ISSN
2671-3462 (print)
2671-3470 (online)

Economy, Business & Development (2025) 6(1), 55-67
DOI: 10.47063/ebd.00024

RESEARCH PAPER

Journal homepage: https://journals.ukim.mk/index.php/ebd

HUMAN CAPITAL AND ECONOMIC DEVELOPMENT: THE RELATIONSHIP BETWEEN EDUCATION AND HEALTH EXPENDITURES AND GDP IN SELECTED COUNTRIES OF SOUTHEAST EUROPE

Vladimir Filipovski
Ss. Cyril and Methodius University in Skopje
Faculty of Economics – Skopje
vladimir.filipovski@eccf.ukim.edu.mk

Daniela Bojadjieva
Ss. Cyril and Methodius University in Skopje
Faculty of Economics – Skopje
daniela.mamucevska@eccf.ukim.edu.mk

Marijana Cvetanoska
Ss. Cyril and Methodius University in Skopje
Faculty of Economics – Skopje
marijana.cvetanoska@eccf.ukim.edu.mk

Abstract

The modern theory of economic growth and development posits that human capital is one of the main drivers of economic growth, as it enhances the productivity of the two classical growth factors i.e. physical capital and labour. Moreover, investments in human capital accumulation are considered an important precondition for achieving higher levels of economic development. In this context, one line of empirical research focuses on assessing the importance of the two key components of human capital—education and health—in the process of economic development. This paper investigates the impact of education and health on the level of economic development, measured by GDP per capita, in a sample of five Southeast European countries (Albania, Croatia, North Macedonia, Serbia, and Slovenia) over the period 2000–2021. The empirical analysis relies on cross-sectional regression using two panels, i.e. one for education-based human capital and the other for health-based human capital. Additional variables in the models include lagged GDP per capita, gross fixed capital formation per capita, and the Corruption Perceptions Index as a proxy for institutional quality. The results from both panel regressions indicate that spending on education and health has a significant positive effect on GDP per capita. These findings support the policy recommendation that public investment in education and health, aimed at improving the quality of human capital, may significantly contribute to the process of economic development.

Keywords: *Economic development, Education expenditures, Health expenditures, Human capital, Southeast Europe*

JEL: *I10, I20, J24, O40, O52.*

Introduction

In modern economic theory, human capital is recognized as a fundamental driver of economic growth. From a broader economic development perspective, the quality of human capital is considered a crucial determinant of sustainable long-term increases in productivity, aggregate income, and living standards, particularly in developing countries.

There is a well-established relationship between human capital and economic development. Human capital refers to the productive knowledge and skills acquired through education and work experience, supported by adequate health conditions. On one hand, investment in human capital enhances an economy's capacity to innovate and increase productivity, thereby accelerating long-term economic growth. On the other hand, economic development entails sustained improvements in productivity, income levels, standard of living, and overall societal well-being of a nation. Thus, the accumulation of human capital contributes to economic development, while higher levels of economic development, in turn, create favorable conditions for further improvements in the quality of human capital. From a developmental perspective, human capital functions both as an input in raising standard of living and as an outcome, in the sense that improving human capabilities is itself a goal of economic development.

Human capital can be broadly conceptualized as comprising two key components, i.e. education capital and health capital. A well-educated and skilled workforce tends to be more productive, efficient, and adaptable to new technologies, work processes, and organizational structures. Similarly, improved health conditions enhance workers' productivity. Moreover, as noted by Todaro and Smith (2015), investments in education and health capital are mutually reinforcing. Enhancements in the quality of education encourage individuals to invest more in their health, while improvements in health increase the returns on educational investment by enabling individuals to better absorb and apply knowledge.

Several renowned economists and Nobel laureates have extensively examined the role of human capital in economic growth and development, as well as their mutual interdependence. Schultz (1961) emphasized the importance of investment in education and skills as a means of enhancing productivity and promoting economic growth. He particularly highlighted the critical role of human capital improvement in advancing economic development in developing countries. Becker (1962) further advanced this line of thought by formulating 'the theory of human capital' underscoring the significance of investing in education, training, and health as fundamental to economic growth. Human capital has also been at the very center of the modern models of endogenous growth. Later on, the two prominent Nobel Laureate economists within the school of New Growth Theory, Robert Lucas and Paul Romer, have put human capital as one of the core elements in endogenous growth models. Namely, Lucas (1988) puts human capital formation in the center of endogenous economic growth since in contrast to other "classical" production factors, marginal returns on additional unit of human capital do not follow the principle of diminishing marginal returns on factor accumulation. Similarly, in Romer's model of endogenous growth (Romer, 1990), human capital in research (i.e., knowledge creation sector) features as an important determinant of economic growth in a knowledge-based economy.

This paper explores both the theoretical and empirical dimensions of the relationship between the components of human capital and economic growth and development. Section 2 provides a literature review on the links between educational and health capital, on one hand, and economic growth, on the other. Section 3 presents descriptive statistics on education and health expenditures in five selected countries of Southeast Europe, i.e. Albania, Croatia, North Macedonia, Slovenia, and Serbia, over the period 2000–2021. The time frame of the analysis encompasses two major episodes of global economic turbulence, i.e. the 2007–2009 Financial Crisis and the COVID-19 pandemic. Section 4 offers an empirical analysis of the impact of human capital expenditures on the level of economic development in the selected countries. Two panel regression models are employed to estimate the effects of changes in education and health expenditures on GDP per capita. In addition to these two main explanatory variables, the models include three other variables commonly associated with economic growth and development, i.e. gross fixed capital formation per capita, lagged GDP per capita, and the Corruption Perceptions Index as a proxy for institutional quality. Section 5 summarizes the findings of both

theoretical and empirical analyses, offering general policy recommendations and suggestions for future research.

Literature Overview

The concept of human capital has evolved significantly since its early applications in the late 1950s and early 1960s, notably through the works of Mincer (1958), Schultz (1961), and Becker (1962). However, human capital was not explicitly incorporated into the basic neoclassical Solow growth model until Mankiw, Romer, and Weil (1992) extended the model to include human capital accumulation. Lucas (1988) played a pivotal role in advancing the integration of human capital into new endogenous growth models by assuming constant returns to human capital accumulation, thereby positioning it as a key driver of per capita income growth. Later, Lucas (2015) further emphasized the positive spillover effects of education and social learning, explaining that even a simple model could show that "all growth is driven by schooling and on-the-job training" (p. 85).

Education and health are two fundamental components of human capital. From the perspective of economic growth, investments in both areas are vital for increasing per capita income. Todaro and Smith (2015) emphasize the dynamic interplay between education and health, noting that healthier individuals tend to be more productive, thereby yielding higher returns on educational investments, while greater educational attainment enhances the returns on health-related investments. Moreover, education and health function not only as inputs to economic growth but also as outcomes of the development process, representing core objectives of economic development. This dual role is especially significant for developing countries, where sustained investment in education and healthcare systems is essential for fostering inclusive and sustainable growth.

Numerous studies have investigated the relationship between education and economic growth, although the findings have varied depending on country-specific contexts and methodological approaches. Early empirical work, such as that by van Leeuwen (2007), examined the contribution of human capital to economic growth using both Solow-based growth accounting frameworks and macro-regression models incorporating human capital variables. While these studies often found a relatively modest effect of human capital on growth, van Leeuwen attributed this outcome to methodological limitations, including inconsistent definitions of human capital and variations in empirical model specifications.

Several studies have examined the causality between education and economic growth. Agiomirgianakis et al. (2002) identified direct causality from economic growth to primary and secondary education in Greece, while tertiary education exhibited reverse causality. Similarly, Danacica (2011) found unidirectional causality from school education to economic growth in Romania. Barro (2013), in a cross-country analysis involving 100 nations, reported a positive causal relationship between education and economic growth. In the case of Turkey, Erdem and Tugcu (2010) employed cointegration analysis to demonstrate bidirectional causality between higher education and economic growth over the period 1970–2008. In Greece, Pegkas (2014) used Granger causality tests to identify a bidirectional causal relationship between secondary education and economic growth. Further evidence of bidirectional causality between higher education and growth has been provided by studies such as those by Qazi et al. (2014) and Dragoescu (2015), conducted in various national contexts.

The role of health in economic growth has also been extensively examined. Barro (1996) incorporated health capital into his cross-country analysis and found a significant positive effect of health on growth in a sample of 100 countries. Mayer (2001), analyzing data from 18 Latin American countries, identified long-term Granger causality from health improvements to income growth. Von Zon and Muysken (2001) explored the health-growth nexus within an endogenous growth model, demonstrating that improved health enhances labor productivity. However, they also noted that in aging populations, rising health expenditures may eventually act as a substitute for growth due to the increasing demand for healthcare services. Bloom et al. (2004) investigated the channels through which health influences economic growth, including labor productivity, educational attainment, and technological advancement. Their findings underscore the critical role of health investments in promoting long-term economic development. Similarly, Gyimah-Brempong and Wilson (2004) found that health-related human capital

positively affects per capita income growth in both developed and developing countries. Wang (2015) further examined the relationship between healthcare spending and economic growth in OECD countries, concluding that when health expenditures are below 7.55% of GDP, increases in spending have a positive effect on growth. However, once this threshold is exceeded, the marginal impact on growth diminishes, potentially due to the crowding out of other growth-enhancing investments.

Several studies have examined the interaction between education and health in promoting economic growth. Pasara et al. (2020) found that in Zimbabwe, the relationship between education and economic growth is mediated by health, with improvements in health functioning as a transmission channel through which education impacts growth. Jack and Lewis (2009) reviewed both macroeconomic and microeconomic studies on the relationship between health and income. They concluded that while the macroeconomic effects of health on growth are relatively modest and often inconclusive, the microeconomic effects, particularly on individual earning potential, are more substantial and consistent. Erdil and Yetkiner (2009) investigated the relationship between GDP and health expenditures in a sample of 75 countries, identifying bidirectional causality. Their analysis revealed that in high-income countries, causality tends to run from health to GDP, whereas in low- and middle-income countries, the reverse relationship is more prevalent. Similarly, Aghion et al. (2010) reported a strong positive association between initial health conditions and GDP per capita growth, highlighting the critical role of health investments in fostering economic development.

Studies from selected Southeast European countries highlight the critical role of health care spending and human capital in driving economic growth and stability. In Slovenia, Bekő et al. (2019) employ input-output analysis to demonstrate that healthcare sector expenditures generate strong multiplier effects throughout the economy. Both output and income multipliers exceed unity, and each job created in the health sector supports an additional 0.7 jobs in other sectors. Notably, these effects remain stable throughout the business cycle, highlighting the sector's contribution to mitigating economic volatility. In Albania, Xhindi, Kripa, and Shestani (2020) identify a short-term, bidirectional causal relationship between per capita healthcare expenditures and GDP per capita using autoregressive distributed lag (ARDL) models. Their findings suggest that both increased investment and enhanced efficiency in the healthcare sector are essential for improving productivity and promoting economic growth. Qehaja et al. (2023) analyze the impact of government health expenditure on economic growth in Western Balkan countries between 2000 and 2020. Using data from Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia, they examine variables such as health spending, health insurance, longevity, average age, and death rate. Their econometric analysis shows that increased government spending on health significantly and positively influences GDP per capita growth. The study highlights that investing in healthcare improves human capital by enhancing population health and productivity, which in turn supports stronger economic growth in the region. Similarly, in Serbia, Josipovic and Molnar (2018) show that human capital, measured by the level of higher education among employees, and entrepreneurship significantly contribute to rural economic growth. Their results emphasize the importance of developing knowledge and entrepreneurial capacity as key drivers of broader regional development. Based on the World Bank report *Harnessing Human Capital for Growth in Croatia* (World Bank, 2024), the country faces challenges in maximizing its human capital due to demographic decline, skills mismatches, and emigration of young and educated workers. The report highlights the need for Croatia to improve education outcomes, expand access to quality early childhood development, invest in lifelong learning, and strengthen health and social protection systems. These measures are essential to boost productivity, retain talent, and support sustainable economic growth in the face of an aging population and labor shortages.Collectively, these findings affirm the importance of strategic investment in health and human capital for sustainable economic advancement in Southeast Europe.

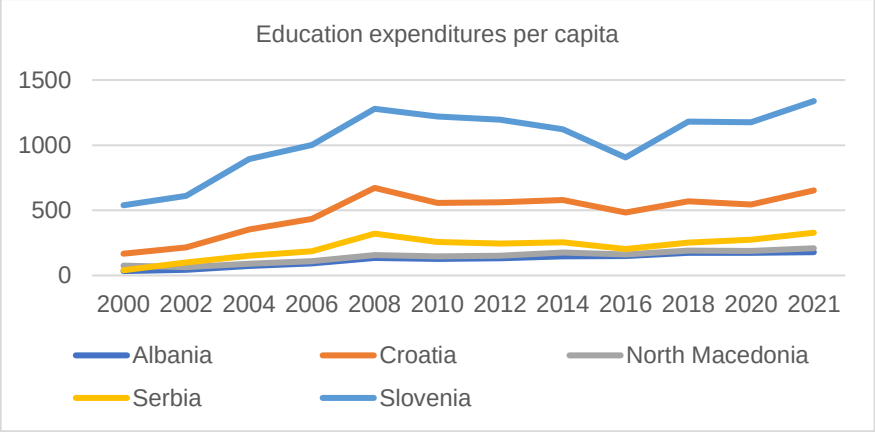
Descriptive Statistics

To address the research question of this paper, the analysis focuses on the impact of education and health expenditures on the level of economic development in a sample of five Southeast European (SEE) countries, i.e. Albania, Croatia, North Macedonia, Serbia, and Slovenia. These countries share significant geographical, historical, and socio-economic characteristics that justify a comparative

analysis. All five underwent a transition from centrally planned to market-oriented economies, with Slovenia and Croatia becoming members of the European Union, while the remaining countries are EU candidates. This shared transition has profoundly influenced the structure and functioning of their education and healthcare systems, rendering these sectors essential for promoting economic development. Moreover, the region faces common challenges, including aging populations, economic restructuring, and persistent unemployment. These countries also engage in regional cooperation initiatives aimed at fostering growth and integration. Analyzing the relationship between education and health expenditures, and economic development in this context provides valuable insights into the broader regional dynamics.

Figure 1 and Figure 2 present the relative levels and trends of education and health expenditures during the period 2000–2021 in the five SEE countries included in the sample. The data are sourced from the World Bank database. As shown in Figure 1, Slovenia stands out with significantly higher per capita education expenditures compared to the other four countries. In contrast, Albania and North Macedonia consistently record the lowest levels of education spending per capita. Regarding the dynamics of expenditure, a general upward trend is observed across most countries from 2000 until the onset of the 2008 Financial Crisis. Following the crisis, a downward trend persisted until approximately 2016, after which the data indicate a gradual recovery and renewed upward movement in education expenditures.

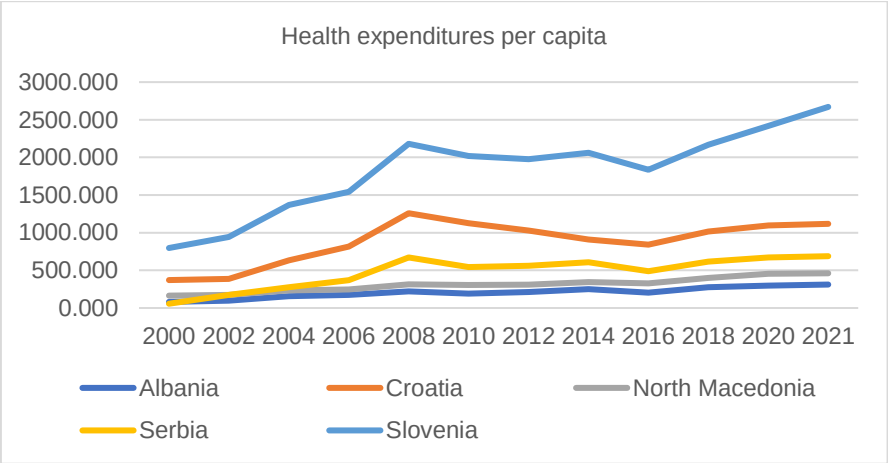
Figure 1: Education expenditures per capita in selected countries of Southeast Europe



Source: World Bank, World Development Indicators

Figure 2 illustrates the trends in health expenditures per capita, which closely mirror those observed in education expenditures. Once again, Slovenia emerges as the country with significantly higher health expenditures compared to the other countries in the sample. In contrast, Albania and North Macedonia consistently exhibit substantially lower levels of health spending. From a dynamic perspective, the period from 2000 to 2008 was marked by a general upward trend in health expenditures across all five countries. Following the 2008 Financial Crisis, these trends reversed, showing a period of decline. However, since 2016, health expenditures have been on the rise in all countries, with a particularly sharp increase observed in the final two years of the period (2020–2021), likely driven by heightened healthcare spending in response to the COVID-19 pandemic.

Figure 2: Health expenditures in selected countries of Southeast Europe



Source: World Bank, World Development Indicators

A common feature observed in both types of human capital expenditures is the noticeable gap between the EU member states (Slovenia and Croatia) and the non-EU countries (Albania, North Macedonia, and Serbia). The former consistently exhibits higher levels of investment in education and health compared to the latter. This divergence in human capital expenditure suggests a potential long-term risk for the non-EU countries in the Southeast European region, as insufficient investment in these sectors may hinder their prospects for sustained economic growth and development.

The allocation of financial resources to education and healthcare systems is vital for promoting economic progress and improving societal well-being. Table 1 presents a comparative analysis of average per capita expenditures on health and education, expressed as a percentage of per capita gross domestic product (GDP), for the five selected SEE countries, i.e., Albania, Croatia, North Macedonia, Serbia, and Slovenia.

Table 1: Average human capital expenditures per capita as a % of GDP per capita

	Health Expenditures	**Education Expenditures**
Albania	5.35	3.16
Croatia	7.11	3.90
North Macedonia	6.94	3.20
Serbia	8.67	3.97
Slovenia	8.39	4.83

Source: Authors' calculations

The data provide valuable insights into the health expenditure priorities of the selected Southeastern European (SEE) countries. Albania allocates the lowest share, with only 5.35% of its GDP per capita directed towards health expenditures, indicating a relatively limited financial commitment to the healthcare system. In contrast, Croatia demonstrates a strong commitment to health, allocating 7.11% of its GDP per capita to healthcare. North Macedonia follows closely, with 6.94%, reflecting a considerable focus on strengthening its health system. Serbia stands out with the highest proportion, dedicating 8.67% of its GDP per capita to health expenditures, suggesting substantial investment in healthcare infrastructure and services. Slovenia also exhibits a high level of commitment, allocating 8.39% of its GDP per capita to health, further underscoring the importance placed on healthcare in the country's development priorities.

The data on education expenditures as a percentage of per capita gross domestic product (GDP) provide valuable insights into the financial priorities of the analyzed Southeast European countries. Albania allocates approximately 3.16% of its GDP per capita to education, reflecting a deliberate effort

to prioritize investment in human capital. Croatia allocates a slightly higher share at 3.90%, underscoring the country's recognition of education as a key driver of societal development. North Macedonia dedicates 3.20% of its GDP per capita to education, indicating a measured approach to balancing economic constraints with educational priorities. Serbia invests 3.97%, highlighting the country's commitment to strengthening human capital as a foundation for economic progress and productivity. Slovenia leads the group, allocating 4.83% of its GDP per capita to education, signaling a strong commitment to addressing educational needs and challenges. Taken together, these figures illustrate the varying strategies and levels of commitment among the countries in the region, emphasizing the central role of education investment in fostering sustainable economic and social development.

Table 2 presents the Human Capital Index (HCI) estimates, an indicator recently developed by the World Bank to assess the level of human capital development across countries. The estimates provided are for the years 2018 and 2020, which represent the only available data for the countries analyzed in this study. The HCI was introduced in the *World Development Report 2019*, which serves as the primary source for these values. According to the World Bank (2020), "The HCI calculates the contributions of health and education to worker productivity. The final index score ranges from zero to one and measures the productivity of a child born today, as a future worker, relative to the benchmark of complete education and full health." The index is constructed from six core components that capture both education and health dimensions, i.e. (1) the probability of survival to age five; (2) expected years of schooling; (3) harmonized test scores; (4) learning-adjusted years of schooling; (5) the share of children under five not stunted; and (6) the adult survival rate. These components are aggregated to produce a composite score, offering an integrated measure of the quality of human capital in a given country.

Table 2: Human Capital Index for the five countries of Southeast Europe for the years 2018 and 2020

Year	**Human Capital Index**				
	Albania	Croatia	North Macedonia	Serbia	Slovenia
2018	0.62	0.72	0.53	0.76	0.79
2020	0.63	0.71	0.56	0.68	0.77

Source: The World Bank (2020), Human Capital Index 2020

The Human Capital Index (HCI) scores for the five selected countries reveal notable trends between 2018 and 2020. Slovenia consistently recorded the highest HCI, reflecting its sustained and effective investment in human capital. In contrast, North Macedonia had the lowest score, indicating substantial room for improvement. Albania showed a slight increase in its HCI, rising from 0.62 in 2018 to 0.63 in 2020, suggesting modest progress. Conversely, Croatia experienced a marginal decline, from 0.72 to 0.71, implying a slight weakening in human capital development. Serbia exhibited the most pronounced decline, with its HCI falling from 0.76 in 2018 to 0.68 in 2020, pointing to a potential erosion of previous gains in human capital. These variations underscore the need for targeted and sustained policy interventions to improve the quality of human capital, particularly in North Macedonia, where reforms are most urgently needed to support long-term economic growth.

Empirical Research

This study employs a panel data approach to examine the relationship between human capital and economic growth in five Southeast European countries, i.e., Albania, Croatia, North Macedonia, Serbia, and Slovenia. The analysis is based on a balanced panel dataset covering the period from 2000 to 2021. Panel data methodology is selected for its numerous advantages, including richer information content, greater variability, reduced multicollinearity among explanatory variables, increased degrees of freedom, and improved estimation efficiency (Gujarati, 2004, p. 637). Moreover, panel analysis is particularly well-suited for investigating the dynamics of economic growth over time (Durlauf and Quah, 1998).

The study incorporates two key indicators of human capital, i.e. education expenditures per capita (EE) and health expenditures per capita (HE), which serve as the primary independent variables in the empirical models. The dependent variable is gross domestic product per capita (GDP), used as a proxy

for the level of economic development. In addition to the human capital indicators, the model includes three control variables known to influence economic growth and development, i.e. gross fixed capital formation per capita (GCF), representing investment in physical capital; the one-period lagged value of GDP per capita (GDP_{t-1}), capturing the effect of previous economic performance; and the Corruption Perceptions Index (CPI) from Transparency International, serving as a proxy for institutional quality. The analysis is based on annual data for the period 2000–2021.

Data on gross domestic product, education expenditures, health expenditures, and gross fixed capital formation were obtained from the World Bank database, while data on the Corruption Perceptions Index were sourced from Transparency International.

Model Specification and Methodology

The empirical analysis is based on cross-sectional regression using two panel models: one focusing on education-based human capital (Model 1) and the other on health-based human capital (Model 2). The model specifications are as follows:

Model 1:

$$GDP_{it} = \beta_0 + \beta_1 * EE_{it} + \beta_2 * GCF_{it} + \beta_3 * GDP_{i(t-1)} + \beta_4 * CPI_{it} + \varepsilon_{it} \quad (1)$$

Model 2:

$$GDP_{it} = \beta_0 + \beta_1 * HE_{it} + \beta_2 * GCF_{it} + \beta_3 * GDP_{i(t-1)} + \beta_4 * CPI_{it} + \varepsilon_{it} \quad (2)$$

where:
GDP_{it} - current gross domestic product per capita for country *i* in period *t*,
EE_{it} – education expenditures per capita for country *i* in period *t*,
HE_{it} – health expenditures per capita for country *i* in period *t*,
GCF_{it} – gross fixed capital formation per capita for country *i* in period *t*,
$GDP_{i(t-1)}$ – one-period lagged gross domestic product per capita for country *i* in period *t*-1,
CPI_{it} – value of the corruption perception index for country *i* in period *t,*
ε_{it} – residual term.

The panel regression models are estimated using appropriate econometric techniques, including fixed effects estimation, correlation analysis, and tests for the stationarity of variables. The estimated coefficients offer insights into the relationships between the level of economic development and key explanatory variables, i.e. human capital, physical capital investment, perceived corruption, and the initial level of GDP. The statistical significance of these relationships is evaluated using standard hypothesis testing procedures and robustness checks to ensure the reliability of the results.

The analysis begins with testing the stationarity of the time series variables. As the empirical investigation relies on time series data, assessing the stationarity of the variables is essential to ensure the validity of the regression results. Stationarity was evaluated using the Augmented Dickey-Fuller (ADF) test, a widely applied method for detecting the presence of unit roots in time series data. The ADF test was conducted for each variable included in the model, namely, GDP per capita, education expenditures, health expenditures, gross fixed capital formation, and the Corruption Perceptions Index. The test results indicated that all variables are stationary at their levels. The ADF test statistics were statistically significant, leading to the rejection of the null hypothesis of a unit root. These findings suggest that the variables are stationary in levels, implying the presence of stable long-run relationships among them (see Table 3).

Table 3: ADF Unit Root test results

Series	GDP	EE	HE	GCF	GDP (-1)	CPI
Level of differentiation	0	0	0	0	0	0

Source: Authors' calculations

To obtain a preliminary understanding of the relationships among the variables included in the models, a correlation analysis was conducted. The results of this analysis are presented in Table 4. The

correlation coefficients measure both the strength and direction of the linear associations between pairs of variables. The statistical significance of these coefficients is assessed at the 95% confidence level.

The results of the correlation analysis, presented in Table 4, indicate that all correlation coefficients are statistically significant at the 95% confidence level. This finding suggests the existence of meaningful associations among the variables under investigation. The observed positive and statistically significant correlations provide preliminary evidence of potential relationships, thereby justifying and supporting the implementation of the subsequent regression analysis.

Table 4: Correlation Analysis

	GDP	EE	HE	GCF	GDP (-1)	CPI
GDP	1					
EE	0.989*	1				
HE	0.981*	0.810*	1			
GCF	0.964*	0.940*	0.924*	1		
GDP (-1)	0.981*	0.974*	0.962*	0.933*	1	
CPI	0.916*	0.897*	0.888*	0.911*	0.906*	1

Source: Authors' calculations

Subsequently, the Hausman test was conducted to determine the appropriate model specification, fixed effects or random effects, for the analysis. The null hypothesis assumes the suitability of the random effects model, while the alternative hypothesis favors the fixed effects model. The results of the Hausman test are presented in Table 5.

Table 5: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Probability
Model 1	51.17	0.0000
Model 2	9.74	0.0451

Source: Authors' calculations

The p-values associated with the Chi-square test statistic (Prob < Chi-Sq.) are reported as 0.0000 and 0.0451 for the two models, respectively, indicating statistically significant differences in the estimated coefficients. The overall outcome of the Hausman test supports the adoption of the fixed effects model, which considers the differences for individual countries by allowing the intercept to vary cross-sectionally. In the fixed effects model, it is assumed that all slope estimates remain constant both across different cross-sections and over time.

Results and Discussion

The results of the cross-country regression analysis are presented in Table 6. The two model specifications are identical, with the exception that Panel 1 includes education expenditures as the human capital variable, while Panel 2 incorporates health expenditures in its place.

Table 6: Panel Regression Results

Panel 1 Dependent Variable: log GDP Number of obs. 110				
	Coef.	**Std. Err.**	**t**	**P > | t |**
Log Education expenditures	0.6580	0.0495	13.29	0.000
Log Gross fixed capital formation	0.1799	0.0336	5.36	0.000
Log GDP lagged (-1)	0.1340	0.0352	3.81	0.000
Log Corruption Perception Index	2.3334	0.1527	1.88	0.063
Panel 2 Dependent Variable: GDP Number of obs. 110				
	Coef.	**Std. Err.**	**t**	**P > | t |**
Log Health expenditures	0.4334	0.0567	7.65	0.000
Log Gross fixed capital formation	0.2328	0.0460	5.07	0.000
Log GDP lagged (-1)	0.2996	0.0394	7.61	0.000
Log Corruption Perception Index	0.0760	0.0667	1.14	0.258

Source: Authors' calculations

The empirical findings offer important insights into the determinants of economic growth, particularly within the context of Southeast European (SEE) countries. The results underscore the critical role of education and health expenditures, capital investment, previous GDP performance, and perceptions of corruption in influencing economic outcomes.

One of the most compelling findings is the strong and statistically significant impact of education expenditures on GDP per capita. The coefficient of 0.6580 in Panel 1 indicates that increased investment in education generates substantial economic benefits, lending empirical support to human capital theory, which posits that a well-educated workforce enhances productivity and drives economic expansion. These results underscore the importance of prioritizing education spending as a strategic policy measure to sustain long-term economic growth.

Similarly, health expenditures demonstrate a significant and positive relationship with GDP per capita, as indicated by the coefficient of 0.4334 in Panel 2. This finding highlights the fundamental role of health in economic development, as healthier populations tend to exhibit higher labor productivity and impose lower healthcare-related burdens on the economy. The strong statistical significance ($p < 0.05$) further suggests that policies aimed at increasing investment in healthcare can have a meaningful and positive impact on economic performance.

The results for gross fixed capital formation further affirm the critical role of physical capital investment in promoting economic growth. The coefficients of 0.1799 in Panel 1 and 0.2328 in Panel 2 indicate that increased investment in infrastructure and productive assets contributes positively to GDP. These findings are consistent with classical economic theories that emphasize capital accumulation as a fundamental driver of productivity and output growth

The inclusion of lagged GDP in both models highlights the presence of economic persistence, suggesting that past levels of economic performance significantly influence current growth trajectories. The coefficients of 0.1340 in Panel 1 and 0.2996 in Panel 2 indicate that historical economic momentum plays a critical role in shaping present economic outcomes. This finding underscores the importance of maintaining macroeconomic stability and implementing consistent, growth-oriented policies over time.

The results for the Corruption Perceptions Index (CPI) offer valuable insights into the role of institutional quality in economic growth. In both panels, the coefficient is positive, indicating that higher levels of perceived corruption are associated with higher GDP per capita. However, the statistical significance of this relationship varies. In Panel 1, the CPI is significant at the 10% level, suggesting a moderate influence of corruption perception on economic growth. In contrast, the coefficient in Panel 2 is not statistically significant, implying that while institutional quality may affect economic performance, its direct impact may be less pronounced than that of other factors such as education and capital investment. Nonetheless, these findings support the broader argument that reducing corruption enhances institutional efficiency, thereby improving resource allocation and contributing to economic growth.

Overall, the empirical analysis underscores the critical importance of human capital development, capital investment, economic persistence, and institutional transparency in promoting sustained economic growth in Southeast European (SEE) countries. The findings highlight the need for policy interventions that prioritize expenditures on education and healthcare, encourage investment in infrastructure, and strengthen institutional frameworks to combat corruption. By focusing on these key areas, policymakers can foster a more resilient and sustainable economic environment, ultimately contributing to improved living standards across the region.

Conclusion

This paper investigates the impact of human capital on economic growth and development. The reviewed literature highlights education and health as two fundamental components of human capital that influence both the level and dynamics of economic development. A panel data approach was employed, and two panel regression models were developed to examine the relationship between GDP levels and expenditure on education and health in a sample of five Southeast European countries. The

empirical analysis reveals a statistically significant and positive relationship between GDP per capita and spending on education and health across the selected countries. In addition, the results confirm that economic growth and development are positively influenced by the level of physical capital investment, as well as by lagged GDP values, indicating the importance of economic persistence. Moreover, the findings suggest that institutional quality and governance play a beneficial role in promoting economic growth and development. Within the context of human capital, higher institutional quality may enhance the effectiveness of policies aimed at accelerating growth through increased investment in education and healthcare.

Among the countries analyzed, Slovenia and Croatia, both EU member states, demonstrate higher and more stable levels of investment in human capital and institutional quality, which are associated with stronger economic growth performance. These countries serve as valuable benchmarks for their non-EU neighbors, Albania, North Macedonia, and Serbia, which generally exhibit lower levels of public expenditure on education and health and face more pronounced institutional challenges.

For the non-EU Southeast European countries, prioritizing increased public investment in education and healthcare is essential for cultivating a healthier, more productive workforce capable of supporting sustainable economic growth. Equally important is the enhancement of institutional quality through improved transparency and governance, which is critical to maximizing the efficiency and impact of investments in both human and physical capital. These countries may also benefit from adopting the best practices and policy frameworks employed by their EU counterparts, particularly in aligning their education, healthcare, and anti-corruption systems with EU standards. Such an alignment could facilitate greater access to structural funds and development assistance. Furthermore, a focus on sustained capital formation, through increased investment in physical infrastructure and productive assets, alongside human capital development, is likely to generate synergistic effects that strengthen long-term economic growth.

This paper contributes to the existing literature on human capital and economic growth by reinforcing and expanding upon foundational theories established by Mincer (1958), Schultz (1961), Becker (1962), and the extended Solow growth model of Mankiw, Romer, and Weil (1992), as well as Lucas's endogenous growth framework (1988, 2015). While earlier studies have predominantly examined education or health separately, this research highlights the combined and synergistic roles of education and health investments in fostering economic growth, particularly within non-EU Southeast European countries, a context that remains underexplored. Empirically, it builds on regional analyses such as Bekő et al. (2019) and Qehaja et al. (2023) by providing updated evidence of how increased public expenditures on education and healthcare, alongside improvements in institutional quality and gross fixed capital formation, significantly contribute to GDP growth in these transitional economies. Furthermore, the paper offers practical policy recommendations that emphasize adopting EU-aligned standards and reforms to enhance human capital development, institutional transparency, and physical capital investment. Nevertheless, further research is warranted to incorporate additional indicators of institutional quality and to model more explicitly the interaction between institutional factors and the efficiency of education and health expenditures. From a policy perspective, the combined results of the descriptive and econometric analyses underscore the need for all countries, particularly non-EU member states, to prioritize investment in human capital as a central component of their development strategies.

Concerning the geographic scope of this study, the sample includes Slovenia, Croatia, Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia, countries that represent a subset of Southeast Europe. This selection was guided by data availability as well as the shared economic and developmental characteristics of these countries, making them a relevant group for examining the impact of government health expenditure on economic growth. However, we acknowledge that the sample is not fully representative of the entire Southeast European region, as several countries were excluded due to incomplete or inconsistent data on key variables such as health and education expenditures. This limitation restricts the general perception of the findings to all Southeast European

countries. Moreover, variations in data quality, differences in reporting standards, and the relatively short time frame (2000–2020) constrain the robustness and long-term perspective of the analysis. Additionally, while expenditure levels are used as proxies for human capital investment, they do not account for qualitative dimensions of health and education services, which may also significantly influence economic outcomes. Future research could address these limitations by incorporating more comprehensive, standardized, and high-quality datasets that cover a broader range of Southeast European countries. Extending the timeframe and including qualitative indicators of human capital, such as learning outcomes, service accessibility, and healthcare effectiveness, would further enhance the depth, accuracy, and policy relevance of future analyses.

References

Aghion, P., Howitt, P. and Murtin, F. (2010), "The relationship between health and growth: when Lucas meets Nelson-Phelps", Working Paper, no. w15813, National Bureau of Economic Research.

Agiomirgianakis, G., Asteriou, D. and Monastiriotis, V. (2002), "Human capital and economic growth revisited: A dynamic panel data study". *International Advances in Economic Research,* Vol. 8 No. 3*,* pp.177-187.

Barro, R. (1996), "Health and economic growth", *Working Paper*, Harvard University.

Barro, R. J. (2013), "Education and economic growth", *Annals of Economics and Finance,* Vol. 14 No. 2A*,* pp. 277-304.

Becker, G. S. (1962), "Investment in human capital: a theoretical analysis". *Journal of Political Economy*, Vol. 70 No. 5, pp. 9-49.

Bekő, J., Jagrič, T., Fister, D., Brown, C., Beznec, P., Kluge, H. and Boyce, T. (2019), "The economic effects of health care systems on national economies: An input-output analysis of Slovenia", *Applied Economics*, Vol. 51 No. 37, pp. 4116-4126.

Bloom D., Canning D. and Sevilla J. (2004), "The effect on health on economic growth: A production function approach", *World Development*, Vo.32 No.1, pp 1-13.

Danacica, D. E. (2011), "Causality between school education and economic growth in Romania", *Argumenta Oeconomica*, Vol. 1 No. 26*,* pp.57–72.

Dragoescu, R. M. (2015), "Education as a determinant of economic growth. The case of Romania", *Procedia-Social and Behavioral Sciences*, Vol. 197, pp. 404-412.

Durlauf, S. N. and Quah, D. T. (1998), "The new empirics of economic growth", *Working Paper 6422*, Centre for Economic Performance, London School of Economics and Political Science.

Erdem, E. and Tugcu, C. (2010), "Higher education and economic growth: an empirical investigation of cointegration and causality for Turkish economy", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, Vol. 36, pp. 1-14.

Erdil, E. and Yetkiner, I. H. (2009), "A panel data approach for income-health causality", available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.462.1318andrep=rep1andtype=pdf (accessed on 10.06.2023).

Gujarati, D. (2004), *Basic Econometrics*, 4th edition, The McGraw−Hill Inc, Newyork.

Gyimah-Brempong, K. and Wilson, M. (2004), "Health human capital and economic growth in Sub-Saharan African and OECD countries", *The Quarterly Review of Economics and Finance*, Vol. 44 No. 2, pp. 296-320.

Gyimah-Brempong, K. and M. Wilson (2005), "Human capital and economic growth. Is Africa different?", *Journal of African Development*, Vol. 7 No. 1, pp. 73-109.

Jack, W. and Lewis, M. (2009), "Health investments and economic growth: Macroeconomic evidence and microeconomic foundations", Spence, M., Lewis, M. (Eds), *Health and Growth*, World Bank, Washington D.C.

Josipović, S. and Molnar, D. (2018), "Human capital, entrepreneurship and rural growth of the Serbian economy", *Acta Economica*, Vol. 16 No. 29, pp. 39-62

Lucas Jr, R. E. (1988), "On the mechanics of economic development", *Journal of Monetary Economics*, Vol. 22 No. 1, pp. 3-42.

Lucas, Jr, R. E. (2015), "Human capital and growth", *American Economic Review*, Vol. 105 No. 5, pp. 85-88.

Mankiw, N. G., Romer, D. and Weil, D. N. (1992), “A contribution to the empirics of economic growth”, *The Quarterly Journal of Economics*, Vol. 107 No. 2, pp. 407-437.
Mayer, D. (2001), “The long-term impact of health on economic growth in Latin America”, *World Development*, Vol. 29 No. 6, pp. 1025-1033.
Mincer, J. (1958), “Investment in human capital and personal income distribution”, *The Journal of Political Economy,* Vol. 66, pp. 281-302.
Pasara, M. T., Mutambirwa, T. K. and Diko, N. (2020), “The trivariate causality among education, health, and economic growth in Zimbabwe”, *Sustainability*, Vol. 12 No. 4, pp. 1357-1372.
Pegkas, P. (2014), “The link between educational levels and economic growth: A Neoclassical approach for the case of Greece”, *International Journal of Applied Economics*, Vol. 11 No. 2, pp. 38-54.
Qazi, W., Raza, S. A. and Jawaid, S. T. (2014), “Higher education and growth performance of Pakistan: evidence from multivariate framework”, *Quality & Quantity*, Vol. 48, pp. 1651-1665.
Qehaja, S. S., Qehaja, D., Arber, H. O. T. I. And Marovci, E. (2023), “The relationship between government health expenditure and economic growth: Evidence from western Balkan countries”, *International Journal of Applied Economics, Finance and Accounting*, Vol. 15 No. 1, pp. 10-20.
Romer, P. M. (1990), “Endogenous technological change”, *Journal of Political Economy,* Vol. 98 No. 5, Part 2: The Problem of Development: A Conference of the Institute for the Study of Free Enterprise Systems, pp. S71-S102.
Schultz, T. W. (1961), “Investment in human capital”, *The American Economic Review*, Vol. 51 No. 1, pp. 1-17.
Solow, R. M. (1956), “A contribution to the theory of economic growth”, *The Quarterly Journal of Economics*, Vol. 70 No. 1, pp. 65-94.
The World Bank (2020), *Human Capital Index 2020.* https://datacatalog.worldbank.org/search/dataset/0038030/Human-Capital-Index.
Todaro, M.P. and Smith S.C. (2015), *Economic Development*, 12th Edition, Pearson, Boston, pp. 860.
Van Leeuwen, B. (2007), *Human Capital and Economic Growth in India, Indonesia, and Japan: A quantitative analysis, 1890-2000*, ISBN: 978 90 8891 003 6, Printed in the Netherlands.
Van Zon, A. and Muysken, J. (2001), “Health and endogenous growth”, *Journal of Health Economics*, Vol. 20 No. 2, pp. 169-185.
Wang, F. (2015), “More health expenditure, better economic performance? Empirical evidence from OECD countries”, *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, Vol. 52, pp.1-5.
World Bank (2024), *Harnessing Human Capital for Growth in Croatia - Unleashing Potential for Economic Takeoff Amid Demographic and Technological Change*, World Bank.
Xhindi, T., Kripa, E. and Shestani, K. (2020), “Causality between economic growth and health expenditure: A time series analysis from 1996 till 2017 in Albania”, *WSEAS Transactions on Environment and Development*, Vol. 16, pp. 276-285.