Modelling of Public Financial Security and Budget Policy Effects

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Abstract
This article substantiates the scientific provisions for modelling the level of Ukraine's public financial security taking into account the impact of budget policy, in the process of which identified indicators of budget policy that significantly affect the public financial security and the factors of budget policy based on regression analysis do not interact closely with each other. A seven-factor regression equation is constructed, which is statistically significant, reliable, economically logical, and devoid of autocorrelation. The objective function of maximizing the level of public financial security is constructed and strategic guidelines of budget policy in the context of Ukraine's public financial security are developed, in particular: optimization of the structure of budget revenues through the expansion of the resource base; reduction of the budget deficit while ensuring faster growth rates of state and local budget revenues compared to their expenditures; optimization of debt serviced from the budget through raising funds from the sale of domestic government bonds, mainly on a long-term basis; minimization of budgetary risks and existing threats to the public financial security by ensuring long-term stability of budgets etc.

Key words:
Budget Policy, Public Financial Security, Indicator, Ratio, Strategic Guidelines.

1. Introduction

The public financial security is formed under the influence of many factors, the main of which is budget policy. Improving the effectiveness of budget policy leads to an increase in the level of financial security and, conversely, deteriorating the effectiveness of budget policy inevitably reduces the level of public financial security. However, the difference between the phenomena of budget policy and financial security lies primarily in causation: budget policy is the primary link of public financial policy, along with monetary policy, debt policy, tax policy, customs policy, investment policy, but financial security is secondary or derivative. The fundamentality and scale of the problem, the diversity of the content of financial security and its provision require the formation of information and analytical base for monitoring financial security indicators. Thus, in fact, decisions are made and implemented in the budget sphere (or in any other sphere of the financial policy), and the consequences of these decisions are reflected in the state of public financial security through key indicators.

Many scholars investigate the theoretical and methodological aspects of the public financial security formation in their works. The proposed study is based on the works [1]–[8], which explore various aspects of the theoretical and conceptual foundations of the formation, implementation and provision of public financial security in the context of developed financial markets, internationalization, financial control; [9]–[15], which study the practical features of the formation, implementation and provision of public financial security on the example of European countries and Ukraine and their impact on national security; [16]–[27], which apply methodological approaches to modelling and forecasting strategic priorities for the formation, implementation and provision of financial security, as well as analyse their impact on socio-economic development.

However, the solution of the problem of methodological support for the assessment of public financial security is unsystematic, multi-vector and insufficiently developed in the scientific literature, so it needs further research. The existing methodological problem of reliability of formalization of budget policy impact on public financial security can be solved by using economic and mathematical modelling, as it includes a methodological approach to selecting the most significant factors, the complex impact of which reflects the full impact of budget policy on financial security. An important role is to play a role in the peculiarity of pre-adolescent goals and the development of skin conditions [28, p. 176]. At the same time, the models are especially important, which allow both the formation of management solutions and the forecast of the main parameters of the economic system [29, p. 28].

Thus, the study's main purpose is to improve the methodological support for modelling public financial security, taking into account the impact of budget policy and the development of strategic guidelines for its implementation.

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2. Theoretical Consideration

Based on empirical analysis, a sequence of modeling the level of public financial security is proposed, taking into account the impact of budget policy, which is formalized by 8 stages, illustrated in Fig. 1.

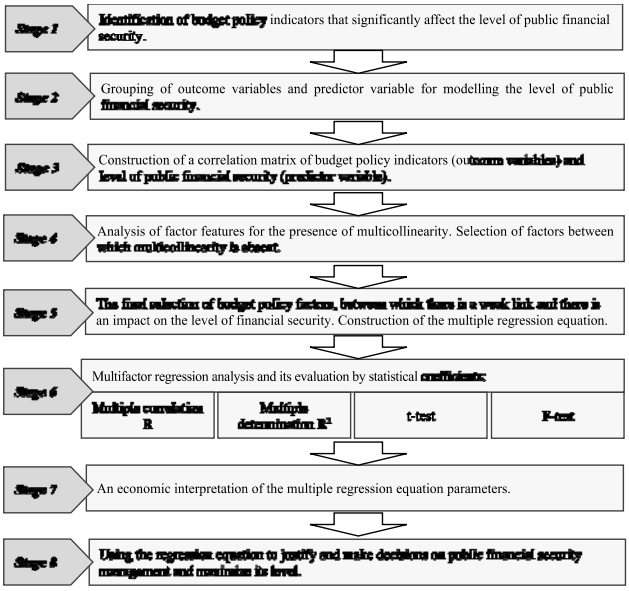

Fig. 1 The sequence of modelling the level of public financial security taking into account the impact of budget policy

Source: *Authors' development.*

The procedure for selecting the correct type of model makes it possible to specify the tool for modeling indicators of public financial security [30, p. 40]. We have empirically identified 15 budget policy indicators that have an impact on public financial security (Table 1). Also, the formation of public financial security as a basic prerequisite for the effective functioning of the state should take into account the influence of factors that can significantly change its level, relationship, and mutual influence of the development of individual elements [31].

The main task of factor analysis is to combine the initial number of initial indicators, which characterize the process of public financial security in the optimal number of factors based on them, so the resulting set of factors requires adequacy of interpretation and accuracy of sample data. All indicators listed in Table 1 can be grouped according to the following classification features:

i) indicators of the effectiveness of budget policy of revenues and expenditures (Var_1–Var_4);

ii) indicators of dependence of budget expenditures on revenues (Var_5–Var_8);

iii) indicator of efficiency of intergovernmental policy (Var_9);

iv) additional indicators of public budget security Var_{10}–(Var_{15}).

Applying the method of calculation parameters listed in Table 1, held their calculations. The results posted in Table 2.

Modelling the level of Ukraine's public financial security taking into account the impact of budget policy also involves correlation analysis by constructing a correlation matrix of budget policy indicators selected by outcome variables (see Table 2) and the level of public financial security (Y), the predictor variable. It should be noted that the correlation analysis is implemented in order to eliminate the multicollinearity between the outcome variables [32, p. 634–635], which should be detected at the critical value of F-test for the significance level $\alpha = 0{,}05$ and the degrees of freedom $k_1 = m$ and $k_2 = n - m - 1$ in formula:

$$F = \frac{r^2}{1-r^2} \cdot \frac{n-m-1}{m}, \qquad (1)$$

where r is the pairwise correlation coefficient;
n is the number of values of the observed indicators;
m is the number of predictive variables in the model [32, p. 634].

So, $k_1 = 1$ and $k_2 = 10 - 1 - 1 = 8$ in our case, F.INV(0.95;1;8) = 5.318 in Excel is the critical value of F-test. Using Formula (1), we find the critical level of the pairwise correlation coefficients, which will inform about the stochastic power flow calculation of high-density correlation between outcome variables, and, consequently, the presence of multicollinearity:

$$\begin{aligned} &5.318 = \frac{r^2}{1-r^2} \cdot \frac{10-1-1}{1} = \frac{8r^2}{1-r^2}; \\ &8r^2 = 5.318(1-r^2); 8r^2 = 5.318 - 5.318r^2; \\ &13.318r^2 = 5.318; r^2 = 0.399; \\ &r = \pm\sqrt{0.399} = \pm 0.632. \end{aligned} \qquad (2)$$

Therefore, if the pairwise correlation coefficient between two outcome variables $r \notin [-0.632; 0.632]$, between them there is exactly multicollinearity, otherwise there is no multicollinearity.

In the final selection of budget policy outcome variables that have an impact on the level of Ukraine's public financial security (predictive variable), those are identified between which there is a weak link (outcome variables), and construct multiple linear regression equation of the form:

Table 1: Grouping of factors for modelling the level of public financial security

Indicator	Method of calculation	Marking
Funding ratio of national functions	The ratio of expenditures for financing national functions to the expenditures of the consolidated budget	Var_1
Ratio of direct taxes in the tax revenues of the consolidated budget	The ratio of revenues from direct taxes to tax revenues of the consolidated budget.	Var_2
Efficiency ratio of local budgets tax sources	The ratio of tax revenues to local budget revenues	Var_3
Ratio of state budget expenditures relative redistribution to GDP	The ratio of state budget expenditures to GDP in actual prices	Var_4
Ratio of the local budgets' revenue base stability	The ratio of revenues to the local budget expenditures	Var_5
Ratio of budget deficit (surplus) of local budgets relative to GDP	The ratio of the deficit (surplus) of local budgets to GDP in actual prices	Var_6
Debt ratio relative to GDP	The ratio of maintenance costs and repayment of public debt of the consolidated budget to GDP in actual prices	Var_7
Public debt service and repayment ratio	The ratio of maintenance costs and repayment of public debt to the consolidated budget expenditures	Var_8
Ratio of budget dependence	The ratio of transfers from the state budget to local budgets expenditures and transfers from the state budget	Var_9
Debt service ratio	The ratio of maintenance costs and repayment of public debt to the consolidated budget expenditures	Var_{10}
Devaluation stability of the consolidated budget revenue base, million USD	The ratio of consolidated budget revenues to the USD exchange rate in UAH	Var_{11}
NBU participation ratio in the state budget	The ratio of revenues from the National Bank of Ukraine (NBU) to state budget revenues	Var_{12}
Domestic government bonds efficiency ratio	The ratio of revenues from domestic government bonds to consolidated budget expenditures	Var_{13}
Ratio of budget dependence on lending	The ratio of lending to consolidated budget expenditures	Var_{14}
Population income stability ratio	The ratio of the volume of consumer loans received by households to household income	Var_{15}

Source: *Authors' development.*

Table 2: Initial data for modelling the level of Ukraine's public financial security taking into account budget policy

Indicators' marking	The values of the indicators at the beginning of the year:									
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Var_1	10.8	11.9	12.0	11.1	12.2	14.7	17.3	16.1	15.7	15.3
Var_2	46.4	48.0	46.1	45.3	47.8	44.7	43.0	45.1	44.5	44.9
Var_3	77.6	80.3	85.2	82.3	81.6	82.1	80.0	85.0	83.4	84.0
Var_4	25.89	27.21	25.07	27.38	26.53	27.42	29.16	28.78	28.19	27.73
Var_5	0.987	0.997	1.003	1.012	1.005	1.027	1.051	1.044	1.012	0.985
Var_6	–0.18	–0.04	0.05	0.28	0.12	0.64	1.51	1.63	0.61	–0.9
Var_7	–0.013	–0.003	0.003	0.012	0.005	0.027	0.051	0.044	0.012	–0.015
Var_8	3.43	4.63	6.08	6.01	7.09	9.94	12.96	11.66	10.55	10.31
Var_9	0.313	0.327	0.344	0.359	0.345	0.367	0.383	0.358	0.355	0.344
Var_{10}	3.43	4.63	6.08	6.01	7.09	9.94	12.96	11.66	10.55	10.31
Var_{11}	26,915	30,321	39,487	43,305	42,441	30,041	24,477	24,119	29,832	34,121
Var_{12}	2.41	6.46	3.78	6.82	8.35	6.39	11.56	6.19	5.59	5.45
Var_{13}	6.09	10.66	6.87	8.00	9.98	12.71	1.46	4.42	3.09	5.20
Var_{14}	0.92	0.36	1.14	0.87	0.11	0.95	0.45	0.22	0.20	0.15
Var_{15}	15.33	11.17	9.96	8.58	8.87	8.91	5.92	4.95	4.60	4.67
Y*	0.518	0.542	0.575	0.574	0.566	0.454	0.390	0.458	0.479	0.479

** the level of Ukraine's public financial security, calculated in [33, p. 21–22] according to the Methodological recommendations for calculating the level of economic security of Ukraine [34].*

Source: *Formed and calculated by the authors according to the [35], the State Treasury Service of Ukraine [36], the State Statistic Service of Ukraine [37].*

$$Y = a_0 + a_1 Var_1 + a_2 Var_2 + ... + a_m Var_m + \varepsilon, \quad (3)$$

where Y is the predictive variable (function) in multifactor linear regression;

Var_1, Var_2, …, Var_m is outcome variables in multifactor linear regression;

a_1, a_2, …, a_m is regression coefficients (parameters) for outcome variables that quantify the individual influence of the corresponding outcome variables on the predictive variable;

a_0 is a constant that acquires the value of the predictive variable when 0 of all variables is equal;
ε is a random component of the model.

3. Experimental Consideration

As a result of the correlation analysis of outcome variables, the main purpose of which is to eliminate the phenomenon of multicollinearity, which is inevitably present between indicators and is a close or dense correlation between two outcome variables, we conclude that this inevitably leads to distortion of modelling results, inadequacy statistical estimates to be eliminated. The results of correlation analysis are shown in Table 3.

From the data in Table 3 it is seen that among the 15 outcome variables "Ratio of budget dependence" (Var_9) has a stochastic power flow calculation of high-density correlation between 10 outcome variables but "Devaluation stability of the consolidated budget revenue base" (Var_{11}), "Domestic government bonds efficiency ratio" (Var_{13}) and "Ratio of budget dependence on lending" (Var_{14}) have none. Thus, as a result of the procedures for comparing the pairwise correlation coefficients of outcome variables, for their analysis were selected: "Ratio of direct taxes in the tax revenues of the consolidated budget" (Var_2), "Ratio of state budget expenditures relative redistribution to GDP" (Var_4), "Ratio of budget deficit (surplus) of local budgets relative to GDP" (Var_6), "Devaluation stability of the consolidated budget revenue base" (Var_{11}), "NBU participation ratio in the state budget" (Var_{12}), "Domestic government bonds efficiency ratio" (Var_{13}) and "Ratio of budget dependence on lending" (Var_{14}).

Table 3: Correlation matrix of budget policy and financial security indicators of Ukraine*

	***Var*$_1$**	***Var*$_2$**	***Var*$_3$**	***Var*$_4$**	***Var*$_5$**	***Var*$_6$**	***Var*$_7$**	***Var*$_8$**	***Var*$_9$**	***Var*$_{10}$**	***Var*$_{11}$**	***Var*$_{12}$**	***Var*$_{13}$**	***Var*$_{14}$**	***Var*$_{15}$**	***Y***
Var_1	1															
Var_2	**–0.765**	1														
Var_3	0.322	–0.190	1													
Var_4	**0.820**	–0.631	0.086	1												
Var_5	**0.665**	–0.611	0.155	**0.682**	1											
Var_6	0.576	–0.504	0.090	0.624	**0.961**	1										
Var_7	**0.665**	–0.611	0.155	**0.682**	**1.000**	**0.961**	1									
Var_8	**0.973**	**–0.786**	0.411	**0.812**	**0.718**	0.602	**0.718**	1								
Var_9	**0.711**	**–0.761**	0.335	**0.667**	**0.834**	**0.682**	**0.834**	**0.818**	1							
Var_{10}	**0.973**	**–0.786**	0.411	**0.812**	**0.718**	0.602	**0.718**	**1.000**	**0.818**	1						
Var_{11}	–0.594	0.425	0.263	–0.545	–0.438	–0.509	–0.438	–0.435	–0.106	–0.435	1					
Var_{12}	0.513	–0.351	–0.102	0.629	**0.664**	0.536	**0.664**	0.576	**0.739**	0.576	–0.071	1				
Var_{13}	–0.560	0.623	–0.111	–0.466	–0.304	–0.348	–0.304	–0.509	–0.272	–0.509	0.427	–0.165	1			
Var_{14}	–0.483	–0.037	–0.138	–0.579	–0.080	–0.086	–0.080	–0.452	–0.091	–0.452	0.178	–0.409	0.294	1		
Var_{15}	**–0.818**	0.604	**–0.657**	**–0.737**	–0.482	–0.374	–0.482	**–0.875**	**–0.702**	**–0.875**	0.112	–0.476	0.480	0.600	1	
Y	–0.892	0.779	0.074	–0.778	–0.644	–0.573	–0.644	–0.823	–0.586	–0.823	0.803	–0.455	0.499	0.277	0.505	1

* *Are highlighted in bold pairwise correlation coefficients that go beyond the limits, i.e.* $r \notin [-0.632; 0.632]$, *by Formula (2).*

Source: *Formed and calculated by the data in Table 2.*

As a result of constructing the multiple regression by Formula (3), it is determined that the predictive variable is the level of Ukraine's public financial security, and the outcome variables are seven indicators, between which there is no multicollinearity (see Table 3). The results of the regression analysis of the impact of budget policy on the level of Ukraine's public financial security, the task of which is to find unknown parameters or regression coefficients a_1, a_2, …, a_m and free member a_0, are shown in Fig. 2.

Multifactor regression analysis and its evaluation by statistical coefficients of the proposed method of construct an economic and mathematical model of the impact of budget policy on the level of Ukraine's public financial security provides statistical evaluation of correlation and regression analysis, which is traditionally conducted on 5 main indicators (Table 4).

SUMMARY OUTPUT

Regression statistics

Multiple R	0.998112104
R Square	0.996227772
Adjusted R Square	0.983024974
Standard Error	0.008041422
Observations	10

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*	*t*
Regression	7	0.034155171	0.00487931	75.45580838	0.01314066	22.98239889
Residual	2	0.000129329	6.46645E-05			
Total	9	0.0342845				

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1.885072815	0.371875981	-5.069089998	0.036783226	-3.485126019	-0.285019611
Var2	0.03579126	0.004378959	8.173463012	0.0146409	0.01695012	0.054632399
Var4	0.021786608	0.006964992	3.128016129	0.088800062	-0.008181335	0.051754552
Var6	0.004348434	0.005803311	0.749302165	0.53181906	-0.020621199	0.029318067
Var11	6.39765E-06	5.64313E-07	11.33705516	0.007690717	3.9696E-06	8.82569E-06
Var12	-0.007250608	0.001771318	-4.093340554	0.054820517	-0.014871975	0.000370758
Var13	-0.005464278	0.001273877	-4.289485035	0.050284645	-0.01094533	1.6774E-05
Var14	0.065495758	0.015780888	4.150323519	0.053443191	-0.002403889	0.133395404

Fig. 2 Results of regression analysis of the impact of budget policy on the level of Ukraine's public financial security

Source: *calculated by the authors according to Tables 2 and 3 using Excel.*

Table 4: Statistical coefficients for estimating the tightness of the relationship, statistical significance of the results and autocorrelation of the regression model

Statistical coefficient	Formula	Critical value	Actual value
1. Multiple correlation coefficient *R*	$R = \sqrt{1 - \frac{\sum_{i=1}^{m}(Y_j - \overline{Var_i})^2}{\sum_{j=1}^{n}(Y_j - \overline{Y})^2}}$	0.7	0.998
2. *R* square	$R^2 = 1 - \frac{\sum_{i=1}^{m}(Y_j - \overline{Var_i})^2}{\sum_{j=1}^{n}(Y_j - \overline{Y})^2}$	0.5	0.996
3. t-statistic	$t = \frac{R}{\sqrt{1-R^2}} \cdot \sqrt{n-m-1}$	2.92	22.98
4. F-statistic	$F = \frac{R^2}{1-R^2} \cdot \frac{n-m-1}{m}$	19.35	75.46
5. Darbin-Watson statistic (*DW*)	$DW = \frac{\sum_{t=2}^{n}(e_t - e_{t-1})^2}{\sum_{j=1}^{n} e_t^2}$	2	1.96

Note: *where Yj is the actual value of the j-th predictive variable, j = 1, 2,…, n;* $\overline{Var_i}$ *is the average value of the i-th outcome variable and i = 1, 2,…, m;* $\overline{Y}$ *is the average value of the predictive variable; n is the number of values of the observed indicators; m is the number of outcome variables in the model;* e_t *and* e_{t-1} *are respectively, the adjacent points of deviation of the actual values of the outcome variables from those calculated by the regression equation.*

Source: *The author has formed and carried out calculations according to the data given in Tables 2–3, Fig. 2 and [38].*

The multiple correlation coefficient R = 0.998 indicates a close or dense correlation (stochastic) relationship between the level of Ukraine's public financial security and the 7 factors introduced into the model. The coefficient of multiple determination $R^2 = 0.996$ indicates that any changes in the level of financial security by 99.6 % are due to changes in the factors introduced into the model, the influence of other factors is 0.4 %. The reliability of the multiple correlation coefficient confirms the value of t-test, which is 8 times greater than critical. The reliability of the obtained multiple regression equation (see Fig. 2) confirms the value of F-test, which is 4 times more than critical. Another test of the statistical significance of the regression equation is to detect and eliminate the phenomenon of autocorrelation, i.e. the dependence of the predictive variable on the time sequence (in our case, the period 2010–2019), determined by the Darbin-Watson statistic. The actual value of the Darbin-Watson statistic is close to 2 (see Table 4), so we can assume that the obtained regression equation (Formula (4) is devoid of autocorrelation.

This indicates the statistical significance, reliability and adequacy of the calculations to model the impact of budget policy indicators on the level of Ukraine's public financial security by the following equation of multiple regression:

$$Y = -1.885 + 0.036R_{DT_{TRCB}} + 0.022R_{ER_{SD/GDP}} + \\ +0.004R_{BD(S)_{LB/GDP}} + 0.000006R_{DSR_{CB}} - 0.007R_{NBUR_{SB}} - (4) \\ -0.005R_{ER_{DGB}} + 0.065R_{BDL} + \varepsilon,$$

where *Y* is the level of Ukraine's public financial security;

$R_{DT_{TRCB}}$ is the Ratio of direct taxes in the tax revenues of the consolidated budget;

$R_{ER_{SD/GDP}}$ is the Ratio of state budget expenditures relative redistribution to GDP;

$R_{BD(S)_{LB/GDP}}$ is the Ratio of budget deficit (surplus) of local budgets relative to GDP;

$R_{DSR_{CB}}$ is the Devaluation stability of the consolidated budget revenue base;

$R_{NBUR_{SB}}$ is the NBU participation ratio in the state budget;

$R_{ER_{DGB}}$ is the Domestic government bonds efficiency ratio;

R_{BDL} is the Ratio of budget dependence on lending.

Based on Formula (4), we can make the following economic interpretation of the obtained multiple regression equation:

i) when the share of direct tax revenues in the consolidated budget (Ratio of direct taxes in the tax revenues of the consolidated budget) increases by 1 %, the level of public financial security increases by 0.036 points (or 3.6 %);

ii) when the Ratio of state budget expenditures relative redistribution to GDP increases by 1 %, the level of public financial security increases by 0.022 points (or 2.2 %);

iii) with the growth of the Ratio of budget deficit (surplus) of local budgets relative to GDP by 1 %, the level of public financial security increases by 0.004 points (or 0.4 %);

iv) with the growth of consolidated budget revenues by 1 million USD (Devaluation stability of the consolidated budget revenue base), the level of public financial security increases by 0.000006 points (or 0.0006 %);

v) when the share of revenues from the NBU in state budget revenues (NBU participation ratio in the state budget) increases by 1 %, the level of public financial security is reduced by 0.007 points (or 0.7 %);

vi) with the growth of revenues from domestic government bonds as a percentage of consolidated budget expenditures (Domestic government bonds efficiency ratio) by 1 %, the level of public financial security is reduced by 0.005 points (or 0.5 %);

vii) when the share of lending in the consolidated budget expenditures (Ratio of budget dependence on lending) increases by 1 %, the level of public financial security increases by 0.065 points (or 6.5 %).

In this context, it should be noted that the total growth of all budget policy factors per unit leads to an increase in the level of public financial security by 0.11 points (or

11 %) and will prevent negative trends in the impact of budget policy on the level of Ukraine's public financial security.

Given that the level of Ukraine's public financial security can be in the range from zero to one according to the Methodological recommendations for calculating the level of economic security of Ukraine [34], we have the opportunity to maximize it by construct the following objective function:

$$Y = -1.885 + 0.036R_{DT_{TRCB}} + 0.022R_{ER_{SD/GDP}} + \\ +0.004R_{BD(S)_{LB/GDP}} + 0.000006R_{DSR_{CB}} - 0.007R_{NBUR_{SB}} - \\ -0.005R_{ER_{DGB}} + 0.065R_{BDL} \to 1. \quad (5)$$

Maximization of the objective function of the level of Ukraine's public financial security is to determine such values of outcome variables, at which the value of predictive variable $Y = 1$. The results of optimization of the level of Ukraine's public financial security based on solving the objective function of maximization (Formula (5) are given in Table 5.

Table 5: Results of optimization of the level of Ukraine's public financial security

Name of the indicator	Actual value of 2019*	Optimal value
Ratio of direct taxes in the tax revenues of the consolidated budget, %	44.90	57.26
Ratio of state budget expenditures relative redistribution to GDP, %	27.73	30.60
Ratio of budget deficit (surplus) of local budgets relative to GDP, %	–0.9	0
Devaluation stability of the consolidated budget revenue base, billion USD	34.12	35.40
NBU participation ratio in the state budget, %	5.45	5.41
Domestic government bonds efficiency ratio, %	5.20	5.18
Ratio of budget dependence on lending, %	0.15	0.15
Integrated indicator of public financial security	0.48	1.0

** beginning of 2019.*

Source: *Proposed and calculated by the authors according to Formula (5) using Excel.*

Guided by the results of optimization, given in Table 5, we conclude that to achieve the maximum level of public financial security the Government must achieve the following strategic guidelines:

firstly, to ensure revenues from direct taxes in the tax revenues of the consolidated budget of Ukraine at the level of 57.3 %, which is 12.4 % more than at the beginning of 2019;

secondly, to ensure such an amount of expenditures of the state budget of Ukraine, which as a percentage of GDP would be 30.6 %, which is 2.9 % higher than at the beginning of 2019;

thirdly, to ensure the lack of deficit of local budgets, but at the beginning of 2019, the deficit of local budgets in % of GDP was 0.9 %;

fourthly, to increase the revenues of the consolidated budget of Ukraine in USD by 3.6 % compared to the beginning of 2019;

finally, in terms of the NBU participation ratio in the state budget, the Domestic government bonds efficiency ratio and the Ratio of budget dependence on lending, they should remain at the level of the beginning of 2019.

4. Conclusion

Thus, in the course of developing prospects for the implementation of budget policy in the context of public financial security, the following results were obtained.

Firstly, the authors proposed and implemented a methodological approach to modelling the level of public financial security, taking into account the impact of budget policy, which involves the consistent implementation of eight stages.

Secondly, a correlation and regression analysis was performed to construct the equation of seven-factor regression of the impact of the Ratio of direct taxes in the tax revenues of the consolidated budget, the Ratio of state budget expenditures relative redistribution to GDP, the Ratio of budget deficit (surplus) of local budgets relative to GDP, the NBU participation ratio in the state budget, the Domestic government bonds efficiency ratio and the Ratio of budget dependence on lending to the level of Ukraine's public financial security. The statistical significance and reliability of the obtained regression equation of the level of public financial security taking into account the influence of budget policy factors are also proved.

Thirdly, the solution of the objective function presented by Formula (5) allowed to form the optimal values of efficiency indicators, i.e. the expected results to be achieved in budget policy in the long run to ensure the highest level of Ukraine's public financial security.

Fourthly, conceptual bases of strategic orientations of budgetary policy formation in system of maintenance of financial security are developed, in particular: increase by 12.4 % of a share of receipts from direct taxes in tax receipts of the Consolidated budget of Ukraine, increase by 2.9 % of the relation of expenses of the State budget of Ukraine to GDP, ensuring deficit-free local budgets, 3.6 % growth in revenues of the Consolidated Budget of Ukraine in USD, maintaining the share of revenues from the NBU in state budget revenues at 5.4 %, the share of revenues from domestic government bonds in the consolidated

budget expenditures not more than 5.2 % and the share of lending in the consolidated budget expenditures 0.15 %.

Finally, the proposed strategic guidelines allow to achieve the optimal structure of budget policy, fair distribution and redistribution of public finances and to determine budget criteria for maximizing the level of Ukraine's public financial security, which lays the prospects for further research by the authors.

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