The main purpose of the article is to carry out a statistical assessment of the impact of the structure of budget expenditures on economic growth in Ukraine according to official statistics of 2004–2018. The author established the uneven growth of consumption expenditures compared to development expenditures, in particular in the consolidated budget current expenditures increased 1.4 times faster than capital, and in the state budget – 2.2 times, but in local budgets capital expenditures grew 1.3 times faster than current expenditures. It was determined that the share of capital expenditures in the consolidated budget decreased by 4.3 % due to a decrease in the share of capital expenditures in the state budget by 8.8 %. Synchronicity of dynamics of the index of physical volume of GDP and shares of capital expenditures in budgets of all levels based on the offered periodization is established. The article proves that the growth of the index of physical volume of GDP (indicator of real economic growth) during the period under review is caused by 30 % influence of the share of capital expenditures in local budgets, 57 % – in the state budget, 59 % in the consolidated budget of Ukraine.

Key words: share, capital expenditures, recurrent expenditures, consolidated budget, state budget, local budgets, GDP.
potочних і капітальних видатків у бюджетах усіх рівнів, графічний метод для візуалізації динаміки досліджуваних показників, регресійний аналіз для статистичної оцінки впливу структури видатків бюджетів на економічне зростання. Встановлено нерівномірність зростання видатків на споживання порівняно з видатками розвитку, зокрема у зведеному бюджеті поточні видатки збільшувалися в 1,4 рази швидше, ніж капітальні, а у державному бюджеті – у 2,2 раза, проте у місцевих бюджетах капітальні видатки в 1,3 раза зросли швидше, ніж поточні видатки. Виявлено, що частка капітальних видатків у зведеному бюджеті скоротилася на 4,3 % через зменшення питомої ваги капітальних видатків, у державному бюджеті – на 8,8 %. Встановлено синхронність динаміки індексу фізичного обсягу ВВП та часток капітальних видатків у бюджетах усіх рівнів на основі запропонованої періодизації. У статті доведено, що зростання індексу фізичного обсягу ВВП (індикатор реального економічного зростання) упродовж аналізованого періоду спричинене на 30 % впливом частки капітальних видатків у місцевих бюджетах, на 57 % – у державному бюджеті, на 59 % – у зведеному бюджеті України.

Ключові слова: частка, капітальні видатки, поточні видатки, зведений бюджет, державний бюджет, місцеві бюджети, ВВП.

Problem statement. Distribution and redistribution of financial resources of the state in the form of budget expenditures is an integral part of fiscal policy. In the course of financing budget expenditures, there is a problem of efficiency—whether the spent funds will contribute to economic development. Since budget expenditures are part of GDP, according to the end-use method, the dynamics of their volume has a direct impact on the dynamics of GDP. At the same time, the long-term synergistic effect from the position of economic growth can be obtained precisely at the expense of development expenditures (capital expenditures).


Ideas regarding the assessment of the main structural trends in public spending and their impact on economic growth in both developed and developing countries, in particular in Ukraine,
do not lose their relevance today. The author in the works [9; 10] starts the solution of these problems.

Uninvestigated parts of general matters defining. It should be noted that the problem of statistical estimation of the impact of the structure of public spending on macroeconomic growth remains poorly understood, and therefore requires detailed research.

**Problem statement.** The main purpose of the study is to conduct a statistical assessment of the impact of the structure of budget expenditures on economic growth in Ukraine according to official statistics of 2004–2018 for the formation of prerequisites for forecasting macroeconomic dynamics, taking into account the economic classification of budget expenditures.

Presentation of the main research material. Capital expenditures of the budget (development expenditures) include expenditures on capital transfers to enterprises; capital repairs; items of durable equipment; capital construction; land and intangible assets; state reserves; capital transfers to the population; capital inter-budgetary transfers and the like [11].

According to paragraph 3 of part 2 of article 71 of the Budget code of Ukraine, capital expenditures of the development budget are directed to: social and economic development of regions; implementation of investment projects; construction, overhaul and reconstruction of objects of social and cultural sphere and housing and communal services; construction of gas pipelines and gasification of settlements; construction and purchase of housing for certain categories of citizens in accordance with the legislation; preservation and development of historical and cultural places of Ukraine and reserves; construction and development of the subway network; purchase of cars for municipal electric transport; development of road economy; purchase of school buses and ambulances; updating of material and technical base of municipal health care institutions, computerization and informatization of general educational institutions and municipal health care institutions; environmental protection measures; other measures related to expanded reproduction [12].

Analysing the structure of budget expenditures, it should be noted that their distribution on capital (development costs) and current (consumption costs) occurs within the framework of the methodology of budget classification by economic elements (table 1).

As can be seen from the data table 1, during 2004–2018, there was an increase in both current and capital expenditures, but it was disproportionate and heterogeneous. Thus, current expenditures of the consolidated budget increased by 14.3 times, annually increasing by 21 %, and capital expenditures-by 10.3 times (+18 % annually), while the growth of current expenditures of the state budget is 2.2 times higher than the growth of capital expenditures. With regard to the dynamics of local budgets, the picture is the opposite-capital expenditures increased 1.3 times faster than current expenditures. Here it is worth noting the peculiarities of legislative regulation of the budget process, since, according to the budget code; capital expenditures are mainly directed to the development of administrative-territorial units through local development budgets. This also gives grounds to speak about the impact of local finance on economic growth.

Let us go directly to the analysis of the structure of budget expenditures. To do this, it is necessary to calculate the specific weights of current and capital expenditures in the expenses of the consolidated, state and local budgets.
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Table 1

Dynamics of budget expenditures (by economic elements) by levels of the budget system of Ukraine

<table>
<thead>
<tr>
<th>Years</th>
<th>Current budget expenditures:</th>
<th>Capital budget expenditures:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>consolidated</td>
<td>state</td>
</tr>
<tr>
<td>2004</td>
<td>80 582</td>
<td>64 363</td>
</tr>
<tr>
<td>2005</td>
<td>123 427</td>
<td>101 972</td>
</tr>
<tr>
<td>2006</td>
<td>150 804</td>
<td>121 687</td>
</tr>
<tr>
<td>2008</td>
<td>268 037</td>
<td>215 855</td>
</tr>
<tr>
<td>2009</td>
<td>287 334</td>
<td>231 991</td>
</tr>
<tr>
<td>2010</td>
<td>347 210</td>
<td>282 548</td>
</tr>
<tr>
<td>2011</td>
<td>374 907</td>
<td>302 178</td>
</tr>
<tr>
<td>2012</td>
<td>451 709</td>
<td>366 180</td>
</tr>
<tr>
<td>2013</td>
<td>476 464</td>
<td>385 612</td>
</tr>
<tr>
<td>2014</td>
<td>502 926</td>
<td>422 818</td>
</tr>
<tr>
<td>2015</td>
<td>633 119</td>
<td>559 429</td>
</tr>
<tr>
<td>2016</td>
<td>762 561</td>
<td>658 517</td>
</tr>
<tr>
<td>2017</td>
<td>902 305</td>
<td>769 770</td>
</tr>
<tr>
<td>2018</td>
<td>1 149 344</td>
<td>942 537</td>
</tr>
</tbody>
</table>

Growth rate in 2018, compared to 2004, times

Average annual increase (+/-), %

Source: formed according to the data given in [12], excluding the temporarily occupied territory of the ARC, Sevastopol and parts of the temporarily occupied territories in Donetsk and Luhansk regions for 2014–2018.

Let us analyse the structure of expenses of the consolidated budget, the state and local budgets of Ukraine on economic elements (table 2).

From the data given in table 2, it can be seen that in the structure of the consolidated budget, the share of current expenditures significantly exceeds the share of capital. Thus, in 2004, the share of capital expenditures was 18.1 % and as of 2018 decreased by –4.3 %. At the same time, in 2004, the lowest value of the share of current expenditures was recorded, which amounted to 81.9 %, and the maximum value of 96.1 % was achieved in 2014, while the share of capital expenditures was minimal, amounting to only 3.9 %. The data given in table 2, also testify to the suboptimality of the structure of expenditures of the consolidated budget of Ukraine for economic elements, since as of 2018 only about 14 % of expenditures were directed to the development of the national economy, and 86 % – on consumption.

Structure of state budget expenditures by economic elements similar to the structure of consolidated budget expenditures, as the share of current expenditures is much higher than the share of capital. Thus, in 2004, the share of capital expenditures was 17.6 % and as of 2018 decreased by –8.8 %. At the same time, in 2004 the lowest value of the share of current expenditures was recorded, which amounted to 82.4 %, and the maximum value of 98.3 % was...
achieved in 2014, while the share of capital expenditures was minimal, amounting to only 1.7%. As of 2018, only about 9% of expenditures were directed to the development of the national economy, and 91% – to consumption, which indicates the suboptimal balance of the structure of expenditures of the state budget of Ukraine on economic elements.

The structure of expenditures of local budgets for economic elements is similar to the structure of expenditures of the consolidated and state budgets, since the share of current expenditures is much higher than the share of capital. Thus, in 2004, the share of capital expenditures was 15.1% and as of the end of 2018 increased by +3.4%. At the same time, in 2007, the lowest value of the share of current expenditures was recorded, which amounted to 78.5%, and the maximum value of 93.8% was achieved in 2014, while the share of capital expenditures was minimal, amounting to only 6.2%.

The situation of non-optimal structure of expenditures on economic elements is also inherent for local budgets of Ukraine, since as of 2018 only 18.5% of expenditures were directed to the development of territorial and administrative units, and 81.5% – to consumption. At the same time, the share of capital expenditures in local budgets exceeds the share of capital expenditures of the consolidated budget by +4.7%, and the share of capital expenditures of the state budget by +9.7%. This means that the fiscal policy is aimed at the development of administrative-territorial...
Also from the data table 2 it can be concluded that there is a certain synchronicity of changes in the dynamics of the share of capital expenditures in the consolidated, state and local budgets of Ukraine.

To conduct a statistical assessment of the impact of the structure of budget expenditures on economic growth, first analyse the synchronicity of the dynamics of the share of capital expenditures in budgets of different levels in comparison with the dynamics of the index of physical GDP (dynamic indicator of “real” GDP, calculated in constant prices of the base period, usually the previous, the dynamics of which interprets economic growth) according to Fig. 1.

Fig. 1. Comparative dynamics of the share of capital expenditures at the levels of the budget system of Ukraine with the dynamics of the index of physical volume of GDP

Source: formed according to the data given in [12; 13], excluding the temporarily occupied territory of the ARC, Sevastopol and parts of the temporarily occupied territories in Donetsk and Luhansk regions for 2014–2018.

Graphs of the dynamics of the share of capital expenditures in budget expenditures at all levels and the index of physical volume of GDP, shown in Fig. 1, demonstrate a certain synchronicity from 2005 to 2018, which it is advisable to analyse by dividing the graphs into 5 periods:

1. In 2005–2007, the increase in the share of capital expenditures in the consolidated budget was +4.3 % (an increase from 12.8 to 17.1 %), in the state budget – +5.2 % (an increase from 9.6 to 14.8 %), and in local budgets – +6.2 % (an increase from 15.3 to 21.5 %), which was the highest result. At the same time, the growth of the index of physical volume of GDP amounted to + 5.1 %.

2. In the period from 2007 to 2009, which includes the global financial crisis, observed the descending dynamics of reduction of the share of capital expenditures in the consolidated budget

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for –10.6 % (to 6.5 % at end-2009), state budget – by –10.5 % (to 4.3 % at end-2009), in local budgets – on –13.1 % (to 8.4 % at end-2009), the worst downward dynamics. These changes were accompanied by a catastrophic decline in the index of physical volume of GDP by –23.3 %.

3. In the post-crisis period of 2009–2011, the growth of the studied indicators is observed, which is accompanied by an increase in the index of physical volume of GDP by +20.5 %. The share of capital expenditures in consolidated budget expenditures rose by +3.6 %, and the share of capital expenditure in the state budget expenditures by 5.1 percent (the best result), the share of capital expenditures in local budget expenditures by 1.2 percent (the worst result).

4. In 2011, there was a reversal of the trend towards recession, which ended in 2014, the dynamics of the share of capital expenditures at the levels of the budget system, but the decline in the index of physical volume of GDP continued until 2015. Thus, during 2011–2014, the negative increase in the share of capital expenditures in the consolidated budget was –6.2 % (down from 10.1 to 3.9 %), in the state budget –7.7 % (down from 9.4 to 1.7 % – the largest reduction), and in local budgets –3.4 % (down from 9.6 to 6.2 % – the smallest reduction). At the same time, the negative growth of the index of physical volume of GDP amounted to –12 %.

5. Since 2014, there has been a reversal of trends in the share of capital expenditures in budgets of different levels towards growth, which continued until 2018. in the dynamics of the index of physical volume of GDP growth began 1 year later and at the end of 2018 amounted to 113.1 %.

At the final stage of assessing the impact of the structure of budget expenditures on economic growth, it is necessary to calculate the following statistical coefficients:

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}},$$

where $r_{xy}$ – pair correlation coefficient;

$n$ – number of observations;

$x_i$ – i-th the observed value of the independent variable (in our case, the share of capital expenditures in the consolidated, state and local budgets);

$y_i$ – i-th the observed value of the dependent variable (in our case, the index of physical volume of GDP).

$$t = \frac{r_{xy}}{\sqrt{1-r_{xy}^2}},$$

where $t$ – student’s criterion, which assesses the significance of the pair correlation coefficient, compared with the corresponding critical value, which can be calculated using the statistical function Excel T.INV.2T(0.95;13).

$$F = \frac{r_{xy}^2}{1-r_{xy}^2} (n-2),$$

where $F$ – Fisher criterion, which assesses the quality (reliability) of the coefficient of determination $r_{xy}^2$ in comparison with the corresponding critical value that can be calculated using the statistical function Excel F.INV.RT(0.95; 2;13).
The results of the calculations carried out by the formulas (1)-(3) are summarized in Table 3.

Table 3

<table>
<thead>
<tr>
<th>Factor signs</th>
<th>Statistical coefficients (criteria)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation coefficient $r_{xy}$</td>
<td>Determination coefficient $r_{xy}^2$</td>
<td>t-criterion</td>
<td>F-criterion</td>
</tr>
<tr>
<td>1. Share of expenditures in the consolidated budget:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– current</td>
<td>$-0.765$</td>
<td>$0.585$</td>
<td>$4.28$</td>
<td>$18.35$</td>
</tr>
<tr>
<td>– capital</td>
<td>$0.765$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Share of expenditures in the state budget:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– current</td>
<td>$-0.755$</td>
<td>$0.570$</td>
<td>$4.16$</td>
<td>$17.27$</td>
</tr>
<tr>
<td>– capital</td>
<td>$0.755$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Share of expenditures in local budgets:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– current</td>
<td>$-0.549$</td>
<td>$0.301$</td>
<td>$2.37$</td>
<td>$5.61$</td>
</tr>
<tr>
<td>– capital</td>
<td>$0.549$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Critical value of statistical coefficient</td>
<td>$0.7$</td>
<td>$0.5$</td>
<td>$1.77$</td>
<td>$3.81$</td>
</tr>
</tbody>
</table>

Source: author’s calculations by formulas (1)–(3).

The data given in Table 3 show that between the particles of current and capital expenditures in the consolidated and state budgets and the index of physical volume of GDP there is a stochastic relationship of high density (the modulus of the correlation coefficients exceeds 0.7). The growth in the share of current expenditure leads to a decrease of the volume index of GDP (feedback) and the growth of the share of capital expenditures – increase of the volume index of GDP (direct link). It should be noted that between the share of capital expenditures in local budgets and the GDP volume index there is a stochastic direct relationship of average density (the value of the correlation coefficient is between 0.5 and 0.7), and between the share of current expenditures in local budgets and the GDP volume index—the same feedback. At the same time, the change in the index of physical volume of GDP by 58.5 % is due to a change in the structure of expenditures in the consolidated budget, by 57 % – in the state budget and by 30 % – in local budgets. It should also be noted that all values of the pair correlation coefficient are statistically significant, since the calculated t-test levels exceed their critical value of 1.8. Similarly, the entire value of the determination coefficient is statistically reliable, so that the actual levels of the F-test are greater than the critical value of 3.8.

Conclusions. Therefore, according to the results of the assessment of the impact of the structure of public spending on economic growth in Ukraine, we can draw the following conclusions. First, it was found that during 2004–2018 current expenditures (consumer expenditures) of the consolidated budget grew by 40 % faster than capital expenditures (development expenditures), and the growth of current expenditures of the state budget exceeded the growth of capital expenditures by 2.2 times, but in local budgets the growth of capital expenditures exceeded the...
growth of current expenditures by 1.3 times. Secondly, it was revealed that the share of capital expenditures in the expenditures of the consolidated budget decreased during the analysed period by –4.3 % due to the reduction of the share of capital expenditures in the expenditures of the state budget from 17.6 % in 2004 to 8.8 % in 2018. Thirdly, the periodization of the dynamics of the index of physical volume of GDP and the share of capital expenditures in the budgets of all levels was developed, as a result of which their relative synchronicity was established. Fourthly, it is proved that during 2004-2018 years, the economic growth of the national economy of Ukraine was influenced by the dynamics of the structure of budget expenditures, in particular, the degree of influence of the share of capital expenditures in local budgets was 30 % (average density), in the state budget – 57 % (high density), in the consolidated budget – 59 % (high density). The obtained results make it possible to form preconditions for forecasting macroeconomic dynamics taking into account the structure of budget expenditures behind economic elements, which will become the basis for further research of the author.

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Martynenko V. V. Assessment of the impact of the structure of budget expenditures on economic growth in Ukraine
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Стаття надійшла до редакції 15 січня 2020 року
В. В. Мартиненко. Оцінка впливу структури бюджетних розходів на економічний рост в Україні

Головна мета статті полягає у проведенні статистичної оцінки впливу структури бюджетних розходів на економічний рост в Україні на основі офіційних статистичних даних 2004–2018 років. Автором установлена нерівномірність росту розходів на потреблення по відношенню до розходами розвитку, в частності в свідомому бюджеті: розходи на потреблення збільшувались в 1,4 рази більше, ніж розходи на розвиток, а в державному бюджеті – в 2,2 рази, однак в місцевих бюджетах розходи на потреблення збільшувались в 1,3 рази більше, ніж розходи на розвиток. Опреділено, що доля розходів на потреблення у свідомому бюджеті сократилася на 4,3 %, а в державному бюджеті – на 8,8 %. Установлена синхронність динаміки індекса фізичного об'єму ВВП і долях розходів на розвиток у бюджетах всіх рівнів на основі запропонованої періодизації. В статті доведено, що зрост індекса фізичного об'єму ВВП (індикатор реального економічного росту) в розрахунку на основі розходів на потреблення у місцевих бюджетах, на 57 % у державному бюджеті, на 59 % у свідомому бюджеті України.

Ключові слова: доля, розходи на розвиток, розходи на потреблення, свідомий бюджет, державний бюджет, міські бюджети, ВВП.

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