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The Impact of Public Education Expenditure on Economic Growth in Kosova: A Quantitative Analysis

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Abstract

This paper analyses the impact and correlation of different education indicators on the economic growth of Kosova from 2012 to 2022. Using time-series data, this paper applies the Cobb-Douglas production function as a measurement model. The main findings demonstrate a mixed impact on growth, where public expenditure on education as a percentage of government expenditure contributed a solid positive impact and statistically significant effect, while the gender parity index exhibited a less significant positive impact on growth. In contrast, only public expenditure on education as a percentage of GDP showed a negative impact, while other examined variables have not displayed a significant positive impact on the economic growth of Kosova. These findings suggest that the effective allocation of education expenditures and the alignment of these expenditures with broader economic objectives are crucial for maximizing growth potential and fostering economic development in Kosova. In terms of policy implications, institutions in Kosova and other relevant policymakers should prioritize enhancing the quality of the education system and adopting policies that not only increase expenditures for education but also improve specific aspects. These policies enable the education system of Kosova to become a significant contributor to economic performance and sustainable long-term growth.

Keywords: education system; human capital development; investment(s) in education; Kosova; labour market; public expenditure on education

JEL classification: C10, C22, H52, I24, I25, J24, O40

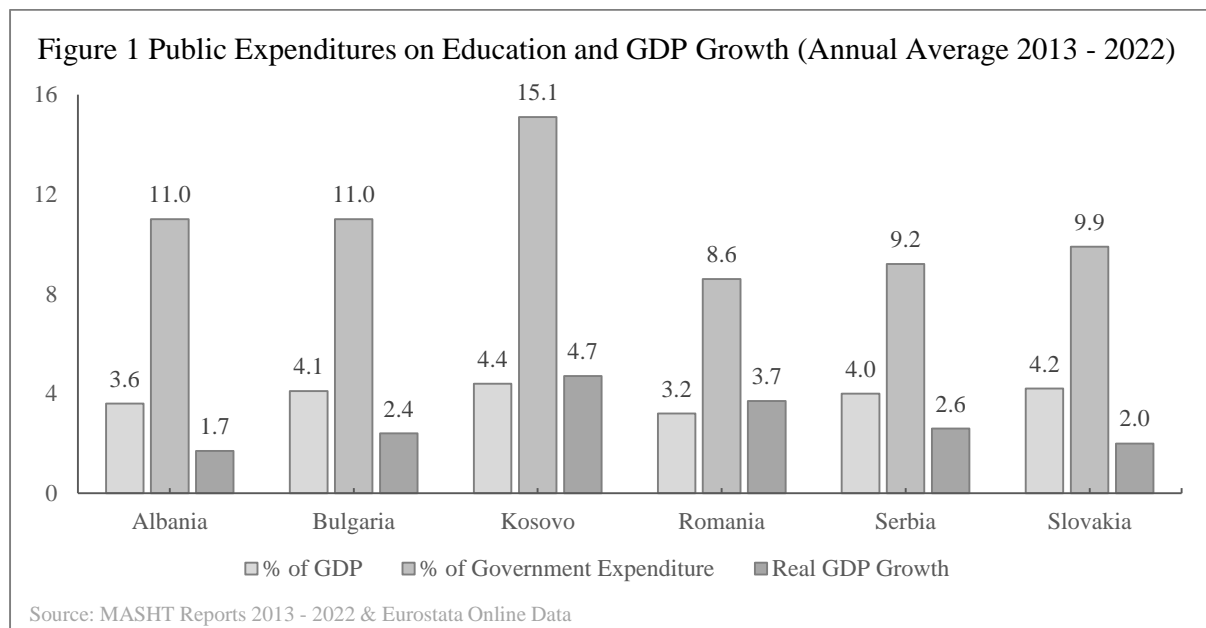
Introduction

Education is recognized globally as a critical driver of human capital development, economic prosperity, and growth. As a result, numerous countries are prioritizing the enhancement and modernization of their education systems (Hanushek and Wößmann 2010; Marquez-Ramos and Mourelle 2019; Suwandaru *et al.* 2021). Investments in education, viewed as public expenditures, play a vital role in enhancing various aspects of society. They contribute to improving living standards, boosting social welfare, increasing productivity, raising wages, and driving economic growth (Ciucu and Dragoescu 2014; Fekri-Ziber *et al.* 2022). Besides these expenditures, government expenditures on education are crucial for improving the quality of the education system, enhancing human capital, and boosting economic productivity (Del Boca *et al.* 2018). The primary aim of this paper is to analyze the impact and correlation of key educational indicators/variables, such as public expenditure on education as a percentage of GDP and government expenditure, human capital development as a percentage of GDP per capita, gross enrolment rate in lower- and upper-secondary education, and the gender parity index up to secondary education on Kosova's economic growth from 2012 to 2022. The structure of this paper is as follows: Section 2 covers the literature review; Section 3 details the

research methodology, including research design, data collection and model specification; Section 4 presents the main findings; and Section 5 offers the conclusions.

Literature Review

Nowadays, the government plays a vital role in the education system and primary healthcare across most countries worldwide (Afonso and Jalles 2014; Churchill *et al.* 2015). Government public expenditures are considered essential for economic growth, and as growth increases, these expenditures tend to focus more on investments in the education system, healthcare, and welfare services (Taiwo and Abayomi 2011; Patel and Annapoorna 2019). Consequently, public expenditures on education constitute a substantial financial burden on the overall state budget of any country (Ifa and Guetat 2018). However, many countries are continually striving to increase their public investment (expenditure) in the education system (Chandra, 2010). Thus, developed countries (such as the USA and the UK) have significantly increased their public expenditures on education, doubling their investment throughout the 19th and 20th centuries (Carpentier 2006). Between 2000 and 2020, many countries significantly raised their public expenditure on education, with the total amount rising from \$4.8 billion to \$12.7 billion and at the same time, the proportion of public expenditure on education relative to GDP also saw a notable increase (Miningou 2019; World Bank Report 2019). According to (MEST Report 2022), Kosova's public expenditures on education are comparable to or exceeds that of regional countries in terms of both percentage of GDP and overall government expenditures (see Figure below).



However, public expenditures on education consume a significant portion of national funds and high-income countries (such as Denmark at 8.2%, Sweden at 7.6%, etc.) allocate a larger percentage of their GDP to education compared to low-income countries (such as Myanmar at 1.8%, etc.), and thus, high-income countries generally achieve higher levels of educational attainment and development (Craigwell *et al.* 2012; Gupta *et al.* 2004/a; Ifa and Guetat 2018). Low-income countries, however, tend to experience lower levels of educational outcomes (OECD Report 2022/a). In terms of Balkan countries, the education system provides a lower

quality of education, and the development of science continues to decline compared to other European countries (Dumciuviene 2015; Živković and Panić 2020). As a result, the education system in these countries has failed to deliver the quality education needed for a modern economy (Hajdari and Fetaj 2022; Uvalic and Bartlett 2020). Despite these challenges, education has demonstrated a positive correlation with economic development and GDP per capita in most Balkan countries (Erić 2018). Among the numerous challenges Kosovo faces on its path to development and growth, education reform and improvement are top priorities for its institutions and Kosovo's public expenditures on education as a percentage of GDP remains above the regional average (OECD Report 2022/b).

Then, government public expenditures on education are crucial, but they should also consider the timing of their impact (Del Boca *et al.* 2018). Government public expenditures on early education are crucial and more cost-effective than later educational stages, it significantly influences children's outcomes and their future educational trajectories. Moreover, early stage of education provides higher returns and has a more profound impact compared to interventions during adolescence or adulthood (Carneiro and Heckman 2003; Cunha *et al.* 2006; Shonkoff and Phillips 2000). Consequently, higher investments in early stage of education in Northern European countries have led to better educational outcomes and reduced inequality, while lower investments in early stage of education in Southern European countries have resulted in poorer education outcomes, lower education performance, and increased inequality (OECD Report 2013). The authors (Devarajan *et al.* 2011; Farayibi and Folarin 2021) have concluded that the disproportionate government expenditures across different education levels can lead to a misalignment with global knowledge standards and educational competitiveness, it creates mismatches with labour market demands and results in insufficient skills to drive economic growth and development.

However, increasing overall expenditure on education, particularly in primary and secondary education has positively impacted educational attainment. The findings suggest that a 1 percent increase in GDP allocated to education expenditure can boost gross enrolment rates at the secondary level by more than 3 percent (Baldacci *et al.* 2003; Gupta *et al.* 2004/b). Consequently, gross enrolment rates significantly influence economic development, though the impact may take time to materialize. Additionally, higher enrolment and improved education quality contribute to more equitable income distribution and help reduce socioeconomic inequalities within a country's population (Grant 2017; Tilak 2003; UNESCO Report 2010). But, low-income countries should implement policies aimed at reducing poverty to eliminate the direct costs of schooling, which can significantly boost upper secondary school enrolment (Asante 2022). On the other hand, when secondary education enrolment rates are relatively high, investments and the labour market may not positively impact economic growth, however, in cases where enrolment rates are lower, they can contribute positively to growth. In contrast, higher tertiary education enrolment rates consistently enhance a country's economic activities and positively impact growth (Marquez-Ramos and Mourelle 2019).

Despite the effects in terms of the gross enrolment rate on economic growth, gender gaps in education are recognized as key drivers of gender inequalities across various socio-economic dimensions (Bertocchi and Bozzano 2019). Thus, many countries and regions have succeeded

in reducing gender disparities in primary and secondary education, but achieving gender parity in higher education remains a challenge in many countries (UN Report 2017). A study by (Keller 2018) indicates that a high gender parity index ratio helps reduce infant mortality rates, poverty and income inequality, and it also contributes positively to economic growth and GDP per capita. Based on the dynamic panel estimation model, the gender parity index for education enrolment significantly stimulated economic growth in the 20 high-income OECD countries between 1980 and 2015 (Khan *et al.* 2017). Also, authors (Bertay *et al.* 2020; Kim *et al.* 2016; Saba *et al.* 2023) have found that women's time allocation through labour market participation and the enhancement of their accumulated human capital are associated with improvements in the gender parity index, which has notably contributed to economic growth in Asian economies. Another study by (Mishra *et al.* 2020) has provided evidence that improvements in the gender parity index across education, healthcare, the labour market, and political electoral aspects have a broadly positive impact on long-term economic growth.

Despite these estimations and evidence regarding the impact of gross enrolment rates and the gender parity index on growth, the education system is widely regarded as a crucial investment for the global economy, with the potential to transform human, social, economic and cultural aspects of individuals and societies worldwide over the long term (Churchill *et al.* 2015; Obi and Obi 2014). In the short-term, the education system has made a significant contribution to boosting economic activities (De Ridder *et al.* 2020). Education positively influences economic growth and significantly impacts reducing inequality and poverty rates. It also enhances well-being, boosts labour productivity and increases a country's innovative and technological capacities (Breton 2013; Castelló-Climent 2008; Castelló-Climent and Doménech, 2008; Glaeser *et al.* 2004; Hanushek and Woessmann 2008). Based on the Lucas' model of endogenous growth (1988), education is a key factor in developing human capital, driving social progress and sustainable economic development; similarly, investments in education are vital for the economic growth of every country (Patel and Annapoorna 2019). Thus, developing human capital through high-quality education yields significant benefits for society, while substantial investments in education lead to greater economic development and increased productivity (Del Boca *et al.* 2018; Hanushek and Wößmann 2010).

The authors (Marquez-Ramos and Mourelle 2019) have concluded that an increase in education levels is positively related to GDP growth. Similarly, authors (Oluwatobi and Ogunrinola 2011) have argued through the model of Solow that government expenditures on human capital development has a positive correlation with real economic growth. Then, modern states and/or societies consistently strive to build a strong educational foundation, which enables them to create sustainable public wealth through increased investment in education and in this context, the education system has a significant contribution and positive impact on economic growth (Berger and Fisher 2013). Also, authors (Baldacci *et al.* 2004) have analysed education and economic growth in developed countries using data from 1988 to 2018 and their findings indicated that public expenditures on education have a positive impact and a strong correlation with economic growth. Based on the ARDL approach, human capital development, particularly education has a direct and significant impact on economic growth (Adeyemi and Ogunsola 2016). A study by (Breton 2013) has argued that education has both direct and indirect effects on enhancing and improving economic growth. Authors (Karaçor *et al.* 2017; Lauder *et al.*

2018) have concluded that education fosters individuals with the potential for innovation, whose productivity provides development and economic growth.

Numerous theories, studies, and debates have examined the relationship between public expenditure on education and economic growth, analyzing its role, impact, and effects. However, these discussions remain inconclusive and continue to generate ongoing debate. A study by (Bexheti and Mustafi 2015) argue that public expenditure in the education sector negatively affects economic growth. Also, authors (Ifa and Guetat 2018) found that public expenditure on education has an insignificant impact on short-term economic growth. Another study by (Frank 2017) analyzed the impact of education expenditure on the economic growth of 179 countries between 1970 and 2014. The results indicate that education spending negatively affects growth in developing countries, while its impact is insignificant in OECD nations. Another study by (Frank 2017) analyzed the impact of education expenditure on the economic growth of 179 countries between 1970 and 2014. The results indicate that education expenditure negatively affects growth in developing countries, while its impact is insignificant in OECD countries. Meanwhile, (Farayibi and Folarin 2021) argue that government capital expenditure on education negatively impacted growth in many Sub-Saharan African countries between 2000 and 2019. Moreover, authors (Krueger and Lindahl 2001) analyzed a group of countries, categorizing them into low, medium and high education levels. Their results indicated that countries with a medium level of education exhibited no effect with growth, while those with high education levels showed a negative relationship with growth.

Methodology

This section outlines the specific procedures used in the research process of the paper and addresses the validity and reliability of research methods and the resulting findings. The methodology section of the paper follows these main steps: First, it explains the research design, including the strategy, approach, research questions, and objectives. Second, it provides an overview of data collection methods and *discusses data limitations*. Lastly, it details the model specification and explains the models used for the analysis.

Research Design

The research design outlines a clear plan for key aspects of the research process and identifies the appropriate tools to be used in the study. This paper focuses on a case study research strategy for Kosova. As argued by (Zainal 2007), the case study strategy allows researchers to analyze data within the context of a specific contemporary real-life phenomenon. Then, a quantitative approach is adopted as the research approach in line with the paper's objective. This approach allows the study (research) to analyze and assess a specific research activity using quantifiable data or measurable variables (Mertler 2016). Thus, this paper analyzes the impact (contribution) and correlation of various educational indicators (variables) on Kosova's economic growth from 2012 to 2022 using extensive time-series data.

The main focus of this paper revolves around the following research questions:

- ⇒ How does Kosova's education expenditure and its impact on economic growth compare to other countries in the Balkans?

- ⇒ How does education expenditure relate to the early stage of education, gross enrolment rates, gender gap, inequality and poverty rates, innovation and technology on growth?
- ⇒ What is the contribution (impact) of educational indicators to economic growth in Kosova during the period from 2012 to 2022?
- ⇒ Which indicators of education expenditure (human capital development, gross enrolment rate, gender parity index) have the most significant impact on growth?
- ⇒ How strongly are educational indicators correlated with economic growth in Kosova?
- ⇒ What is the degree of determination between educational indicators (variables) and growth in Kosova?

In addition, the main research objectives of this paper are listed below:

- ⇒ to investigate how different aspects of the economy (such as social welfare, labour market, healthcare, income distribution, innovation and technology, GDP, etc.) respond to education expenditure and their contributions to overall economic growth;
- ⇒ to assess the influence of different education components (including early-stage of education, gross enrolment rates, future educational paths, educational outcomes, etc.) on economic growth and development as driven by education expenditures;
- ⇒ to examine how education expenditure affects economic growth across different components within Kosova, including human capital development, gross enrolment rates, gender parity index, etc.;
- ⇒ to analyse the impact of education expenditure indicators (variables) on the economic growth of Kosova over the period 2012 to 2022;
- ⇒ to evaluate the level of determination and correlation between Kosova's education expenditure indicators (variables) and its economic growth;

The main hypotheses (H) of this paper are presented as follows:

- ⇒ H.1 Increased public investments in education lead to a statistically significant improvement in Kosova's economic growth;
- ⇒ H.2 Human capital development and improvements in the gender parity index have a statistically significant impact on the economic growth of Kosova;
- ⇒ H.3 An increase in the gross enrolment rate in lower and upper secondary education is statistically significantly associated with Kosova's economic growth;

Data

This paper analyzes time-series data to assess the contribution (impact) and correlation of various education indicators on Kosova's economic growth over the period 2012 - 2022. Then, the main variables of this paper include economic growth (*log_growth*), public expenditure on education as a percentage of GDP (*log_pubexpedu/gdp*), public expenditure on education as a percentage of government expenditure (*log_pubexpedu/govexp*), human capital development as a percentage of GDP per capita (*log_humcapdev/gdppc*), gross enrolment rates in lower secondary education (*log_gerlowsec*) and upper secondary education (*log_geruppsec*), and the gender parity index in secondary education (*log_gpiuppsec*). All data are expressed as percentages (%) and transformed into logarithmic form for analysis using Stata. The data for this paper comprise 11 observations covering the period from 2012 to 2022 and these data were

obtained from annual reports published by the Central Bank of Kosova (CBK), the Ministry of Education, Science and Technology (MEST) and the Kosova Agency of Statistics (ASK). These are the official institutions and agencies of Kosova, responsible for producing annual reports and conducting statistical surveys on the country's education system and economic growth. Then, Appendix 2 offers additional details on the selected variables to provide a clearer understanding. In terms of data limitations, the human capital development variable is unavailable for 2022, but this gap is addressed by employing the time series forecasting method

Model Specification

Numerous authors (De Ridder *et al.* 2020; Del Boca *et al.* 2018; Fu *et al.* 2019; Gupta *et al.* 2002; Köse and Güven 2007) have analysed the relationship between education indicators and economic growth using various models. Moreover, the starting point of these models is based on the classical Cobb-Douglas (C-D) production function (Ciucu and Dragoescu 2014). This function assesses the impact and relationship between various input variables (factors) and the quantity of production factors (output) (Dritsaki and Stamatiou 2018; Suwandaru *et al.* 2021). Then, the basic formula of the C-D function is presented as follows

$$Y = (A, K, L) \quad (1)$$

where Y represents the production factor (output), A denotes technological progress (input), K signifies physical capital (input), and L indicates labour (input). However, when human capital (H) is included in the equation above (1), it represents the education variable (Ciucu and Dragoescu 2014). Thus, the C-D function can be expressed in the following equation form:

$$Y = (A, K, L, H) \quad (2)$$

Furthermore, the authors (Cozzi 2017; Gualdi and Mandel 2019) argue that economic growth is influenced by public capital investment, with public expenditure on education being a key component of this investment. This implies that public expenditure on education significantly impacts economic growth. In this situation, the value of production (output) in a country's economy (Y) is influenced by public expenditure on education (EDU) (Tomic 2015). Now, the C-G function can be expressed as follows:

$$Y = f(EDU) \quad (3)$$

when equation (3) is converted into logarithmic form, it can be represented as follows:

$$\log Y = \beta_0 + \beta_1 \log(EDU) + \mu \quad (4)$$

where β_0 represents the constant intercept term, β_1 denotes the regression coefficient, and μ indicates the error term. Considering that the Cobb-Douglas function requires multiple input variables and production factors, this paper adopts the C-D function to estimate the impact of public expenditure on education to Kosova's economic growth from 2012 to 2022. Thus, the Cobb-Douglas function model used in this paper is expressed in the following equation form:

$$growth = \left(\frac{pubexpedu}{GDP} + \frac{pruexpedu}{ge} + \frac{humcapdev}{GDPpc} + gerlowsec + geruppsec + gpiuppsec \right) \quad (5)$$

where *GDP* represents the percentage of gross domestic product, *ge* indicates the percentage of government expenditures, and *GDPpc* refers to the percentage of GDP per capita. Next, equation (5) is converted into logarithmic form, resulting in the following equation

$$\log(\text{growth}) = \beta_0 + \beta_1 \log\left(\frac{\text{pubexpedu}}{\text{GDP}}\right) + \beta_2 \log\left(\frac{\text{pubexpedu}}{\text{ge}}\right) + \beta_3 \log\left(\frac{\text{humcapdev}}{\text{GDPpc}}\right) + \beta_4 \log(\text{gerlowsec}) + \beta_5 \log(\text{geruppsec}) + \beta_6 \log(\text{gpiuppsec}) \quad (6)$$

Research Findings

This section discusses the findings derived from the regression analysis of the Cobb-Douglas (C-D) production function model, as outlined in the previous section of the paper. The regression analysis is conducted to evaluate the impact of various education indicators on the economic growth of Kosova from 2012 to 2022, when their results are summarized in the Table below. Among the variables of this paper, only public expenditure on education as a percentage of GDP exhibited a negative impact (contribution) on economic growth, while other variables of the paper demonstrated a positive impact on Kosova's economic growth. Thus, the findings of this paper are consistent with many studies and research by various authors who have analysed the positive and negative impacts of public expenditure on education towards economic growth, some of them are described in the literature review section. The, the p-value results reveal that only the variable of public expenditure on education as a percentage of government expenditure ($p = 0.093$) is statistically significant at the 10% level, indicating reliable evidence between this variable and growth. In contrast, the remaining paper variables ($p > 10\%$) did not demonstrate a statistically significant with growth, providing no evidence between these variables and the economic growth of Kosova within the research period.

Table 1/A The Regression Results (based on the logarithmic analysis form)

Variables	Coefficients	Std. Dev.	t-Statistics	Probability
Constant	-66.716	113.211	-0.589	0.587
log_pubexpedu/gdp	-19.520	16.278	-1.199	0.297
log_pubexpedu/govexp	20.360	9.276	2.195	0.093
log_humcapdev	2.589	5.535	0.468	0.664
log_gerlowsec	1.746	30.206	0.058	0.957
log_geruppsec	6.056	11.492	0.527	0.626
log_gpiuppsec	18.047	76.268	0.237	0.825
Probability > F	0.253	No of Observations		11
R Square	0.755	F (5, 1)		2.05
Adjusted R Square	0.387	Root MSE		1.049

Note: Significance Level $p < 0.10$

Source: Author's Calculation

In terms of the coefficient of determination, the analysis has provided an R-squared value of 0.755 which indicates that 75,5 % of the variability in economic growth can be explained by the educational variables included in this paper. Despite the R^2 value indicating a relatively strong fit, the Adjusted R^2 value is only 0.387 which shows a notable decline. Its result also

shows that certain predictors may not be making a meaningful contribution to the model, as noted in the analysis of the paper. Then, the F-statistic and p-value suggest that the overall model is not statistically significant ($F(5, 1) = 2.05$; $p = 0.253$), it means that the selected educational indicators do not collectively predict economic growth effectively (see Table above). The Correlation Matrix analysis explains the relationships between various education indicators and economic growth in Kosova from 2012 to 2022 (see Table below). This analysis provides the following key insights: public expenditures on education as a percentage of government expenditure showed a moderate positive correlation ($r = 0.570$) with economic growth. It suggests that higher public expenditures on education are associated with increased economic growth and it aligns with many theories that emphasise the positive role and impact of education investment in economic growth.

Table 2 Correlation Matrix (based on the logarithmic analysis form)

Variables	log_growth	log_pubex_pedu/gdp	log_pubexp_edu/govexp	log_humcap_dev/gdppc	log_ger_lowsec	log_ger_uppsec	log_gpi_uppsec
log_growth	1.000						
log_pubex_pedu/gdp	-0.136	1.000					
log_pubexp_edu/govexp	0.570	0.596	1.000				
log_humcap_dev/gdppc	-0.270	-0.809	-0.851	1.000			
log_ger_lowsec	-0.087	0.503	0.217	-0.303	1.000		
log_ger_uppsec	0.363	0.070	0.257	-0.217	-0.183	1.000	
log_gpi_uppsec	-0.055	-0.620	-0.483	0.606	-0.025	-0.728	1.000

Source: Author's Calculation

Also, the gross enrolment rate in upper-secondary education indicator indicates a moderate positive correlation ($r = 0.363$) with economic growth. It means that higher gross enrolment rate at this education level can contribute to improved economic performance by enhancing productivity in Kosova's labour market. Surprisingly, a very weak negative correlation ($r = -0.136$) was found between public expenditures on education as a percentage of GDP and growth. This unexpected result suggests possible inefficiencies in education expenditures or other external factors that may lead to this correlation result. Also, a weak to moderate negative correlation ($r = -0.270$) was identified between human capital development relative to GDP per capita and Kosova's economic growth. It suggests that higher human capital development is somewhat associated with lower economic growth or this unexpected finding indicates delayed returns on human capital investments. Then, the indicator of the gross enrolment rate in lower secondary education has demonstrated a very weak negative correlation ($r = -0.087$) with

growth by providing a minimal relationship between gross enrolment rate at this educational level and growth. The analysis of the gender parity index in upper secondary education revealed a very weak negative correlation ($r = -0.055$) with Kosova's economic growth, suggesting that there is a negligible direct impact of gender parity in this educational level.

Conclusions

This paper aims to analyse the impact and correlation of education-related public expenditures on Kosova's economic growth over the period from 2012 to 2022. Using a Cobb-Douglas production function model and time-series data, the analyses of the paper are focused on several key variables, including public expenditure on education as a percentage of GDP, public expenditure on education as a percentage of government expenditure, human capital development as a percentage of GDP per capita, gross enrolment rate in lower- and upper-secondary education, and gender parity index in upper-secondary education. The main paper's findings revealed mixed results, where public expenditure on education as a percentage of GDP demonstrated a negative impact and non-statistically significant on economic growth while public expenditure on education as a percentage of government expenditure showed a statistically significant positive impact on growth. Other variables, including human capital development, the gender parity index and gross enrolment rate(s) have shown no significant contributions, indicating that these variables might have a more intricate relationship with economic growth in Kosova. Thus, these results are easily aligned with numerous studies and research that mentioned in the literature review section, where the positive and negative impacts of public expenditure on education toward economic growth have been argued.

This highlights the importance of understanding that simply increasing public expenditure on education does not guarantee economic growth without strategic planning and effective allocation of resources. From a policy perspective, the findings suggest that investing in education is essential, but the efficiency of these expenditures in education and their alignment with broader economic goals are also equally important. In addition, these expenditures can be a key important factor in fostering economic development. Therefore, institutions in Kosova and other relevant policymakers should consider optimizing the allocation of education expenditures to enhance their potential impact on long-term economic growth. Lastly, this paper encountered a limitation due to missing data for the human capital development variable for 2022, which was compensated by applying forecasting methods. Future research should explore the longer-term impacts of educational investments, including how the quality of education and labour market outcomes influence the economic growth of Kosova. Expanding the scope of research to include other macroeconomic factors would also provide a more comprehensive understanding of the education-growth relationship in Kosova.

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Appendix 1 Statistic Descriptive (Logarithmic method)

	<i>log_growth</i>	<i>log_pubex_pedu/gdp</i>	<i>log_pubex_pedu/govexp</i>	<i>log_humcap_dev/gdppc</i>	<i>log_ger_lowsec</i>	<i>log_ger_uppsec</i>	<i>log_gpi_uppsec</i>
Obs.	11	11	11	11	11	11	11
Min	-2.303	1.361	2.549	2.549	4.530	4.355	-0.030
Mean	1.676	1.476	2.715	2.820	4.568	4.448	-0.017
Max	2.688	1.548	2.874	3.083	4.600	4.527	0.010
Sum	18.436	16.232	29.867	31.023	50.244	48.929	-0.182
Std Dev	1.341	0.064	0.098	0.195	0.022	0.053	0.012
Range	4.990	0.187	0.324	0.533	0.070	0.172	0.040
Varian.	1.795	0.004	0.009	0.038	0.001	0.002	0.001
Coef. Var	0.800	0.044	0.035	0.069	0.004	0.011	-0.737
S.E Mean	0.404	0.019	0.029	0.058	0.006	0.015	0.003
Skewness	-2.674	-0.392	-0.063	-0.092	0.165	-0.334	1.052
Kurtosis	8.568	1.816	2.117	1.539	2.200	2.117	3.257
Median	2.015	1.482	2.701	2.845	4.569	4.464	-0.020
Int. Rang	0.200	0.120	0.119	0.399	0.029	0.089	0.010

Source: Author's Calculation

Appendix 2 The variables used in the paper's analysis, their meaning and data sources

No	Denote Variables	Name of the Variables	The Meaning of the Variables	Source
1	log_growth	Economic Growth, (annual %)	Economic growth is an increase in the production of goods and services in an economy over a period of time (mostly a one-year period)	CBK Reports, ASK Reports
2	log_pubexpedu/gdp	Public Expenditures on Education, (as % of GDP)	Public expenditure on education as a percentage of Gross Domestic Product (GDP) indicate the portion of the wealth created within a financial year that is spent by government authorities for the education system.	MEST Reports
3	log_pubexpedu/govexp	Public Expenditures on Education, (as % of Government Expenditure)	Public expenditure on education as a percentage of government expenditure is used to assess the level of concentration of governmental policies in education and the value of investment assigned for education in comparison with other public investments.	MEST Reports
4	log_humcapdev/gdppc	Human Capital Development (as a % of GDP per capita)	The operating public expenditures per pupil/student as a percentage of GDP per capita are used for assessing the level of public investment in human capital development. This indicator shows the share of income per capita of a country that is spent for each pupil/student.	MEST Reports
5	log_gerlowsec	Gross Enrolment Rate Lower Secondary Education (%)	Gross enrolment rate (GER) for lower secondary education is calculated to measure the participation of the official population aged 11-14 years old in this level of education. It is a ratio of pupils who are registered in lower secondary education (grades 6-9).	MEST Reports
6	log_geruppsec	Gross Enrolment Rate Upper Secondary Education (%)	Gross enrolment rate (GER) for upper secondary education is the ratio between the pupils enrolled in this level of education (grades 10-12) and participation of the population aged 15-17 years old.	MEST Reports
7	log_gpiuppsec	Gender Parity Index Upper Secondary Education (%)	Gender parity index is an indicator that measures progress toward gender equality and participation in education. It is calculated as the ratio of gross enrolment rate, accounting for women and men of the estimated value.	MEST Reports

Source: Authors