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THE EFFECT OF EDUCATION
AND HEALTH CARE EXPENDITURE
ON GDP IN EU COUNTRIES

Abstract

The paper analyses the peculiarities of public expenditure on education and health care in eight EU countries grouped by population. Trends in the outcomes are revealed. Applying correlation and regression analysis to Eurostat data, the significance of influence of these expenditure on GDP during 2011-2019 is determined. It is established that health care expenditure have a positive effect in all countries, while education expenditure have not had a significant impact on economic development in some countries. These expenditure are proven to have a varying influence on GDP depending on budget capacity of any given country, government priorities, effectiveness of use and support for dynamic financing.

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Introduction

Ensuring dynamic economic growth, which is determined by GDP, is one of the most important tasks of any country's development in the current globalized world society. The level and pace of this growth in the EU countries formed under the influence of external and internal environmental factors and the actions of governments; now they vary depending on the pragmatics of public, namely financial, policy implemented by «governments. To ensure economic and social development, the legislative and executive bodies of the EU countries are trying to ensure the permanent growth of GDP using appropriate state mechanisms. Recognizing the priority role of manufacturing facilities in creating GDP, we note that in the era of the fourth industrial revolution, importance is attached to government policy, where a significant role belongs to public expenditure. According to theoretical and methodological approaches in economics of the21st century, in particular the human-centric paradigm of social development, economic growth is determined by the social component. Financial investment in human potential is the key to social development; therefore, expenditure on social programmes reach significant levels in economically developed countries, including the EU. At the same time, social expenditure, in particular on education, science, health care, and social security of vulnerable groups, create practical foundations for successful economic relations. In this context, this study reveals the activities of individual EU governments aimed at ensuring GDP growth depending on the efficiency of spending on education and health care. As each EU country has its own government policies, including with regards to spending on education and

health care, the study investigated how effective these expenditure are in terms of impact on GDP growth. The study was performed for selected groups of countries with a reasonable sample, which ensures the significance of results. This research aimed to identify the extent of impact exerted by education and health care expenditure on GDP with appropriate comparison and clarification of the specifics of such expenditure.

Problem Statement

GDP growth is a key objective for EU countries, as confirmed by the *Europe-2030 Strategy*, which states that sustainable development meets the needs of current generations (European Commission, 2019). Transformational processes, which are conditioned by the challenges of the modern era, require preventive measures aimed at protecting against negative factors and creating favourable conditions for social development. In this context, government actions should be aimed at implementing effective mechanisms of economic growth, which use appropriate levers, in particular financial ones, to ensure sustainable development. A synchronous combination of government programmes and research is the best option for this task. Scientists should propose a theoretical and methodological basis, while government agencies ought to develop and implement specific programmes that will ensure GDP growth. Pragmatics of the second decade of the 21st century with regard to EU countries shows the complexity and diversity of the implementation of GDP dynamics processes. To a large extent, this applies to expenditure on education and health care in the context of their impact on GDP dynamics. That is why this issue is relevant for EU countries in the current environment and requires proper research. Finally, the study of social processes and GDP growth in the EU is also relevant for deepening the relationship between education and health care with the GDP in non-EU countries, in particular Ukraine.

The aim of this article is to determine the trends in the impact of education and health care expenditure on the dynamics of GDP during 2011-2019, while identifying the features of government financial policies in representative EU countries.

Literature Review

Throughout the evolution of society, allocation of public expenditure to ensure the functioning of the country has always been a priority in the activities of government agencies. The postmodern era, characterized by exacerbation of

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both internal and external social contradictions, forces parliaments and governments to design development programmes not only for the near future, but also for the long term, as well as to implement preventive measures for the challenges of the era. Thus, the role of these expenditure as a significant lever of public policy is growing. Accordingly, these problems have become a frequent subject of scientific research. While the entirety of scientific research on the topic is quite extensive, we will focus on the role and characteristics of both general government expenditure and targeted ones, in particular on education and health care expenditure in terms of their impact on GDP.

Barro (1990) was one of the first to lay the foundations for models of public finance structure and to reveal endogenous models of growth through expenditure. He also found that economic growth rates initially increase under the influence of government spending, but then decrease. At the same time, he concluded that government spending and economic growth were interdependent, but noted that this relationship required further substantiated evidence.

Analysing the views of scientists on the impact of education and health care expenditure on GDP expressed in studies of the first quarter of the 21st century, we can distinguish two conclusions: insignificant (or even negative) impact and significant impact.

In the first «camp», Gerson (1998), Avila and Strauch (2003), Afonso and Furceri (2008), having studied the influence of the structure of expenditure, concluded that government transfers on consumption, as a rule, have a negative impact on growth. Galetić (2015) came to a similar conclusion about the impact of spending on education and health care on EU GDP. He also found large differences between EU countries for the analysed indicators and noted that the most developed countries allocate significant financial resources for these purposes and therefore have better results. Somewhat earlier, Mărginean (2014) came to the same conclusion: using a statistical model based on the Z-score, he proved that the impact of government spending on GDP in the European Union is insignificant.

A comprehensive study was performed by Boldeanu and Tache (2015), which analysed the correlation between government spending and economic growth for 30 European countries during 1991-2012. Using econometric OLS, LSDV and GMM models, the authors found that most government spending negatively affects economic growth.

Some researchers who have studied the impact of public spending on economic growth and found negative correlation note that although in the short term such expenditure have a negative coefficient of economic growth, the positive effect may manifest in the long term (Barrios & Schaechter, 2008).

Shijaku and Gjokuta (2013) used an original approach based on the GMM model. They performed an empirical analysis of the impact of expenditure on

GDP by distinguishing between government spending on production and non-production sectors. The study identified relevant trends and concluded that the growth of government revenues had a greater impact on economic growth than government spending, and that production expenditure had a positive effect on economic growth, while non-production – a negative one.

Highlighting the peculiarities of growth trends for European economies, Halmai (2015) found that the European model was challenged by the lack of a convergence mechanism, due to which the integration mechanism became dysfunctional because of the imbalance of public finances. That is why to increase the growth rate it is necessary to implement reforms that will contribute to the efficient use of public spending.

The multivariate impact of these expenditure on economic growth was found by Churchill et al. (2015). They used a sample of 306 estimates taken from 31 primary studies, analysed the empirical synthesis of the relationship between economic growth and public spending on education and health care and discovered that the impact of education expenditure on GDP growth was positive, but the effect of increased public spending on health was negative. At the same time, the authors note the heterogeneity of empirical results.

Assessing the approaches of scientists to the insignificant impact of these expenditure on GDP, we note that the dynamics of economic growth are influenced by factors other than these expenditure, and therefore it is difficult to single out the «pure» impact of these expenditure in practice, because it requires a very complex and comprehensive mathematical apparatus and specially developed software using fairly voluminous statistical data. That is why there is no public need to prove the feasibility of public spending on education and health care, as they are important for the progressive development of any country. Thus, in general, only the possible amount of expenditure for a particular period of allocation is in question.

Representatives of the second outlook give argue for the importance and significance of the impact of social spending on the dynamics of economic growth. A large-scale study on the role of health and education in economic growth was conducted by Siddique et al. (2008). They analysed the pragmatics of 76 middle-income countries during 1991-2016 using fixed and randomized effects models. As a result of the obtained FE and RE models, they proved that secondary and higher education contribute to the acceleration of economic growth.

Expenditure on health care is a complex and comprehensive social task for governments where parliamentary and governmental structures are willing to spend not only on economic development and entrepreneurship, but also on other social needs in line with campaign promises. Darvas and others (2018) tried to find the optimal level of health care spending. They found that Canada and the United States spend more than twice as much per capita as in the Euro-

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pean Union. There are also significant differences between EU countries. Arguing in favour of health systems, they highlight the positive impact of employment, labour productivity and human activity on overall macroeconomic performance.

The success of governments in shaping the positive dynamics of economic growth in the EU depends on many factors, some of which may be generated by government bodies, including the implementation of reforms, budget and tax policies, the efficient use of expenditure, targeted programmes and more. In this context, Kutasi and Marton (2020), World Economic Forum (2016), Grant (2017), Woessmann (2015), Murawska (2017), International Institute for Applied Systems Analysis (2008) are in favour of increasing spending on education and health care, believing that they contribute to increasing economic growth. Convincing arguments are given by UNESCO experts who claim that for every US dollar spent on education, GDP can be increased by 10 to 15 US dollars (Global Education Monitoring Report Team, 2012).

Researchers also publish broad papers, which comprehensively cover the factors of influence, analyse the actions of governments, substantiate the impact of education on migration, birth rate and mortality, and predict possible options for future economic development of the EU (Lutz et al., 2019).

Governments are also taking steps to increase economic growth and inform the public accordingly. For example, in Germany, the annual National Education Report is published, which extensively analyses European trends, the situation in the federal states, highlights the directions of educational policy, and assesses the impact of education expenditure on economic development (Autorengruppe Bildungsberichterstattung, 2018).

Having assessed the scientific achievements on the impact of education and health care expenditure on the dynamics of economic growth, we can conclude that there is both positive and negative impact of such public spending, so it is necessary to expand research and justify appropriate actions of governments.

Data and Methodology

Control variables

The study used Eurostat data for a reasonable sample of countries. Countries are grouped into four groups according to the main criterion – the population, which should ensure the representativeness of the study (Table 1).

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Table 1

Classification features of the studied EU countries by population

Feature	Group			
	I	II	III	IV
Gradation	Large countries	Middle countries	Small countries	Very small countries
Population	over 40 million	10 to 40 million	1 to 10 million	less than 1 million
Countries, real population, million people as of January 1, 2021	Germany 83,2	Poland 37,8	Hungary 9,7	Cyprus 0,9
	France 67,4	Romania 19,2	Austria 8,9	Luxembourg 0,6

Source: compiled by the authors using Eurostat data.

Observation period and indicators

2011-2019 is chosen as the study period in order to obtain results that correlate with the stable functioning of the EU countries when the governments could pursue the most effective economic growth policies. The choice is made according to the following criteria: the consequences of the global financial crisis of 2007-2009 were overcome, the decline in GDP from the coronavirus pandemic was not yet noticeable, the period is sufficient for economic and mathematical modelling. When identifying the impact of education and health care expenditure on GDP, in view of the law of large numbers in the interpretation of Chebyshev, we choose a main criterion to obtain comparable results of the calculations. Given the need to compare the results, the most optimal unit is the euro per person (resident) in the relevant years. As not all the indicators required for the calculations are available on the official Eurostat website, some of them are obtained using *Microsoft Office Excel* software. We use the following symbols: y – real GDP; x_1 – education expenditure; x_2 – health care expenditure (Table 2).

Table 2

Real GDP and expenditure on education and health care in EU countries, euro per capita

Year	Real GDP (y)	Education expenditure (x_1)	Health care expenditure (x_2)	Real GDP (y)	Education expenditure (x_1)	Health care expenditure (x_2)
			Group I			
		Germany			France	
2011	33532	1442	2280	31533	1734	2491

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Year	Real GDP (y)	Education expenditure (x_1)	Health care expenditure (x_2)	Real GDP (y)	Education expenditure (x_1)	Health care expenditure (x_2)
2012	34093	1466	2046	31844	1751	2547
2013	34808	1532	2471	32027	1761	2542
2014	36053	1550	2596	32348	1779	2652
2015	36826	1547	2651	32981	1781	2671
2016	37987	1558	2735	33444	1806	2709
2017	39373	1614	2835	34153	1851	2742
2018	40429	1698	2911	35180	1864	2814
2019	41147	1783	3069	36201	1919	2897
Group II						
Poland			Romania			
2011	9850	539	469	6320	269	275
2012	9980	550	469	6500	199	258
2013	10100	547	485	6770	202	288
2014	10440	570	485	7040	228	303
2015	10890	601	506	7290	265	360
2016	11240	562	517	7670	286	346
2017	11790	603	578	8280	269	413
2018	12420	655	629	8700	337	495
2019	13000	701	688	9110	346	577
Group III						
Hungary			Austria			
2011	10180	524	524	36300	1844	2840
2012	10090	474	515	36390	1885	2903
2013	10310	486	517	36180	1904	2969
2014	10770	560	487	36130	1902	3066
2015	11210	596	584	36140	1939	3244
2016	11480	593	557	36390	1975	3343
2017	12010	662	610	37030	2010	3429
2018	12680	709	654	37800	2077	3567
2019	13260	702	673	38170	2144	3707
Group IV						
Cyprus			Luxembourg			
2011	22900	1448	712	79310	4194	4194
2012	21700	1325	673	77240	4354	4353
2013	20400	1343	650	78030	4146	4654
2014	20250	1152	556	79490	4165	4608
2015	21020	1180	527	80300	4156	4607
2016	22270	1218	553	82880	4180	4551
2017	23200	1233	582	82550	4247	4814
2018	24120	1247	610	83470	4499	4989
2019	24530	1355	1003	83640	4889	5202

Source: compiled by the authors using Eurostat data.

Calculation and methodology

The calculations were performed using correlation-regression analysis to identify the effectiveness of financial policies of the governments under study, in particular to determine the impact of these expenditures on the GDP of the selected EU countries. The methodology is based on a systems approach, includes the use of methods such as analysis, comparison, grouping, generalization, and induction. The developed methodology provides for the following stages: identification of the purpose of the study, selection of representative countries, selection of only comparable indicators, performance of correlation-regression analysis, determination of the extent of the impact of the expenditure, verification of results, formulation of conclusions and recommendations. Calculations are done using the following formulae (Table 3).

Table 3

Calculation formulae

Name	Formula	Legend	Use
Coefficient of pair correlation	$r_{xy} = \dfrac{\overline{xy} - \bar{x} \cdot \bar{y}}{s(x) \cdot s(y)}$	r_{xy} – coefficient of pair correlation; s – vector of regression coefficient estimates.	Determining the dependence between expenditure on education, health care and GDP
Variance increase formula	$VIF(b_j) = \dfrac{1}{1 - R_j^2}$	R_j^2 – coefficient of multiple determination in regression x_j to other x	Estimation of multicollinearity of factors x1, x2. More than 4 – multicollinearity.
Adjusted coefficient of determination	$\overline{R}^2 = 1 - (1 - R^2) \cdot \dfrac{n-1}{n-m-1}$	Relation of GDP revenues to education expenditure and health care expenditure	Used for models with a constant. It can have a value from 0 to 1. The more the coefficient approaches 1, the stronger the dependence

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Name	Formula	Legend	Use
β-coefficients	$\beta_1 = \dfrac{r_{yx1} - r_{yx2} r_{x1x2}}{1 - r_{x1x2}^2}$ $\beta_2 = \dfrac{r_{yx2} - r_{yx1} r_{x1x2}}{1 - r_{x1x2}^2}$		Determine the priority of the impact of education and health care expenditure on GDP
Regression equation	$\bar{y}_i = a + b \cdot \bar{x}_i$	a i b – effective coefficient estimates	The extent of impact of education and health care expenditure on GDP
Average approximation error	$A = \dfrac{\sum |c_i Y|}{n} \cdot 100\%$	unbiased approximation error $s = Y - Y(x) = Y - X \cdot s$ (absolute approximation error).	Determines the mean deviation of normative values from actual ones

The choice of formulae is made taking into account the calculations necessary to identify the conditioned effect, determine the severity of this effect, check the optimality of the results, and identify the possible errors in the calculations.

Research Results

We used the regression equation to determine the extent of the effect of these types of expenditure on GDP, and obtained the following results (Table 4).
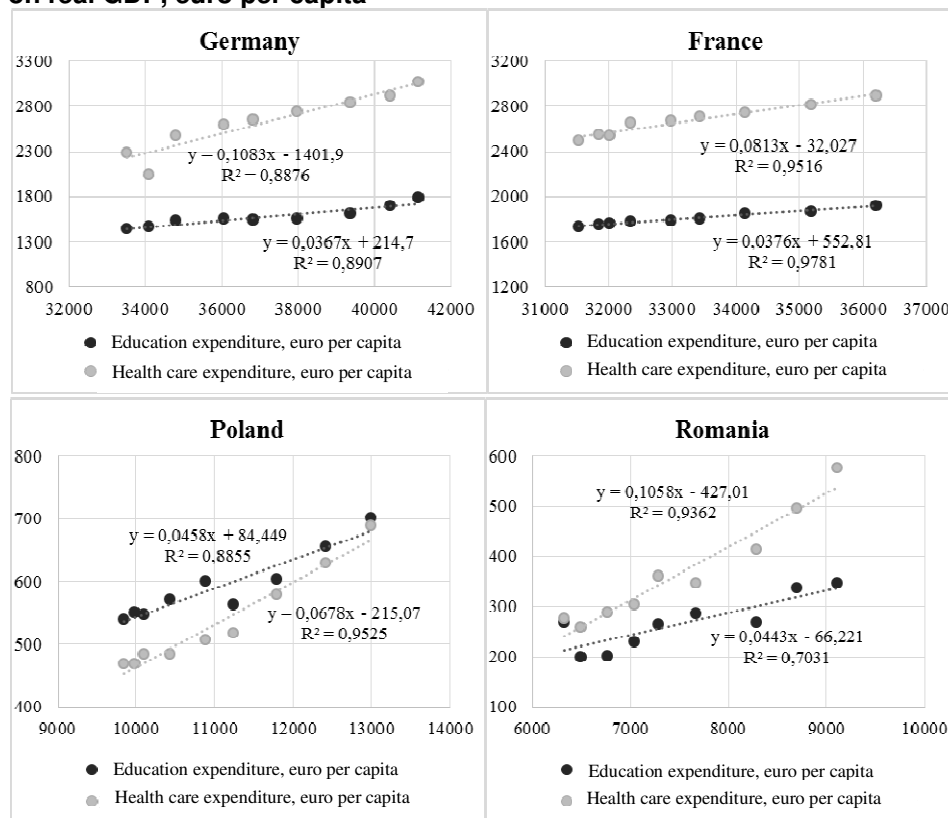
To determine the impact of education and health care spending on real GDP in eight EU countries, a correlation-regression analysis was performed based on data for 2011-2019. Nine years is a sufficient period of time to obtain reliable research results. The impact of these types of expenditure on the real GDP will be determined using the data from Table 2. The results are visually represented in Fig. 1.
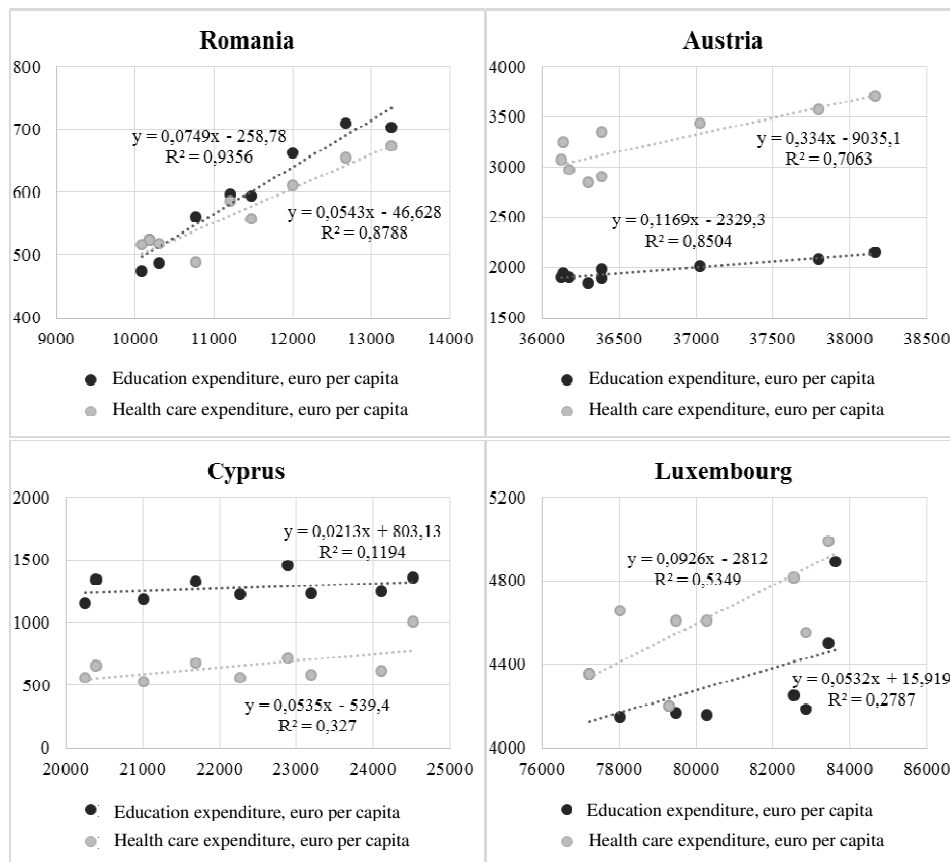
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Table 4

Calculation results for the effect of expenditure on GDP

Country	Obtained equation
Germany	$Y = 5637{,}985 + 12{,}956X_1 + 4{,}224X_2$
France	$Y = -9768{,}015 + 18{,}8984X_1 + 3{,}3492X_2$
Poland	$Y = 3363{,}9976 + 0{,}7924X_1 + 13{,}5126X_2$
Romania	$Y = 4436{,}7075 - 1{,}6225X_1 + 9{,}5461X_2$
Hungary	$Y = 3001{,}8736 + 8{,}5815X_1 + 5{,}7489X_2$
Austria	$Y = 14428{,}8629 + 16{,}1045X_1 - 2{,}8917X_2$
Cyprus	$Y = 19102{,}6943 - 0{,}8239X_1 + 6{,}468X_2$
Luxembourg	$Y = 53971{,}4335 - 0{,}09627X_1 + 5{,}835X_2$

Figure 1

**Obtained data on the impact of education and health care expenditure
on real GDP, euro per capita**

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Romania

$$y = 0{,}0749x - 258{,}78$$
$$R^2 = 0{,}9356$$

$$y = 0{,}0543x - 46{,}628$$
$$R^2 = 0{,}8788$$

● Education expenditure, euro per capita
● Health care expenditure, euro per capita

Austria

$$y = 0{,}334x - 9035{,}1$$
$$R^2 = 0{,}7063$$

$$y = 0{,}1169x - 2329{,}3$$
$$R^2 = 0{,}8504$$

● Education expenditure, euro per capita
● Health care expenditure, euro per capita

Cyprus

$$y = 0{,}0213x + 803{,}13$$
$$R^2 = 0{,}1194$$

$$y = 0{,}0535x - 539{,}4$$
$$R^2 = 0{,}327$$

● Education expenditure, euro per capita
● Health care expenditure, euro per capita

Luxembourg

$$y = 0{,}0926x - 2812$$
$$R^2 = 0{,}5349$$

$$y = 0{,}0532x + 15{,}919$$
$$R^2 = 0{,}2787$$

● Education expenditure, euro per capita
● Health care expenditure, euro per capita

Next, we determine the vectors and significance of impact of these types of expenditure on GDP. To compare the analysed indicators, we perform calculations using Microsoft Office Excel software and the formulae of Table 3. We summarise the results in Table 5.

The obtained results must be explained logically. Thus, while the positive impact of health care expenditure on GDP in all countries was obvious, there was a negative effect of education expenditure on GDP in Romania, Cyprus and Luxembourg. Note that similar results in relation to other EU countries have been obtained by other scientists. To explain such results, we compare the dynamics of real GDP and total expenditure on education and health care in Germany and France as in countries where the extent of this impact on the absolute resulting values of education and health care is the highest (Fig. 2, 3).

Table 5

Main calculation results

Indicator	Country							
	Germany	France	Poland	Romania	Hungary	Austria	Cyprus	Luxem-bourg
r_{x1y} (GDP and education)	0,944	0,989	0,941	0,839	0,967	0,922	0,346	0,528
r_{x2y} (GDP and health care)	0,942	0,976	0,976	0,968	0,037	0,84	0,572	0,731
r_{x1x2} (education and health care)	0,907	0,969	0,961	0,886	0,91	0,974	0,655	0,728
$VIF(b_j) = \dfrac{1}{1 - R_j^2}$	5,61	16,55	13,14	4,64	5,81	19,77	1,75	2,13
R^2	0,91	0,977	0,937	0,917	0,94	0,89	0,105	0,38
β_1 (education on GDP)	0,503	0,719	0,039	-0,086	0,664	2,042	0, 051	-0,01
β_2 (health care on GDP)	0,486	0,279	0,939	1,043	0,333	-1,149	0,605	0,738
Effect on 1 (education on GDP)	12,956	18,898	0,792	-1,623	8,581	16,1	-0,82	-0,09
Effect on 1 (health care on GDP)	4,224	3,349	13,51	9,546	5,747	2,892	6,468	5,835
A (%)	1,68	0,43	1,85	2,64	1,83	0,47	4,54	1,59

Analysing the data presented in Fig. 2 and 3, we find different dynamics of growth in indicators, which causes different significance of the impact. A more detailed analysis and comparison of the main indicators is presented in (Table 6).

Thus, comparing the indicators of Germany and France, we can see a greater growth in spending on education compared to spending on health care per capita in both countries. At the same time, the increase in health care expenditure compared to the increase in GDP per capita has risen in a larger proportion. Assessing such ratios, we conclude that the GDP is greater effected by the types of expenditure that grow at a slower pace than GDP. Such differences in impact in various countries are a consequence of government policy, in particular financial measures on funding these social expenditures.

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Figure 2

Comparison of real GDP of Germany and France, annual total volumes
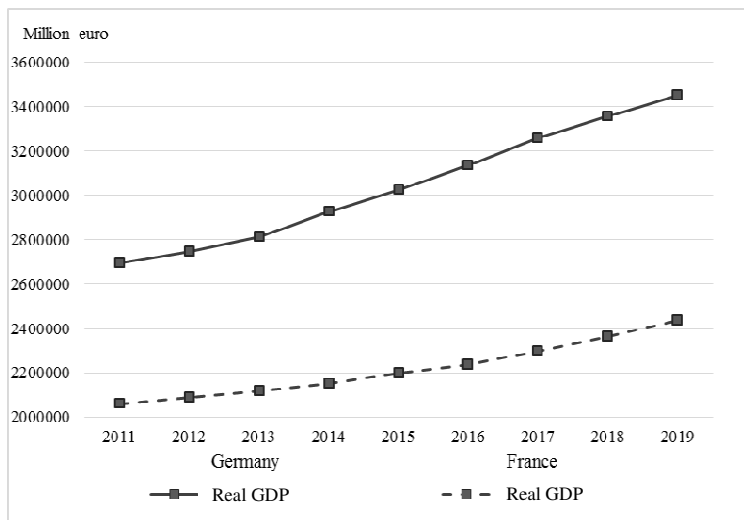
Figure 3

**Comparison of total expenditures on education and health care
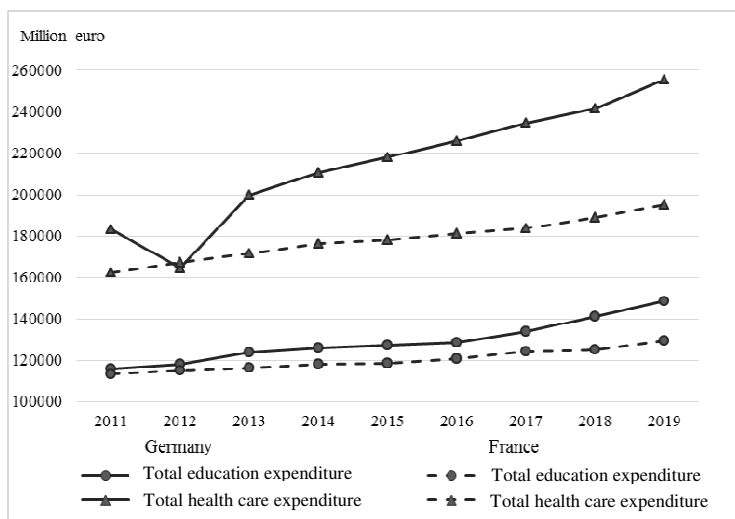in Germany and France, annual volumes**

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Table 6

Comparison of indicators according to the analysis results

Indicator	Germany	France
Increase of 1 euro of GDP from increase in expenditure: education	12,956	18,898
Increase of 1 euro of GDP from increase in expenditure: health care	4,224	3,349
Real GDP, million euros: 2011	2 693 560	2 058 369
Real GDP, million euros: 2019	3 449 050	2 437 635
Increase in real GDP during 2011-2019, %	128,05	118,43
Total expenditure on education, million euro: 2011	115823	113 250
Total expenditure on education, million euro: 2019	148 309	129 195
Increase in expenditure on education during 2011-2019, %	128,04	114,1
Total expenditure on health care, million euro: 2011	183 163	162 611
Total expenditure on health care, million euro: 2019	255 230	195 011
Increase in expenditure on health care during 2011-2019, %	139,35	119,92
Population growth during 2011-2019, %	3,52	3,13
Increase in GDP per capita during 2011-2019, euro	122,7	114,8
Increase in education expenditure per capita during 2011-2019, euro	123,65	110,67
Increase in health care expenditure per capita during 2011-2019, euro	134,6	119,92

Source: compiled by the authors on the basis of Eurostat data and own calculations.

Discussion and Conclusions

The conducted analysis confirms the conclusions of scientists concerning both positive and negative effects of the selected types of expenditure on GDP. Notably, the results of the study reflect the following: (a) selected research methodology, which includes methods, defined indicators, time period, and mathematical apparatus; (b) representative countries; (c) set of statistical data; (d) comparable estimation criteria; (e) units of measurement of indicators; and (f) extent of consideration of other influential factors. This set of databases and the applied economic and mathematical apparatus determine the differing results of various studies.

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The results of economic and mathematical modelling suggest that government agencies in the EU should increase funding for education and health care to increase economic growth.

This study confirmed the merit of creating an advancing trend of expenditure on education and health care, because, in addition to purely mathematical results, it is necessary to create strong intellectual capacity that promotes economic growth in order to ensure such growth in the times of the fourth industrial revolution. That is why EU governments must design active financial policies to not only ensure economic growth, but also implement optimal social policies in order to avoid social instability and improve the welfare.

This area of economic policy research is also relevant for countries that are not currently members of the EU, but have intentions of accession (in particular Ukraine, Moldova, and Georgia), as spending on education and health care is an important factor in increasing GDP, which is the basis for meeting the Maastricht criteria. The suggestion of such a point presupposes the intensification of further scientific research on this issue, specifically in relation to the candidate countries.

References

Afonso, A., & Furceri, D. (2008). Government size, composition, volatility and economic growth. *ECB Working Paper*, *No. 849.*

Autorengruppe Bildungsberichterstattung. (2018). *Education in Germany 2018. An indicator-based report with an analysis on the effects and benefits of education* [in German]. Kultusminister Konferenz. Bundesministerium für Bildung und Forschung. https://www.bildungsbericht.de/de/bildungsberichte-seit-2006/bildungsbericht-2018/pdf-bildungsbericht-2018/bildungsbericht-2018.pdf

Avila, de R., & Strauch, R. (2003). Public finances and long-term growth in Europe – Evidence from a panel data analysis. *ECB Working Paper*, *No. 246.*

Barrios, S., & Schaechter, A. (2008). The quality of public finances and economic growth. *European Economy Economic Papers*, *No. 337*.

Barro, R. (1990). Government spending in a simple model of endogeneous growth. *Journal of Political Economy*, *98*(5), 103–105.

Boldeanu, F., & Tache, I. (2015). Sub-division expenditure and economic growth in Europe. *Bulletin of the Transylvania University of Brasov Series*, *8/57*(2), 329-338.

Churchill, S., Ling, S., & Ugur, M (2015). Effects of government education and health expenditure on economic growth: A meta-analysis. Greenwich Papers in Political Economy, No. GPERC21. https://gala.gre.ac.uk/id/eprint/14072/1/GPERC21_Churchill_Yew_UgurF.pdf.

Darvas, Z., Moës, N., Myachenkova, Y., & Pichler, D. (2018). The macroeconomic implications of health care. *Bruegel Policy Contribution, No. 11.*

European Commission. (2019, January 30). *A sustainable Europe by 2030.* https://ec.europa.eu/info/publications/reflection-paper-towards-sustainable-europe-2030_en

Galetić, F. (2015). Government expenditure on education as the percentage of GDP in the EU. In N. Popov, C. Wolhuter, K. Ermenc, G. Hilton, J. Ogunleye, & E. Niemczyk (Eds.), *BCES Conference Books* (vol. 13, no. 1, pp. 221-228). Bulgarian Comparitive Education Society. https://files.eric.ed.gov/fulltext/ED568641.pdf

Gerson, P. (1998): The impact of fiscal policy variables on output growth. *IMF Working Paper, 98/1.*

Global Education Monitoring Report Team. (2012). *Youth and skills: Putting education to work, EFA global monitoring report.* UNESDOC Digital Library. http://unesdoc.unesco.org/images/0021/002180/218003e.pdf

Grant, C. (2017). *The contribution of education to economic growth.* Knowledge, evidence and learning for development K4D. https://assets.publishing.service.gov.uk/ media/5b9b87f340f0b67896977bae/K4D_HDR_The_Contribution_of_Education_to_Economic_Growth_Final.pdf

Halmai, P. (2015). Structural reforms and growth potential in the European Union. *Public Finance Quarterly*, *60*(4), 510–525.

International Institute for Applied Systems Analysis. (2008). Economic growth in developing countries: Education proves key. *IIASA Policy Brief #3.* http://www.iiasa.ac.at/web/home/resources/publications/IIASAPolicyBriefs/pb03-web.pdf

Kutasi,G, & Marton, A. (2020). The long-term impact of public expenditure on GDP-growth. *Society and Economy*, *42*, 403–419.

Lutz, W., Amran, G., Bélanger, A., Conte, A., Gailey, N., Ghio, D., Grapsa, E., Jensen, K., Loichinger, E., Marois, G., Muttarak, R., Potančoková, M., Sabourin, P., Stonawski, M. (2019). *Demographic scenarios for the EU – Migration, population and education – Executive summary* (W. Lutz, (Ed.). Publications office of the European Union. https://doi.org/10.2760/98611

Mărginean, I. (2014). Public expenditure with education and health care in EU Countries. *Procedia Economics and Finance*, *8*, 429-435. https://doi.org/10.1016/S2212-5671(14)00110-5

Journal of European Economy
English Edition. Vol. 20. № 3 (78). July–September 2021.
ISSN 2519-4070

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Murawska, A. (2017). The increase in the educational level of the population as an opportunity for socio-economic development of countries of the European Union. *Social Inequalities and Economic Growth*, 52, 9-20. https://repozytorium.ur.edu.pl/bitstream/handle/item/3319/1%20murawska-wzrost%20poziomu.pdf?sequence=1 &isAllowed=y.

Shijaku, G., & Gjokuta, A. (2013). Fiscal policy and economic growth: The Case of Albania. *MPRA Paper No. 79090*. https://mpra.ub.uni-muenchen.de/79090/1/MPRA_paper_79090.pdf

Siddique, H., Mohey-ud-din, G, & Kiani, A. (2008). Health, education and economic growth nexus: Evidence from middle income countries. *Global Social Sciences Review*, *3*(4), 67-86.

Woessmann, L. (2015). The economic case for education. *Education Economics*, *24*(1), 3-32. https://doi.org/10.1080/09645292.2015.1059801

World Economic Forum. (2016). Global Competitiveness Report 2015-2016. http://reports.weforum.org/global-competitiveness-report-2015-2016/ education/#view/fn-