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AKADÉMIAI KIADÓ

The effect of social expenditures on human development in the European Union

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ABSTRACT

Researchers and practitioners alike have long debated the role of high GDP growth strategies and social expenditures (SE) in ensuring a better distribution of income and reduction of poverty. This study is aimed at investigating the effectiveness of social expenditures by offering the use of a robust methodology. Our sample consists of 27 EU countries (further divided into pre- and post-2000 members) between 2005 and 2017. We used panel data to determine whether social expenditures have a positive effect on the World Bank generated Human Development Index (HDI).

KEYWORDS

social expenditure, human development, human development index, EU, panel data

JEL CLASSIFICATION INDICES

C5, H55, O1

1. INTRODUCTION

Already the ancient Greek philosopher proposed that "*the purpose of economic activity is to use things that are necessary for life and human flourishing*" (as cited in Younkins 2003: 1). Aristotle reasoned that economic activity was a means to achieve goods necessary to attain

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happiness, rather than its sole purpose. High GDP growth strategies do not guarantee well-being, even resulting in financial instabilities and crises (Alkire 2010). Moreover, some researchers state that policy that is solely focused on economic growth is inefficient. However, despite the professed importance of the topic, a lack of consensus remains among the available literature regarding the role of expenditure policy (Haile – Nino-Zarazua 2018). This situation is unfortunate in that reduced confidence in the potential short- and long-term benefit of social expenditure (SE) can result in governments becoming less willing to invest valuable or limited resources (Park 2011). Moreover, with little empirical research targeting the efficiency of government SE in comparison to GDP (Gebregziabher – Nino-Zarazua 2014; Prasetyo – Zuhdi 2013), this creates motivation to analyze the effect of SE on human development (Pahlevi 2018; Sanga 2018).

Our paper is an attempt to determine whether empirical justification exists for increasing the share of SE within countries. As such, we investigate the relationship between SE and the Human Development Index (HDI) in 27 EU Member States. The EU Member States have maintained high and consistent levels of SE (for example, SE within GDP increased from 21.3% in 2005 to 24.2% in 2015 (Eurostat 2020)). However, the current research in this area, unfortunately, suffers from older or outdated models. We aim to analyze the relationship by reviewing the latest evidence guiding these practices and offering the use of a robust methodology that will broaden and deepen our understanding. We conduct a sensitivity analysis to test the robustness of our results by dividing the sample into two groups; pre- and post-2000 EU Member States. The pre-2000 countries harbor better-developed bureaucracies (Horký-Hlucháň – Lightfoot 2013), share similar policies in terms of SE (Beaudonnet 2013), and have higher levels of social investment in comparison to the post-2000 counties (Rubianes 2011; Ostojić – Žmegač 2014; Eurostat 2020). Thus, our analysis aims at providing an evaluation of the confidence in our model and determining whether SE has influenced HDI between these homogeneous groups.

2. LITERATURE REVIEW

Initially published in 1990 under the Human Development Report, the HDI is a multidimensional measure that aggregates indicators (education, health and standards of living) with real per capita income. One differentiating character of the index from similar proxies is the argument that it provides an accurate and comparable representation (Alin – Marieta 2011; Rahayu – Widodo 2012; Morais et al. 2013) of country statistics. Loko et al. (2003) posited that the lack of consensus on the definition of HDI hampers cross-country comparison. Beraldo et al. (2009), Kosack – Tobin (2015) similarly stated that the availability of data analyzing of the human factor is a significant constraint in the HD studies. Studies concerning the relationship between SE and HD continue to suffer from this lack of consensus (Iheoma 2012). This issue, coupled with the argument that little empirical evidence exists addressing the efficiency of government SE (Prasad 2008; Pahlevi 2018; Alin – Marieta 2011; Sanga 2018), motivates us to analyze the effect of SE on HD. A summary of the main arguments of each article is presented in Table 1. Moreover, we conduct additional analysis to distinguish between the impact of GDP on HD and SE. Thus, the purpose of our study is to test this relation, review the latest evidence on social practices, and offer the use of a robust methodology.

Table 1. Major arguments in the literature

Authors	Major arguments
Supportive literature	
Dell'Anno (2009)	Improved education, standards of living and economic growth can aid in reducing the size of the informal economy.
Iheoma (2012)	Investment within the social sector can lead to human capital development in developing countries. Moreover, health expenditure is significant (short-/long-run) in explaining human development levels.
Rahayu – Widodo (2012)	Anti-corruption programs could be successful in diminishing poverty level if supported by increased economic growth/equitable income distribution/strengthened governance.
Morais – Miguéis – Camanho (2013)	Investments in education and health services reward countries with direct improvement in human development.
Daghighiasli – Mohammadi – Shahba (2014)	Improvements in living conditions/health are conducive for increasing economic growth, in turn, serving towards improving welfare and living conditions.
Gebregziabher – Nino-Zarazua (2014)	Social expenditures have a significant positive causal relationship with human development, and social expenditure/related policy strategies have benefited innovation and knowledge creation.
Pangastuti (2015)	Effective education/health care services within a country can aid efficiency in HDI. Health expenses can have a positive effect on HDI by increasing labor productivity and contributing to economic growth.
Agbloyor – Kusi – Gyeke-Dako (2018)	Credit information sharing promotes human development (employed as a proxy for poverty) and welfare, in turn, reducing poverty.
Haile – Nino-Zarazua (2018)	Social expenditures play an essential role in rising human development levels in developing countries.
Olivia (2018)	Government intervention directly influences human development, while economic growth does not. The development of infrastructure, education/health facilities should be prioritized in underdeveloped regions.
Tasci – Tatli (2019)	Social-security expenditure is positively related to HDI both in the short-/long-term. A share should be allocated for private social sector expenditure from the state's budget, balancing the role in the private market and public expenditure

(continued)

Table 1. Continued

Authors	Major arguments
Contrasting literature	
Sahay – Cashin – Mauro (2001)	Macroeconomic policies/stabilization programs can positively affect the distribution of income within the country. However, they find little evidence in support of this argument.
Prasad (2008)	Although social expenditures lead to higher scores on HDI, the efficient usage of resources is what determines the outcome.
Hall (2014)	Housing/health expenditure improves equality, more so than social security expenditures and benefits.
Asadullah – Savoia – Mahmud (2014)	A country's success is not a reflection of its economic growth and social expenditure programs. Instead, low-cost solutions, Non-Governmental Organizations (NGOs), infrastructure development, public campaigns and interlinkages between various indicators have been successful in achieving social progress.
Casasnovas – Bori (2014)	There is no significant relationship between social expenditure and healthcare expenditure.
Pahlevi (2018)	A well-structured social expenditure policy could result in sustainable HDI; however, only if there is a proper distribution. Moreover, large amounts of social expenditures do not necessarily indicate effective use.

Source: Authors' own compilations.

3. DATA AND METHODOLOGY

We examined the effect of SE and GDP on HDI in the period of 2005–2017 in 27 EU countries. These countries were selected as a result of data continuity within the sample. Only Croatia was excluded from the analysis because 2005, 2006 and 2007 yearly data were not available. Had this country been included in the investigation, the missing data amount would have increased to 81 (3 years * 27 countries = 81). By simply removing Croatia from the analysis, we were able to reduce this amount to 13 observations (13 years * 1 country = 13). The data for the analysis (SE, HDI and GDP) were downloaded from Eurostat (2020), the UNDP (2019) and the World Bank (2020), respectively. SE and GDP are the independent variables, while the HDI is the dependent variable. We considered the following model:

$$\mathrm{HDI}_{2\mathrm{it}} = \alpha_{\mathrm{it}} + \beta_1 \mathrm{SE} + \beta_2 \mathrm{GDP} + u_{\mathrm{it}} \tag{1}$$

where α is the fixed term, i is the observation number, t is time, u_i is the error term, β_1 is the social expenditures (SE) coefficient, and β_2 is the economic growth (GDP) coefficient prediction.Referred to as "social protection statistics", the SE data consists of interventions from public/private bodies to address specific risks/needs. The latter can be listed as follows: "*sickness/healthcare, invalidity and disability, old age, parental responsibilities, the loss of a spouse or parent, unemployment, housing, and social exclusion*" (Eurostat 2020: 1). The data are calculated as a percentage of GDP. The HDI is a universally accepted, widely employed, robust and valid measure that is highly correlated with commonly known indicators. HDI is empirically measured on a scale of 0–1 (worst–best) and provides a standardized measure for analyzing a concept that differs significantly across countries. As expounded by the UNDP in 1990, HD is not only explained by economic growth ("*access to income. . .is not the sum total of human endeavor*") but by the level of well-being achieved ("*. . .HDI is a process of enlarging people's choices*") (UNDP 1990: 1). Thus, we employed the HDI data as the dependent variable in the study and calculated the logarithm of the variables to obtain more consistent results. Data for each variable included in the study are yearly (SE, HDI and GDP). The data were selected as such because the sources only provide annual information. The variables' descriptive statistics are presented in Table 2. The total observation number is 351.

A cross-country comparison of the data shows that overall SE increased between 2005 and 2017. HD levels have shown a consistent increase for the entire sample, while 48% of the sample presents a decrease in economic growth. We also found a positive and significant correlation between HD levels and SE. This offers supportive evidence for testing our hypothesis[1].

The analysis consisted of five stages. In the first stage of the study, we applied the unit root to test the stability of the series. We tested for unit root with the aid of the methods of Maddala – Wu (1999) and Im et al. (2003). Both unit root tests distinguish themselves from similar methods by assuming that the autoregressive component is common to all panels and that all panels contain a unit root. To overcome the limitation of a strong autoregressive component, method of Im et al. (2003) was implemented. This test allows for different delay lengths in the augmented Dickey-Fuller (ADF) regressions for cross-section units. We applied the ADF unit root test for each cross-section separately within the first panel. Next, we took the average of individual ADF to obtain panel test statistics.

The formula presented in Maddala – Wu (1999) tests the primary hypothesis (Equation 2).

Table 2. Descriptive statistics

Variables	Obs	Mean	Std Dev	Min	Max
HDI	351	0.866983	0.040863	0.750000	0.938000
SE	351	23.00171	5.824730	10.60000	34.50000
GDP	351	2.036375	3.876230	-14.81416	25.16253

[1]The results for the cross-country comparison of the data and the correlation analysis are available upon request.

$$P\lambda = -2\sum_{i=1}^{N}\log(\pi_i) \sim \chi^2_{2N} \tag{2}$$

where i is the horizontal section, π_i is the distribution of the P values taken from the unit root test, N is the number of separate samples, and $X_{2N}{}^2$ is the chi-square distribution of $2N$ degrees of freedom.

We present the test statistic of Im et al. in Equation (3).

$$\Delta y_{i,t} = \alpha_{i+}\beta_i y_{i,t-1} + \delta_i t + \sum_{j=1}^{pi}\phi_{ij}\Delta y_{i,t-j} + u_{i,t} \quad t = 1, 2, \ldots T \quad i = 1, 2, \ldots N \tag{3}$$

where N is the sample of cross-sections observed over T time period, y_{it} is the first-order autoregressive process, $\alpha_i = (1 - \varnothing_i)\mu_i$, null hypothesis of the unit roots is $\varnothing_i = 1$, β_i is - (1- $\varnothing_i$), $\Delta y_{i,t}$ is y_{it}-$y_{i,t-1}$.

In the second and third stages, we tested the existence of a long-term cointegration relationship between the variables via the method developed by Kao (1999). Kao (1999) involves applying a Dickey-Fuller (DF)/ADF test to the findings obtained by regression (Karama 2007). The analysis aids in confirming the validity of the cointegration relationship and in testing the cointegration in heterogeneous panels (where cointegration vectors are different between cross-sections) (Hoang 2006).

We tested for the coefficient and direction estimation among the variables with the panel Fully Modified Ordinary Least Squares (FMOLS) test developed by Pedroni (2001). This method can adequately account for cross-sectional heterogeneity and correct auto-correlation and heteroskedasticity. The panel FMOLS test can correct deviations in fixed-effect estimators. Finally, we applied the panel causality tests in the fourth and fifth stages of the study. The method developed by Dumitrescu – Hurlin (2012) aided in detecting the country and panel level causality. This model allows for the consideration of cross-sectional dependence among the sample countries, despite issues regarding time (T) or cross-sections (N) (such as $T>N$ or $T<N$), a cointegration relationship between the variables, and unbalanced panel data. Whether or not the panel causality test has a cointegration relationship between the variables is irrelevant because the method holds in the presence of both cases. We tested for the causal relationship between Y and X with the help of the following formula:

$$y_{i,t} = \alpha_i + \sum_{k=1}^{K}\gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K}\beta_i^{(k)} X_{i,t-k} + \varepsilon_{i,t} \tag{4}$$

where x and y are initial condition ($y_{i,-K}, \ldots, y_{i,0}$) and ($x_{i,-K}, \ldots, x_{i,0}$) observed for both individual processes $y_{i,t}$ and $x_{i,t}$, $\gamma^{(k)}$ is the autoregressive parameters, $\beta^{(k)}$ is the regression coefficients slopes, N is individuals on T periods, K is lag orders, β_i is estimates of autoregressive parameters and ε_i is individual residuals.

$H_0 = \beta_i = 0\,\forall_i = 1, \ldots, N$, there is no causality relationship from X to Y in all horizontal sections.

$H_1 = \beta_i = 0\,\forall_i = 1, \ldots, N_1$

$\beta_i \neq 0\ \forall_i = N_1 + 1, N_1 + 2, \ldots, N$, there is a causality relationship from X to Y in some horizontal sections.

When compared with other causality methods used in the literature, the bootstrap technique developed by Konya (2006) is superior because it is a regression estimation (Seemingly Unrelated Regression – SUR) that takes into account cross-sectional dependence.

The method not only presents the results of causality, but it also reveals the direction of the relationship. Moreover, it does not stipulate a common hypothesis for all countries whose bootstrap critical values are based on Wald statistics. The method has the added benefit of not requiring the series to be stationary or co-integrated. The underlying logic of the causality test developed by Konya (2006) is the predictions presented by Zellner (1962) (employing unrelated regression estimators). The values required for estimation are bootstrap critical values produced in each cross-section. Moreover, the cross-sectional dependence is loosened by the critical estimator, and the causality test can be performed without a unit root test and cointegration test. SUR estimators are argued to present more reliable results than OLS estimators. Thus, we applied the panel causality test developed by Konya (2006) to determine causality at the country level.

We also took into consideration the panel analysis assumptions. As the FMOLS can adequately account for cross-sectional heterogeneity, heteroskedasticity, and correct auto-correlation, the normal distribution is not essential for either the random or fixed-effects approaches (Clarke et al. 2010), and it can correct deviations in fixed-effect estimators – we only tested for cross-sectional dependence under the following conditions: when the time dimension is greater than the cross-section dimension, the "Lagrange Multiplier" (LM); when the cross-section dimension is greater than the time dimension, the "Cross Section Dependent-CD, LM-Lagrange Multiplier" (CD_{LM}); and when the cross-section dimension equals time dimension, the CD_{LM2} methods are applied. Finally, we tested for the bias-adjusted LM. We present the results of the cross-sectional dependence test in Table 3.

$$CD_{lm} = \sqrt{\frac{1}{n(n-1)}} \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} \left(T\check{\rho}_{ij}^{2} = \pi r^{2} - 1 \right) \tag{5}$$

where CD is cross section dependent, LM is Lagrange Multiplier, $\check{\rho}_{ij}$ is the sample estimate of the pair-wise correlation of the residuals, T is the time dimension of the panel, and N is the panel with a large cross-section dimension.

According to the findings of Table 3, we could argue that there was no cross-sectional dependence relation ($P > 0.05$) between the variables. Therefore, we determined that there was no present obstacle for employing a first-generation unit root test in the remainder of the study.

Table 3. Cross-sectional dependence test

Cross-sectional dependence between variables	Model	
	Statistics	Prob.
CD_{LM1} (Breusch – Pagan 1980)	508.186	0.200
CD_{LM2} (Pesaran 2004)	64.168	0.120
CD_{LM} (Pesaran 2004)	22.507	0.110
Bias-Adjusted CD Test	64.635	0.120

4. RESULTS

Im et al. (2003) and Maddala – Wu (1999) tests were applied and the results indicated that the levels of the series were not stable. However, when we applied the first differences to available data, our series became stable. The results for the tests are presented in Table 4.

We tested for the existence of a long-term relationship between the variables via the use of a cointegration test (Kao 1999). The cointegration test results are listed in Table 5. Our results indicate the existence of a cointegration relationship among the variables, significant at %1. Thus, we rejected the hypothesis, "There is no cointegration relationship between the variables". Put differently, SE and HD move together in the long-run.

We provide the test results for the FMOLS in Table 6. The results indicate that SE positively affects HD. On the other hand, we determined that economic growth has a positive and significant effect on HD. We analyzed the panel FMOLS test with small samples, and the results were sufficient to continue the analysis.

When we examined the causality test results in Table 7, we detected the existence of a two-way relationship between SE and HD. Moreover, we found a two-way causal relationship

Table 4. Unit Root Test results

	Constant							
	Im et al.				Maddala – Wu			
	Level		First difference		Level		First difference	
	t stat.	Prob.	t stat.	Prob.	t stat.	Prob.	t stat.	Prob.
SE	–1.06	0.14	–4.34	0.00	57.01	0.29	115.64	0.00
HDI	2.85	0.99	–4.04	0.00	35.58	0.96	109.22	0.00
GDP	2.55	0.91	–4.24	0.00	30.22	0.90	105.77	0.00

Note: Fixed model was applied. The Schwartz criterion was used to solve the autocorrelation problem between errors.

Table 5. Kao cointegration test

Model: $HDI_{2it} = \alpha_{it} + \beta_1 SE_{it} + \beta_2 GDP_{it}\ u_{it}$		
	t stat.	Prob.
ADF	*–4.070139***	0.0000
Residual Variance	11.22584	
Heteroskedasticity Consistent Variance	2.772725	

Note: Significant at level *** 1%, ** 5%, * 10%.

Table 6. Panel FMOLS test

Model: $HDI_{2it} = \alpha_{it} + \beta_1 SE_{it} + \beta_2 GDP_{it}\ u_{it}$			
Variables	Coefficient	t stat.	Prob.
SE	*0.004271***	6.347521	0.0000
GDP	*0.001354***	4.504120	0.0000

Note: Significant at level *** 1%, ** 5%, * 10%.

Table 7. Causality test results

Variables	Zbar-Stat.	Prob.
SE-HDI	2.20928**	0.0272
HDI-SE	1.91769*	0.0552
HDI-GDP	–1.61072	0.1072
GDP-HDI	–0.24894	0.8034
SE-GDP	3.14300***	0.0017
GDP-SE	4.09296***	4.E-05

Note: Significant at level *** 1%, ** 5%, * 10%.

between SE and economic growth[2]. Finally, we analyzed the causality relationship between economic growth and HD. However, the result of this analysis showed that a causal relationship did not exist for our sample.

The two-way causality test results for SE-HD are listed in Table 8.

We detected a causality relationship from SE to HD (SE-HDI) in three countries. Konya's (2006) test results show that this significance is the result of the following countries: Sweden, Finland and Romania. We detected no causal relationship in other countries. Upon analyzing the variables from HD to SE (HDI-SE), we determined that there existed a causality relationship in four countries. Repeating the analysis for testing the causal relationship between SE to economic growth (SE-GDP) yields a relationship in six countries (United Kingdom, Sweden, Poland, Hungary, Latvia and Estonia). A causality relationship existed between the variables from economic development to SE across nine countries (United Kingdom, Sweden, Finland, Slovakia, Slovenia, Portugal, Latvia, Estonia and Bulgaria). We also conducted a causality test analyzing the relationship between economic growth and HD (GDP-HDI and HDI-GDP). However, we did not detect the existence of a significant causal relationship in the sample. For

[2]The tables for the two-way causality test results for SE-economic growth and economic growth-HD are available upon request.

Table 8. Konya Panel Bootstrap Causality Test results (The relationship between SE and HD – The relationship between HD and SE)

Countries	H_0: Social expenditures is not the cause of human development					H_0: Human development is not the cause of social expenditures				
	Wald St.	Bootstrap Critic Value			Res.	Wald St.	Bootstrap Critic Value			Res.
		1%	5%	10%			1%	5%	10%	
Belgium	3.994	464.4	161.5	90.82	×	0.200	188.16	84.88	53.74	×
Bulgaria	0.87	552.2	168.5	91.38	×	4.375	170.13	76.16	49.20	×
Czech Republic	0.839	189.5	76.71	45.52	×	1.680	269.59	110.55	73.24	×
Denmark	13.15	451.1	138.7	72.10	×	7.213	276.08	107.34	68.92	×
Germany	39.88	432.5	158.5	98.45	×	3.829	197.02	78.94	48.15	×
Estonia	3.568	470.8	178.7	111.13	×	2.066	149.92	62.15	38.57	×
Ireland	1.033	296.4	114.0	69.22	×	10.33	255.53	83.79	50.12	×
Greece	0.768	573.4	169.9	90.74	×	0.723	228.65	81.30	51.39	×
Spain	3.593	140.0	54.90	33.11	×	8.910	289.29	128.89	87.84	×
France	46.54	494.6	172.8	98.55	×	3.345	276.92	127.77	82.97	×
Italy	29.42	301.12	122.9	77.73	×	**103.8***	287.11	135.74	49.74	√
Cyprus	2.376	528.9	172.1	96.31	×	2.131	170.20	59.76	33.38	×
Latvia	0.357	435.4	144.7	82.18	×	4.198	179.52	72.49	43.96	×
Lithuanian	1.696	405.1	137.8	81.65	×	0.394	161.53	62.07	39.04	×
Luxembourg	2.489	269.2	106.4	67.25	×	2.230	214.64	81.80	49.74	×
Hungary	3.095	190.4	85.45	53.77	×	**194.8*****	124.70	65.61	39.33	√
Malta	23.81	166.3	61.15	38.12	×	21.59	222.48	132.30	81.81	×
Netherlands	26.84	446.9	161.6	92.45	×	1.477	172.52	103.00	62.87	×
Austria	1.997	142.2	63.81	39.60	×	**118.0***	246.42	141.93	89.07	√
Poland	0.361	654.0	229.9	120.72	×	2.797	58.36	33.86	21.15	×
Portugal	2.787	57.49	26.45	17.32	×	0.158	49.78	25.13	17.18	×
Romania	**20.72***	49.88	21.70	13.69	√	4.927	85.35	24.75	14.36	×
Slovenia	0.114	44.11	19.90	13.29	×	1.222	60.12	29.68	20.04	×
Slovakia	11.11	49.12	23.40	15.14	×	**26.67***	67.82	28.25	18.13	√
Finland	**25.84****	48.14	21.12	14.18	√	13.63	76.96	34.99	24.05	×
Sweden	**15.30****	52.44	22.80	14.91	√	3.203	44.76	20.85	13.56	×
United Kingdom	0.231	47.00	22.37	14.35	×	0.616	48.11	23.82	15.89	×

Note: Significant at level *** 1%, ** 5%, * 10%. Countries depicted as bold indicate a significant and casual relationship between the variables.

HDI-GDP, on the other hand, only Slovakia scored a significant result. Finally, we applied a panel Granger test to determine the direction of the identified relationship. We present a summary of our findings in Table 9. According to the empirical results generated, we can argue that SE benefitted HD levels in the EU countries between 2005 and 2017.

Sensitivity analysis

We employed a sensitivity analysis to test the robustness of our results. By dividing the sample into two groups (pre- and post-2000 EU Member States) and repeating each previously mentioned stage of the analysis, we aimed to test the confidence in our model. This argument is further supported by data available from Eurostat (2020). When examining the share of SE in the national product between 2005 and 2017, we determined that the pre-2000 EU Member States gave much more importance to SE (ranging between 17.1% and 34.5%), than did the post-2000 EU Member States (ranging between 10.6% and 24.7%). Thus, we took both pre- and post-2000 countries into account and investigated whether or not both groups of countries generated similar/dissimilar results dependent on our variables. We determined that these homogeneous groups are a contributing factor affecting our variables. The results of this sensitivity analysis are summarized in Table 9[3].

Table 9. Panel granger direction and effect of causality

Direction of causality	Countries	Significance of causality
Social expenditures →Human development	Finland, Sweden	Significant and positive
	Romania	Significant and negative
Human development→ Social expenditures	Austria, Italy, Slovakia	Significant and positive
	Hungary	Significant and negative
Social expenditures →Economic growth	Estonia, Latvia, Poland, Sweden, United Kingdom	Significant and positive
	Hungary	Significant and negative
Economic growth→ Social expenditures	–	Significant and positive
	Bulgaria, Estonia, Latvia, Portugal, Slovenia, Slovakia, Finland, Sweden, United Kingdom	Significant and negative
Economic growth→ Human development	Romania	Significant and positive
	Malta, Portugal	Significant and negative
Human development→ Economic growth	–	Significant and positive
	Slovakia	Significant and negative

[3]The results for the pre- and post-2000 countries will be available upon request.

According to the unit root test, we determined that the levels of the series became stable once the first differences were applied. The cointegration test developed by Kao (1999) indicate the existence of a cointegration relationship among the variables (SE, growth and HD) for the pre-2000 countries. Thus, our findings aid in rejecting the hypothesis, "There is no cointegration relationship between the variables". However, when we recalculated the analysis for the post-2000 countries, we found a different result, no cointegration relationship was identified. Because the previous cointegration test only yielded results for the pre-2000 countries, we calculated the FMOLS test only for the said countries. The results indicate a causal relationship between SE to HD and SE to economic growth for the pre-2000 countries. Analyzing the relationship for the post-2000 countries shows a causal relationship between HD to SE. Finally, we identified a two-way causal relationship between SE to economic growth.

5. DISCUSSION

We aimed to determine whether there is an empirical justification for further increasing SE across countries. We investigated the relationship between SE and HDI in the period of 2005–2017 for 27 EU Member States. Moreover, we conducted an additional analysis to distinguish between the effect of GDP on HDI and SE. A panel causality test and panel bootstrap causality test were employed because they presented the opportunity to analyze an area of literature that currently suffers from fundamental methodological issues. We found that a two-way causal relationship between SE and HDI exists for our sample. Consistent with the findings of the related literature, we found that SE has benefitted HDI levels in the EU countries between 2005 and 2017. Our findings provide empirical support for further increasing SE.

Upon analyzing the relationship between SE and HD, we found a causal relationship for our sample ($P < 0.05$). There is a positive and significant causal relationship between SE to HDI for Sweden and Finland. Considering our findings, we can verify that the EU countries attach importance to SE in supporting HDI. Upon further separating the sample into two groups (pre- and post-2000 EU Member States), we found similar results for the pre-2000 EU Member States. The pre-2000 countries are considered to harbor better-developed bureaucracies and similar policies in terms of SE. Throughout the years, the EU Member States have maintained high and consistent levels of SE. For example, SE within GDP increased from 21.3% in 2005 to 24.2% in 2015 (Eurostat 2020). However, this trend seems to be more prominent in the pre-2000 EU Member States. When we examined the share of SE within the national product, we saw that this amount ranged from 17.1% to 34.5% in these states. Moreover, their share of SE in national product amounted to 27.2%. The post-2000 countries' share of the SE in the national product ranged from 10.6% to 24.7% (Eurostat 2020). Thus, coupled with the results from our causality tests, it can be argued that the pre-2000 EU countries (in comparison to the post-2000 EU countries) place higher importance on SE, and this investment has a stronger effect on increasing HDI. There is a positive and significant causal relationship between SE to HDI within the pre-2000 EU Member States. The post-2000 countries, on the other hand, do not show a significant relationship between the two factors. In conclusion, we argue that countries that have homogenous social policies have demonstrated similar results in terms of their HD and SE relationship. Furthermore, the pre-2000 countries have demonstrated a higher return on HD for their investment in SE.

Analyzing the results for all EU Member States, we determine a negative and significant causal relationship between the variables for Romania. Interestingly, the results for this country could be explained upon further consideration of the relationship between economic growth to HDI. By replacing SE with GDP as an independent variable and recalculating the analysis, we found that increases in HDI (that are not explained by increases in SE) can be explained by changes in economic growth. We argue that the presence of a causal relationship depends on the country's level of development and that there is a significant and positive causal relationship between economic growth to HDI in Romania. Thus, according to our findings, we can state that increases in HDI in Romania are a result of increases in GDP, rather than SE. These findings highlight the ambiguous nature of the current literature regarding the effectiveness of SE and GDP in the development of countries. However, we must point out that the two-way causality test for the whole sample does not yield significant causal results between HDI to GDP and GDP to HDI. Instead, the results of the test indicate that this relationship is specific to the case of Romania, which had shown a negative causal relationship between SE-HDI.

The analysis of the causal relationship between HDI to SE yields a significant relationship in 4 out of 27 countries. There is a positive and significant relationship between HDI to SE for Austria, Italy and Slovakia. However, further separating the sample into pre- and post-2000 EU Member States yields differing results. For the pre-2000 EU Member States, we do not identify a causal relationship, but we do find a significant and positive relationship for one country out of 12 (Slovakia). Finally, reviewing the results from our causality test, we see that SE increases have resulted in improvements in HDI. Moreover, these increases seem to be a reflection of changes in the post-2000 countries, which have shown a corresponding increase in SE. It is interesting to note that countries with less homogenous policies (post-2000 countries) are investing more in SE as their levels of HDI increase. Meanwhile, more advanced countries continue to invest in SE at a steady rate.

The findings of our study contribute to the current literature arguing for the benefits of increasing SE in countries. Our study provides empirical evidence supporting a two-way causal relationship between HDI and SE across the period of 2005–2017 for the EU Member States. Moreover, we demonstrated the short- and long-term benefits of SE on HD via the use of a robust methodology.

In our sensitivity analysis, we detected a causal relationship between SE to HDI for the pre-2000 countries. The post-2000 countries, conversely, harbor a causal relationship between HDI to SE. Moreover, our findings indicate that HDI changes in some countries (that cannot be explained by SE) can be explained by the changes in GDP. Although SE has a markedly higher effect on HDI in many countries, we cannot discount the role of GDP.

Another prominent argument in the literature is the transference of growth into SE. However, contrary to what is supported in the literature, we detect a negative causal relationship between economic development to SE (between 2005 and 2017). With 9 out of 27 countries showing a negative relationship between variables, our results indicate that increases in GDP have resulted in lower levels of SE. The social redistribution of limited resources is the essence of a social protection system. With countries facing issues such as rising poverty and inequality, this system plays a vital role in ensuring that individuals have access to healthcare and other various social services. Unfortunately, the results of our study indicate that as GDP increases in countries, SE levels are negatively affected. This relationship is also apparent in both pre- and post-2000 countries. Upon analyzing the causal relationship between economic growth to SE for

the post-2000 countries, we find that 6 countries out of 12 have a negative causal relationship between economic growth and SE. For the pre-2000 countries, although the general analysis did not yield a significant result, we find that individually, Portugal also shows a negative causal relationship between variables.

It is worth underscoring that none of the 27 countries have a positive and significant relationship between economic growth to SE. This finding is supportive of the arguments presented by the OECD (2014). Thus, we argue that although strong economic growth in countries has contributed to their development, there still exist challenges to social policy and the redistribution of resources. Although the ideal is for the increase and transference of GDP into SE, this does not seem to be the case for either the pre- or post-2000 EU Member States.

Finally, we analyzed the relationship between SE to economic growth. Five countries out of 27 show a positive relationship between the two factors. This relationship is also apparent in both pre- and post-2000 countries. According to Keynesian theory, increased governmental expenditure results in increased demand by raising public consumption, thus putting more money in the hands of individuals and spurring further economic growth.

6. CONCLUSION

Although countries have undertaken widespread modernization efforts within the past few decades, it is apparent that economic growth has not been conducive to reducing poverty and inequality. In contrast, arguments are now being expounded supporting the role of public services. Social expenditures, especially, are viewed as an essential factor in ensuring the successful distribution of income. However, despite its professed importance, there remains a lack of empirical justification for increasing SE within countries. Thus, our paper was aimed at contributing to the discussion and analysis of the potential short- and long-term benefit of investing countries' limited resources. Overall, we successfully demonstrated a need to revisit or develop appropriate and sound social policies within the EU countries. More emphasis should be placed on increasing the proportion of SE in the EU countries so as to enhance HD levels further.

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