DESCRIPTIVE ANALYSIS OF PUBLIC POLICIES FOR PROVISION OF GOODS FOR COLLECTIVE CONSUMPTION

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Abstract

The purpose of the study is to systematize the 27 EU member states in separate groups in 2021 based on the relative shares in GDP of the expenditure of the sub-sector "Central government" by functions of the COFOG and on this basis a comparative analysis was made of the European spending policies in the field of providing public goods for the benefit of the society. Attention is focused on the public policy dimensions of the provision of collective consumption goods in EU member states after 2020 and the effect of the emergence of the Covid-19 pandemic on the financing of strategic government functions to each country.

Keywords: public policies, government expenditure, comparative analysis, public goods

JEL: E60, H53, C38

Government Expenditure: Theoretical Basis and Need for Research

A big part of the theoretical basis of public sector economics focuses on the principles of achieving efficiency, the conditions for establishing general market equilibrium, and the measurement of government expenditure. Clarification the reasons for the long-standing tendency to increase the amount of government expenditure is the subject of great interest not only for scientists, but also for society. The origin and characteristics of government expenditure imply periodic consideration of their development trends, as well as an analysis of the factors stimulating their growth. In the specialized literature, the factors stimulating the growth of government expenditure are related to the growth of income; industrialization and related with urbanization; the demographic and social structure of the population; the role of public choice, the productivity of the public economy, the role and utility function of the bureaucrat, as well as the administrative-institutional way of forming the state budget (Маринов, 2017, с. 138; Беев, Йотова, 2021; Браун, Джаксън, 1998, с. 604). Each one of the above-mentioned factors is related to increase in the demand and supply of public goods,

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and hence the amount of government expenditure. On the basis of these factors, various macro models have been developed, justifying the growth of government expenditure. Macro models take into account in a long-term period how a number of macroeconomic phenomena influence the growth of government expenditure, proving that one of their specific characteristics is macroeconomic dependence on the current economic conjuncture (Величков, 2023).

A number of authors try, through the construction of various models, to explain the established tendency for the growth of government expenditure and the factors affecting their expansion, on the one hand, and on the other – the influence of government expenditure on growth (Akmal, Fayzullokh, 2023; Poku, Opoku, Ennin, 2022, pp. 1-16; Garry, Valdivia Rivas, 2017, pp. 1-53; Zulkifli1, Effendi, 2022; Moudud, 1999, pp. 1-5; Mehmood, Sadiq, 2010, pp. 29-37; Baumol, Bater, Wolff, 1985, pp. 806-817; Peacock, 1997; Jibir, Aluthge, Ercolano, 2019, pp. 1-23; Todorov, 2015, pp. 2-22). For example, J. I. Amuka, M. O. Ezeoke and Fr. O. Asogwa (2016) analyse the relationship between the amount of government expenditure decomposed by sector and the achievement of macroeconomic stability (Amuka, Ezeoke, Asogwa, 2016, pp. 1930-1936). Ez. R. Ukwueze (2015) analysed various factors affecting the amount of public expenditure in Nigeria, including: the formed budget imbalances, reflecting on the increase in the level of public debt; the amount of foreign aid; income and world population growth; the type of political government of the states, as well as the degree of institutionalization of a number of processes within the scope of the public sector (Ukwueze, 2015, p. 2). Based on the research carried out, the author proves that in the short and long term, the amount of government expenditure in Nigeria is positively influenced by factors such as the amount of revenue; the growth of national income and private investment, while the amount of government debt is a factor that negatively affects the amount of government expenditure in the short term (Ukwueze, 2015, p. 1). In other words, the issue of research the factors influencing the amount of government expenditure is significant, as the study of these factors helps to improve the management of public policies directly aimed at increasing public welfare. An important component of government expenditure is government expenditure by functions of COFOG (Classification of the functions of government, created by the Organization for Economic Co-operation and Development (OECD)). The study of this type of expenditure allows to analyse public policies in the field of providing goods for collective consumption, which have an impact of increasing public welfare. The comparative analysis of government expenditure by functions of COFOG makes it possible to examine the implemented public policies related to social development and to make recommendations regarding their effective management and reduction of inequalities between individual countries. Government expenditure by functions of sector "General Government" are systematized into ten groups: *general public services;*

defence; public order and safety; economic affairs; environmental protection; housing and community amenities; health; recreation, culture and religion; education; social protection (Цоклинова, 2021, с. 162).

Methodological framework of the study

In the present study, the government expenditure of the sub-sector "Central Government" by functions of COFOG are used. The researched year is 2021, which, at the time of the realization of the empirical study, is the last year with available data on the expenditure by functions of COFOG of sub-sector „Central Government" in Eurostat. The research method used is cluster analysis. Clustering methods are divided into hierarchical and non-hierarchical. The most significant disadvantage of the first ones is that the redistribution of units in the different clusters is one-time and irreversible. This is a prerequisite for the formation of insufficiently uniform clusters. For this reason, non-hierarchical clustering methods are preferred in the present study. The most widely used of these is the K-means method. It uses the Euclidean distance as a measure of dissimilarity. It is determined by a formula (1) (Манов, 2002).

$$S_{il}^E = \sqrt{\sum_{j=1}^{p}(z_j - z_l)^2} \ , \tag{1}$$

where z_{ij} is the standardized value of the j-th expenditure by function of CO-FOG in the i-th EU member state;

z_{lj} – the standardized meaning of the j-th expenditure by function of COFOG in the l-th EU member state;

p – the number of types of expenditure by functions of COFOG.

For the purpose of the study, a clusterization is made of the relative shares of GDP of the expenditure in sub-sector "Central Government" by functions of COFOG in 27 member states in EU for 2021. The ten groups of expenditure are used, that constitute COFOG classification of expenditure by functions. The institutional sector, the data of which is applied when performing the cluster analysis, covers all administrative units of the state, whose powers cover the entire economic territory, without taking into account the social insurance funds, namely: sub-sector "Central Government" (БНБ, 2018).

Results and Discussion

In 2021, EU Member States are grouped into six clusters based on the relative share in GDP of expenditure by functions of COFOG. Cluster 1 includes two countries – Belgium and Spain. Cluster 2 consists of four countries – Bulgaria, Croatia, Lithuania and Portugal. Only Greece falls into cluster 3. Cluster 4 consists only of Denmark. Cluster 5 includes Germany, Ireland, France, Cyprus, Latvia, Hungary, Poland, Romania, Slovenia, Slovakia and Finland. Cluster 6 consists of eight countries – the Czech Republic, Estonia, Italy, Luxembourg, Malta, the Netherlands, Austria and Sweden.

Cluster 1 consists of countries characterized by a high relative share in GDP of expenditure on **General public services**, ranked second among the six clusters. The average value of the cluster centre in terms of the indicator is 18.7% of GDP. The relative share of countries in terms of this indicator is as follows: Belgium (19.4% of GDP) and Spain (18% of GDP). It is noteworthy that cluster 1 includes countries that are characterized by a low relative share in GDP of expenditure on **Social protection**, as the average value of the cluster centre in terms of the indicator is 3.35% of GDP. The relative share of countries in terms of this indicator is as follows: Belgium (4.8% of GDP) and Spain (1.9% of GDP). By all other indicators, the countries forming cluster 1 are characterized by a very small relative share in GDP. Here is the place to note the extremely small relative share in GDP of expenditure on **Health** – the average value of the cluster centre of the indicator is 0.35% of GDP. The relative share of countries in terms of this indicator is as follows: Belgium (0.4% of GDP) and Spain (0.3% of GDP). The situation is identical with the expenditure on **Education**. The average value of the cluster centre in terms of the indicator is 0.1% of GDP. The high relative share in GDP of expenditure on general public services of the countries forming cluster 1 is an indicator of changes in the fiscal policy of these countries, as a result of the Covid-19 pandemic, especially in terms of the formed budget deficits and subsequent payments on towards repayment of the government debt.

Cluster 2 includes Bulgaria, Croatia, Lithuania and Portugal. The countries forming cluster 2 are characterized by the highest relative share in GDP of expenditure on **Health**, ranking first among the six clusters. The average value of the cluster centre in terms of the indicator is 3.8% of GDP. The relative share of the countries in terms of this indicator is as follows: Bulgaria (2.4% of GDP); Croatia (3.1% of GDP); Lithuania (2.5% of GDP) and Portugal (7.2% of GDP). It can be seen that the countries falling into this cluster are characterized by a comparatively high relative share in GDP of the expenditure on **General public services**. The average value of the cluster centre in terms of the indicator is 13.23% of GDP. The relative share of countries in relation to this indicator is as follows: Bulgaria (12% of GDP); Croatia (15.1% of GDP); Lithuania (14.1% of GDP)

and Portugal (11.7% of GDP). Cluster 2 countries have similar characteristics to those forming cluster 1 in terms of the relative share in GDP of **Social protection** expenditure, with the average value of the cluster center in terms of the indicator being 3.23% of GDP (for cluster countries 1 the average value of the cluster center in terms of the indicator is 3.35% of GDP). Countries that fall into cluster 2 are characterized by a moderately high relative share in GDP of expenditure on **Economic affairs**, ranking fourth among the six clusters. The average value of the cluster center in terms of the indicator is 4.3% of GDP. The relative share of countries in relation to this indicator is as follows: Bulgaria (6.3% of GDP); Croatia (4.9% of GDP); Lithuania (2.3% of GDP) and Portugal (3.7% of GDP). In terms of the relative share in GDP of expenditure on **Education**, countries in cluster 2 rank penultimate among the six clusters, with the cluster center average for the indicator at 3.8% of GDP. The high relative share in the GDP of the expenditure on general public services indicates an increase in the transactions to secure the government debt of these countries. Also, the high relative share in GDP of health expenditure indicates increased government intervention in health care as a result of the Covid-19 pandemic. A negative trend in the expenditure policies of these countries regarding the provision of collective goods is the low relative share in GDP of expenditure on education. The latter is related to moving away from the European goals of achieving sustainable and smart growth.

Only Greece falls into cluster 3. The state notes a high relative share in GDP of the expenditure on **General public services**, similar to the states forming cluster 1. According to this indicator, Greece ranks first among the six clusters. The average value of the cluster centre in terms of the indicator is 20.6% of GDP. It is noteworthy that Greece is also characterized by the highest relative share in GDP of expenditure on **Economic affairs**. The average value of the cluster centre in terms of the indicator is 9.2% of GDP. As can be seen from table 2, Greece also reports high relative shares in GDP of **Health** expenditure – the average value of the cluster centre in terms of the indicator is 3.7% of GDP (second position in relation to the six clusters) and **Education** expenditure – the average value of the cluster centre in terms of the indicator is 3.9% of GDP (first position in terms of the six clusters). Greece reports the lowest share in GDP of **Social protection** expenditure, ranking last. The average value of the cluster centre in terms of the indicator is 0.5% of GDP, in contrast to Denmark (forming cluster 4), which reports the highest relative share in GDP of this type of expenditure. Greece is characterized by the lowest relative share in GDP of expenditure on **Housing and community amenities policy**, among the six clusters. The average value of the cluster centre in terms of the indicator is 0% of GDP. The high relative shares in GDP of the expenditure on general public services and economic affairs are a consequence of the emerging Covid-19 pandemic, which

reorganized and restructured to a large extent state intervention in the economy and put under serious pressure the balanced functioning of state budgets of a number of countries, including Greece. A positive trend observed in Greece's public policies regarding the provision of collective public consumption goods is the high relative share in GDP of health and education expenditure. The latter is the result of Greece's aspiration to realize the generally accepted objectives of the European Union in terms of economic growth and public welfare.

Cluster 4 is formed by only one country – Denmark. It notes the highest relative share in GDP of the expenditure on **Social protection**, similar to the countries forming cluster 6. The average value of the cluster centre in terms of the indicator is 12.3% of GDP. Denmark is characterized by a high relative share in GDP of the expenditure on **General public services**, similar to cluster 1 and cluster 3. The average value of the cluster centre in terms of the indicator is 14.8% of GDP. Denmark reports the highest relative share in GDP of expenditure on **Recreation, culture and religion**, in contrast to cluster 1. The average value of the cluster centre in terms of the indicator is 0.9% of GDP. At the same time, Denmark reports a low relative share in GDP of expenditure on **Health**, similar to cluster 1. The average value of the cluster centre in terms of the indicator is 1.1% of GDP. Also, Denmark has a low relative share in GDP of expenditure on **Economic affairs**. The average cluster centre on the indicator is 3% of GDP, the second lowest after cluster 1. In terms of the relative share of education expenditure in GDP, Denmark ranks third among the six clusters. The average value of the cluster centre in terms of the indicator is 1.1% of GDP. The low relative share in GDP of expenditure on **Education** in Denmark indicates a shift away from the opportunity to generate additional benefits from achieving smart and sustainable economic growth based on a knowledge economy, innovation and technological changes in the production structure of the economy. On the other hand, the high relative share in GDP of expenditure on **Social protection** is an indicator of the presence of a well-developed social policy, especially after a period of economic decline, as a result of the Covid-19 pandemic.

Cluster 5 is formed by eleven countries – Germany, Ireland, France, Cyprus, Latvia, Hungary, Poland, Romania, Slovenia, Slovakia and Finland. It is noteworthy that the countries forming cluster 5 are characterized by the highest relative share in GDP of expenditure on **Housing and community amenities**, in contrast to cluster 1 and cluster 3. The average value of the cluster centre in terms of the indicator is 0.44% of GDP. In 2021, the countries forming cluster 5 report relatively high relative shares in GDP of **Health** expenditure. The average value of the cluster centre in terms of the indicator is 3.75% of GDP. The relative share of countries in terms of this indicator is as follows: Germany (1.1% of GDP); Ireland (5.3% of GDP); France (0.6% of GDP) Cyprus (5.4% of GDP),

Latvia (5.8% of GDP), Hungary (6% of GDP), Poland (2.7% of GDP), Romania (2.1% of GDP), Slovenia (5.4% of GDP) and Slovakia (3.2% of GDP). At the same time, the countries in this cluster report the lowest relative share in GDP of the expenditure on **General public services**. The average value of the cluster centre in terms of the indicator is 5.34% of GDP. Also, cluster 5 is characterized by a low relative share in GDP of expenditure on **Social protection**, compared to cluster 4 and cluster 6. The average value of the cluster centre in terms of the indicator is 5.76% of GDP. The relative share of countries in terms of this indicator is as follows: Germany (6.6% of GDP); Ireland (4.6% of GDP); France (5.4% of GDP) Cyprus (5% of GDP), Latvia (4.2% of GDP), Hungary (4.2% of GDP), Poland (6.9% of GDP), Romania (4.1% of GDP), Slovenia (6.5% of GDP) and Slovakia (7.9% of GDP). Cluster 5 ranks third, after cluster 3 and cluster 6, in terms of relative share in GDP of expenditure on **Economic affairs**. The average value of the cluster centre in terms of the indicator is 5.42% of GDP. In the countries forming cluster 5, a balance is observed in terms of public policies related to the provision of goods with a collective nature of consumption. In other words, relative to the ranked six clusters, the countries falling in cluster 5 are in the middle in terms of the relative share in GDP of a large part of expenditure on COFOG functions. The latter is related to conducting a moderate fiscal policy and striving to ensure an equal degree of satisfaction in terms of collectively consumed goods. At the same time, the countries in cluster 5 report the lowest relative share in GDP of the expenditure on general public services, which testifies to the focus of the state intervention on the social public needs and not on the administrative state duties.

Cluster 6 includes the Czech Republic, Estonia, Italy, Luxembourg, Malta, the Netherlands, Austria and Sweden. These countries are characterized by a high relative share in GDP of expenditure on **Social protection**, ranking second after cluster 4. The average value of the cluster centre in terms of the indicator is 10.71% of GDP. The relative share of countries in terms of this indicator is as follows Czech Republic (12.8% of GDP); Estonia (12.1% of GDP); Italy (8.5% of GDP) Luxembourg (12.4% of GDP), Malta (11% of GDP), the Netherlands (8.2% of GDP), Austria (10.9% of GDP) and Sweden (9.8% of GDP). Cluster 6 ranks second after cluster 3 in terms of relative share in GDP of expenditure on **Economic affairs**. The average value of the cluster centre in terms of the indicator is 5.56% of GDP. Cluster 6 is characterized by a high relative share in GDP on **Education** expenditure, similar to cluster 3. The average value of the cluster centre in terms of the indicator is 3.86% of GDP. The countries forming cluster 6 are characterized by a low relative share in GDP of the costs of **General public services**, contrary to cluster 1 and cluster 3. The average value of the cluster centre in terms of the indicator is 7.6% of GDP. The relative share of

countries in terms of this indicator is as follows Czech Republic (3.7% of GDP); Estonia (8.3% of GDP); Italy (8.4% of GDP); Luxembourg (5.6% of GDP); Malta (6.3% of GDP); The Netherlands (7.8% of GDP); Austria (10.7% of GDP) and Sweden (10% of GDP). The large relative shares in GDP of expenditure on Social protection, Economic affairs and Education show the guideline of the public policies of the countries forming cluster 6, namely: wide-ranging social activity; supporting economic activities affected by Covid-19 and making significant efforts to stimulate innovation and technological change based on knowledge and scientific research progress (see Table 1).

Table 1: Final cluster centres of expenditure of the "Central Government" sub-sector of the EU member states in 2021

Final cluster centres						
	Cluster					
	1	2	3	4	5	6
General public services	18.70	13.23	20.60	14.80	5.34	7.60
Defence	0.95	1.27	2.80	1.20	1.42	1.06
Public order and safety	1.10	1.95	2.20	0.90	1.53	1.51
Economic affairs	2.50	4.30	9.20	3.00	5.42	5.56
Environmental protection	0.15	0.48	0.50	0.20	0.31	0.33
Housing and community amenities	0.00	0.18	0.00	0.10	0.44	0.24
Health	0.35	3.80	3.70	1.10	3.75	3.53
Recreation, culture and religion	0.15	0.68	0.50	0.90	0.74	0.73
Education	0.10	2.03	3.90	3.60	3.38	3.86
Social protection	3.35	3.23	0.50	12.30	5.76	10.71

Source: Eurostat and author's calculations

Table 2 presents the matrix of the distances between the final cluster centres of the 6 clusters described above in 2021. It is clear from it that the 1st cluster is the closest to the 2nd cluster and is the furthest from 5th cluster. At the same time, the 2nd cluster is closest to the 1st cluster and the most distant from the 4th cluster. In turn, the 3rd cluster is the closest to the 1st cluster and the furthest from the 6th cluster. At the same time, the 4th cluster is the closest to the 6th cluster and the farthest from the 3rd cluster. In turn, the 5th cluster is closest to the 6th cluster and farthest from the 3rd cluster. The last 6th cluster is closest to the 5th cluster and

farthest from the 3rd cluster. From the comparisons made, it is obvious that the 3rd and 6th clusters are the most distant from each other.

Table 2: Distance between the final cluster centres of expenditure of the "Central government" sub-sector of the EU member states in 2021

Clusters	1	2	3	4	5	6
1		7.077	9.336	10.443	14.705	14.548
2	7.077		9.581	9.876	8.489	9.644
3	9.336	9.581		14.922	16.670	17.035
4	10.443	9.876	14.922		12.076	8.206
5	14.705	8.489	16.670	12.076		5.485
6	14.548	9.644	17.035	8.206	5.485	

Source: Eurostat and author's calculations

From the values of the calculated F-criteria, it is established that the variables that have the most significant contribution to the formation of the 6 clusters are: General public services; Social protection and Education. They have the highest F-test values of all the variables used, respectively 35.268; 20.619 and 3.985 and their level of significance (Sig.) is as follows: 0.000; 0.000 and 0.011 and is less than the risk of a first-order error ($\alpha = 0.05$), which implies that the measures have discriminating power.

Conclusion

The classification of the EU member states into six clusters in terms of the relative share in GDP of the expenditure on the sub-sector "Central Government" by functions of COFOG for 2021 allows the following conclusions to be drawn:
- The effects of the Covid-19 pandemic can be seen in the implemented public policies of all EU countries in 2021 related to the provision of goods for collective consumption.
- Strengthened public policy in the field of health care, as a result of the emerging Covid-19 pandemic, is observed in the countries forming cluster 2 – Bulgaria, Croatia, Lithuania and Portugal; cluster 3 – Greece; cluster 5 – Germany, Ireland, France, Cyprus, Latvia, Hungary, Poland, Romania, Slovenia, Slovakia and Finland, which are characterized by a high relative share of healthcare expenditure in GDP.

- A reorganization of state intervention in the economy and putting under serious pressure the balanced functioning of the state budgets of a number of countries is noticeable. The latter is the result of the high relative share in GDP of the General public services expenditure (increase in transactions related to the government debt of these countries). With such characteristics are the countries forming cluster 1 – Belgium and Spain; cluster 2 – Bulgaria, Croatia, Lithuania and Portugal; cluster 3 – Greece and cluster 4 – Denmark.
- Implementation of policies related to supporting economic activities affected by Covid-19 and making significant efforts to stimulate innovation and technological changes based on knowledge and scientific research progress is observed in cluster 2 – Bulgaria, Croatia, Lithuania and Portugal; cluster 3 – Greece and cluster 6 – Czech Republic, Estonia, Italy, Luxembourg, Malta, Netherlands, Austria and Sweden.
- The high relative share in GDP of Social protection expenditure is an indicator of the presence of a well-functioning social policy, especially after a period of economic decline, as a result of the Covid-19 pandemic. Cluster 4, consisting of Denmark, is characterized by high relative shares in GDP of Social protection expenditure, as well as cluster 6 – the Czech Republic, Estonia, Italy, Luxembourg, Malta, the Netherlands, Austria and Sweden.
- Implementation of public educational policies, stimulating innovation and technological changes, based on knowledge and scientific research progress are noticed in cluster 3 – Greece; cluster 6 – Czech Republic, Estonia, Italy, Luxembourg, Malta, Netherlands, Austria and Sweden and cluster 4 consisting of Denmark.

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