

ASSESSMENT OF THE GOVERNMENT EXPENDITURE EFFECT ON WELFARE OF SOCIETY

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Abstract. *This study gets into the challenge of exploring how government expenditure influences social welfare and offers insights into optimizing public spending to enhance it. The primary objective was twofold: firstly, to devise a methodology for evaluating how government spending affects social welfare of society, and secondly, to conduct an empirical investigation to pinpoint the level of government expenditure that maximizes it. The article introduces a method for appraising welfare of society based on an extended concept, accompanied by a model for quantifying the extent of government expenditure's influence on welfare. After establishing the non-linear nature of the effect of government expenditure and considering the developed evaluation methodology for social welfare, both general and functional government spending are optimized. For the matter, 122 econometric models were formulated to appraise the impact of both general and functional government expenditures on welfare of society. These models serve to validate or reject the research hypothesis encompassing the possibility of decreasing marginal effect of government expenditure. Drawing from the outcomes of the study encompassing clusters I and II of EU countries, depending on both size of the government and GDP per capita, it was evident that 87 econometric models corroborate the non-linear effect of government spending on welfare of society. Cluster I countries within the EU displayed a U-shaped pattern in terms of government spending's impact on welfare of society, while countries in cluster II exhibited an inverted U-shaped effect.*

Keywords: *government expenditure, public policy, public expenditure, welfare of society, objective welfare, subjective welfare, size of the government*

Introduction

Relevance. The core focus of this research pertains to the critical relevance of welfare of society achieved through the equitable redistribution of resources within an economic framework, a fundamental responsibility of any government. Governments, entrusted with the constitutional management of the economy, employ a variety of economic, social, and political mechanisms, primarily realized through diverse policy initiatives, to fulfil this imperative role. Notably, fiscal policy stands as one of the most precise and recognized tools in the government's arsenal. It is through this policy that governments finance their obligations, striving to create a cohesive environment that accommodates or even advances the needs of society. An economic rationale based on the concept of demand satisfaction suggests that government spending may exhibit diminishing marginal utility in the quest to foster welfare of society. This indicates that the assessment of life satisfaction in different countries may remain relatively uniform despite drastic increases in public sector expenditure.

This proposition has given rise to the scientific question at the core of this article: the examination of the influence of public sector expenditure on welfare of society, and the exploration of methodologies to optimize public spending with a view to enhancing overall welfare. The primary subject under scrutiny here is the interplay between public sector spending and social welfare.

The primary **aim** of this article is twofold: first, to develop a comprehensive methodology for evaluating the impact of public expenditure on welfare of society, subsequent to a thorough

investigation of the theoretical paradigms underpinning the phenomenon of social welfare. Second, to conduct an empirical study aimed at determining the magnitude of public sector spending that maximizes welfare of society.

The objectives of this research can be summarized as follows:

- To construct a model for evaluating welfare of society and formulate a methodology for assessing the effect of government spending on the welfare.
- To execute an empirical investigation to evaluate the consequences of state spending on the level of welfare of society, discerning the effects of both decreased and augmented public sector expenditure, with a specific focus on EU countries as illustrative examples.
- By capitalizing on non-linear effects, to optimize the general and functional expenses within the government sector. This involves determining critical thresholds or intervals for the magnitude of expenditure that yield maximum welfare of society.

To fulfil these objectives, this research employs a comparative and systematic analysis of scientific literature, in conjunction with mathematical, statistical, expert, and econometric assessment techniques.

Literature review

The views of authors analyzing the phenomena differ, but many researchers today (Haile and Nino-Zarazua, 2018; Kotakorpi and Laamanen, 2010; Naraškevičiūtė, 2003; Smalenskas, 2007; Besley, 2002; Bator, Hessami, 1958; 2010; Ott, 2012; Radcliff, 2001; Di Tella, MacCulloch, & Oswald, 2003; Sirovicus, Gottlieb, & Welch, 2006; Cutler, McClellan, 2001; Kaestner, Silber, 2009; Doyle, 2007) agree that authorities, as the actions of a public management body directly or indirectly determine the welfare of society.

Based on different interpretations, the relationship between welfare of society and government spending has been examined by various researchers, arguing that the increase in government spending is either caused by (Radcliff, 2001; Di Tella, MacCulloch, & Oswald, 2005; Ekici, Koydemir, 2013; Flavin, Pacek, & Radcliff, 2014) or does not lead (Veenhoven, 2000; Ott, 2012; Bjørnskov, Dreher, & Fische, 2007) to the improvement of welfare. Some researchers have even found an inverted U relationship between government spending and welfare of society (Hessami, 2010; Eiji, 2009).

The analysis of interpretations of the phenomenon shows that welfare of society is characterized by multidimensionality, collectivism, objectivity, and subjectivity. The multidimensionality of the concept has been observed since the first signs of civilization. In general, welfare of society is analyzed as a combination of economic, social, health, political and natural environment dimensions that are crucial for the successful existence of an individual or society.

In general, the author of this article understands welfare of society more as a social rather than an individual phenomenon. Although welfare of society and welfare are not identical phenomena. The welfare of society is understood as the ability to meet the general needs of society members, determined by the environment, and judging from the perspective of their subjective experience. This approach makes it possible to identify the objective and subjective welfare of society, which constitutes the general welfare of society. Objective welfare of society is defined as the ability to satisfy the objective needs of society members determined by the environment, while subjective welfare of society is defined as the subjective experience about the ability to satisfy the objective needs of society.

Considering the research works discussed in the theoretical framework and the fact that there is no consensus on the impact of government spending on welfare of society, the hypothesis put forward in this paper is as follows:

H_{1.0}: The effect of government spending on welfare of society is not linear and reflects a pattern of decreasing or increasing effects.

To confirm or reject the hypothesis of a non-linear relationship, the study used an econometric model (Razmi, 2012; Hessami, 2010; Gomanee, Morrissey, & Mosley, 2003; et al.) to:

- 1) assessment of the impact of public sector expenditures on the level of welfare of society.
- 2) assessment of the impact of functional government expenditures on the level of welfare of society.
- 3) determination of optimal general and functional public sector expenditures aimed at maximizing welfare of society, considering the non-linear effect.

Research methods

A selection algorithm, based on the extended concept of societal well-being and a novel approach that bypasses the traditional calculation of objective and subjective societal well-being, has been developed. This algorithm consists of three levels of indicators that reflect the welfare of society. A total of 16 indicators have been carefully chosen to represent five distinct dimensions of societal welfare, namely economic, social, health, political, and the natural environment. These indicators have been selected based on a combination of qualitative, quantitative, and evaluative criteria that establish their links with the subjective welfare of society.

The criteria breakdown for each dimension:

- **Economic Dimension:** Indicators selected include GDP per capita, unemployment rate, inflation, and the ratio of public debt to GDP.
- **Social Dimension:** Criteria consist of the GINI coefficient, which reflects income inequality, the divorce rate, poverty levels, and the expected duration of education.
- **Natural Environment Dimension:** Selected criteria encompass CO₂ emissions, the proportion of consumed electricity from renewable sources in total electricity consumption, and changes in water efficiency.
- **Health Dimension:** Indicators represent life expectancy, infant mortality, and suicide rates.
- **Political Dimension:** Key indicators reflect democracy and corruption perception.

To assess the level of welfare of society, an additive function has been chosen and justified. This function is employed to calculate the Welfare of Society Index (WSI). An expert survey was conducted with the assumption that different dimensions of WSI exert varying effects on societal welfare. The results of the expert survey indicated that the economic and health dimensions (0.22 each), the social dimension (0.21), the natural environment (0.19), and the political dimension (0.16) have different degrees of influence on welfare of society. This distribution of effects aligns closely with the parallel assessment of societal welfare dimensions conducted by the academic community of Vytautas the Magnus University, corroborating the expert assessment.

The Welfare of Society Index (WSI) encompasses groups of indicators representing five dimensions. Each dimension is assigned different weighting factors. Weighting factors for

dimensional indicators are determined equally using the formula $1/n$, where 'n' represents the number of dimensional indicators. As per the OECD Guidelines for Aggregating Indicators (2008), the index is aggregated using a cumulative expression function, as depicted in equation 1.

$$WSI = 0,22 \sum_{i=1}^4 \frac{WSI_{ECO}}{4} + 0,21 \sum_{i=1}^4 \frac{WSI_{SOC}}{4} + 0,19 \sum_{i=1}^4 \frac{WSI_{ENV}}{3} + \quad (1)$$

$$+ 0,22 \sum_{i=1}^4 \frac{WSI_{HEALTH}}{3} + 0,16 \sum_{i=1}^4 \frac{WSI_{POL}}{2}$$

where *WSI* – welfare of society index; *WSI_{ECO}* – economic dimension; *WSI_{SOC}* – social dimension, *WSI_{ENV}* – dimension of natural environment; *WSI_{HEALTH}* – health dimension; *WSI_{POL}* – political dimension.

The Welfare of Society Index (WSI) operates on a scale from 0 to 100. The data undergo two critical processes: (1) standardization and (2) normalization, ensuring the compatibility of indicators with distinct units of measurement and their proper integration into a comprehensive index with a value range spanning from 0 to 100. The WSI estimates are categorized, and its evaluation scale is structured in accordance with the methodological principles of the Human Development Index (HDI) as outlined by Sen in 1994. The HDI, which normally ranges from 0 to 1, has been converted to a 0 to 100 range to align with the WSI framework.

To adapt to the evolving economic and social landscape, the study conducts an analysis spanning the pre-crisis and post-crisis period from 2003 to 2015. The study aims to gauge the influence of public expenditure on the overall well-being of society, as represented by the WSI. To scrutinize the WSI model, a total of 25 EU countries have been selected and examined. Initially, following the methodology for assessing welfare of society levels based on EU country statistics, the level of welfare is computed and validated.

The WSI level has been computed and categorized into four intervals using a modified grouping methodology influenced by the UN Human Development Index, which reflects the evolution of public well-being over time. The examination of WSI results has revealed a strong correlation between the WSI and subjective welfare measures, underscoring the consistency of WSI with various alternative welfare indicators. Notably, the WSI more accurately captures the integrated concept of societal well-being compared to traditional individual metrics like GDP or composite indices such as the HDI.

Following the calculation of WSI for each participating country, the study unfolded in two parts: an assessment of general government spending and an exploration of the impact of functional government spending on welfare of society, as represented by the WSI. Utilizing official EU statistics databases, the study identified different categories of public sector expenditures by function, which included public services, defence, public order and security, economy, environmental protection, housing and utilities, health protection, leisure, culture, religion, education, and social security. The EUROSTAT government expenditure classifier and state expenditure data from databases were relied upon for this analysis.

All 25 EU countries were examined in the study, and government spending data was expressed in relative terms rather than absolute figures. This approach aimed to evaluate the nature of the influence of optimized public sector spending on welfare of society. To ensure precision in the context of the EU's 25 countries, government spending was assessed as a

percentage of each country's GDP. The EU nations were categorized into two groups based on GDP per capita and the proportion of public sector spending relative to GDP.

The first cluster, with an average GDP per capita of 27,646.2 euros, demonstrated a government sector expenditure averaging 48.74 percent of GDP. This cluster comprised countries such as Sweden, Denmark, Finland, Netherlands, Ireland, Austria, UK, Germany, France, Belgium, Spain, Italy, and Cyprus. The second cluster, with an average GDP per capita of 15,570.8 euros, showed government sector spending at an average of 42.07 percent of GDP, encompassing countries like Slovenia, Portugal, Czech Republic, Slovakia, Greece, Estonia, Hungary, Latvia, Poland, Lithuania, Bulgaria, and Romania.

Considering welfare of society and its five dimensions, the study sought to optimize ten distinct functional types of public sector expenditures. This process led to the formulation of ten systems of equations for the optimization of various government spending categories. The general equation expression was as follows:

$$WSI_{it} = \alpha + \beta_1 \times G_{xit} + \beta_2 \times G_{xit}^2 + \beta_3 \times G_{xit} \times AIS + \beta_4 \times G_{xit}^2 \times AIS + c_1 \times BVP_{g_{it}} + c_2 \times student_{proc_{it}} \times mirt_t + c_4 \times pol_{stabil_{it}} + c_5 \times energ_{taup_{it}} + (2) + \sum_{t=2}^{10} lp_t + \sum_{i=2}^{25} op_i + e_{it}$$

where:

" α " represents the constant of the model.

" WSI_{it} " signifies the estimation of the Welfare of Society Index for each object "i" during the period "t," where "i" ranges from Ireland to Germany, and "t" spans from 2003 to 2015.

" β_i " denotes the weight coefficient associated with independent variables, with "i" ranging from 1 to 4; " c_i " stands for the weight coefficient of controlled variables, with "i" ranging from 1 to 5.

"AIS" is the binomial coefficient that designates countries within cluster I, characterized by a high level of development.

G_{xit} - Government expenditure of function x for each object "i" within the timeframe "t" is inclusive of various categories such as "general government expenditure," "expenditure on social security," and more. Here, "i" ranges from Ireland to Germany, and "t" encompasses the years from 2003 to 2015.

$student_{proc_{it}}$ - size of student population" for each object "i" during period "t."

$BVP_{g_{it}}$ - GDP growth rate for each object "i" during period "t."

$mirt_t$ - Total mortality rate for each object "i" during period "t."

$pol_{stabil_{it}}$ - Political stability index for each object "i" during period "t."

$energ_{taup_{it}}$ - Energy efficiency level for each object "i" during period "t," with "i" spanning from Ireland to Germany and "t" covering the years from 2003 to 2015.

" lp_i " corresponds to pseudo-variables related to time, encompassing the years from 2003 to 2015.

" op_i " represents pseudo-variables linked to objects, with "i" encompassing countries from Ireland to Germany.

" e_{it} " denotes the inherent error associated with the model.

The influence of government spending on welfare of society is elucidated through the weight coefficients assigned to the independent variables. The positive effect of public sector expenditure on welfare is ascertained in the following manner:

For Cluster II, if $\beta_2 > 0$ or $\beta_2 = 0$, then $\beta_1 > 0$.

For Cluster I, if $\beta_2 + \beta_4 > 0$ or $\beta_2 + \beta_4 = 0$, then $\beta_3 > 0$.

Hypothesis H_{1.0}, pertaining to a nonlinear, upside-down U-shaped impact of government spending on welfare of society, is validated if:

For Cluster I, $\beta_1 + \beta_3 > 0$ and $\beta_2 + \beta_4 < 0$.

For Cluster II, $\beta_1 > 0$ and $\beta_2 < 0$.

The hypothesis concerning a nonlinear, U-shaped effect of government spending on welfare of society holds true if:

For Cluster I, $\beta_1 + \beta_3 < 0$ and $\beta_2 + \beta_4 > 0$.

For Cluster II, $\beta_1 < 0$ and $\beta_2 > 0$.

If the hypothesis regarding the nonlinear effect of public sector expenditure on social welfare be confirmed, the optimization of public expenditure can be undertaken based on the Welfare of Society Index (WSI) or its components. This optimization involves the determination of the maximum value of the nonlinear function, representing the critical government spending size in the case of an upside-down U-shaped effect, or the minimum value of the nonlinear function, signifying the critical government spending size in the case of an upside-down U-shaped effect. When solving the system of equations, it may not be possible to pinpoint the precise critical government expenditure amount, but it does allow for the identification of the optimal expenditure range that facilitates the enhancement of welfare of society.

Throughout the study, critical values of government sector expenditure size or optimal expenditure intervals are established. These values enable the maximization or augmentation of welfare of society or its constituent elements. The primary critical values or limits of government expenditure intervals are determined based on the WSI function of government expenditure, with supplementary limits for the intervals established by considering the functions detailing the impact of government spending on the index's dimensions.

Considering the study's constraints, the following areas for future research development are provided:

- Conducting expert assessments not only in Lithuania but also in other countries to further develop the Welfare of Society Index.
- Expanding the dimensions of the welfare of society index to include cultural, lifestyle, or leisure dimensions.
- Investigating not only quadratic but also cubic effects of public sector expenditure on societal well-being.
- Exploring the grouping of countries by more than two attributes, potentially leading to more than two country groups.

Discussion of results

The study encompassed an evaluation of 25 EU countries based on the methodology for assessing the influence of government spending on the Welfare of Society Index (WSI) and its constituent components. To ensure the reliability of the outcomes, supplementary control variables were incorporated into the developed econometric model for each dimension. Specifically:

- For the economic dimension, the GDP growth rate was chosen as a controlled variable.
- In the context of the social dimension, control variables included the number of students and GDP per capita.

- The political dimension involved the use of the political stability index as a controlled variable.
- In the health dimension, control variables encompassed total mortality and GDP per capita.
- The environmental dimension considered the GDP growth rate as a controlled variable.

Table 1. The nature of the impact of both overall and specific government expenditures on the Welfare of Society Index (WSI) and its constituent dimensions within Cluster I

	General government expenditure	On general public services	On defence	On public order and public security	On the economy	On environmental protection	On housing and utilities	On health care	On leisure, culture and religion	On education	On social security
WSI	U	∩	U	∩	∩	∩	∩	∩	U	U	U
EKO _{dimension}	NA	U	∩	∩	U	∩	∩	∩	X	U	U
SOC _{dimension}	NA	∩	X	U	U	∩	∩	U	∩	∩	U
POL _{dimension}	NA	U	X	X	∩	X	X	∩	X	X	U
HEALTH _{dimension}	NA	U	U	U	∩	∩	U	∩	U	U	U
ENV _{dimension}	NA	∩	U	∩	∩	U	U	X	U	∩	∩

Within the category of Cluster I countries, a total of 61 econometric models were constructed, and summaries are provided in Table 1. Among these, 9 cases exhibited no significant impact of government spending on WSI or its individual components. In the remaining 52 cases, a non-linear relation was established. This non-linearity revealed a U-shaped effect in 26 instances, indicating a pattern of increasing influence or a critical threshold of government spending beyond which WSI or its dimension estimates rose. The remaining 26 cases demonstrated an inverted U-shaped effect, signifying a reduction in the impact of government spending or a critical threshold beyond which WSI or its dimension estimates increased.

Table 2. The nature of the impact of both overall and specific government expenditures on the Welfare of Society Index (WSI) and its constituent dimensions within Cluster II

	General government expenditure	On general public services	On defence	On public order and public security	On the economy	On environmental protection	On housing and utilities	On health care	On leisure, culture and religion	On education	On social security
WSI	∩	∩	U	∩	∩	∩	∩	∩	U	X	∩
EKO _{dimension}	NA	∩	U	-	∩	U	∩	∩	X	U	∩
SOC _{dimension}	NA	X	X	∩	+	∩	∩	∩	X	∩	∩
POL _{dimension}	NA	∩	X	X	∩	X	X	∩	X	X	∩
HEALTH _{dimension}	NA	X	U	X	∩	∩	∩	∩	U	U	∩
ENV _{dimension}	NA	X	U	U	∩	X	U	X	U	U	X

For cluster II nations, a total of 61 econometric models were formulated, with 16 cases revealing no significant impact of public sector spending on the Welfare of Society Index (WSI)

or its constituent components, as detailed in Table 2. Among the remaining 45 cases, two exhibited a linear, either positive or negative, correlation. In the 43 instances of non-linear correlation, 14 demonstrated a U-shaped effect, signifying an increasing impact pattern. The remaining 29 cases displayed an inverted U-shaped effect, indicative of a diminishing influence.

In the comprehensive analysis, it was found that out of the 122 models utilized to assess the influence of government spending on the Welfare of Society Index (WSI) and its dimensions for both country clusters I and II, a significant majority, which accounts for 87 models, exhibited non-linear effects. This substantiated the hypothesis $H_{1.0}$, which posited that government spending has a non-linear impact on welfare of society and its various components. Notably, the study highlighted that cluster I countries primarily encountered a U-shaped effect, while cluster II nations experienced an inverted U-shaped effect. These distinctions underscored the notion that cluster I countries yield different outcomes from government spending compared to cluster II countries.

As outlined in the methodology section, the optimization of government sector expenditure size concerning the WSI and its dimensions relies on determining the non-linear effect of government sector expenditure. This optimization can be achieved by identifying critical expenditure thresholds or optimal expenditure intervals, within which the maximization of societal well-being or its constituent dimensions is attainable.

This is facilitated through the application of an algorithm aimed at pinpointing the level of government spending that corresponds to the minimum or maximum value of a quadratic equation. Consequently, the critical levels of government spending or their respective ranges are determined. The U-shaped characteristic of the impact function enables the identification of the government spending threshold below which the WSI or its components tend to decrease, and beyond which the WSI tends to increase. Conversely, the inverted nature of the U-shaped effect function allows the identification of the government spending level below which societal well-being or its components tend to increase and beyond which they tend to decline. Figure 1 illustrates an example of the positive (A) and negative (B) impact of government spending on public welfare.

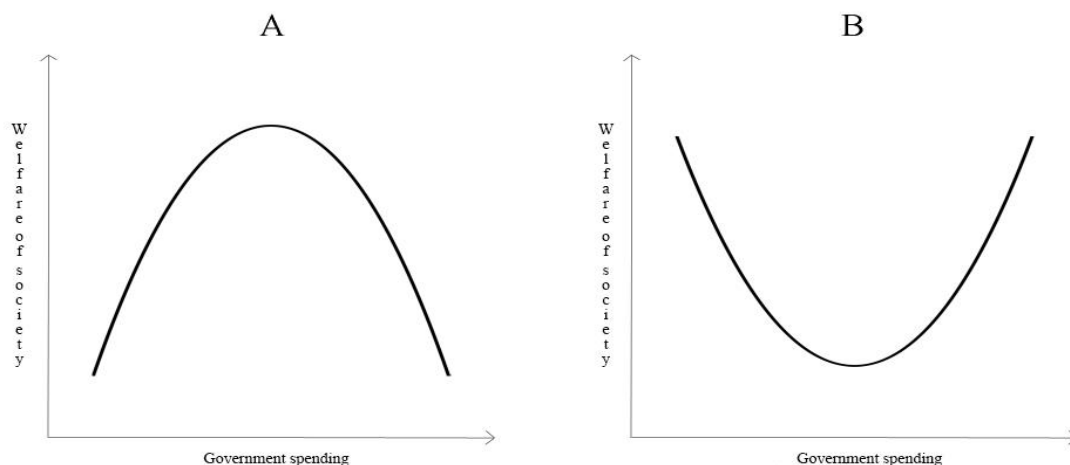


Fig. 1. Characters of possible government expenditure effect on welfare of society

The examination of regression models for countries within Cluster I revealed that, concerning public sector expenditures, the Welfare of Society Index (WSI) begins to minimize once these expenditures attain a threshold of 49.28% of GDP, as depicted in Figure 2.

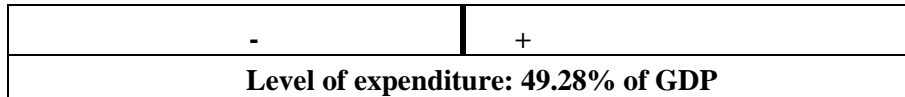


Fig. 2. The optimal influence of general government expenditure on the Welfare of Society Index (WSI) within Cluster I of EU nations.

For country cluster II, WSI is maximized by government spending as soon as the level of government spending reached 39.34% of GDP (Figure 3).

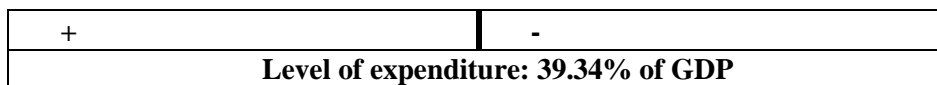


Fig. 3. The optimal influence of general government expenditure on the Welfare of Society Index (WSI) within Cluster II of EU nations.

The optimization of functional government sector expenditures, accounting for the welfare of society, varies for countries in Cluster I and Cluster II of the EU:

For Cluster I countries, the successful optimization ranges are as follows:

- Expenditures for public services should constitute up to 6.4% of GDP;
- Defence expenditure should be around 1.91% of GDP;
- Public order and public safety expenditures should fall between 2.07% to 2.13% of GDP;
- Economic expenditures should reach up to 8.99% of GDP;
- Environmental protection expenditures should range from 0.8% to 0.88% of GDP;
- Housing and communal services expenditures should be from 0.98% to 2.77% of GDP;
- Health care expenditures should make up to 6.73% of GDP;
- Leisure, culture, and religion expenditures should be around 1.69% of GDP;
- Education expenditures should be up to 6.83% of GDP;
- Social protection expenditures should range from 18.23% to 21.02% of GDP.

For Cluster II countries, the successful optimization varies as follows:

- Expenditures for public services should constitute up to 6.4% of GDP;
- Defence expenditure should be around 1.91% of GDP;
- Public order and public safety expenditures should be up to 2.13% of GDP;
- Economic expenditures should reach up to 7.94% of GDP;
- Environmental protection expenditures should range from 0.55% to 0.88% of GDP;
- Housing and communal services expenditures should be up to 1.08% of GDP;
- Health care expenditures should make up to 6.73% of GDP;
- Leisure, culture, and religion expenditures should be around 1.69% of GDP;
- Education expenditure was not optimized for Cluster II countries, as no correlation with WSI was found;

- Social security expenditures should range up to 12.83% of GDP.

Conclusions

This paper introduces a model designed to assess the influence of public expenditure on welfare of society. The empirical investigation centers on European Union (EU) countries and entails an evaluation of the impact of both general and functional government spending on the level of societal welfare. It examines whether there exists a phenomenon of diminishing or increasing marginal efficiency in public expenditure. Furthermore, the research aims to optimize both general and functional government sector spending by identifying critical expenditure thresholds that maximize societal welfare.

1. To establish a foundation for this study, 16 indicators were selected through the application of quantitative and qualitative criteria rooted in an extended interpretation of welfare of society. These indicators encompass five distinct dimensions of societal welfare: GDP per capita, unemployment rate, inflation, public debt as a ratio of GDP, GINI coefficient as a measure of income inequality, divorce rate, poverty levels, expected duration of education, CO₂ emissions, the proportion of electricity derived from renewable sources in total electricity consumption, water efficiency variations, life expectancy, infant mortality, suicide rates, democracy index, and corruption perception index.

2. To formulate a comprehensive Welfare of Society Index (WSI), expert surveys were conducted, involving 16 qualified participants. These experts were tasked with determining weighting coefficients for each dimension of welfare of society, ultimately creating the WSI through an additive function. The results revealed that the economic and health dimensions (each at 0.22), the social dimension (0.21), and the natural environment dimension (0.19) exert the most substantial influence on welfare of society. In contrast, the political dimension contributes the least (0.16). Countries were categorized into four levels of welfare of society based on their respective WSI values: low, moderately low, moderately high, and high.

3. Considering the research's objectives and data availability, an econometric analysis was deemed the most suitable method. A modified fixed-effect regression model was developed to account for the nature of the data and research goals. Model involved panel data and pseudo-variables. As part of the study, the hypothesis $H_{1.0}$ was postulated, suggesting that the effect of public sector spending on welfare of society follows a non-linear pattern, indicating a model of either decreasing or increasing marginal effect.

4. To ensure greater precision in the results, EU countries were categorized into two clusters based on national GDP per capita and the magnitude of government expenditures. These clusters formed the basis for evaluating the impact of state spending on welfare during the years 2003-2015, chosen due to data availability.

5. The analysis conducted to validate the Welfare of Society Index affirmed the methodology's alignment with the theoretical concept of societal welfare. It also exhibited a high degree of correlation with subjective welfare. This research demonstrated that the proposed methodology more accurately represents the integrated nature of welfare of society compared to individual indicators or multi-component indices.

6. In this study, a total of 122 econometric models were created to assess the influence of both general and functional government sector expenditures on societal welfare. Among these, 87 econometric models revealed a non-linear nature in the effect of public sector spending on societal welfare, corroborating hypothesis $H_{1.0}$, which posited a non-linear impact of government spending on societal welfare and its components. Additionally, the research revealed that EU countries in Cluster I exhibit a U-shaped effect of public sector spending on societal welfare, whereas countries in Cluster II manifest an inverted U-shaped effect. These

findings underline the distinct impact of government sector spending in Cluster I compared to Cluster II EU countries.

7. Analysis of the regression models for Cluster I EU countries indicated that public sector expenditures tend to reduce societal welfare once they reach 49.28% of GDP. However, expenditures exceeding this threshold contribute to an increase in societal welfare. In the case of Cluster II countries, government spending tends to enhance societal welfare when it remains below 39.34% of GDP, whereas expenditures surpassing this level result in a reduction of societal welfare.

8. The optimization of functional government sector expenses with respect to societal welfare varies for Cluster I and Cluster II EU countries. For Cluster I, optimized expenditure levels can be established as follows: General public service expenses up to 6.4% of GDP; Defense expenses at approximately 1.91% of GDP; Public order and public safety expenses ranging from 2.07% to 2.13% of GDP; Economic expenses reaching up to 8.99% of GDP; Environmental protection expenses within the range of 0.8% to 0.88% of GDP; Housing and communal services expenses between 0.98% and 2.77% of GDP; Health care expenses up to 6.73% of GDP; Expenses for leisure, culture, and religion at about 1.69% of GDP; Education expenses up to 6.83% of GDP; Social protection expenses within the range of 18.23% to 21.02% of GDP; In the case of Cluster II EU countries, optimizing functional government sector expenses with regard to societal welfare involves the following: General public service expenses up to 6.4% of GDP; Defense expenses at approximately 1.91% of GDP; Public order and public safety expenses up to 2.13% of GDP; Economic expenses within the range of 7.94% of GDP; Environmental protection expenses ranging from 0.55% to 0.88% of GDP; Housing and communal services expenses up to 1.08% of GDP; Health care expenses up to 6.73% of GDP; Expenses for leisure, culture, and religion at around 1.69% of GDP; Notably, education expenses exhibited no optimization in Cluster II countries due to a lack of correlation with WSI; Social security expenses up to 12.83% of GDP.

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