

A COMPLEX RELATION BETWEEN EDUCATION AND GROWTH: INSTITUTIONAL CONTEXT

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ABSTRACT

Aiming to reshape the economic growth trajectories through the improvement of human capital, countries of Southeast Europe significantly increased the number of students during the study period from 2005-2021 through liberalization of higher education sector. However, despite the increased number of students, the latest PISA findings show that the region's educational capacities are inadequate. Which, coupled with a low average level of institutional quality, affects economic growth. By utilizing the Two Step GMM robust model, the study shows that tertiary education enrollment, government expenditures, and institutional quality, significantly and positively impact GDP. In contrast, the trade openness has a negative impact. Ultimately, the study confirms that the effects of education in economic performance are moderated by the quality of institutions, which resulted statistically significant and with positive impact on GDP. Thus, strengthening the scholarly corpus and better management of the institutions cause an increase in the level of education and productivity by better responding to labor market dynamics and promoting sustainable economic trajectories.

Key words: economic growth, institutional quality, education, tertiary and secondary education.

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1. INTRODUCTION

The progress of the Southeast Europe (SEE) region towards sustainable economic growth faces several ongoing challenges related to the complex relationship between education and the quality of institutions. Numerous studies have suggested a close relationship between educational level, institutional circumstance, and economic success on both the individual and national levels (Becker¹, Romer², Hanushek³). While the importance of education quality and student numbers in fostering economic growth is widely recognized (Odhiambo⁴, Sarwar et al.⁵, Maneejuk and Yamaka⁶), scholarly opinions diverge on the specific contributions of different education levels to economic expansion (Gruševá and Blašková⁷, Kurihara⁸, Apostu et al.⁹, Avcı and Çalışkan¹⁰, Hasyiyati and Sahara¹¹). Additionally, studies are less focused on the impact that the number of students has on economic growth in the context of the interaction they have with the quality of institutions, and they are relatively scarce and without focus on SEE countries. This study aims to fill these gaps, enhancing the literature by delving into the complexity and interplay between education, institutions, and economic growth. Although, it is already known that the relationship between education, institutions, and economic growth is not

¹ Becker, G. S.: Investment in Human Capital: A theoretical analysis, *Journal of Political Economy*, 70(5) 1962, pp. 9-49.

² Romer, P. M.: Increasing returns and long-run growth, *Journal of Political Economy*, 94(5) 1986, pp. 1002-1037.

³ Hanushek, E. A.: Will more higher education improve economic growth?, *Oxford Review of Economic Policy*, 32(4) 2016, pp. 538-552.

⁴ Odhiambo, N.: Education and economic growth in South Africa: An empirical investigation, *International Journal of Social Economics*, 48(1) 2020, pp. 1-16.

⁵ Sarwar, G., Ali, M., Hassan, N.: Educational expansion and economic growth nexus in Pakistan: Instrumental variable approach, *Journal of Quantitative Methods*, 5(1) 2021, pp. 1-17.

⁶ Maneejuk, P., Yamaka, W.: The impact of higher education on economic growth in ASEAN-5 countries, *Sustainability*, 13(2) 2021, pp. 520.

⁷ Gruševá, E., Blašková, V.: Education as a factor influencing the economic growth of the V4 countries, *Review of Applied Socio-Economic Research*, 24(2) 2022, pp. 5-69.

⁸ Kurihara, Y.: Which types of education are important for economic growth?, *Research in Applied Economics*, 11(4) 2019, pp. 1-11.

⁹ Apostu, S. et al.: Economic growth through the lenses of education, entrepreneurship, and innovation, *Administrative Sciences*, 12(3) 2022, pp. 74.

¹⁰ Avcı, H., Çalışkan, Z.: The effect of health on economic growth: A production function approach for Turkey, *Panoeconomicus*, 71(3) 2022, pp. 373-393.

¹¹ Hasyiyati, Z., Sahara, S.: The composition of human capital and economic growth: Evidence from Aceh and West Papua provinces, Indonesia, *International Journal of Economics and Financial Issues*, 10(2) 2020, pp. 132-142.

linear and is influenced by many institutional factors that may change based on the stages of development of different economies¹². Investing in higher education increases economic performance by encouraging a more effective and accountable government. Additionally, many authors consider that, in developing countries, such as the Western Balkans and some of the SEE countries, institutional insufficiencies can hinder the potential economic benefits of education (Faria et al.¹³, Hanushek¹⁴, Nistor et al.¹⁵, Hall and Jones¹⁶). The sustainable growth of the region's economies also depends on strengthening institutions¹⁷. Institutional quality, which encompasses the effectiveness, transparency, visibility, and stability of socio-political institutions, promotes economic growth by creating an attractive business environment that encourages investment and facilitates the efficient allocation of resources¹⁸.

The study uses 2SGMM methodology to eliminate the effects of autocorrelation in the institutions' data and by using an interaction model between the number of enrolled students and institutions in economic growth. These specific methodologies are selected purposively to answer the following research questions: a) What is the impact of the number of enrolled students in secondary and tertiary education, and what is the quality of institutions in economic growth? b) How does the interaction between the number of enrolled students and average institutional quality impact economic growth?

By recognizing education as a tool to strengthen human capital and as one of the economic growth factors, Southeast European governments, during the last decades, have rapidly embraced strategies to encourage investment and liberalize their higher education market. This movement, complemented by individual incentives such as expectations for improved social and financial status (Mincer¹⁹,

¹² Nistor, S., Mera, V. I., Pop Silaghi, M. I.: Is education important in assessing the impact of institutions on economic growth in emerging economies?, *Applied Economics*, 50(34–35) 2018, pp. 3840–3854.

¹³ Faria, H. J. et al: Unbundling the roles of human capital and institutions in economic development, *European Journal of Political Economy*, 45(Supplement) 2016, pp. 108–128.

¹⁴ Hanushek, E. A.: Will more higher education improve economic growth?, *Oxford Review of Economic Policy*, 32(4) 2016, pp. 538–552.

¹⁵ See note 12

¹⁶ Hall, R., Jones, C. I.: Why do some countries produce so much output per worker than others?, *Quarterly Journal of Economics*, 114(1) 1999, pp. 83–116.

¹⁷ Meyer, D. F.: A quantitative assessment of the impact of government activities on the economy of Poland, *Journal of Eastern European and Central Asian Research*, 6(2) 2019, pp. 220–233.

¹⁸ Acemoglu, D., Johnson, S., Robinson, J.: Institutions as the fundamental cause of long-run growth, *National Bureau of Economic Research Working Paper Series*, (w10481) 2004.

¹⁹ Mincer, J.: Economic development, growth of human capital, and the dynamics of the wage structure, *Journal of Economic Growth*, 1(March) 1996, pp. 29–48.

Hanushek²⁰), resulted in an increase in education providers and an increase in student enrolment in secondary and tertiary education, from 2005 with its maximum in 2010, and then started to decline²¹. The study includes 12 countries of the Southeast Europe region, comprising: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Kosovo, Montenegro, North Macedonia, Romania, Serbia, Slovenia, and Turkey, which are already integrated or are working towards the EU membership. The region has 144.8 million inhabitants, with an average GDP per capita of 14,510 dollars. Kosovo has the lowest value of GDP_PC with 5,270 dollars, and Greece has the highest value with 20,192 dollars per capita. However, it is known that regions of South-Eastern Europe (except Slovenia and Greece) struggle with institutional weaknesses. Taking the average ranking of institutional quality²², we see that the countries of the region that are members of the EU are ranked higher, with Slovenia and Croatia being the best on average, with 77.96 and 65.5 points, respectively. Bosnia and Herzegovina and Turkey have the lowest average ranking, with 33.5 and 35.2 points, respectively. Also, the latest PISA results in the region show a poor status of education quality, with most countries facing poor improvements or even regression in 2022 compared to 2018 and 2015 PISA tests in reading, mathematics, and science²³. This was different for Turkey, which made some improvements in science compared to 2018 and maintained the same level in mathematics. Overall, for these results, the report highlights the negative impacts of the recent pandemic crisis. It further points out that it faces long-term and structural problems in education, including a lack of government investment and support for schools and students. Although the status, effects, and measures to be taken have been identified after the international PISA tests at different stages, countries have not done enough to promote the quality of education and cognitive skills in society precisely because of their institutions. Institutions are crucial for complex interactions in creating and implementing sustainable and long-term policies that extend beyond the electoral mandates of elected governments. However, they are less attractive in fragile democracies focused on investments and activities with faster returns, aiming at short-term power preservation (Persson²⁴, Efendic and Pugh²⁵).

²⁰ See note 14

²¹ World Bank: World Development Indicators, 2023, <<https://databank.worldbank.org/source/world-development-indicators>>.

²² See note 21

²³ OECD: *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*, PISA, Paris: OECD Publishing, 2023.

²⁴ Persson, T.: Do political institutions shape economic policy?, *Econometrica*, 70(3) 2002, pp. 883-905.

²⁵ Efendic, A., Pugh, G.: Institutional effects on economic performance in post-socialist transition: A dynamic panel analysis, *Acta Oeconomica*, 65(4) 2015, pp. 503-523.

Therefore, despite the results of PISAS and the level of institutional quality, the region's countries also face demographic factors such as migration and negative population growth rates of -0.2% per year, affecting future NESSTE and NESSE trends, as seen in Figures 3 and 4. Therefore, the study's main findings confirm the positive impact of the selected variables on economic growth and the synergy from interaction between NESTE and AvgINS affecting positively economic growth of the region's countries, which raises the interest for further attention to the policy makers, giving deserved credits, not just for the quality but also the quantity of education and how well it matches up with the needs of the labor market. Ultimately, this determines how effectively the economy can integrate and employ the educated population.

Figure 1. SEE GDP_Ln over time²⁶

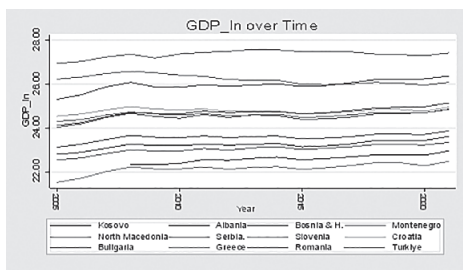


Figure 2. SEE Average institutional quality²⁷

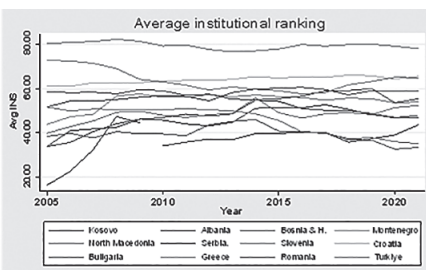


Figure 3. NESSE_Ln over time²⁸

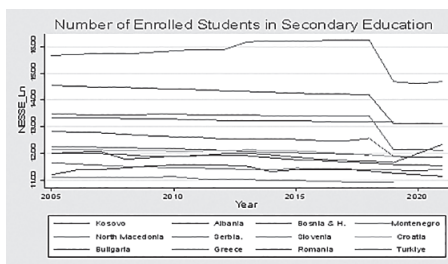
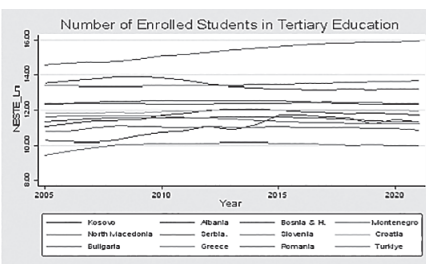


Figure 4. NESTE_Ln over time²⁹



²⁶ See note 21

²⁷ See note 21

²⁸ See note 21

²⁹ See note 21

2. LITERATURE REVIEW

The pace and sustainability of countries economic growth depend on the quantity and quality of human capital as an endogenous growth factor (Romer³⁰, Lucas³¹). However, to obtain the intended effects on economic growth, countries must increase the quality of human capital through education³². According to Hanushek³³, education is seen as a substitute for human capital, which increases the workforce's productivity through increasing cognitive skills. In addition to the increases in quality, the increase in duration in years of study, although with a minor impact, positively affects economic growth³⁴. Therefore, aiming for a rise in the accumulation of human capital, the increase of innovations, and improvements in the institutional aspect, there has been an expansion in education in the last decades, expressed in the increase in the number of the students³⁵. Various individual factors, such as social conditions and expectations for higher personal income, may have served as a promotor for the increase in the duration of studies in developing countries, including those in transition (Schultz³⁶, Mincer³⁷, Mincer³⁸, Hanushek³⁹, Marginson⁴⁰, Sahadewo⁴¹). Subsequently, individual factors that increase well-being, including income and health care, significantly impact worker's productivity; they increase with the population's education level⁴².

³⁰ See note 2

³¹ Lucas, R. E.: On the mechanics of economic development, *Journal of Monetary Economics*, 22(1) 1988, pp. 3-42.

³² Barro, R. J., Lee, J. W.: Sources of economic growth, *Carnegie-Rochester Conference Series on Public Policy*, 40(June) 1994, pp. 1-46.

³³ See note 14

³⁴ Hanushek, E. A., Wößmann, L.: The role of education quality for economic growth, *World Bank Policy Research Working Paper*, (4122) 2007.

³⁵ Valero, A., Van Reenen, J.: The economic impact of universities: Evidence from across the globe, *Economics of Education Review*, 68(February) 2019, pp. 53-67.

³⁶ Schultz, T. W.: Investment in human capital, *The American Economic Review*, 51(1) 1961, pp. 1-17.

³⁷ Mincer, J.: Investment in human capital and personal income distribution, *Journal of Political Economy*, 66(4) 1958, pp. 281-302.

³⁸ Mincer, J.: Economic development, growth of human capital, and the dynamics of the wage structure, *Journal of Economic Growth*, 1(March) 1996, pp. 29-48.

³⁹ See note 14

⁴⁰ Marginson, S.: Limitations of human capital theory, *Studies in higher education*, 44(2) 2019, pp. 287-301.

⁴¹ Sahadewo, G. A.: School quality and labor market earnings: some new results on an old debate, *Journal of Applied Economics*, 26(1) 2023.

⁴² See note 32

While many authors define the importance of investments in education, emphasizing that secondary and higher education play an essential role in economic growth (Pegkas and Tsamadias⁴³, Kocourek and Nedomlelová⁴⁴, Maneejuk and Yamaka⁴⁵), studies of Odhiambo⁴⁶ and Sarwar et al.⁴⁷, found that education and economic growth show a causal positive relationship. However, there are differences in research in terms of the impact that each level of education has on GDP, showing also different impact country by country. As studies of Gruševá and Blašková⁴⁸ confirms, in some countries the secondary level of education plays more robust impact on GDP, compared to other levels of education. Studies like Kurihara⁴⁹, Apostu et al.⁵⁰ and Avcı and Çalışkan⁵¹, confirm that education, particularly the tertiary education has a positive impact on economic performance. Chatterji⁵² found a decisive influence of higher education compared to secondary education in strengthening the effects of human capital on economic growth. However, Hasyiyati and Sahara⁵³ found a non-significant effect of tertiary education level in economic growth in case of Indonesia.

Grđinić⁵⁴ emphasizes that public spending on education, the size of the workforce with tertiary education, and the number of researchers positively affect GDP. Moreover, treating economic growth as endogenous concerning investments in the growth of physical capital and education, Pegkas and Tsamadias⁵⁵ emphasize that investments in higher education positively impact GDP per worker in the short and long term. According to their research based on GMM

⁴³ Pegkas, P., Tsamadias, C.: Does higher education affect economic growth? The case of Greece, *International Economic Journal*, 28(3) 2014, pp. 425-444.

⁴⁴ Kocourek, A., Nedomlelová, I.: Three levels of education and the economic growth, *Applied Economics*, 50(19) 2018, pp. 2103-2116.

⁴⁵ See note 6

⁴⁶ See note 4.

⁴⁷ See note 5.

⁴⁸ See note 7

⁴⁹ See note 8.

⁵⁰ See note 9.

⁵¹ See note 10.

⁵² Chatterji, M.: Tertiary education and economic growth, *Regional Studies*, 32(4) 1998, pp. 349-354.

⁵³ See note 11

⁵⁴ Grđinić, M.: Higher education as a means of achieving economic growth and development – A comparative analysis of selected EU and former Soviet Union countries, *International Public Administration Review*, 12(4) 2014, pp. 93.

⁵⁵ See note 43

estimators, Sebki⁵⁶ and Nistor et al.⁵⁷ point out that investments in tertiary education have a stronger impact on economic growth than spending on primary or secondary education, because they promote social responsibility and the demand for more accountability, thus increasing the government spending effectiveness. Wang and Liu⁵⁸ support the conclusion that tertiary education, contrary to primary and secondary education, has a positive and significant impact on GDP.

In contrast, in the case of India, researchers Behera and Mallick⁵⁹ and Self and Grabowski⁶⁰ come to the same results as Barro and Lee⁶¹ regarding the positive impact that the increase in the number of students in primary education raises GDP, they reach conflicting results with the above by concluding that the increase in the number of students in secondary education does not affect GDP. Pastor et al.⁶² highlight the positive effect of Higher Education Institutions on the increase of human capital and the use of new technologies, leading to higher GDP per capita. Along the same lines, Lövdén et al.⁶³ reinforce the idea that extended education is positively related to intensifying individuals' cognitive abilities and institutional quality. One of the most frequent reasons for the failure of developing countries and countries in transition to establish policies and reforms oriented toward the human capital growth is the failure to create qualitative institutions (Rodrik⁶⁴, Acemoglu and Robinson⁶⁵). Moreover, Murphy and O'Reilly⁶⁶ found a strong positive effect of education on economic

⁵⁶ Sebki, W.: Education and economic growth in developing countries: Empirical evidence from GMM estimators for dynamic panel data, *Economics and Business*, 35(1) 2021, pp.14-29.

⁵⁷ See note 12

⁵⁸ Wang, Y., Liu, S.: Education, human capital and economic growth: Empirical research on 55 countries and regions (1960-2009), *Theoretical Economics Letters*, 6(2) 2016, pp. 347-355.

⁵⁹ Behera, B. K., Mallick, H.: Does Fiscal Deficit Matter for Economic Growth Performance of Indian States?, *Indian Public Policy Review*, 3(6) 2022, pp. 16-44.

⁶⁰ Self, S., Grabowski, R.: Does education at all levels cause growth? India, a case study, *Economics of Education Review*, 23(1) 2004, pp. 47-55.

⁶¹ See note 32

⁶² Pastor et al.: Higher education institutions, economic growth and GDP per capita in European Union countries, *European Planning Studies*, 26(8) 2018, pp. 1616-1637.

⁶³ Lövdén, M. et al.: Education and cognitive functioning across the life span, *Psychological Science in the Public Interest*, 21(1) 2020, pp. 6-41.

⁶⁴ Rodrik, D.: Second-best institutions, *American Economic Review: Papers & Proceedings*, 98(2) 2008, pp. 100-104.

⁶⁵ Acemoglu, D., Robinson, J. A.: *Why nations fail: The origins of power, prosperity, and poverty*, Crown Publishers, 2012.

⁶⁶ Murphy, R., O'Reilly, C.: Applying panel vector autoregression to institutions, human capital, and output, *Empirical Economics*, 57(5) 2018, pp. 1633-1652.

institutions. Therefore, as Zhao et al.⁶⁷ state, countries with higher investments in tertiary education show higher chances for the success of political reforms through the accumulation of human capital. Also, Banász and Csányi⁶⁸ highlight the impact of tertiary enrolments on GDP growth, especially in post-socialist countries, with an enormous impact compared to other education levels.

Many authors, including Schultz⁶⁹, Romer⁷⁰, Barro and Lee⁷¹, Hanushek and Wößmann⁷², and Hanushek⁷³ consider that insufficient and/or inadequate education as the main explanatory factor of poverty level differences in income from the labor force, predominantly explaining differences in development between countries. However, countries' failure to create and implement appropriate policies gives the right to authors such as Hall and Jones⁷⁴, Acemoglu et al.⁷⁵, Acemoglu and Robinson⁷⁶ and Rodrik⁷⁷ who consider institutional quality as the leading cause of differences between countries regarding the level of education, capital accumulation, and productivity, causing inequality in income distribution.

By prioritizing education, Hanushek⁷⁸ emphasizes the role of institutions in economic growth by creating policies and suggesting policies that improve the education quality instead of simply increasing the number of students. Furthermore, Faria et al.⁷⁹ point out that education and qualitative institutions interact to produce higher economic growth and stability for countries. Evrensel⁸⁰ and

⁶⁷ Zhao, J. et al.: Institutional reforms and their impact on economic growth and investment in developing countries, *Sustainability*, 13, 2021, p.4941.

⁶⁸ Banász, Z., Csányi, V. V.: Does the post-socialist past determine the relationship between GDP per capita and education? Evidence from Europe, *Acta Oeconomica*, 68(4) 2018, pp. 573-589.

⁶⁹ Schultz, T. W.: Investing in poor people: An economist's view, *The American Economic Review*, 55(1/2) 1965, pp. 510-520.

⁷⁰ See note 2

⁷¹ See note 32

⁷² See note 34

⁷³ See note 14

⁷⁴ See note 16

⁷⁵ See note 18

⁷⁶ See note 65

⁷⁷ See note 64

⁷⁸ Hanushek, E. A.: Economic growth in developing countries: The role of human capital, *Economics of Education Review*, 37(December) 2013, pp. 204-212.

⁷⁹ See note 13

⁸⁰ Evrensel, A. Y.: Institutional and economic determinants of corruption: A cross-section analysis, *Applied Economics Letters*, 17(6) 2008, pp. 551-554.

Feeny et al.⁸¹ argue that this synergy between education and institutions promotes civic engagement, democratic governance, and crisis resilience.

The interaction between institutions and education can also be understood from North's⁸² definition of institutions as social choices of a country that are influenced by the history, policies, and effectiveness of society. This implies that human and social capital is decisive in creating conditions to enable social benefits from institutions and influence the growth of economic performance. More specifically, Wasmer et al.⁸³ explain the interaction impact of human capital and institutions on economic growth. Qualitative institutions reduce information asymmetry, decrease transaction costs in the labor market, and increase investments in education that direct the workforce toward market needs. Glaeser et al.⁸⁴ state that developed countries with better quality-education are consolidated democracies. On the contrary, countries with low levels of education fail to establish a system of checks and balances in their governance. In this line, Mamoon and Murshed⁸⁵ consider that education-oriented policies bring two benefits to developing countries. In the short term, they absorb the benefits of free trade (technologies and capital absorption from abroad in the form of FDI). In the long term, they improve the quality of institutions, creating more opportunities to implement policies that promote economic growth⁸⁶.

However, despite the positive role of increased government spending on education, low-income countries experience various challenges. Poor institutional quality and the lack of qualitative education can hinder the effect of educational expenditure on economic growth. As Nomura⁸⁷ and Marginson⁸⁸ state, weak institutions can lead to inefficient policies that hinder the improvement of the

⁸¹ Feeny, S., Posso, A., Regan-Beasley, J.: Handle with care: fragile states and the determinants of fragility, *Applied Economics*, 47(11) 2015, pp. 1073-1085.

⁸² North, D. C.: *Institutions, institutional change and economic performance*, Cambridge: Cambridge: Cambridge University Press, 1990.

⁸³ Wasmer, E., Fredriksson, P., Lamo, A., Messina, J., Peri, G.: The macroeconomics of education, in: Brunello, G., Garibaldi, P., Wasmer, E. (eds.): *Education and Training in Europe* (pp. 1-133), Oxford and New York: Oxford University Press, 2007.

⁸⁴ Glaeser, E. L. et al.: Do institutions cause growth?, *Journal of Economic Growth*, 9(September) 2004, pp. 271-303.

⁸⁵ Mamoon, D., Murshed, S. M.: Want economic growth with good quality institutions? Spend on education, *Education Economics*, 17(4) 2009, pp. 445-468.

⁸⁶ Bayer, P., Urpelainen, J.: It is all about political incentives: Democracy and the renewable feed-in tariff, *Journal of Politics*, 78(2) 2016, pp. 603-619.

⁸⁷ Nomura, T.: Contribution of education and educational equality to economic growth, *Applied Economics Letters*, 14(9) 2007, pp. 627-630.

⁸⁸ See note 40

quality of education and keep low levels of human capital. Likewise, countries with weak institutions cause ineffective use of funds dedicated to education and health, not reaching their destination due to the lack of responsibility and accountability (Mauro⁸⁹, Rock and Bonnett⁹⁰, Williamson⁹¹). Therefore, investments in the human capital accumulation through increasing the quality and number of students must be accompanied by improvements in institutional and governance efficiency to become attractive for investments and achieve optimal economic growth (Fincher⁹², Evrensel⁹³, Hanushek⁹⁴).

3. METHODOLOGY

This study aims to investigate the complex relationship between the increase in the number of students in secondary and tertiary education and institutional quality, and their joint impact on the economic growth of Southeast European Countries. This aim is intended to be achieved through objectives such as determining the impact on GDP growth at each level of education, specifically the number of enrolled students in secondary (NESSE) and tertiary (NESTE) education, and the average institutional quality variable. The study's final objective is to numerically evaluate the interaction effect on economic growth between the number of enrolled students and average institutional quality.

The methodology of instrumental variable (IV) regression, implemented through the gmm2s option (Generalized Method of Moments, two-step), is well designed to address the many econometric challenges, including endogeneity, heteroscedasticity, and non-stationarity, which pose significant analytical challenges for which traditional estimation with the Ordinary Least Squares (OLS) method would yield inconsistent results. Therefore, using IV regression through GMM, especially with robust standard errors and with error correction term (ECT), allows us to treat a model that captures both short-term dynamics and relationships on long-term equilibrium, which can be achieved

⁸⁹ Mauro, P.: Corruption and growth, *The Quarterly Journal of Economics*, 110(3) 1995, pp. 681-712.

⁹⁰ Rock, M. T., Bonnett, H.: The comparative politics of corruption: Accounting for the East Asian paradox in empirical studies of corruption, growth and investment, *World Development*, 32(6) 2004, pp. 999-1017.

⁹¹ Williamson, J.: The strange history of the Washington Consensus, *Journal of Post Keynesian Economics*, 27(2) 2004, pp. 195-206.

⁹² Fincher, M.: Governments as human capital providers: A rationale for strong government support of broad higher education access, *Competitiveness Review*, 17(1-2) 2007, pp.67-76.

⁹³ See note 80

⁹⁴ See note 3

through the use of valid and robust instruments (Stock & Yogo⁹⁵). Adding variable lags as instruments, the Two-STEP GMM method addresses the endogeneity, by breaking the correlation between independent variables and the error term. However, it is worth noting that this method is effective in cases where we have large samples. Otherwise, it may suffer from the finite sample problem, for which researchers are required to use robust estimates in the Two-STEP GMM model to deal with endogeneity and autocorrelation effectively (Bon⁹⁶, Hansen and Lee⁹⁷). On the other hand, the presence of heteroscedasticity, where the variance of the error terms varies across observations, can lead to underestimation and invalid inferences. By specifying the robust option, we obtain standard errors robust to heteroscedasticity, ensuring the reliability of statistical tests despite heteroscedasticity.

Panel data often present complexities such as non-stationarity and cointegration, leading to potentially spurious regressions if not addressed. To handle non-stationary data, first differencing or the ECT approach are possible options; cointegration, if confirmed, allows for standard regression techniques, as it suggests a stable long-run relationship between variables (Hamilton⁹⁸, Johansen⁹⁹). By incorporating these techniques, this model provides a comprehensive and methodologically sound framework for addressing econometric issues while preserving the integrity of the long-run relationships between variables.

Numerous studies emphasize that institutional variables, and other variables related to economic growth exhibit endogeneity problems. In addition, indicators for institutional quality tend to show correlation, as they may interact among themselves (Efendic and Pugh¹⁰⁰, Ahlerup et al.¹⁰¹). For example, when we have an improvement in the rule of law indicator, we can consequently also have improvements or greater control of corruption, showing the impact that

⁹⁵ Stock, J. H., Yogo, M.: Testing for Weak Instruments in Linear IV Regression. *Econometrica*, 59(2) 2019, pp. 379-407.

⁹⁶ Bon, N. V.: Does governance matter for the public debt–inflation relationship in developed countries? panel quantile regression approach, *Annals of Public and Cooperative Economics*, 93(4) 2022, pp. 1153-1173.

⁹⁷ Hansen, B. E., Lee, S.: Inference for iterated GMM under misspecification, *Econometrica*, 89(3) 2021, pp. 1419-1447.

⁹⁸ Hamilton, J. D.: *Time Series Analysis*, New Jersey: Princeton University Press, 2020.

⁹⁹ Johansen, S.: Estimation and hypothesis testing of cointegration vectors in gaussian vector autoregressive models, *Econometrica*, 59(6) 1991, pp. 1551-1580.

¹⁰⁰ See note 25

¹⁰¹ Ahlerup, P., Olsson, O., Yanagizawa, D.: Social capital vs institutions in the growth process, *European Journal of Political Economy*, 25(1) 2009, pp. 1-14.

reforms and changes in certain institutions can have on other institutions (Sobel and Coyne¹⁰², Di Tommaso et al.¹⁰³). Therefore, creating an indicator that averages the institutional ranking for its six indicators may be a good indicator to measure the overall effect of changes. However, it may minimize results achieved in specific sectors. Given that institutions and education interact, causing double endogeneity between these variables, which has a joint effect on economic growth, the instrumental Two-STEP GMM followed by multiple linear regression with an interaction model to capture precisely the synergy among variables, is an appropriate methodological choice for this type of relationship – strengthening the viewpoint that improvement of education may result from higher quality of institutions, encouraging investment in education and vice versa. More educated people influence the creation of more vital and sustainable institutions.

The testing of residuals in the first model shows that in AR (1), they result significantly with $p = 0.000$ but not in AR (2) with $P > |t| p = 0.196$. As expected, this indicates the presence of first-order autocorrelation, but lacks the second-order one, which is treated using robust standard errors Two-Step GMM. This results in Pagan-Hall statistic = 6.636 and $p = 0.273$, which indicates that the data are homoscedastic.

Given that some of the variables show unit roots which can cause spurious results, we chose to perform the cointegration test, where we have an Unadjusted modified Dickey–Fuller t statistic of -3.9197 and $p = 0.0000$, as well as Unadjusted Dickey–Fuller t-statistic value: -2.7208 and $p = 0.0033$, which shows that the main variables of the study GDP_In, GovExp, AvgINS, NESTE, TO and Dummy are cointegrated showing long-term relationships, even though some of them (such as NESTE, and NESSE variables for different lags) are non-stationary.

The long-term cointegration relationship is also confirmed in the evaluation of the Im-Pesaran-Shin (IPS) unit-root test, for residuals from the OLS regression of the variables included in the analysis.

The test resulted statistically significant at $p=0.0000$, implying that it is reasonable to proceed to the next step and execute the model of Two-Step GMM with robust errors and accounting for the Error Correction term (ECT) in the regression.

¹⁰² Sobel, R. S., Coyne, C. J.: Cointegrating institutions: The time-series properties of country institutional measures, *Journal of Law and Economics*, 54(1) 2011, pp. 111-134.

¹⁰³ Di Tommaso, M. L., Raiser, M., Weeks, M.: Home grown or imported? Initial conditions, external anchors and the determinants of institutional reform in the transition economies, *The Economic Journal*, 117(520) 2007, pp. 858-881.

Table 1. Pesaran Shin unit-root test

| Variable | t-bar | t-tilde-bar | Z-t-tilde-bar | p-value |
|-------------------|---------|-------------|---------------|---------|
| GDP_ln | -3.3275 | -2.4471 | -4.9289 | 0.0000 |
| GDP_ln_lag | -2.7024 | -2.2606 | -3.9462 | 0.0000 |
| AvgINS | -2.1065 | -1.8373 | -2.1454 | 0.0160 |
| Population growth | -3.1295 | -2.2733 | -4.1973 | 0.0000 |
| NESTE | -1.9396 | -1.3514 | -0.0104 | 0.5042 |
| GovExp | -2.2275 | -1.8833 | -2.2809 | 0.0113 |
| TO | -2.8708 | -2.3281 | -4.2296 | 0.0000 |
| Residuals | -2.3024 | -2.0043 | -2.8631 | 0.0021 |
| Iv_residuals | -2.4341 | -1.9473 | -2.6717 | 0.0038 |

The Im Pesaran-Shin test, which relies on the t-bar-statistic, confirms stationarity for all variables and residuals of the regression, except for the NESSTE. Monte Carlo studies by Im-Pesaran et al.¹⁰⁴ show that this test remains reliable even for small samples. The results show that the data are stable, improving the reliability of the econometric analyses. However, Hansen¹⁰⁵ highlights that when residuals are stationary, it supports the consistency of GMM estimates, reinforcing that the model captures the dynamic relationships without leaving unaddressed the non-stationary influences.

In our model, GovExp, NESTE, and AvgINS are treated as endogenous, as different factors associated with these variables can interact to explain the underlying and dependent variable. To address this, the endogenous variables are instrumentalized using their lagged values: L. GovExp, L. NESTE, and L. AvgINS, assuming that past values influence current GDP but are not directly correlated with current error terms (Stock & Yogo¹⁰⁶). The exogenous variables included in the model are lagged GDP (GDP_ln_lag), a dummy variable (Dummy), population growth (Population growth), and the error correction term (ECT).

We structure two econometric models as follows, aiming to answer the research question and being complementary to each other. The first model assesses the impact of education and institutions (along with other indicators).

¹⁰⁴ Im, K. S., Pesaran, M. H., Shin, Y.: Testing for unit roots in heterogeneous panels, *Journal of econometrics*, 115(1) 2003, pp. 53-74.

¹⁰⁵ Hansen, L. P.: Large sample properties of generalized method of moments estimators, *Econometrica*, 50(4) 1982, pp. 1029-1054.

¹⁰⁶ Stock, J. H., Yogo, M.: Testing for Weak Instruments in Linear IV Regression, *Econometrica*, 59(2) 2019, pp. 379-407.

The second model presents multiple linear regression with interaction effect between education and average quality of institutions on economic growth:

$$GDP_{in} = \beta_0 + \beta_1 (GDP_{in_lag}) + \beta_2 (GExp) + \beta_3 (NESTE) + \beta_4 (AvgINS) + \beta_5 (TO) + \beta_6 (Pop\ Growth) + \beta_7 (Dummy) + \beta_8 (ECT) + \varepsilon \quad (1)$$

$$GDP_{in} = \beta_0 + \beta_1 NESSE + \beta_2 NESTE + \beta_3 AvgINS + \beta_4 (NESSE*AvgINS) + \beta_5 (NESTE*AvgINS) + \varepsilon \quad (2)$$

Where the natural logarithm of GDP is the dependent variable, while β_0 is the intercept, $\beta_1 \dots \beta_8$ are the coefficients of independent variables, which measure the degree of the effect of a one-unit change in the independent variable (independent variables are described in Table 2) on a change in the dependent variable, if all other factors are held constant. At the same time, ε is the error term representing the unobserved factors that may affect the dependent variable. In the second model, β_4 and β_5 are coefficients for the independent variable measuring the interaction terms for education and institutional quality. The data in this model uses centered values of independent variables NESSE, NESTE, and AvgINS (calculated as a difference of the variable's individual value from the variable mean).

The study uses data from the online databases of the World Bank, the World Governance Indicator, and countries' statistical agencies for the 2005-2021 period. Table 1 presents variables included with the description and descriptive statistics for 12 countries. In the analysis of these data, the average growth of GDP is 2.36%, which shows the average value of economic performance for these states during the studied period. Another critical difference is the average GCF (gross fixed capital formation), which has a value of 22.50 and shows the level of investment in the development and modernization of the economies of these countries. In contrast, the inflation variable has an average of 3.25%, an indicator of the change in the prices level during the year and is considered a moderate rate of inflation. Government spending on education has an average of 4.22% of gross domestic product; this level is considered high and can help improve the quality of the education system. Another important aspect is the average population growth, which has a negative value of -0.20%, which shows a tendency for population reduction in the region throughout the study period.

Therefore, since countries have followed a policy of liberalizing the education market, which has resulted in a significant increase in the number of students over the years, negative population growth rates inevitably affect the reduction of the number of students at both levels. However, the average attendance at the

secondary and tertiary levels has an increasing trend of 12.59% and 12.12%, respectively.

Table 1 above shows the institutional variables, where the average of the government effectiveness index is 0.064. Then, the perception of corruption among the citizens of these countries has an average of -0.15, where negative values show general efforts to fight corruption. In the rule of law variable, we have an average of -0.02, which shows that these states should make a higher effort to achieve the rule of law.

Table 2. Variables definition and descriptive statistics

| Variable | Abbreviation | Definition | Source of data and definition | OBS | Mean | Std. Dev. | Min | Max |
|--|---------------|--|--|-----|--------|-----------|---------|---------|
| GDP in current US\$ | GDP | The total production of goods and services within a country in a year, expressed in current prices in US dollars. This means the data are not adjusted for inflation and are reported in the reporting year's prices. | WDI | 204 | 2.363 | 4.473 | -15.307 | 13.072 |
| Government expenditures | GovExp | Government expenditures as % of GDP | WDI | 193 | 4.221 | 1.237 | 2.42 | 9.4 |
| Trade openness | TO | The extent to which a country allows the free flow of goods, services, and capital across its borders. It is measured as a sum of exports with imports divided by GDP | WDI | 201 | 91.542 | 26.454 | 46.142 | 161.142 |
| Students in Secondary Education | NESE | Number of Students Enrolled in Secondary Education | WDI, Countries' Statistic Agencies | 189 | 12.594 | 1.339 | 10.949 | 16.25 |
| Students in tertiary education | NESTE | Number of Enrolled Students in Tertiary Education | WDI, Countries' Statistic Agencies | 202 | 12.128 | 1.384 | 9.465 | 15.93 |
| Government effectiveness | GE | Public opinion on the country's public and civil services quality and its independence from politics. Also, the opinion on the government's credibility in formulating and implementing qualitative policies. | WGI 2022 Interactive > Documentation (worldbank.org) | 203 | 0.064 | 0.456 | -1.043 | 1.178 |
| Control of corruption | CC | It measures public opinion about how elites and private interests use public power for private advantage, including corruption and governmental "capture". The indicator ranges from -2.5, the most corrupted, to +2.5, the least corrupted countries. | WGI 2022 Interactive > Documentation (worldbank.org) | 204 | -0.157 | 0.389 | -0.813 | 1.052 |

| Variable | Abbreviation | Definition | Source of data and definition | OBS | Mean | Std. Dev. | Min | Max |
|--|---------------|---|---|-----|--------|-----------|--------|-------|
| Political stability and absence of violence and terrorism | PSAVT | Measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. | WGI 2022 Interactive > Documentation (worldbank.org) | 200 | 0 | 0.603 | -2.009 | 1.149 |
| Rule of law | RL | Agents' faith in and compliance with social norms, such as contract enforcement, property rights, the police, and the courts. | | 204 | -0.026 | 0.444 | -0.949 | 1.112 |
| Voice and accountability | VA | A measure of the perception of a country's citizens regarding freedom of expression and media, to organize and to choose and to be chosen. | | 204 | 0.251 | 0.422 | -0.86 | 1.098 |
| Regulatory quality | RQ | Measures the perception of the ability to create and implement rules and policies that allow and promote the development of the private sector. | | 202 | 0.271 | 0.345 | -0.624 | 1.007 |
| Population growth | | Population growth % | WDI | 204 | -0.202 | 0.774 | -4.257 | 1.986 |
| Average institutional Quality ranking | AvgINS | It is the average of overall countries ranking in the quality of their institutions | WGI 2022 | 204 | 53.234 | 12.26 | 16.42 | 82.19 |

Note: Using ln (GDP; NESSE and NESTE) instead of raw numbers linearizes exponential trends, stabilizes variance, and simplifies interpretation. Large-scale data are compressed by this technique, making analysis easier. We used AvgINS to average countries' yearly scores in six institutional quality measures.

The number of observations is 2004, but for some variables, there is a lack of data for up to 6 observations. In the NESSE, the missing data are for 15 countries: Bosnia and Herzegovina for the years 2005, 2006, 2011, 2016, 2019, 2020, and 2021; Montenegro for the years 2013, 2014, 2020, and 2021; Greece for 2008 and 2009; and Serbia for 2020 and 2021.

4. RESULTS

To answer research questions regarding the effects of the number of students and the quality of institutions on economic growth and their interactions, we used two econometric models, with 161 and 186 observations in the first and second models, respectively. The first model, Two Step GMM (2SGMM), whose data are presented in Table 3, shows a high explanatory power of the change in economic growth by the independent variables used in the research for the region of Southeastern Europe. The F-test value of 312.55 confirms the model's statistical strength with a Prob > F of 0.000. Also, the Wald chi2 (8) statistic of 2500.4 further validates the overall significance of the model. It makes it clear that individual unobserved effects play a significant role in describing levels of changes in economic performance, underscoring the importance of considering both time-varying and time-invariant variables in our analysis. Therefore, the use of the 2SGMM model results is a powerful and suitable tool, which, with included variables, creates an excellent choice to enable a more nuanced understanding of the subject and answer the question about the complex interaction between education, the quality of institutions, and economic growth.

Table 3. Two Step GMM Model

| GDP_In | Coef. | St.Err. | z-value | p-value | [95% Conf | Interval] | Sig |
|--|--------------------------------------|---------|---------------------|---------|--------------|-----------|-----|
| GExp | .0775 | 0.009 | 8.75 | 0.000 | 0.060 | 0.095 | *** |
| NESTE | 1.105 | 0.042 | 25.86 | 0.000 | 1.021 | 1.188 | *** |
| AvgINS | .0261 | 0.006 | 4.61 | 0.000 | 0.015 | 0.037 | *** |
| TO | -.0016 | 0.002 | -0.70 | 0.487 | -0.006 | 0.002 | |
| GDP_In_Lag | .0829 | 0.025 | 3.22 | 0.001 | 0.032 | 0.133 | *** |
| Dummy | .1971 | 0.098 | 2.01 | 0.045 | 0.004 | 0.389 | ** |
| Popul_G | .0781 | 0.044 | 1.78 | 0.076 | -0.081 | 0.164 | * |
| ECT | -.1004 | 0.292 | -3.44 | 0.001 | -0.158 | -0.043 | *** |
| Constant | 8.208 | 0.612 | 13.40 | 0.000 | 7.008 | 9.409 | *** |
| Mean dependent var. | 24.162 | | SD dependent var. | | 1.23 | | |
| Centered R2 | 0.9490 | | Number of obs. | | 161 | | |
| F (8, 152) | 312.55 | | Prob > F | | 0.0000 | | |
| Endogenous: GovExp, NESTEc, AvgINS. | Weak Instrument LM stat: | | 60.208; P=0.0000 | | | | |
| Instruments: L. (GovExp, NESTEc, AvgINS). | Cragg-Donald Wald F statistic: | | 164.24 | | | | |
| Exogenous: TO, GDP_In_lag, Dummy, Populationgrowth, ECT. | Kleibergen-Paap rk Wald F statistic: | | 216.15 | | | | |

Note: *** $p < .01$, ** $p < .05$, * $p < .1$; (Hansen J statistic: equation exactly identified)

The analysis of the two-step GMM model provides essential insights into the factors influencing economic growth in Southeastern Europe (SEE), considering the data's limitations and revealing some important differences between the EU member states of the region and the Western Balkan countries. This paper highlights some influential findings regarding the role of government spending, higher education enrollment, institutional quality and regional dynamics, highlighting specific economic pathways within the region. Government spending (GExp) has a positive and statistically significant relationship with GDP growth, with a coefficient of 0.0775, significant at the 1% level. This suggests that for every 1% increase in GDP spent at the government level, economic growth increases by 0.0775% on average. Although in line with expectations and literature suggestions, government spending stimulates economic growth, especially in the Western Balkan countries, where public investment plays a fundamental role in supporting infrastructure and social services. However, it is worth noting that the quality of institutions moderates this impact. In SEE countries that are EU members, EU integration has enabled additional financing in the public sector beyond budgetary possibilities, which, coupled with higher levels of government effectiveness, have experienced higher productivity as a result of increased government spending.

The results of the model, as presented in Table 3 above, show that the number of enrolled students at the tertiary level of education (NESTE) positively impacts economic growth ($\beta=1.105$), and it is statistically significant at a 1% level. i.e., the increase in NESTE level by 1% positively impacts economic growth by 1.1% on average. The results complement the theory, as Sebki¹⁰⁷ and Nistor et al.¹⁰⁸ emphasize that the tertiary level of studies has a greater impact on GDP than the secondary level. Additionally, studies show that increasing NESTE can lead to the development of a more skilled and specialized workforce, which can increase productivity and innovation in the economy by absorbing the opportunities from economic openness and trade by attracting additional capital and new technologies from abroad (Glaeser et al.¹⁰⁹, Mamoon and Murshed¹¹⁰, Grdinić¹¹¹, Pegkas and Tsamadias¹¹², Bayer and Urpelainen¹¹³, Kocourek and Nedomelová¹¹⁴). The results confirm that the effects of NESTE are multidimensional, resulting in a more educated population that is better or-

¹⁰⁷ See note 56.

¹⁰⁸ See note 12.

¹⁰⁹ See note 84.

¹¹⁰ See note 85.

¹¹¹ See note 54.

¹¹² See note 43.

¹¹³ See note 86.

¹¹⁴ See note 44.

ganized and creates better institutions by demanding accountability, affecting better health care, and increasing social welfare. This is particularly important for countries with a socialist past¹¹⁵ because the increase in the number of students has an impact on the increase of personal income and the improvement of social status (Mincer¹¹⁶, Hanushek¹¹⁷; Marginson¹¹⁸, Sahadewo¹¹⁹), serving as a motivator for a longer duration of the years of education.

In addition, aiming to reduce the number of variables in the model, we took the average of the six WGI institutional quality evaluators, presented as a rank from 1 for the weakest to 100 for the decision with the highest institutional quality and included the evaluators: Government Effectiveness, Control of Corruption, Political Stability, Rule of Law, Regulatory Quality and Voice and Accountability. Institutional quality (AvgINS) has a positive impact on GDP, with a coefficient of 0.0261 and is statistically significant at $p < 0.01$, confirming also the expectations that improvements in governance and institutional stability are associated with increased GDP. This result shows the impact on GDP, the degree to which economic agents believe and respect the rules established in society, including the implementation of contracts, the protection of property rights, and the effectiveness of the judicial system. Furthermore, in the last two decades, the SEE region, primarily the Western Balkan countries, has been known for a long history of subsequent instability, which also characterizes the institutional developments of these countries. Therefore, making institutional quality a significant indicator in this region that affects the business climate and economic growth. The Western Balkan countries, although they have made significant progress in strengthening institutions, being under the pressure of mandatory reforms on their path to membership but also benefiting from various packages of EU enlargement policies, clearly differ from the SEE countries that are members of the EU. The dummy variable shows these differences, which with a coefficient of 0.1971 and significant at 5%, shows that the countries of the region that are part of the EU, benefit from significantly higher growth compared to the Western Balkan countries. In addition to benefiting from greater and fuller access to the EU single market, additional financing mechanisms and economic stability, they manage more effective and high-quality institutions, revealing the reasons for the differences in the economic growth gap.

Another important finding of the model confirms that the lagged GDP variable (GDP_In_lag, with a positive coefficient of 0.0829 and significant at $p < 0.001$) and the negative error correction term (ECT, -0.1004, significant at the 1% level)

¹¹⁵ See note 68.

¹¹⁶ See note 19.

¹¹⁷ See note 3.

¹¹⁸ See note 40.

¹¹⁹ See note 41.

suggest that countries in the region show economic stability with a tendency towards long-term convergence. Countries in the region show stability in GDP growth, proving that the positive effects of past economic performance strongly affect current growth. However, the adjustment effect (indicated by ECT) may be more strongly felt in the EU member states in SEE due to more developed institutional structures. On the other hand, the Western Balkan countries have slower economic development trends and are affected by the structural challenges associated with the non-completion of the protracted transition of these countries, political instability and slower reforms. In general, we can say that the results of the study are significantly moderated by WB countries.

The study gains additional value by examining multiple regression with interaction effects between the levels of education and institutional quality in economic growth, as presented in Table 4 below. Initially, through the centralization of data values for the variables NESSEc, NESTEc, and AvgINSc, the model results in a reduced VIF value of 6.1 (less than 10), which is acceptable, indicating manageable multicollinearity and a natural correlation between the variables. The model has an adjusted R² value of 95.55%, indicating a high degree of explanatory power for variations in economic growth. Also, the F test result of 791.95 (Prob > F = 0.000) confirms the statistical reliability of the model.

The statistically significant results of the regression model show that, regardless of the level of studies, the increase in the number of students at the secondary and higher level of education, NESSEc and NESTEc, as well as the improvement of the quality of institutions (AvgINSc) positively affect economic growth, with coefficients $\beta = 0.151; 0.908$ and 0.037 , respectively. All of them are of statistically solid significance ($p < 0.01$).

Table 4. Interaction effect between education and institutions

| GDP_In | Coef. | St.Err. | t-value | p-value | [95% Conf | Inter-val] | Sig |
|--------------------------------------|---------------|---------|----------------------|---------|-----------|------------|-----|
| NESSE | .151 | .045 | 3.34 | 0.001 | .062 | .24 | *** |
| NESTE | .908 | .045 | 20.01 | 0.000 | .818 | .997 | *** |
| AvgINS | .037 | .003 | 14.01 | 0.000 | .032 | .042 | *** |
| c.NESSE##c.AvgINS | -.009 | .005 | -2.02 | 0.045 | -.019 | 0 | ** |
| c.NESTE##c.AvgINS | .011 | .004 | 2.62 | 0.001 | .003 | .02 | *** |
| Constant | 24.351 | .025 | 971.95 | 0.000 | 24.301 | 24.4 | *** |
| Mean dependent var | 24.497 | | SD dependent var | | 1.497 | | |
| R ² / adj- R ² | 0.9556/0.9553 | | Number of obs | | 186 | | |
| F-test | 791.95 | | Prob > F | | 0.000 | | |
| Akaike crit. (AIC) | 105.765 | | Bayesian crit. (BIC) | | 125.120 | | |

*** $p < .01$, ** $p < .05$, * $p < .1$

Based on the interaction framework within the model, the results show that the influence of the number of students enrolled in secondary education in interaction with the average institutional quality (c.NESSE##c.AvgINS), is weakly negative ($\beta = -0.009$, and $p < 0.05$). This result shows that as the quality of institutions increases by one unit, the marginal benefit from NESSE on economic growth, although slightly, decreases by 0.009 units. It may be because the improvement of institutions affects the allocation of resources in more productive and influential sectors in education. On the other hand, the interaction variable of the number of students enrolled in higher education with average institutional quality (c.NESTE##c.AvgINS) has a positive impact with a coefficient $\beta = 0.011$ on economic growth. It is statistically significant at 1%. This interaction shows a synergy, which, with the increase of institutional quality, improves the profitability of the tertiary level of economic studies, among other things, by increasing the country's opportunities for investment in R&D, better application of knowledge in the economy as well as the matching of education with labor market needs.

Moreover, these results suggest that the duration of education affects economic performance (Chatterji¹²⁰, Pastor et al.¹²¹, Lövdén et al.¹²², Odhiambo¹²³, Sarwar et al.¹²⁴, Maneejuk and Yamaka¹²⁵); the interaction effect between education and institutions suggests that the impact of education on economic performance depends on the quality of institutions (Acemoglu et al.¹²⁶, Rodrik¹²⁷, Faria et al.¹²⁸, Murphy and O'Reilly¹²⁹). Specifically, the positive effect of education on economic performance is more robust when there are better institutions. Well-functioning institutions provide an environment that ease economic activity, reduce transaction costs in labor markets by reducing information asymmetry, and enable individuals to maximize their education and skills, especially from the tertiary level, promoting growth and economic development (Wasmer et al.¹³⁰,

¹²⁰ See note 52.

¹²¹ See note 62.

¹²² See note 63.

¹²³ See note 4.

¹²⁴ See note 5.

¹²⁵ See note 6.

¹²⁶ See note 18.

¹²⁷ See note 64.

¹²⁸ See note 13.

¹²⁹ See note 66.

¹³⁰ See note 83.

Kurihara¹³¹, Apostu et al.¹³², Avcı and Çalışkan¹³³). Conversely, countries with higher investments in tertiary education show higher chances for the success of political reforms through the accumulation of human capital¹³⁴.

5. CONCLUSION

This study aimed to investigate the complex relationship between education and institutional quality and their joint impact on the economic growth of Southeast European Countries for the period from 2005 to 2021. The study utilizes the two-step GMM estimator, which reveals that government spending, higher education enrollment, and institutional quality are key factors of economic growth, with differentiated impacts between EU countries in SEE and Western Balkan countries. EU integration appears to amplify the positive effects of these factors by providing access to larger markets, regulatory frameworks, and external financing, while Western Balkan countries face structural and institutional constraints that limit the full benefits of these growth factors. Furthermore, the Error Correction Term (ECT) highlights the dynamics of long-term convergence in the region, where despite short-term deviations, economies in the SEE region quickly return to equilibrium, with EU member states in SEE generally adjusting faster thanks to more stable institutional environments. This result highlights the importance of strengthening governance and institutional frameworks in the Western Balkan countries to enhance economic stability and foster upward convergence. From the first model, the study results show that the increase in NESTE level of 1% positively impacts economic growth, on an average of 1.1%. This result underscores that a larger number of students usually corresponds to more research output, technological progress, and innovation that can drive economic growth by attracting FDI and overall businesses, as they prefer to operate in countries with a skilled workforce and sufficient level of human capital, as well as with stronger institutional framework.

In addition, these results are confirmed and strengthened by the findings of the second model; through testing the interaction of institutional factors, we can conclude that the impact of education on economic growth is complex and reaches its effects when there are qualitative institutions. In the presence of qualitative institutions, NESTE has a significant positive effect on GDP, producing a synergy that amplifies the benefits of education in economic perfor-

¹³¹ See note 8.

¹³² See note 9.

¹³³ See note 10.

¹³⁴ See note 67.

mance. This confirms that a stable and qualitative institutional environment, which implies reduced information asymmetry, higher accountability, respect for property rights, rule of law, and contract enforcement, increases educational outcomes. At the same time, an educated population can demand and foster better institutions.

In the end, this study provides recommendations to decision-makers that, in order to fully exploit the potential of an increase in years of schooling in the GDP growth and to offset the adverse effects of declining trends in NESTE, there is an urgent need to improve the quality of their educational systems and their institutional frameworks. Paying attention to the above, countries would significantly impact achieving the intended effects in increasing individuals with the skills and knowledge needed to establish better institutions and get the economic benefits from the interaction of all these factors in increasing long-term economic performance.

This study, although comprehensive, has its limitations related to the short period, the failure to address the effects of global crises both in economic and social aspects such as migration and informal institutions, as well as the impossibility of addressing the quality of education from lack of data for the entire region. Future research can improve this investigation by examining these additional factors and using a more significant number of observations and more advanced econometric methods to investigate further the impact of relationship between education and institutions in economic growth.

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