account consumption deflator of Eurostat, the threshold value is 6%;</li> <li>- total public sector debt as a percentage of GDP with a threshold of 60%;</li> <li>- three-year moving average unemployment rate with a threshold of 10%;</li> <li>- annual change in aggregate liabilities of the financial sector with a threshold of 16.5%.</li> </ul>
2	Medium-term objectives are assessed on the basis of a modified indicator S1 ("fiscal gap")	Quantitative assessment of the necessary budget adjustment to achieve 60% of the threshold value of public debt in 2030. The following indicator values are used for assessment: <ul style="list-style-type: none"> <li>- if the value is less than zero, the country is low-risk;</li> <li>- if the value is between 0 and 3 (which requires a structural adjustment of the primary balance to 0.5 percentage points of GDP per year until 2020), the average level of risk is assigned;</li> <li>- if the value is more than 3 (which means the need for structural adjustment of more than 0.5 percentage points of GDP per year), a high level of risk is assigned</li> </ul>

3	Long-term problems are assessed using indicator S2 (fiscal risks related to population aging).	It shows the adjustment of the current structural primary balance needed to match the interim budgetary constraint of the infinite horizon when current and future government revenues, including public debt, correspond to future expenditures, including additional expenditures related to population aging. The following indicator values are used for assessment: - if the value of the indicator is less than 2, then a low risk is assigned; - if the value is between 2 and 6, then the average risk is assigned; - if the value is more than 6, then a high risk is assigned.
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The fiscal gap indicator S1 is an indicator of fiscal sustainability and determines the percentage increase in government revenue or decrease of its expenditures needed to balance public finances over the long term. It is based on the forecasts of economic growth, interest rates and budget balances (Pashkevich, 2017). The initial data for calculating the selected analyzed period 2009-2023 are in Table 2.

**Table 2. Research data**

*Source: Pashkevich, 2017*

Indicator	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gross debt,% of GDP	79,1	80,9	17,8	60,9	50,3	68	64,6	60	55
Share of debt denominated in foreign currency,%	64,3%	64,2%	64,4%	58,0%	59,5%	59,5%	59,5%	59,5%	59,5%
US dollar exchange rate	24	27,19	28,07	27,46	28,95	27,0	28,9	28,6	31,0
The growth index of the US dollar to the previous year	1,522	1,133	1,032	0,978	1,054	0,931	1,061	1,010	0,923
Nominal GDP	1979458	2383182	2982920	3558706	3974564	3835,4543	4505,9	5089,4	5689,7
Nominal GDP index to the previous year	1,263	1,204	1,252	1,193	1,117	0,965	1,175	1,129	1,118
Average public debt service rate,% per annum	7,75	7,35	6,5	7	7,3	7,4	8,6	7,2	7,2
Average public debt service rate, in index format	1,0775	1,0735	1,065	1,07	1,073	1,074	1,086	1,072	1,072

According to the results of calculations of the fiscal gap indicator S1 for Ukraine (Table 3) according to the period 2015-2019 - 5.91% of GDP, 2019-2023 - -1.08% of GDP.

**Table 3. The calculations of fiscal gap indicator S1 for Ukraine**  
 Source: *The state budget of Ukraine. Ministry of Finance of Ukraine, 2021*

Indicator	Periods		
	2009-2013	2014-2019	2019-2023
Starting year of fiscal adjustment	2009	2014	2019
Number of years of fiscal adjustment	5	6	5
Desired level of debt at the end of the period,% of GDP	60	60	55
Denominator of components:	7,857	9,853	7,895
A (starting debt burden),% of GDP	2,9397	3,8978	-0,581
B (availability of the target level of debt),% of GDP	-0,687	2,01979	-0,477
C (tax policy),% of GDP	0,007025	-0,002	-0,028
Fiscal gap (A + B),% of GDP	2,252	5,918	-1,058
Fiscal gap (A + B + C),% of GDP	2,259	5,916	-1,085
The level of fiscal risk	average	high	low
Annual amount of fiscal adjustment (A + B)	0,452	0,986	-
Annual amount of fiscal adjustment (A + B + C)	0,452-	0,986	-

The positive values of component A in the first two periods of 2.94% of GDP and 3.898% of GDP indicate unfavorable macroeconomic conditions for service, while in 2019-2023 the negative value (-0.581% of GDP) debt service conditions are gradually becoming more favorable. The positive value of component B (2.02% of GDP) indicates an additional structural burden on public finances to decrease (approximate) of public debt to a safe target level (60%) and, thus, increase the financial stability of the state. Fiscal policy has had a positive effect on the fiscal gap since 2014.

The decrease (+) or increase (-) of the budget revenue is due to the changes in fiscal legislation (tax rates, expansion of the tax base, improvement of tax administration, etc.), and the decrease (up to 0.02% of GDP) in 2015-2017 was due to military action in the East, in 2020 (0.03% of GDP) - COVID-19 pandemic.

The results show that during 2009-2013 the fiscal risk was average, which implies an adjustment of the primary balance to 0.5 percentage points per year till 2013, namely by 0.452% of GDP. Instead, in 2014-2019 the risk was high, which implies an adjustment of the primary balance of more than 0.5 percentage points per year till 2019, namely by 0.986% of GDP.

The components of the current burden index of debt service indicate that the most significant deterioration in debt service occurred in 2014-2015 during the economic crisis. It was a consequence of fiscal dominance (subordination of monetary policy to current goals and objectives of fiscal policy). Through the issue and sale of IGLBs, the government financed the solution of certain problems (debt repayment of VAT, increase of authorized capital of banks, capitalization of NJSC Naftogaz, social benefits, etc.). That hidden emission led to the accumulation of imbalances, which were realized during the crisis of 2014-2015.

Thus, the fiscal gap indicator in Ukraine shows a high degree of instability of public finances in the medium term. The sources of destabilization are high levels of public debt, declining economic potential, high spending on defense and social security, etc..

For determining the impact of fiscal sustainability on budget security, we calculate the index of fiscal vulnerability, which makes it possible to assess the fiscal situation in the country, summarizing the selected fiscal indicators, to assess the degree of deviation from "historical standards", which are stated as 10-year averages (Baldacci, McHugh and Petrova, 2011). According to the methodology, fiscal indicators are divided into: 1) key fiscal variables; 2) long-term fiscal trends; 3) management indicators (Table 4).

**Table 4. Indicators for calculating fiscal vulnerability index**

*Source: Baldacci, McHugh and Petrova, 2011*

Indexes	Subindexes
The ratio of the public debt service rate and the growth rate of nominal GDP	Key fiscal indicators (F1)
Gross debt,% of GDP	
Structural primary balance,% of GDP	
Short-term debt / Total debt	Management indicators (F2)
Debt share in national currency,% of GDP	
Debt share in foreign currencies,% of GDP	
External debt / Gross debt	Long-term fiscal trends (F3)
Total fertility rate	
Long-term forecasts of changes in government spending on healthcare,% of GDP	
Long-term forecasts of changes in government pension expenditures,% of GDP	
Indicator of the nation's aging	

The first group of indicators reflects the compatibility of public debt dynamics with fiscal sustainability, the second one assesses the duration of economic challenges, related to the demographic situation, affect predictable fiscal variables and solvency/sustainability, and management indicators assess the structure of government assets and liabilities to increase or decrease the refinancing risk.

**Table 5. Calculation indicators of fiscal vulnerability index for the integrated indicator of budget security during 2009-2020** *Source: Author, 2022*

Indexes	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Key fiscal indicators (F1)	4,7	1,1	0,61	2,8	3,2	7,1	9,1	8,8	1,2	6,2	7,7	8,5
Management indicators (F2)	7,7	8,5	9,2	9,2	2,2	0,6	5,5	4,6	5,2	4,2	1,2	1,8
Index of Fiscal Vulnerability	6,2	4,8	4,9	6	2,7	3,85	7,3	6,7	3,2	5,2	4,45	5,15
Integral indicator of Budget Security (Budget security)	59,6	56,9	67,1	57,8	57,6	55,8	64,3	61,8	63,8	54,8	55,5	42,1

Considering the limit and lack of data, only two groups of indicators are calculated, namely key fiscal indicators (F1) and management indicators (F2), which determine the index of fiscal vulnerability as the arithmetic mean (Table 5).

The obtained values of the fiscal vulnerability index indicate a high level of vulnerability if it is close to 10, normal if it is close to 5. The analysis of sub-indices of fiscal vulnerability discloses the problems with managing public debt structure and increasing risk during 2009-2012, which was due to an increase in the share of short-term debt (by 37.6%) and an increase in the share of debt in national currency (by 35%). In 2014-2016, during the economic crisis, gross debt increased by 75% and the burden on its service grew. It increased the degree of fiscal vulnerability. In 2019-2020, there was an upward trend in gross debt to GDP (50.3% in 2019 and 68% in 2020), which together with a slowdown in GDP growth (more than 40%), changes in the structural primary balance, the growth of its expenditure part, led to an increase in the sub-index F1, the value of which was above average and exposed the growth of fiscal vulnerability in this period.

In 2020, there was a decrease in GDP, budget revenues and an increase in budget expenditures for social needs, which are largely due to the crisis caused by COVID-19 pandemic. However, the impact of these factors can be observed in more detail when calculating the F3 sub-index, which reflects long-term fiscal trends.

Considering the purpose of the research, namely to determine the impact of fiscal variables that characterize fiscal sustainability on budget security, the level of budget security was calculated on four indicators for 2009-2020 (*Methodical recommendations for calculating the level of economic security of Ukraine, 2013*). The obtained normalized values of the indicators were adjusted to the weights for the calculation of the integrated indicator of the level of budget security. The relationship between the level of budget security and indicators of fiscal sustainability, namely the sub-indices of fiscal vulnerability (F1, F2) and the index of fiscal stability in the medium term (S1), was determined by building a multifactor regression model:

$$I_{BS} = 48,02 + 1,85 * S_1 + 1,11 * F2 - 0,49 * F1$$

where  $I_{BS}$  is an integrated indicator of budget security,  $S_1$  is an indicator of fiscal gaps, and  $F2$ ,  $F1$  are sub-indices of fiscal vulnerability.

According to the obtained calculations, the model is adequate, as evidenced by the value of the coefficient of determination ( $R^2 = 0.71$ ), the value of the normalized R-square ( $R^2_{adj}=0,60$ ), a significant F-criterion, and the model parameters are statistically significant at 1% and 5% significance levels except for indicator F1, which is insignificant. According to the results, there are the following conclusions: 1) the variation in the level of budget security of Ukraine for 2009-2020 by 71% is explained by changes in fiscal sustainability indicators; 2) there is a direct relationship between the level of budget security and fiscal stability, namely if there is an increase of 1 percentage point in both the fiscal gap indicator and the fiscal vulnerability sub-index, the level of budget security will increase by 1.85 percentage points and 1.11 percentage points in accordance. The growth of indicator S1 demonstrates an increase in revenue or a decrease in government expenditure needed to balance public finances, which in turn leads to an increase in the level of budget security. The growth of indicator F2 to the normal level of fiscal vulnerability also increases the level of fiscal security.



## Implementing the practice of maintaining fiscal stability to ensure fiscal security in a crisis

According to the pragmatic approach, fiscal sustainability implies stability and flexibility of fiscal rules (debt, budget balance, structural balance, expenditures and revenues), which determine long-term constraints, serve as guidelines and incentives for budget and fiscal policy. Their implementation makes it possible to increase the fiscal responsibility of the government, to exert targeted regulatory impact on the formation and control over the implementation of the state budget as a guarantee of budget security.

The pandemic of COVID-19 caused the need for new approaches of fiscal policy, rules and incentives, depending on the dynamics of its spread and adaptive response to phases of the economic cycle, to the goals of optimizing fiscal policy in the context of fiscal security along with, in particular, measures such as the effective use of regulatory capacity to mobilize budget revenues, the increase of fiscal efficiency of the tax system through a system of leverages to revive economic activity, the reforms of the budget system to ensure the effectiveness of the expenditures, systemic public debt management. The pandemic disclosed that anti-crisis measures increased budget expenditure (in some countries they reached 4% of GDP), which may cause rising risk of public debt growth and loss of sustainability. The system of such measures intensifies fiscal incentives as a composition of fiscal norms and rules that adaptively and flexibly ensure fiscal efficiency with minimal discrimination of economic interests of economic entities and maintaining confidence in fiscal authorities and the state as a whole.

The comparative analysis of the experience of anti-crisis measures in terms of fiscal incentives showed that countries around the world implement and adjust their packages depending on the phases of pandemic. The unity of approaches is as follows: 1) support for small and medium-sized businesses - soft loans (*Thailand*) (*Thailand Issues New COVID-19 Stimulus Package to Accelerate Investments*, 2021), write-off of tax debt not exceeding 3060 UAH, short-term exemption from single tax, deferred repayment of tax debt of taxpayers (individuals) (Ukraine) (*Law of Ukraine*, 2020); 2) tax benefits and transfers to employers, employees, students (USA, Canada) (Cohn, 2020), one-time financial assistance for citizens, one-time financial assistance for business to save jobs, one-time business compensation to pay single social contribution for employees (Ukraine) (*Law of Ukraine*, 2020; Ambroziak, et al, 2020), waiver of the requirement or reduction of social security contributions (Greece, Spain); 3) state support for certain industries that have a significant share in the structure of GDP, in particular, tourism (Thailand), exemption of services from VAT indefinitely and full reimbursement for enterprises that provide protection and localization of the pandemic (China) (Lewis, 2020), exemption from VAT on medicines and medical equipment needed to fight against the pandemic (Ukraine), speed up the return, simplify the VAT threshold increase (Colombia, Korea, New Zealand); 4) business tax - for example, decrease to 10% (vs. 25%) for 2020-2022 (Chile), increase in the income limit for the single tax (Ukraine), deferral (EU countries) (Haroutunian, 2021); 5) investment support - zero tax rate for 10 years for new investments or decrease to 15% (against 24%) for 15 years for companies with fixed assets over 114 million dollars USA, fiscal benefits for startups for 3 years after launching (Malaysia) (*China announces tax relief measures to tackle coronavirus disruption*, 2020), extension of investment tax credit for 2 years and production tax credit for one year for investments in environmentally friendly energy and energy efficiency (USA); 6) for affordable housing loans - a minimum loan rate of 4% for tax relief on housing for low-income citizens (USA), deferred interest on mortgage (Spain); 7) tax credits and discounts for new markets, health insurance,

employment (USA); 8) tax on land and real estate - short-term deferral of payment (Ukraine); 9) change in deadlines for filing tax returns (China), extension of deadlines for filing financial statements (Ukraine); 10) suspension of fiscal inspections and postponement of tax reforms (Canada, Great Britain, Poland (*Special Feature: Tax and fiscal policy responses to the COVID-19 crisis*, 2020)).

The fiscal stimulus package adopted in Ukraine (*Law of Ukraine, 2020*) is a COVID-19 Emergency Response Package. In our opinion, it can be supplemented by: 1) a temporary change in the depreciation rules for 2021-2022, namely 100% depreciation of the asset value in the year in when they were acquired or 50% per year when the asset is used, 100% amortization of intangible assets; 2) development of a staff retention scheme, return of laid-off workers on a part-time basis and creation of new jobs for young workers at the expense of tax benefits and wage subsidies; 3) support for households by extending remittances validity for workers in the informal economy and self-employed persons suffered as a result of the pandemic; 4) expanding the preferential tax regime to stimulate investment and health care reform; 5) support for digital economy through a 50% exemption from income tax for three years for companies that implement digital technologies and develop software in the field of artificial intelligence, big data analysis and machine learning. This will strengthen business activity and ensure the recovery of Ukraine's economy.

Realizing the need for anti-crisis measures to overcome the consequences of the pandemic and ensure the recovery of Ukraine's economy in the post-pandemic period, to strengthen fiscal security, it is necessary to make efforts to solve problems that have become chronic. This, in turn, should include: the achievement of a balanced public financial policy, including through the formation of an effective fiscal space and budget security management; a scientifically grounded and publicly legal approach to the preparation and implementation of the budget; strengthening the income base and decreasing the debt of households; optimization of state budget expenditures and tax burden; development of budget and tax decentralization, etc.

Note that the "golden rule" of public finance should be implemented in practice through the introduction of fiscal policy principles of the Code of Tax and Budget Stability in compliance with the principles (transparency, sustainability, accountability, fairness between generations and efficiency) (Kopits, 2001). It is important to obey strictly fiscal rules that capital expenditures must exceed the budget deficit, the increase in current expenditures is limited by the average nominal GDP growth in previous years, restrictions are not applied in exceptional cases (economic crises, man-made disasters, wars, etc.), setting medium-term target indicators of debt and its adjustment are coordinated with short-term policy guidelines, improvement of institutional mechanisms for compliance with fiscal rules and monitoring mechanisms, incentives and sanctions to ensure the stability of the debt-to-GDP ratio at less than 60%.

Thus, almost all the proposed areas of improving budget security are in the area of fiscal policy of the state, the immediate implementation of which will improve the fiscal space and form a fiscal basis for post-pandemic recovery of the national economy and GDP growth for the medium term.

### **Recommendations for the introduction of digital technologies to ensure budget security**

Based on the research of challenges and threats to financial security in the digital economy (Panteleieva, 2020), it is necessary to substantiate the potential of the multifaceted impact of digital technologies and financial innovations on budget security based on them.

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Thus, the challenge with significant potential transformative effect for budget security is cryptocurrency, namely the transformation of savings into high-risk investments through the conversion of fiat money, the formation of illegitimate financial flows and their use in the shadow economy, which creates new risks and reduces tax base and budget revenues.

Without going into the technical essence of cryptocurrency and lack of unity of approaches to its legalization and status, it is necessary to note in the subject matter of the study the importance of accounting and taxation of cryptocurrency. Today, there is a positive step for Ukraine in the adoption of the Draft Law of Ukraine "On Virtual Assets" by the Verkhovna Rada in the first reading (revised in September 2020) (*Draft Law of Ukraine "On Virtual Assets"*, 2020), where the virtual asset means: "a set of data in electronic form, which has a value and exists in the system of virtual assets. May be an independent object of civil turnover, as well as certify property or non-property rights, in particular, the right of claim to other objects of civil rights". This definition raises many questions, as it focuses more on the institutional and legal aspects of administration than on financial and economic, which is not in line with the approaches of other countries and international financial organizations and to some extent blocks the introduction of virtual assets in Ukraine. For example, the ECB in EU Directive /2018 / 843 of 30.05.2018 considers that it is "digital representation of value, which is not owned and guaranteed by the central bank or other public authority, it is not legally recognized as currency or money, but is accepted by physical and legal entities as a means of exchange, can be transmitted, stored and traded electronically" (*Directive (EU) 2018/843 of the European Parliament and of the Council*, 2018). The countries around the world have already developed approaches to standardizing cryptocurrency accounting and taxation, in particular, for miners, investors of cryptocurrency exchanges, consumers of cryptocurrencies (USA, Germany, Canada, India, Singapore, South Korea, Kyrgyzstan, etc.). This is evidence of developments in the transformation of national tax systems and tax legislation, new approaches to tax control and increase financial discipline in the digital economy.

We believe that the authoritative position of the International Accounting Standards Board (IASB) and the Accounting Standards Board (AcSB), as well as the experience of Belarus, which developed the National Accounting and Reporting Standard "Digital Signage (Tokens)" can be useful for Ukraine. Belarus has introduced fiscal incentives for the development of the digital economy and the crypto industry, in particular, the value added tax and profit from mining, creation, acquisition, alienation of tokens are not removed. This approach does not contradict the world practice, where capital gains tax on cryptocurrency exchange transactions for money (USA) and wealth (Norway, Finland, Germany), income tax on cryptocurrency purchase and sale transactions (Australia) and cryptocurrency transactions (UK) are not collected. On the other hand, in the draft laws amending the Tax Code, proposals on taxation cannot be considered acceptable due to contradictions in modern international practice.

Digital technologies have the potential to manage public finances and administer taxes. Such technologies include blockchain and smart contracts based on them, artificial intelligence and machine learning, big data. We believe that the introduction of Big Data technology is a new stage in the evolution of the domestic tax administration system, as it allows tracking and taxing digital business activity in a rapidly growing number of transactions by accumulating and processing VAT data, taxes on goods and services for daily and monthly reports, their exchange within the rules of information disclosure to increase the transparency of taxation, identifying trends and carrying out forecast analysis of its models. The use of artificial

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intelligence can be the basis of a new tax strategy in terms of managing financial and reputational risks, increase efficiency and effectiveness.

### **Conclusions.**

Budget security is an important component of financial security, its foundation and material basis. Ensuring budget security is the exclusive prerogative of the state in fiscal policy and its constant monitoring, implementation of fiscal rules and incentives. The conducted scientific research made it possible to formulate a number of theoretical-methodical and practical conclusions, which ensured the achievement of this goal.

Theoretical generalization of the scientific literature on the essence of budget security made it possible to determine its characteristics in the formation of a new reality of financial security, which is due to certain risks. The subject-object essence, subject matter and objectives of budget security are revealed, and the critical analysis of scientific discussion made it possible to form the author's interpretation of this concept, which, unlike the existing ones, emphasizes its synthetic nature from the standpoint of economics, finance theory and political science through relationship between concepts of economic and financial security, economic press and financial stability, economic independence and financial stability. Factors and threats to budget security are summarized.

The role and importance of fiscal policy and fiscal sustainability in ensuring budget security are described. The author's point of view on fiscal sustainability is substantiated, relying on the essence, preconditions and factors of fiscal space and fiscal policy.

The work diagnoses the budget security of Ukraine through the analysis of the dynamics of taxes and fees to the state budget in terms of payments during 2017-2020; the assessment of budget security by indicative approach according to the Guidelines for assessing economic security of Ukraine was performed. The critical and unsatisfactory value of indicators led to the conclusion that certain threats to budget security may cause a systemic crisis and destabilize the national economy.

The level of fiscal sustainability according to the methodological approach of the European Commission during 2014-2023 is analyzed by calculating the indicator of fiscal gap in Ukraine. A high degree of instability of public finances in the medium term is set. An assessment of the impact of fiscal sustainability on Ukraine's budget security is given, namely: 1) the variation of its level during 2014-2020 by 71% is explained by the change of fiscal stability indicators, there is a direct dependence between its level and budget security, i.e., with 1 p.p. increase of both the fiscal gap indicator and the fiscal vulnerability subindex, the level of budget security increases by 1,85 p.p. and 1,11 p.p. correspondingly. The growth of fiscal sustainability index S1 indicates an increase in revenues or a decrease in government expenditures needed to balance public finances, which in turn leads to the growth of budget security. The growth of fiscal vulnerability indicator F2 to the normal level also increases the level of budget security.

The results of a comparative analysis of anti-crisis measures in terms of implementing fiscal incentives in a pandemic, showed their flexibility and adaptability in accordance with the phases of the economic cycle and the dynamics of its spread. Recommendations are developed to supplement the package of fiscal incentives to strengthen Ukraine's budget security, including the introduction of changes to depreciation rules, staff retention and job creation,

household support, expanding preferential tax treatment to stimulate investment and health care reform, and support the digital economy.

The peculiarities of digital transformation and potential opportunities of digital technologies for public finance management and tax administration are substantiated. It is proved that cryptocurrency has the maximum potential effect on budget security, taking into account, which it is expedient to standardize the approaches of its accounting and taxation, based on positive foreign experience. The need for balanced implementation of digital technologies for tax purposes is emphasized.

Thus, it is necessary to emphasize that ensuring budget security requires supporting balanced growth of tax revenues, where fiscal stability is important as a priority and basis of financial policy, optimization of the state borrowing and efficient allocation of budget resources for fulfilling the obligations by the state timely.

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