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Econometric forecasting of some economic processes of academic management in the face of uncertainty of hostilities

Econometric analysis and forecasting of economic processes of academic management in conditions of uncertainty of military actions enables economists and managers from among the academic community to find questions about the causes and consequences and strength of the influence of individual economic or social factors on the effectiveness of academic management in the management of higher education institutions.

The scientific novelty of the obtained results is to clarify approaches to the formation of military budgets in conditions of uncertainty of hostilities and determine their impact on the socio-economic processes of states that form and use their military budgets of various sources of origin (state, municipal, private, international financing).

Now academic management in Ukraine is faced with serious changes in the principles of development of once integral socio-economic systems, which occur not only under the influence of globalization, but also are the result of an increase in crisis phenomena in the national and world economy, an increase in the number of military-political conflicts, revolutions, increased attacks by terrorists, as a result of which people die. In addition, climate and man-made disasters complement the suffering of people. All this gives rise to numerous migration and social problems affecting both developed and developing countries. And all of them have a direct impact on the activities of higher education institutions, especially in Ukraine, where the war continues.

Usually, any hostilities encourage an increase in the production of military goods, as well as related services that provide the necessary level of education and competencies for the country's ability to conduct military operations (defensive or offensive). At the same time, academic management in higher education institutions finds itself in a twofold situation: on the one hand, the enemy deliberately and purposefully destroys educational institutions and their material base in order to prevent the training of high-quality personnel both for military operations and for the rear, and on the other hand, various state and volunteer forms of financing educational institutions are in greater availability and volume, rather than in peacetime. All this clearly affects the economic development of the state, on the territory of which hostilities are conducted, because those who provide military educational services (including for the training of high-quality personnel to work in the rear) increase the economic performance of their economic agent.

Theoretically, military budgeting can affect the economic growth of 1the state through the following two channels: the development of the sector of intermediaries that form military budgets, and the development of the actual military budgeting of a certain economic agent (state, for example), which help to effectively spend working capital, which leads to an increase in production capacity and profitability of the company, and therefore to an acceleration of economic growth. Thus, Both in the first and in the second case, it is the academic budgeting of military budgeting that plays a leading role in ensuring the acceleration of economic growth of a particular country. In addition, military budgeting affects not only economic growth itself, but also other factors of such growth: the discount rate, investments, the overall productivity of a certain sector of the economy, etc. That is, having a double impact on economic growth and on its components, military budgeting is considered the main factor in the economic growth of the state.

That is, we can say that not only the productivity of academic budgeting affects the development of military budgeting, but also vice versa. Therefore, to model these reverse processes in our study, we used the adapted model of Batis and Coeli, which, adjusted for the unexpected reaction of the economies of countries that take an active part of military budgeting to external and internal influences, will now look like this:

$$\text{ВВП}_{it}\text{-П}_{it}= \beta 0+ (\beta 1- 1)\text{П}_{it}+ \beta 2K_{it}+ \beta 3t+ \beta 4D_{it}+ \beta 5D_{it}\text{П}_{it}+ \beta 6D_{it}K_{it}+ \beta 7D_{itt} + \beta 8\text{ЦK}_{it} + v_{it}\text{-}u_{it};$$

$$\mu_{it} = \delta 0 + \delta 1F_{it\text{-}1} + \delta 2D_{it} + \delta\ 3D\ it\ F\ it\text{-}1$$

ВВП – gross domestic product
П – Military budgeting productivity
К – capital
ЦК – cyclic component of GDP
D – Fictitious variable

For the calculations, panel data tables were constructed in three alternatives for these countries, as presented in Table 1. The statistics were taken at intervals of 1 year and over the past 30 years, i.e. from 1998 to 2022.

To adapt the model, the logarithms of these variables were taken. To smooth out and eliminate white noise, fictitious variables and additional variables were used v_{it} and u_{it}.

Table 2 presents the results of calculations according to the model for the first two groups of panel data for developed economies and for countries with active military budgeting. Macroeconomic and financial indicators of 39 countries were used according to the list presented in the first and second columns of Table 1. The fifth column of Table 2 shows the results based on panel data of 18 countries from the second column of Table 1.

As follows from the analysis of the calculations presented in the tables, the level of productive efficiency of academic budgeting does not necessarily have a positive effect on the acceleration of the pace of development of military budgeting, and the economic growth of this country, and the level of development of this country does not matter.

According to the results of the calculations, the confirmation was judged that academic budgeting in countries with territories where active hostilities are conducted has both positive and negative impact on the development of military budgeting and on the economic growth of the respective state, depending on the individual conditions of functioning of the economic system in a particular country.

Table 1
THE DATA IN THE MODEL IN THE ALTERNATIVE PANEL DATA GROUPS

Annual indicators of countries with developed economies, 1998-2022 pp.	Annual indicators of countries with active military budgeting, 1998-2022 pp.	Three-year averaged indicators for developed countries and countries with active military budgeting, 1998-
Australia	Colombia	Australia
Австрія	Ecuador	Австрія
Canada	Dominican Republic	Canada
Denmark	India	Denmark
Finland	Honduras	Finland
France	Republic of the	France
Ireland	Nigeria	Ireland
Iceland	Kenya	Iceland
Italy	Madagascar	Italy
Japan	Malawi	Japan
Morocco	Mexico	Venezuela
Netherlands	Ukraine	Netherlands
Switzerland	Moldova	Switzerland
United States	China	United States
United Kingdom	Russian Federation	United Kingdom
EU	Republic of Belarus	EU
	Thailand	Colombia
	Georgia	India

Uzbekistan	Mexico
Tajikistan	Ukraine
Azerbaijan	Moldova
Sri Lanka	Russian Federation
Venezuela	Republic of Belarus
	Georgia
	Uzbekistan
	Tajikistan
	Azerbaijan

Table 2.

RESULTS OF CALCULATIONS ACCORDING TO THE MODEL, ANNUAL FINANCIAL DATA OF 39 countries for the period 19 98-20 22 years*

Змінна	(1) M2	(2) M2-Г	(3) Г/Д	(4) КРЕДИТ	(5) ВБ
Intercept	6.7035	6.7112	6.6844	6.7135	5.7389
	(0.3139)	(0.3173)	(0.2998)	(0.2797)	(0.4102)
П	-0.2549	-0.2539	-0.2599	-0.2501	-0.3020
	(0.0398)	(0.0402)	(0.0385)	(0.0346)	(0.0321)
K	0.2865	0.2856	0.2902	0.4194	0.3571
	(0.0358)	(0.0362)	(0.0345)	(0.1259)	(0.0339)
t	0.0070	0.0070	0.0074	0.0064	0.0026
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
D	-2.2412	-2.2428	-2.1809	-2.1114	-5.5228
	(0.3898)	(0.3975)	(0.3529)	(0.3317)	(1.0453)
D×П	-0.4514	-0.4523	-0.4405	-0.4578	-0.5371
	(0.0416)	(0.0414)	(0.0419)	(0.3771)	(0.0380)
D×K	0.3709	0.3715	0.3624	0.3707	0.5518
	(0.0381)	(0.0382)	(0.0365)	(0.0333)	(0.0592)
D×t	-0.0051	-0.0052	-0.0070	-0.0077	-0.0217
	(0.0027)	(0.0028)	(0.0024)	(0.0027)	(0.0028)
ЦК-1	0.4450	0.4431	0.4292	0.4194	0.1782
	(0.1271)	(0.1227)	(0.1284)	(0.1259)	(0.1001)
Константа	-0.4211	-0.4261	-0.8593	0.0750	0.7836
	(0.2303)	(0.2313)	(0.2363)	(0.2773)	(0.1103)
FF.i					
	-0.1423	-0.1436	0.1072	-0.3410	-0.4620

D	(0.0790) 0.7792	(0.0787) 0.8053	(0.2789) 1.3212	(0.1242) 0.5190	(0.0820) 0.4134
DF-1	(0.2295) 0.1930	(0.2300) 0.1894	(0.2190) -0.0428	(0.2901) 0.3089	(0.1818) 0.1993
r	(0.0813) 0.9707	(0.0831) 0.97070.9	(0.2823) 0.9721	(0.1258) 0.9673	(0.1259) 0.9999
ΠR	279.9620	279.4873	296.4098	285.0301	198.6686
a	0.4538	0.45 380.45	0.4171	0 .4540	0.2212

In general, econometric forecasting of economic processes of academic management in the face of uncertainty of hostilities plays an important role and is a necessary tool for determining the impact of globalization on socio-economic development and the formation of financial space in the world.

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