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ANALYSIS OF THE IMPACT OF SOCIAL SPHERE BUDGET FINANCING ON ECONOMIC DEVELOPMENT: CASE STUDY OF UKRAINE

The article presents the research of specific features of social sphere funding. In particluar, social expenditures changes are analysed in dynamics by different levels of budgets in Ukraine and in the EU countries. Basing on the statistic data, correlation and regression analysis of the link between social and economic expenditures and GDP of Ukraine is conducted. According to the research findings, there is a statistically significant and direct link between the social sphere expenditures and the main economic growth index.
Keywords: budget funding; social expenditures needs; social security; budget.

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АНАЛІЗ ВПЛИВУ БЮДЖЕТНОГО ФІНАНСУВАННЯ СОЦІАЛЬНОЇ СФЕРИ НА ЕКОНОМІЧНИЙ РОЗВИТОК: НА ПРИКЛАДІ УКРАЇНИ

У статті досліджено особливості державного фінансування соціальної сфери, і розглянуто динаміку зміни видатків соціального спрямування в бюджетах різних рівнів в Україні та країнах ЄС. На основі статистичної інформації проведено кореляційно-регресійний аналіз залежності між видатками соціального та економічного спрямування та обсягом ВВП України. Виявлено, що існує статистично значущий прямий зв'язок між видатками на соціальний захист і основним показником економічного зростання.
Ключові слова: бюджетне фінансування; соціальні видатки; соціальний захист; бюджет.
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АНАЛИЗ ВЛИЯНИЯ БЮДЖЕТНОГО ФИНАНСИРОВАНИЯ СОЦИАЛЬНОЙ СФЕРЫ НА ЭКОНОМИЧЕСКОЕ РАЗВИТИЕ: НА ПРИМЕРЕ УКРАИНЫ

В статье исследованы особенности государственного финансирования социальной сферы, рассмотрена динамика изменения расходов социальной направленности в бюджетах различных уровней Украины и стран ЕС. На основе статистической информации проведен корреляционно-регрессионный анализ зависимости между расходами социального и экономического направления и объемом ВВП Украины. Обнаружено, что существует статистически значимая прямая связь между расходами на социальную защиту и основным показателем экономического роста.
Ключевые слова: бюджетное финансирование; социальные расходы; социальная защита; бюджет.

Introduction. Recently, a general world tendency to enhance social orientation of state policies has been observed to be implemented in order to improve the level and the quality of citizens' life. Ukraine is no exception in this respect. This became especially important in terms of Eurointegration development. Experience of European countries shows that the state cannot have welfare without combination of economic

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and social strengths. Therefore, the main task today is to reform the social sector in order to achieve social justice and population protection in Ukraine. Effective organization and financing of social services will contribute to social and economic development of the state.

Recent research and publications analysis. The issue of social services financing has been investigated by many Ukrainian and foreign scholars. Features of state payments depending on financing models were studied by M. Cawford and R. Houston (2015). Expenditures on social services depending on their kinds were considered by K.E. Lynch (2012). Features of social development and its relationship with national development were investigated by M. Grindle (2010).

A group of authors I.M. Boiarko et al. (2013) and also N.V. Ovcharova (2014) studied theoretical foundations of public expenditures in economy, including social expenditures and their dynamics.

Relationship of expenditures related to social needs and economic development was considered by L.A. Vasiutynska (2010).

Despite significant achievements in this area, the issue of a direct relationship proof between financing of social expenditures and overall economic development through building econometric models have not received sufficient attention yet.

The research objective is to study the impact of social expenditures on GDP of Ukraine through correlation and regression analysis.

Results. In many countries, the state is the main guarantee of decent living conditions, which is especially evident through social protection of citizens and other vital social services' provision. There are different economic concepts on the extent of the state intervention in economic and social spheres, but intervention has need and extent been and still remains essential.

Government intervention in the social sphere of Ukraine covers the following areas:

- legal regulation, which involves developing a system of laws, regulations, norms and directives on social policy;

- provision of information, including statistical information and other public reports;

- state regulation of social policy through a variety of methods and tools providing direct or indirect government intervention in the social sphere;

- financial support.

The last component — financial provision of social services — will be further analysed in a more detailed way. At the state level it is usually provided through governmental/budget funding.

Budget expenditures are aimed at social sphere financing, they are very versatile, as perform different roles in the reproduction process (current or capital), and have different sources of funding (in state and local budgets) as well as implementation periods (current, medium- and long-term), and also various functional, departmental and target purposes (Ovcharova, 2014).

We believe that to provide a more effective analysis it is advisable to group socially directed costs by functional classification which will include expenditures on healthcare, spiritual and physical development, education and social security.

We offer to consider the dynamics of the share of expenditures for social needs in aggregated, state and local budgets of Ukraine, 2002−2015 (Figure 1).
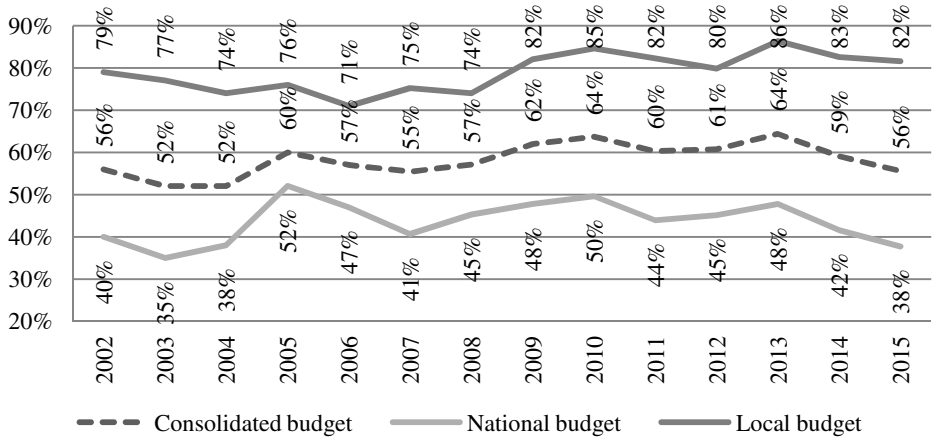

Figure 1. **Shares of social needs' expenditures in aggregated, state and local budgets by functional classification of Ukraine, 2002−2015,** *authors', based on the statistical data of the State Treasury Service of Ukraine* (www.treasury.gov.ua)

From Figure 1 analysis, we can conclude that the share of social spending is the largest for local budgets as it was 82% at the end of 2015. In general, there is a tendency of reducign social spending since 2013: by 8% in consolidated budget, by 10% in state budget and 4% in local budgets. This is a negative fact because it is the evidence of socialization reduction.

For comparison, let us investigate the proportion figures for social costs in the Consolidated budget of Ukraine and the EU integrated indicator (Figure 2).

Thus, the share of social costs in the European Union is slightly larger than in Ukraine (in 2013 − by 4%, while the average for the period is 6%). In addition, there is a gradual increase in the analysed rate of 66% in 2007 to 68% in 2013 in the EU.

In general, social costs' share in Ukraine was lower than 50% for the analyzed period, which is, according to some scientists, the limiting factor for developed countries.

Let us have a more detailed look at different expenditures share in the consolidated budget of Ukraine, 2015 (Figure 3).

Figure 3 demonstrates that social expenditures in Ukraine as of 2015 took the most of the budget, namely 56%. This reveals the social orientation of the budget in Ukraine. Moreover, spending on social security have the largest share − 26%, followed by spending on education (17%), general state functions (17%) and healthcare (11%). The smallest share belongs to the environmental expenditures (1%), utilities and also spiritual and physical development − 2% for each item.

Social sphere development also influences on such economic performance indices, as labour productivity and employment increase, technological and economic development etc.

Economic growth is the country's key indicator that determines long-term sustainable economic development, which is the process of steady increase in gross domestic product in the long run without violations of equilibrium in the short term (Boiarko et al., 2013).
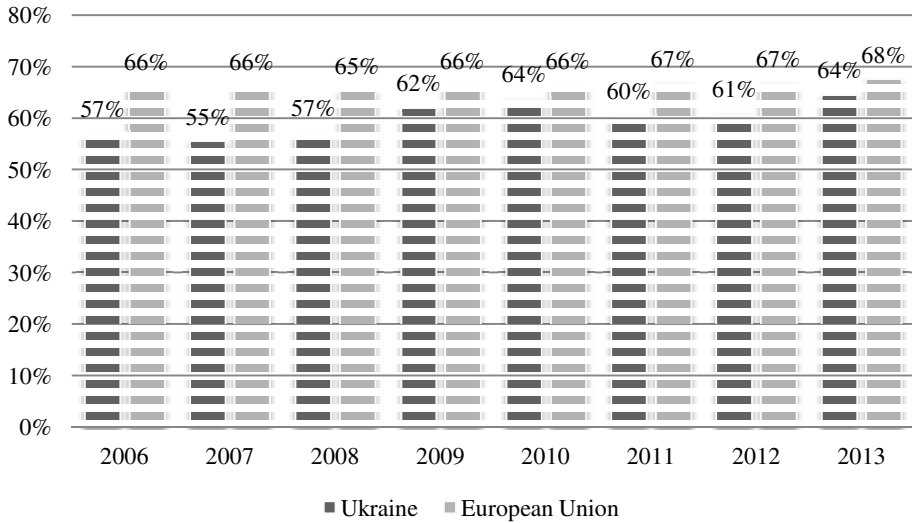
Figure 2. **Specific weight of social orientation costs in Ukraine and in the European Union, 2006–2013,** *authors', based on the statistical data of the State Treasury Service of Ukraine* (www.treasury.gov.ua) *and the Eurostat database* (ec.europa.eu)
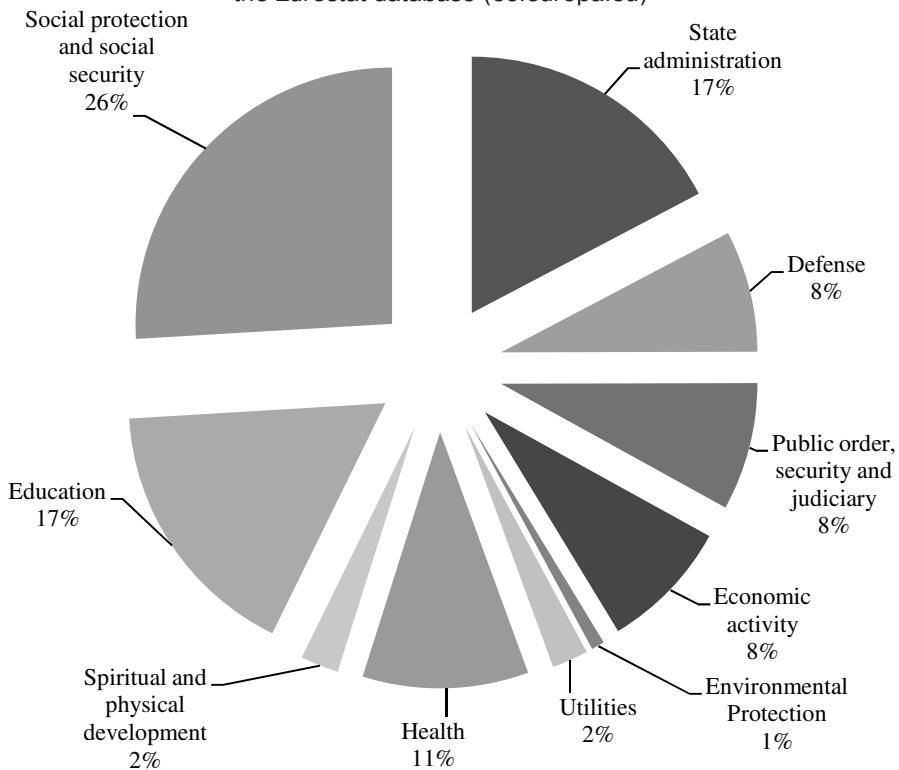

Figure 3. **The share of expenditures in the consolidated budget of Ukraine, 2015,** *authors', based on the statistical data of the State Treasury Service of Ukraine* (www.treasury.gov.ua)

However, there are different theoretical approaches to studying the relationship between public expenditures and economic growth. These approaches may be divided into two groups: some scientists believe that state expenditures cause slower economic development through the growth of tax burden, others − that, on contrary, they stimulate investments via infrastructure and economic development.

One of the most widely spread theoretical concepts is the Wagner's law, which states: industrial economy growth is accompanied by an increased share of public expenditures in GDP (Boiarko et al., 2013). Thus, state social spending may appear to be the result of country's economic development (Magazzino et al., 2015).

According to I.M. Boiarko et al. (2013) government spending, depending on its type, can cause both positive and negative effects. It is remarkable that negative effect is caused by the so-called non-productive spending, which includes national expenditures on defence, spiritual development and subsidies, social protection and extra-budgetary social funds.

Let us have a closer look at the relationship between economic expenditures (x_1), expenditures on social protection/social security (x_2) and GDP of Ukraine (Y) for 2007−2015 (quarterly data). For further work let us use the hypothesis about a link between GDP of Ukraine and social protection expenditures' volume.

Correlation and regression analysis has been conducted using the "STATISTICA" program. For easier analysis, the following abbreviations have been introduced for the variables (Table 1).

First, let us examine the correlation between expenditure volume and GDP of Ukraine using dispersion diagrams (Figure 4−5).

Table 1. **Input parameters for multiple regression,** *authors'*

Parameters	Short name	Variable
GDP at current prices level, bln UAH	GDP	Y
Expenditures on economic activities	Ec_exp	x_1
Social protection/social security expenditures	Soc_exp	x_2

Thus, analysing the graphics, we can assume there is a strong link between social spending and GDP volume, while correlation between economic sphere expenditures and GDP volume is much weaker.
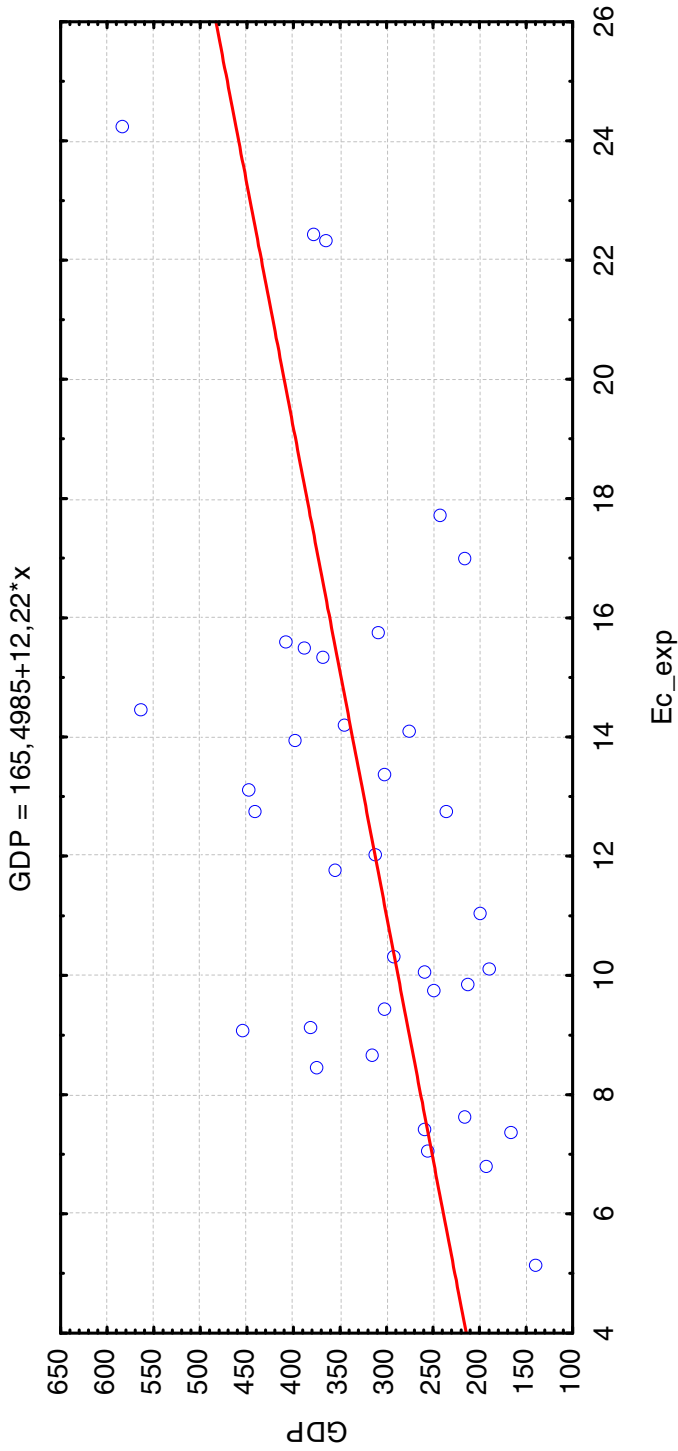
The next step will be to build a linear equation of multiple regressions. Using the software mentioned above, we get the regression summary (Table 2).

As a result, the equation of multiple regression will be as follows:

$$Y = 47.28 + 5.76x_1 + 7.16x_2, \qquad (1)$$

where Y is GDP at current prices, bln UAH; x_1 — economic activities expenditures level of the budget of Ukraine, bln UAH; x_2 — social protection expenditures level of the budget of Ukraine, bln UAH.

Thus, with economic activities expenditures level increase per unit, GDP volume will increase by 5.76 units; likewise, with increased spending on social protection by 1 unit, GDP volume will increase by 7.16 units, while other factors will be also included in the model.

Figure 4. **Diagram of the dispersion between economic sphere expenditures and the level of GDP of Ukraine,** *authors'*

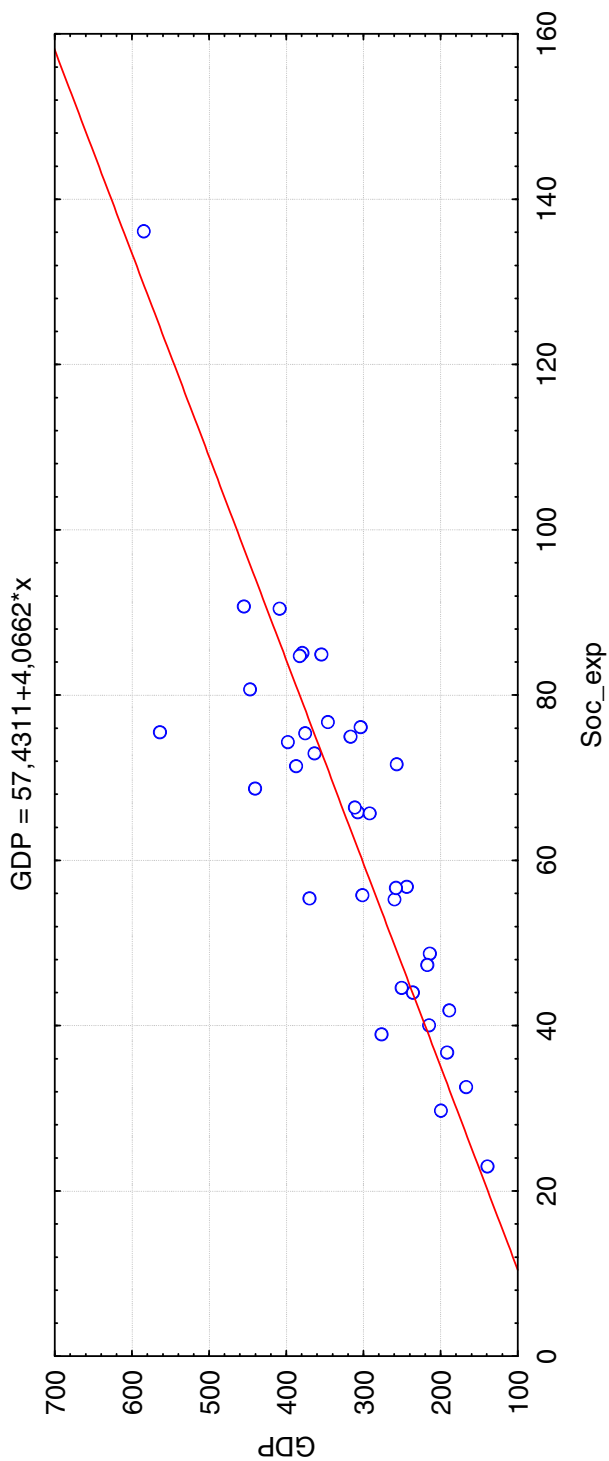GDP = 165,4985+12,22*x

GDP = 57,4311+4,0662*x

Figure 5. **Diagram of the dispersion between social protection expenditures and the level of GDP of Ukraine,** *authors'*

Table 2. **Regression summary table,** *authors'*

	R = .87024994				
	R2 = .75733497				
	Corrected R2 = .74262799				
	F(2.33) = 51.495 p < .00000				
	Standard Evaluation Error: 53.078				
	BETA	Standard Error	B	Standard Error	t(33)	p-level
Intercept Term			47.28643	29.90522	1.581210	0.123369
Ec_exp	0.249547	0.092509	5.76284	2.13633	2.697537	0.010918
Soc_exp	0.745323	0.092509	7.16119	0.88885	8.056731	0.000000

Table 2 shows the determination coefficients (R^2) and multiple correlation coefficients (R), which are used for model verification. They prove high dependence and closeness of the correlation level between the resulting variable (GDP) and selected factors (economic sphere and social protection expenditures).

To assess the significance of the resulting regression equation, let us perform a Fisher test. For this, let us check the hypothesis that the coefficient of determination is equal to 0. F-test is equal to 51.49, while its tabular value is 3.23. Thus, the coefficient of determination is statistically significant and regression equation is statistically reliable. In addition, the p-level for any index is not exceeding 0.05, indicating the significance of the equation.

An equally important stage is to test the model for multicollinearity. To do this, first of all, even correlation coefficients should be calculated and presented as the matrix chart.

Table 3. **Pair correlation coefficients,** *authors'*

Index	Ec_exp	Soc_exp	GDP
Ec_exp	1.000000	0.375160	0.529163
Soc_exp	0.375160	1.000000	0.838943
GDP	0.529163	0.838943	1.000000

Given that pair correlation coefficient r_{x1x2} is less then margin (0.7) we may assume there is no multicollinearity between the factors. The coefficient of pair correlation r_{yx2} indicates a strong connection between the GDP and social protection expenditures volume on the Chaddock scale (Avdashkova, 2012).

To confirm the assumption of multicollinearity absence we use the Farrar-Glauber algorithm (Table 4).

Using Table 4, we can conclude there is no regression multicollinearity in the equation. Also, there is a weak link between GDP volume (Y) and economic sphere expenditures (x_1), especially under the condition that the model does not include the x_2 index. A strong link between GDP volume (y) and social protection expenditures (x_2) should be admitted, while the correlation coefficient is statistically significant. On the other hand, a link between x_1 and x_2 and its tightness are weak.

Let us also test our model for heteroscedasticity using the Goldfeld-Quandt test. First, we examine x_1 variable (economic activity expenditures). The resulting coeffi-

cient $F_{cn} = 2.72$ is less than the tabular value (4.67), this means that the hypothesis of heteroscedasticity absence is accepted. The next step is to study x_2 (social protection expenditures). Experimental models for the population of $n = 14$ are as:

$$\hat{y}_1 = 72.63 + 8.78x; \qquad (2)$$

$$\hat{y}_2 = 165.42 + 6.17x. \qquad (3)$$

Table 4. **Farrar-Glauber algorithm,** authors'

Step	Index	Value	Table value	Assumption
Step1	Criteria χ_2	52.52	3.84	Multicollinearity possibility
Step 2	Fisher F-tests:			Y, x_1, x_2 are not multicollinear with others
	F_1	106.11	251	
	F_2	14.29		
	F_3	83.4		
Step 3	Coefficients of partial correlation and t-statistics:			The coefficient is statistically significant
	$r_{yx1/x2}$	0.425		
	t-statistics	2.698		
	$r_{yx2/x1}$	0.814	2.021	The coefficient is statistically significant
	t-statistics	8.057		
	$r_{x1x2/y}$	-0.149		The connection between factors is weak

Coefficient $F_{cn} = 2.35$ is less than the tabular value, therefore, there is no heteroskedasticity.

Let us have the model tested for autocorrelation presence with the Durbin-Watson test. Our Durbin-Watson criterion is 1.54, therefore, it is within the following limits: $1.5 < DW < 2.5$. This indicates lack of autocorrelation. For more reliable conclusion we will use Durbin-Watson table at the significance level of 0.05: $d_1 = 1.35$; $d_2 = 1.59$. Lower critical limit is followed ($1.35 < 1.54$), but the upper critical value does not satisfy the conditions ($1.59 > 1.54 < 4 - 1.59$), which may indicate the uncertainty of autocorrelation. However, to make sure we calculate the autocorrelation coefficient which appears to be equal to 0.202. This is lower than the critical value of 0.5. Taking into consideration all the calculations, we may declare there is no residual autocorrelation.

Thus, the offered hypothesis of a link between GDP volumes and social protection expenditures is confirmed. In addition, the obtained multiple regression equation is statistically reliable and significant. There is no multicollinearity in the model, but there is a close link between the independent variable and the volume of social protection expenditures. The hypothesis about heteroscedasticity absence is confirmed, while the residual autocorrelation is absent as well. In addition, the research results prove that such non-productive spending as expenditures on social protection and economic activities positively affect economic development of a country.

The following **conclusions** may be formulated:

1. Budgetary provision of social services is the most common form of financing in Ukraine and in the European Union. This is proved by the dynamics analysis of

social expenditures share in the budgets of different levels in Ukraine. It should be noted there is the highest share of social expenditures in the local budgets.

Expenditures on social sphere took 56% in the Consolidated Budget of Ukraine in 2015, which includes spending on social protection and social security (26%), on education (17%) and healthcare (11%), on spiritual and physical development (2%). This demonstrates the social orientation of the budget of Ukraine and its conformity to the generally accepted European standards.

2. The link between social expenditures and economic growth is considered by the economic theory from both positive and negative points of view. Correlation and regression analysis was carried out in order to determine the impact of this link on Ukraine. The constructed multiple regression model indicates tight and significant link between GDP of Ukraine and expenditures on social protection. As a result, it may be stated that social development is critical for the country's economy, which is impossible without social sector funding.

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