

Influence of Some Macroeconomic Indicators on Government Debt (Case of Ukraine)

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ABSTRACT

The aim of the study is to develop theoretical and methodological foundations, scientific and practical recommendations for improving the management and evaluation of public debt in Ukraine. The methodological foundations of the study are a systematic approach to the analysis of the relationship of financial phenomena and processes, creative reflection on the works of Ukrainian and foreign scientists on public debt, and its role in the context of macro-financial stabilization. Specific scientific theoretical and applied developments by the applicant were obtained using the following methods: graphical financial analysis (for studying the tendencies of debt formation); statistical-economic (to identify the impact of public debt on socio-economic processes); economic-mathematical modeling (to determine the relationship between public debt and macroeconomic indicators). On the basis of the research, it was revealed that the selected macroeconomic indicators have a significant impact on the government debt, and there are difficulties in coordinating international, regional economic integration or creating a broad separation based on stable international competitiveness. In order to test the impact of some macroeconomic indicators on the size of public debt, the World Bank's economic indicators have been taken as the main material for research. The analyzed period of time is 2001-2017 years.

The recommendations provided in this article will contribute to the development of public debt management and the associated increase in the living standards of the country's population. Based on the analysis conducted, there are every reason to assert that effective management of public debt can contribute to the development of the national economy. The scientific novelty of the study is to determine the impact of some macroeconomic indicators on public debt management at the current stage of Ukraine's development.

KEYWORDS: Expenses; Capital; Banks; State, Export; Linear model; Coal rents; Domestic credit.

1. Introduction

Macroeconomic effects of state debt are qualitative assessments of economic processes and phenomena caused by the impact of state debt on the economy. They are manifested through a change in the parameters of the macroeconomic situation, fiscal and monetary policy of the state, national wealth, economic development, political stability of the country and

its economic security. Any country can have comparative advantages with greater or less international competitiveness, but Ukraine has a generally weak economic position, but it seeks to create a strong economic role [1]-[6].

The study of public finances in Ukraine, in particular state debt, should provide government agencies and analysts with the necessary information to study the state and dynamics of public sector finance, including public debt. The main macroeconomic effect of public debt in the long run, according to the classical theory of public debt, is the reduction of savings and capital in the economy of the country. The statistical analysis of the relationship between external public debt and the volume of investments in fixed assets, as well as between the state direct and guaranteed debt and the volume of fixed capital investment, shows the

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direct relationship between these indicators. That is, the state debt did not exert a depressing influence on the volume of capital during 1999-2017 in the Ukrainian economy, but on the contrary, it positively influenced the volume of investments in fixed assets. This allows us to consider state credit as one of the sources of investment financing, which at the current stage of development of the Ukrainian economy will not have a significant negative impact in the long run [7]-[8].

Studying the patterns of public debt formation and forecasting its dynamics creates conditions for effective government debt management, effective macroeconomic activity of the state. The growth of requirements for the efficiency of public debt management, the need for sound, current and strategic management decisions on government debt obligations in the context of macroeconomic instability and the prevention of the development of crisis phenomena necessitate the development of an integrated system for the analysis, assessment and forecasting of public debt. This determines the relevance of the study of the processes of formation, repayment, servicing and management of public debt, as well as the need for improvement and adaptation of the methodological principles of the state debt of Ukraine.

Analyzing information on state debt, calculating the impact of macroeconomic factors on its size, assessing risks, it is determined the level of creditworthiness of the country and the need for tools for active debt management. An important component of the analysis of public external debt is the study of the periodization of its development [9]-[15].

For Ukraine, public debt management is a complex issue. Given the urgency of the formation and management of public debt, these processes are the focus of attention of scientists; these problems are given much attention in the scientific environment.

Various aspects of the formation, operation and optimization of public finances in general and public debt in particular were considered by different researchers.

For example, Thomas Gietzen considers modern microfinance, which directs its activities to groups that do not have formal financial services, is widely recognized as a viable business model. The microfinance sector as a whole is involved in a negative transformation of financial sustainability, while the world's largest MFIs face a minimal liquidity risk on average [16].

Conclusions regarding the institutional determinants of risk are expressed in the absence

of the effect of the quality of local regulation on financial risks. Thomas Gietzen believes that in spite of the existence of currency risk in individual institutions or, in some cases, liquidity risk, it calls for the expansion of systematic actions on these microfinance risks [16].

Kristine Forslund, Lycia Limab and Ugo Panizza argue that inflation is the main indicator of macroeconomic instability. The authors examine the reasons for the negative correlation between inflation and the share of domestic debt. The banking crisis can be positively correlated with the share of domestic debt in countries with larger financial sectors and negatively correlate with the share of domestic debt in low-income countries with smaller financial sectors [17].

Gustavo Fruct Dias, George Kapetanios study the usage of large arrays of economic indicators to predict key macroeconomic variables. In the past few years, this information has become more widely available due to the large number of indicators aimed at describing various sectors of the national economy [18].

The research of Gustavo Fruct Dias, George Kapetanios examines the question of modeling and predicting key macroeconomic variables using a variety of data sets [18].

Giovanna Buaa, Juan Pradellib, Andrea F. Presbitero write that public debt analysis and debt management in low-income countries traditionally focus on external debt [19]. This lack of research is partly due to the lack of a comprehensive database on domestic public debt and the historical popularity of external borrowing compared to domestic borrowing. The most important problem is the crowding out effect: government debt issuance will create private savings that would otherwise be available to finance private investment.

Almos Lucía Romero-Barrutieta, Ales Bulír and José Daniel Rodríguez-Delgado write that, after receiving debt relief assistance, poor countries face a classic time sequence problem: they can either restrict absorption and maintain debt-to-GDP ratios at a declining or start borrowing again, possibly exceeding the optimal level. Therefore, when a debt regress is available, high debt does not necessarily signal the "ineffective" government, as it also arises with effective governments [20].

Sydney Chikalipah provides empirical evidence of the ratio of loan size and credit risk in the context of the microfinance industry in the region. Contrary to the consensus in the empirical literature, according to which smaller loans have an increased risk of default, and the exact opposite statement for large loans. The Sydney

Chikalipah studies aims to assess the impact of credit risk exposure on microfinance in the region. In contrast to the widespread view, the Sydney Chikalipah findings suggest that small loans have a lower risk of relatively large sums [21].

Irina Bilan and Iulian Ilnatov argue that public debt almost always has a two-way effect: government debt can contribute to economic growth; however, if the debt is very high, public debt can adversely affect the growth of the economy [22].

The study of Chan-Guk Huh, Jie Wu examines the link between monetary policy and the volatility of Korean financial markets. It is expected that rapid capital flows will affect the foreign currency and volatility of the Korean stock market [23].

Evan Lau, Alvina Syn-Yee Lee, Mohammad Affendy Arip write that the debt crisis affecting European countries is threatening the global economy as a whole [24]. The external environment affects internal economic activity in more open economies.

Cenk Gokce Adas, Bibigul Tussupova write that the liberalization of trade and the removal of rules that hinder the movement of capital between countries have begun the integration process among national economies [25]. International financial integration is expected to reduce macroeconomic instability.

Wei-Bin Zhang continued research of models for studying the relationship between national debt and the growth of the economy. His works relate to the role of fiscal policy in economic growth. The dynamic interdependence between economic growth and investment is revealed. Wei-Bin Zhang developed a neoclassical two-sectoral economic growth model with public debt in a competitive economy [26].

Milan Bednář in his papers presents an analysis of debt sustainability and an assessment of the hypothesis that the countries under study are trapped in excessive indebtedness [27].

Maja Mihelja Žaja, Drago Jakovčević, Lucija Višić conducted an analysis aimed at studying various macroeconomic, financial, fiscal and political indicators that could be significant in determining the yield of government bonds [28].

Hortensia Paula Botezatu, Diana Raluca Diaconescu write that the economic environment in which monetary policy is becoming increasingly complex as a result of globalization, both in international trade and in financial activities [29].

Consequently, the topic of the study of methodological aspects of state debt management is relevant and requires detailed elaboration.

2. Methodology

The aim of the study is to develop theoretical and methodological foundations and scientific and practical recommendations for improving the management and evaluation of Ukraine's state debt. Several tasks were performed to achieve this goal: 1) the parameters of the linear model of the dependence of the total public debt on 19 of the studied indicators were determined; 2) the determination coefficient R^2 is estimated.

The article uses general scientific and special methods and techniques of scientific research, which provide an opportunity to comprehensively outline and solve theoretical and practical tasks of the research. The methodological foundations of the study are the systematic approach to the analysis of the relationship of financial phenomena and processes, creative reflection on the works of Ukrainian and foreign scientists on public debt, and its role in the context of macro-financial stabilization. Specific scientific theoretical and applied developments by the applicant were obtained using the following methods: graphical financial analysis (for studying the trends of debt formation); statistical-economic (to identify the impact of public debt on socio-economic processes); economic-mathematical modeling (to determine the relationship between public debt and macroeconomic indicators). In order to test the impact of some macroeconomic indicators on the size of state debt as the main material for research, the World Bank's economic indicators have been taken. The analyzed period of time is 1999-2017 years

3. Results and Discussion

The study analyzes the impact on the size of the government debt of 19 indicators for the period 1999-2017 years. The analysis aims to compare the economic conditions of different years on the basis of the study of the impact of the indicators on the state debt of Ukraine.

The following indicators were studied: adjusted net national income, bank capital to assets ratio, broad money, claims on central government, claims on other sectors of the domestic economy, coal rents, concessional debt, current account balance, deposit interest rate, domestic credit provided by financial sector, domestic credit to private sector, domestic credit to private sector by banks, expense, exports of goods and services, external balance on goods and services, external

debt stocks, final consumption expenditure, foreign direct investment (net inflows), fuel exports, fuel imports, general government final

consumption expenditure. In Table 1 there are analyzed these indicators and collects the results of the analysis.

Tab. 1. Descriptive statistics of research results

Indicator	Min	Max	Average	Median
Adjusted net national income (annual % growth)	-24,59473	15,08665	3,62080	7,73591
Bank capital to assets ratio (%)	8,01648	15,87900	12,68115	12,85591
Broad money (% of GDP)	16,76517	62,03901	44,31842	47,97609
Claims on central government, etc. (% GDP)	-1,30684	27,91764	11,61620	10,69545
Claims on other sectors of the domestic economy (% of GDP)	14,71953	95,69378	53,68810	55,63400
Coal rents (% of GDP)	0,38866	2,78034	1,17117	1,08232
Concessional debt (% of total external debt)	0,60090	21,34370	5,22344	2,39630
Current account balance (% of GDP)	-9,01096	10,65147	-0,58408	-1,50251
Deposit interest rate (%)	6,97660	20,70000	10,92624	10,77735
Domestic credit provided by financial sector (% of GDP)	23,82241	108,46006	64,27174	78,76235
Domestic credit to private sector (% of GDP)	8,58616	90,57267	49,16961	48,31600
Domestic credit to private sector by banks (% of GDP)	8,46809	73,83121	42,02434	44,32901
Expense (% of GDP)	25,17065	43,54070	35,10847	36,04544
Exports of goods and services (% of GDP)	35,41546	62,44488	50,50538	49,81634
External balance on goods and services (% of GDP)	-20,95682	7,51348	-2,57710	-2,84718
External debt stocks (% of GNI)	41,21251	134,93304	75,78080	59,45856
Final consumption expenditure, etc. (% of GDP)	71,35228	99,24132	81,72533	80,04822
Foreign direct investment, net inflows (% of GDP)	0,63444	9,06410	3,78023	3,68927
Fuel exports (% of merchandise exports)	1,06961	11,72272	6,01509	5,91471
Fuel imports (% of merchandise imports)	26,33295	44,08706	32,42357	31,08270
General government final consumption expenditure (% of GDP)	16,99623	20,91845	19,02288	19,01296

Source: National Bank of Ukraine; World Bank, database [30], 0

The top panel of the table summarizes all available data, while the bottom panel represents the summary statistics for the use of observations in further research.

The data in Table 1 shows the minimum, maximum, mean, and median of the studied

parameters. Minimal and maximal values clearly indicate how many significant differences in the values of a specific indicator for the period under investigation in the years 1999-2017.

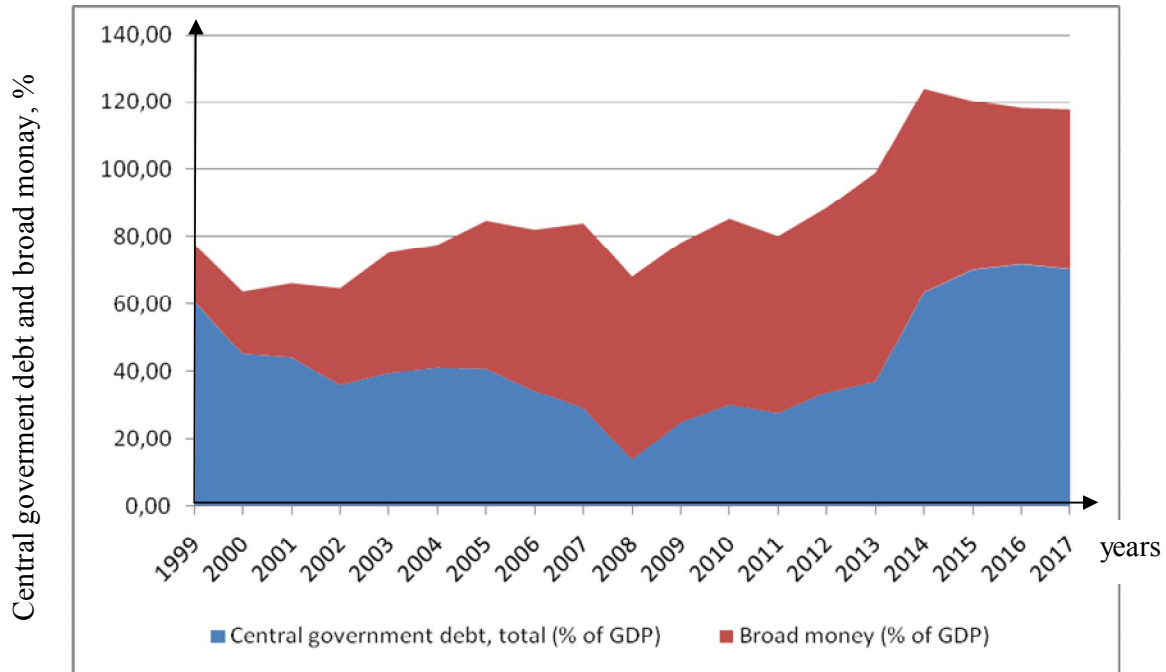


Fig. 1 Dynamics of the size of state debt and money supply in Ukraine, % of GDP

Source: National Bank of Ukraine; World Bank, database [30], 0

According to Fig. 1, the ratio of domestic debt to GDP increases from 60.98 to 70.45 percent of GDP, while the money supply in Ukraine has increased from 16.77 to 47.23 percent of GDP.

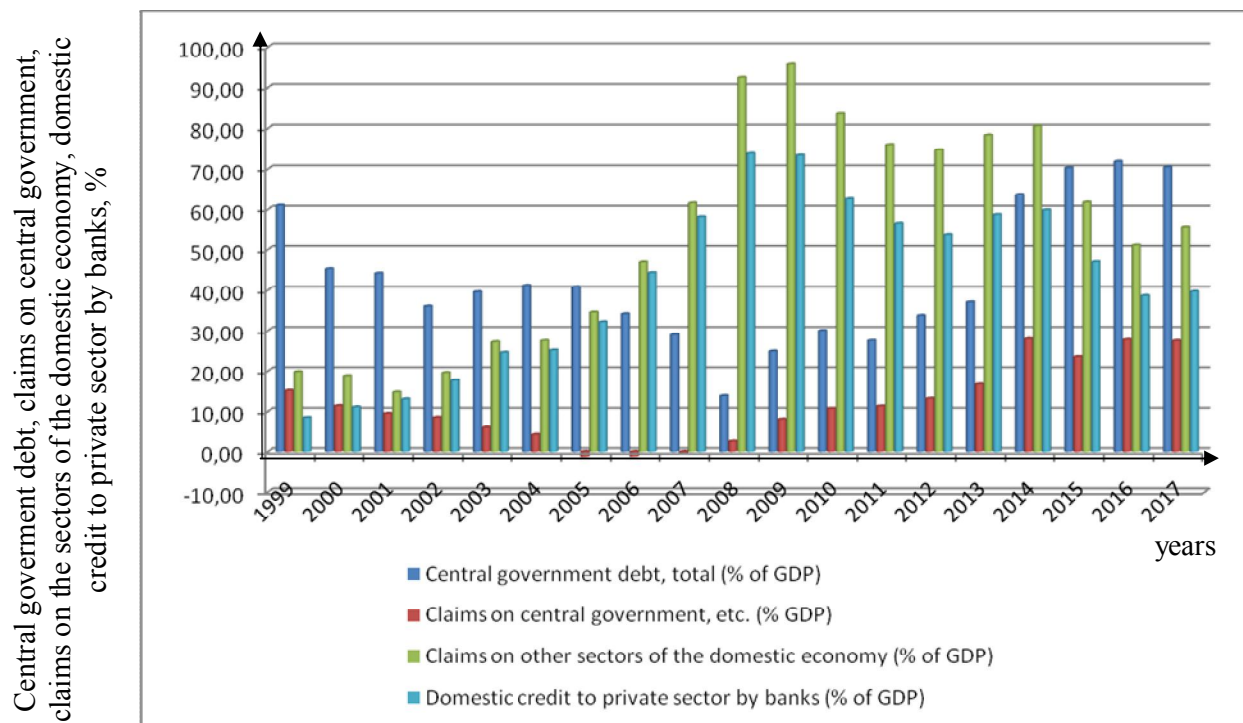


Fig. 2 Dynamics of Ukraine's State Debt Indicators compared to claims on central government, claims on other sectors of the domestic economy, domestic credit to private sector by banks, % of GDP

Source: National Bank of Ukraine; World Bank, database [30], 0

Studying the dynamics of the indicators of state debt of Ukraine for 1999-2017, it was discovered

that its share increased by almost 16%. It is difficult to have a clear prediction about the

relationship between the explanatory and dependent variables. In some cases, it should be

noted which effects are and which are expected to be obtained.

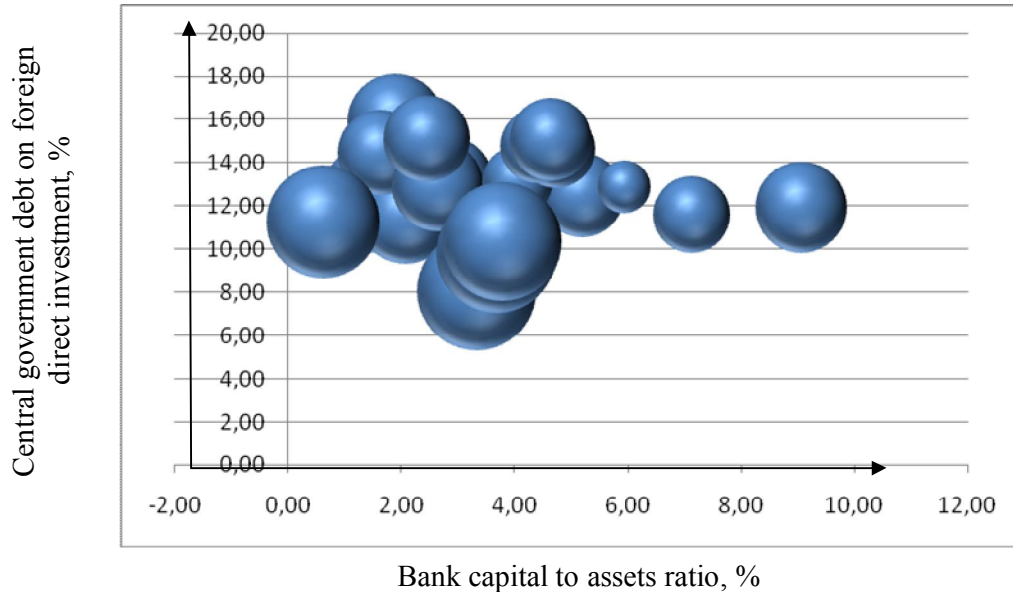


Fig. 3 Dependence of central government debt on foreign direct investment, (net inflows) and bank capital to assets ratio (%)

Source: National Bank of Ukraine; World Bank, database [30], 0

The correlation between the amount of domestic debt, foreign direct investment (net inflows) and bank capital to assets ratio shows that using this sample of debt structures that can be considered as an associative of domestic government debt

portfolios in recent years, random checks of simple correlations provide preliminary evidence regarding the ratio between the value of domestic debt, foreign direct investment (net inflows) and bank capital to assets ratio.

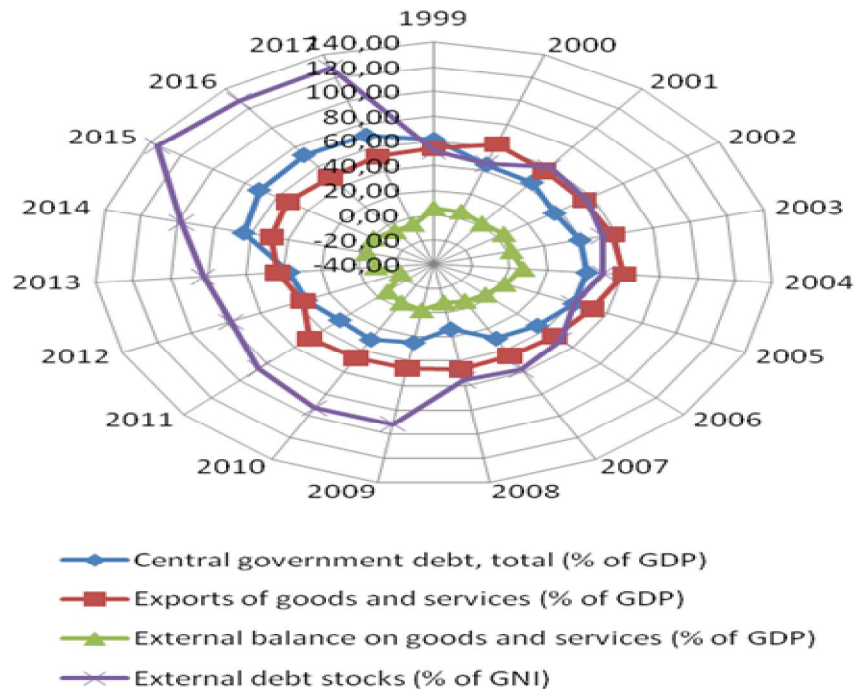


Fig. 4. Dynamics of central government debt compared to the dynamics of exports of goods and services, external balance of goods and services and external debt stocks

Source: National Bank of Ukraine; World Bank, database [30], 0

Analyzing Fig. 4, there is the Central Government debt increasing by 16% against the background of a 4% decrease in Exports of goods and services and an increase in External debt stocks by almost 3 times in 2017 compared to 1999. The largest value of Central government debt, total (% of GDP) was recorded during 2015-2017. The intensification of the processes of globalization, economic, political and social transformations that have taken place in the world over the past decades have led to the emergence of a need for substantial and safe source of funding sources. In most countries, this has led to an increase in external government borrowing and made their financial systems more vulnerable to external economic impacts. Such stagnation is also characteristic of Ukraine. Since public debt and its dynamics are one of the main criteria for economic development, public debt management and servicing are particularly important in the context of the economic difficulties experienced by Ukraine over recent years. The nature of the settlement of a debt problem largely depends on the budget capability of the state, the stability of its national currency.

The process of regulation and management of public debt is an integral part of Ukraine's financial policy. Excessive debt load, upward dynamics of debt ratios by 2017, ineffective restructuring of public debt in 2015, which created the potential for exacerbation of financial and economic problems, significant weaknesses in borrowing attraction policy and the practice of using them - these issues need to be addressed. The experience of financial crises has proved that a thorough analysis of the situation on the world commodity and financial markets, adequate diagnostics of vulnerabilities of the external sector of the economy and national public finances, as well as an accurate assessment of the risks of rising public borrowing, are important elements of the system of public debt management.

On the basis of $n = 19$ statistical data of the period 1999-2017, there will be defined the parameters of the linear model of the dependence of the total public debt on 21 of the studied indicators (adjusted net national income, bank capital to assets ratio, broad money, claims on central government, claims on other sectors of the domestic economy, coal rents, concessional debt, current account balance, deposit interest rate, domestic credit provided by financial sector, domestic credit to private sector, domestic credit to private sector by banks, expense, exports of goods and services, external balance on goods and services, external debt stocks, final

consumption expenditure, foreign direct investment (net inflows), fuel exports, fuel imports, general government final consumption expenditure).

The general linear model has the form:

$$y = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5 + a_6x_6 + a_7x_7 + a_8x_8 + a_9x_9 + a_{10}x_{10} + a_{11}x_{11} + a_{12}x_{12} + a_{13}x_{13} + a_{14}x_{14} + a_{15}x_{15} + a_{16}x_{16} + a_{17}x_{17} + a_{18}x_{18} + a_{19}x_{19} + a_{20}x_{20} + a_{21}x_{21} + u, \quad (1)$$

where y - effective (dependent) variable;

Y — total amount of public debt;

x_1, x_2, x_3 are independent, factor variables;

x_1 — Adjusted net national income;

x_2 — Bank capital to assets ratio;

x_3 — Broad money;

x_4 — Claims on central government;

x_5 — Claims on other sectors of the domestic economy;

x_6 — Coal rents;

x_7 — Concessional debt;

x_8 — Current account balance;

x_9 — Deposit interest rate;

x_{10} — Domestic credit provided by financial sector;

x_{11} — Domestic credit to private sector;

x_{12} — Domestic credit to private sector by banks;

x_{13} — Expense;

x_{14} — Exports of goods and services;

x_{15} — External balance on goods and services;

x_{16} — External debt stocks;

x_{17} — Final consumption expenditure;

x_{18} — Foreign direct investment (net inflows);

x_{19} — Fuel exports;

x_{20} — Fuel imports;

x_{21} — General government final consumption expenditure;

a_0, a_1, \dots, a_m — parameters of the model; u is a random component of the regression equation.

Estimation of model parameters a_0, a_1, \dots, a_m performed using the method of least squares, whose matrix record has the form:

$$A = (X^T X) (X^T Y),$$

where A is the vector of unknown parameters.

After calculations using the MS Excel computer program, the regression function is determined taking into account the found estimates of the coefficients of the model:

$$\hat{y} = 22 + 23,8671875x_1 - 73,875x_2 + 9,609375x_3 - 14,28125x_4 + 1,375x_5 + 93x_6 + 8,1875x_7 + 2,3125x_8 - 0,625x_9 + 18,34375x_{10} - 29x_{11} + 9,25x_{12} - 7,5x_{13} + 0,15625x_{14} + 3x_{15} +$$

$$0,078125x_{16} + 7,6875x_{17} - 1,625x_{18} - 2x_{19} - 5,34375x_{20} + 14,875x_{21} \quad (2)$$

Consequently, we constructed a linear model (2) of the total public debt of 19 indicators studied. The next step of the research is to conduct dispersion-correlation analysis and analysis of the residues. The calculation of qualitative characteristics of the model is carried out. The remnants of the model are calculated $u_i = y_i - \hat{y}_i$, $i=1, 2, \dots, 19$, and their squares. The corrected (unshielded) mean square error of dispersion of residues is calculated (σ_u):

$$\sigma_u = 2,4392$$

Determination coefficient is calculated R^2

$$R^2 = 0,93653$$

Consequently, since the determination coefficient is close to one, the variation of the dependent variable Y (the size of public debt) is largely determined by the variation of independent variables. For given statistical data, the function gives the results shown in Table 2.

Tab. 2. Calculations for finding regression parameters

\hat{a}_m	0,01 9129	0,25 3767	0,84 9897	- 0,31 463	1,55 74	- 3,57 503	0,02 9542	- 0,04 286	- 0,31 288	- 0,52 113	1,66 8	4,5 62	0,6 80	- 2, 91	- 0, 21	33, 60
$S_{\hat{a}_m}$	0,38 3267	0,42 2062	0,62 7846	1,32 4712	3,49 5081	3,33 0683	1,49 5253	0,41 9652	0,62 3093	4,94 7936	1,39 7958	3,0 8	0,5 5	1, 39	0, 12	62, 39
R^2	0,93 653	2,43 9295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F_e кв	57,4 3177	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S_p erp	5125 ,924	17,8 5048	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: National Bank of Ukraine; World Bank, database

Further, the study examined the statistical hypotheses, checked the significance of the sample correlation coefficient. It is calculated $R = \sqrt{R^2}$ - correlation coefficient (it characterizes the density of the linear coupling of all independent variables x_j ($j = 1, 2, 3, \dots, 21$) with dependent variable y): $R = 0,9677$.

The correlation coefficient R , close to one, indicates that there is a close linear relationship between all independent variables $x_1, x_2, x_3, \dots, x_{21}$ with dependent variable y . However, it is still necessary to check its significance, which is carried out according to the Student's criterion.

Hypothesis 1. ($H_0: R = 0$).

Calculate t-statistics according to the formula:

$$t = (R \sqrt{(n-m-1)}) / \sqrt{(1-R^2)}, t = 36,13283$$

We will find $t_{\text{табл}} = t(\alpha/2, n-m-1)$ — Table value of t-distribution with level of significance $\alpha = 0,05$ i $(n-m-1) = 11$ degrees of freedom. It is determined by the Student Distribution Table: $t_{\text{табл}} = t(0,025; 11) = 2,341$.

Because $|t| > t_{\text{табл}}$, then we can conclude on the reliability of the correlation coefficient, which

characterizes the density of the relationship between dependent and independent variables model.

Next for the selected level of significance $\alpha = 0,05$ and degree of freedom $k = n-m-1 = 11$ the limits of reliability for the multiple correlation coefficient are written R :

$$(R-\Delta R; R+\Delta R).$$

Consequently, this study analyzed the main economic indicators under various conditions of activity for the period 1999-2017, namely: adjusted net national income, bank capital to assets ratio, broad money, claims on central government, claims on other sectors of the domestic economy, coal rents, concessional debt, current account balance, deposit interest rate, domestic credit provided by financial sector, domestic credit to private sector, domestic credit to private sector by banks, expense, exports of goods and services, external balance on goods and services, external debt stocks, final consumption expenditure, foreign direct investment (net inflows), fuel exports, fuel imports, general government final consumption expenditure.

To determine the causal relationships of factors' influence on the condition and size of Ukraine's state debt on the totality of the investigated indicators, factors that influence the condition and size of the state debt are determined. The constructed model characterizes the processes of formation and functioning of the state debt of Ukraine.

The coefficient R^2 is indicated, which means that the change in the value of the state debt of Ukraine by 0,93653% depends on the change of the explored explanatory variables. There is no multicollinearity: $\det r = 0.88$.

The equation of connection (2) describes the relationship between the size of the state debt of Ukraine and the Adjusted net national income, Bank capital to assets ratio, Broad money, Claims on central government, Claims on other sectors of the domestic economy, Coal rent, Concessional debt, Current Account balance, Deposit interest rate, Domestic credit provided by financial sector, Domestic credit to private sector, Domestic credit to private sector by banks, Expenses, Exports of goods and services, External balance of goods and services, External debt stocks, Final consumption expenditure, Foreign direct investment (net inflows), Fuel exports, Fuel import, General government final consumption expenditure.

There will be provided the economic content of the received connection characteristics.

An increase of 1% Adjusted net national income, Broad money, will increase the state debt by 23.8671875% and 9.609375%; while an increase of 1% of the Bank's capital to assets ratio, Claims on central government, will reduce state debt by 73.875% and 14.28125% respectively. The result may mean that this change will lead in the future to reduce state debt, which will affect fluctuations positively.

Increase by 1% Claims on other sectors of the domestic economy, Coal rent, Concessional debt, Current account balance, Domestic credit provided by financial sector, Domestic credit to private sector by banks, Exports of goods and services, Exports of goods and services, External balance of goods and services, General government final consumption expenditure will increase the state debt by 1.375%, 93%, 8.1875%, 2.3125%, 18.3437%, 9.25%, 0.15625%, 3%, 0.078125%, 7.6875% 14.875% respectively.

Increase by 1% Deposit interest rate, Domestic credit to private sector, Expenses, Foreign direct investment (net inflows), Fuel exports, Fuel import will reduce the state debt by 0.625%, 29%, 7.5%, 1.625%, 2%, 5.34375% respectively.

The economic content of the equation of connection (2) testifies that the size of the state debt of Ukraine is most affected by the Adjusted net national income, Bank capital to assets ratio, Coal rents and Domestic credit to private sector, therefore, a more detailed analysis is needed precisely these indicators. In subsequent works, keeping all assumptions, it is planned to apply the proposed model for analyzing the prospect of macroeconomic development in Ukraine.

Further research is needed and the proposed data set can serve as a useful source for a better view of the compromises that governments face when choosing to fund public spending. One of the natural ways in which this set is used is to look at the relationship between debt size and economic characteristics (for example, financial development, institutional structure, access to international capital markets). Another important issue for further research is how much the increase in domestic debt affects private sector bank lending and the possible crowding out of investments. At aggregate level, the data provided can help determine the relation between capital flows to developing countries, indicating a potential source of vulnerability.

4. Conclusion

Government borrowings have a significant impact on the economy, on monetary and fiscal policy parameters, and on the overall economic situation. State debt management requires understanding of its effects and involves an analysis of this economic phenomenon.

The results of the study show that an increase of 1% Adjusted net national income, Broad money, will increase the amount of state debt by 23.8671875% and 9.609375%; while an increase of 1% of the Bank's capital to assets ratio, Claims on central government, will reduce state debt by 73.875% and 14.28125% respectively. The result may mean that this change will lead in the future to reduce state debt, which will affect fluctuations positively. Increase by 1% Claims on other sectors of the domestic economy, Coal rent, Concessional debt, Current account balance, Domestic credit provided by financial sector, Domestic credit to private sector by banks, Exports of goods and services, Exports of goods and services, External balance of goods and services, General government final consumption expenditure will increase the state debt by 1.375%, 93%, 8.1875%, 2.3125%, 18.3437%, 9.25%, 0.15625%, 3%, 0.078125%, 7.6875% 14.875% respectively. Increase by 1% Deposit interest rate, Domestic credit to private sector, Expenses, Foreign direct investment (net

inflows), Fuel exports, Fuel import will reduce the state debt by 0.625%, 29%, 7.5%, 1.625%, 2%, 5.34375% respectively.

The economic content of the proposed equation of connection is an indication that the size of the state debt in Ukraine is most influenced by the adjusted net national income, the Bank capital to assets ratio, the Coal rents and the Domestic credit to private sector, therefore, a more detailed analysis of these indicators. In subsequent works, keeping all assumptions, it is planned to apply the proposed model for analyzing the prospect of macroeconomic development in Ukraine.

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