

CONVERGENCE VS. DIVERGENCE OF EDUCATIONAL EXPENDITURE FOR EU COUNTRIES

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Abstract

Public spending on education is important for ensuring equal access to quality learning opportunities, especially within the European Union's (EU) goals of cohesion and social inclusion. As European countries strive for greater integration, the concept of convergence in education spending has become increasingly relevant in policy discussions. Convergence, in this context, refers to reducing the differences in public expenditure per pupil among European nations to establish fair and efficient education systems across the continent. This article explores the trends of convergence in public education spending in Europe. The countries studied include the EU27, divided into Western and Eastern groups. Romania holds a special place in this analysis. The period studied spans from 1995 to 2022, the longest available data range. Although progress has been made in convergence – particularly among newer EU member states – significant disparities still exist. Closing these gaps is important for promoting equal educational opportunities, reducing social inequality, and supporting the EU's broader aims of integration and cohesion. Achieving complete convergence will require ongoing political dedication, targeted investments, and a balanced focus on both spending levels and educational outcomes.

Keywords: *education expenditure; convergence; EU countries.*

JEL Classification: I21, I22, I23, I28

1. INTRODUCTION

Today, education plays an increasingly critical role in society. Currently, the importance of education is determined at the micro level by enhancing individual employability capacities and at the macro level by increasing the competitiveness of states (Zaidan and Ehsan, 2024). Education, especially vocational training, is crucial for imparting knowledge to individuals and transforming them into professionals in various fields of activity, with the ultimate goal of enhancing their long-term employability (Bhattacharya, 2021).

For the longest time, education was considered the instrument through which a series of knowledge necessary for the beginning of a career in any field is transmitted, followed later by obtaining opportunities in life. However, starting in the 1990s, it was observed that the population loses a series of initial skills as it ages (Ouedraogo *et al.*, 2022). Thus, in this situation, it is imperative to transition from the traditional role of education to the need for continuous training

throughout one's active life in various fields. Especially in the last decade, with the development of the global information society, education has become essential in our daily lives, as well as in the public discourse of authorities (Pierson *et al.*, 2023). In these conditions, education is at the center of governments' social policies, as its role has been reconsidered and even strengthened by incorporating vocational training and active labor market strategies to increase the population's employment rate.

At the global level, states are trying to promote similar models of state involvement in society through public spending. However, despite numerous convergences between the states of the world regarding the provision of public goods and the introduction of the welfare state, the individual realities of each state mean that, in practice, there is no real convergence among states (Rodríguez and de Lucas Santos, 2018). At the global level, there is a growing concern about the increasing need for education in the context of the information economy and the evolving labor market. The OECD, UN, and EU have formulated various synthesis and action documents regarding progressive changes in education and the increasing requirements for continuous training to increase employability.

The convergence of public spending on education involves the process by which states or regions progressively reach similar levels of absolute expenditure relative to GDP or relative to population (Sanz and Velázquez, 2004). The European Union, through its actions, has proposed achieving convergence in public spending, aiming to foster long-term cohesion and competitiveness. The convergence of education spending in Europe can be measured in several ways. Still, the three most popular metrics are spending as a percentage of GDP, spending as a percentage of total government spending, and spending per student expressed in purchasing power standards (PPS) (Starke *et al.*, 2008).

In practice, there are two types of convergence: absolute and relative (Skidmore *et al.*, 2004). The first type, absolute convergence, represents the reduction of disparities in real spending levels. Relative convergence, on the other hand, is the process by which nations adjust their spending to levels appropriate to their economic capacities and the needs of their populations. Both types are supported and promoted by the EU, which wants to reduce inequalities between states while respecting national characteristics (Yu *et al.*, 2023).

The spending on education by EU countries has gradually but noticeably converged over the last 20 years, although significant gaps remain. In terms of both absolute and relative GDP, high-spending nations such as Sweden, Denmark, and Luxembourg consistently allocate the largest sums per student. Western and Southern European nations, such as France, Germany, and Italy, are examples of moderate-spending nations, characterized by relatively steady economic trends and modest public spending (Pierson *et al.*, 2023). Historically, spending levels have been low in Eastern and Southeastern European countries (Romania, Bulgaria, and Hungary). However, since joining the EU, these countries have

significantly increased their investment in education. However, despite notable progress, public spending on education per student in several Eastern European nations is still less than half that in Western Europe. At the global level, and due to the standardization promoted by international institutions, education systems have the same composition: primary, secondary, and tertiary (Martens *et al.*, 2010). To these modalities, technical education and lifelong learning are added. In most countries worldwide, education is mandatory for children up to at least 8 years of age, and in some countries, it extends to 10 or 12 years of age. Governments are involved in the education process through educational programs, which establish the knowledge and skills that children must acquire upon completing compulsory education (Pérez-Esparrells *et al.*, 2010).

The present study is organized as follows: the next section presents the primary studies in the literature; the third section presents the methodology and data used in the study; the fourth section involves the empirical analysis of convergence for the components of the educational system; finally, the conclusions section concludes the article.

2. LITERATURE REVIEW

In the specialized literature, preliminary efforts have been made to analyze the convergence of public spending in the education sector. Convergence in the three main components of the education system is almost non-existent in the literature.

Skidmore *et al.* (2004) begin with the convergence model developed by Barro and demonstrate that, at the global level, government spending on education exhibits strong convergence among countries. According to Starke *et al.* (2008), nations are likely to converge in the development of their well-being, which implies that, theoretically, the financing of national education systems could lead to convergence on a global scale: state responses are comparable due to common problems; international harmonisation of legislation can produce the same phenomenon. Jakobi and Teltemann (2009) analyze convergence in education policies across OECD countries and show that two phenomena coincide: convergence in specific indicators of the education system (expenditure) and divergence in outcome indicators. This is the most comprehensive study on the convergence of education system expenditure.

Agasisti *et al.* (2012) examine the sigma and beta convergence of expenditure per student in higher education in the EU-15 from 1998 to 2006. The authors highlight a gradual trend towards convergence; since 2001, the convergence ratio has increased, indicating that the adoption of European-level policies has affected the financing systems of higher education in Europe. Regarding the origin of funding resources, the authors demonstrate that private resources have had a significant impact on convergence, while GDP per capita remains the primary influencing factor. Pjesky (2013) develops his own model starting from the well-

known Barro growth model and analyzes the convergence of education spending in the period 1977-2006 in the constituent states of the USA. The authors show that, especially, the less developed states have the lowest convergence rates in terms of education spending, trying through various methods to increase their private allocations to it.

Apergis (2015) analyzes the convergence of public spending for 19 developing countries during the period 1990-2012 and reaches a surprising conclusion: for this type of state, the classical theory of convergence is no longer respected; they do not reach an equilibrium level. The authors demonstrate from their analysis that the convergence of public spending is achieved only in two or three convergence clubs, being essentially completed in leaps rather than in a linear manner. Perović *et al.* (2016) use data for the period 1995-2010 for the EU-15, employing a spatial correlation model across all expenditure categories, and demonstrate that spatial factors significantly influence education, with convergence achieved over a maximum interval of 5 years. Mahdavi and Westerlund (2017) analyze the convergence of education spending at the local level of the US states for the period 1957-2008 and show that at the interregional level, there were minimal indications of “club-like convergence”, with local authorities needing enormous financial resources to achieve full convergence.

Policy changes are unlikely to lead to convergence, but they will still be unique, according to Pierson (2023). In addition, the political structure of a nation significantly influences the way policies are implemented in response to specific problems, meaning that even similar problems can provoke quite diverse political reactions. At the EU level, the Bologna Process should have led to increased convergence between states, despite the wide variety of forms that national education systems present. Yu *et al.* (2023) focus solely on higher education in China for the period 2007-2018 to analyze σ and β convergence, concluding that there are significant geographical differences between Chinese regions, as well as between rural and urban areas. The authors show that even if financial resources are similar, the levels of convergence register significant differences (policy orientation, economic disparities, and demographic patterns), especially requiring a series of qualitative measures in higher education to promote long-term economic growth.

3. DATA AND METHODOLOGY

To ascertain the existence of the phenomenon under study, we primarily use the accepted literature indicator of beta convergence in our investigation. We chose the period 1995–2022 as the analysis period, as it is the most extended period for which data are available (Table 1). The examined period is significant because, during its 27-year duration, numerous events occurred, particularly the integration of Eastern European countries into the EU.

Table 1. Description of the variables

Description	Definition	Source
Government expenditure on education, total (% of GDP)	General government expenditure on education (including current, capital, and transfer expenditures) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to the government. General government usually refers to local, regional, and central governments.	Eurostat, World Bank
Government expenditure on education, per capita (primary, secondary, tertiary)	Annual expenditure on educational institutions per pupil/student based on FTE, by education level and programme orientation	Eurostat, World Bank

Source: own elaboration

To analyze the achievement of convergence in education spending, several methods are employed in the literature (Apergis, 2015; Glawe & Mendez, 2023). The most widely used and well-known method for determining convergence is β -convergence. The theoretical basis of this method is the neoclassical growth model developed by Barro, which is used to evaluate the growth of macro variables of countries. This model has yielded excellent results at the EU level, particularly in euro countries, due to their homogeneity (Phillips & Sul, 2007; Jakobi & Teltemann, 2009). In our analysis, the macro variable used is the convergence of the different components of public spending, which will be tested.

The regression used to calculate convergence is presented in Equation 1 (Perović *et al.*, 2016; Mahdavi & Westerlund, 2017).

$$\frac{1}{T} \log \left(\frac{Y_{iT}}{Y_{i0}} \right) = \alpha - \beta \log Y_{i0} + \varepsilon_{iT} \quad (1)$$

where Y_{iT} represents the value of the indicator calculated at time T , Y_{i0} represents the value of the indicator calculated at time 0 , i represents the country, and ε_{iT} represents the error term. The specialized literature has shown that if, after performing the regression analysis, the calculated coefficient B is negative, then there is β -convergence.

In the case of public spending, convergence at the EU level involves taking into account two indicators (Agasisti, 2014): the percentage of public expenditure on education as a percentage of GDP and public spending on education as an amount expressed in Euros (broken down into the three components of education: primary, secondary, and tertiary). Following our analysis, we can conclude that there is convergence in education spending at the EU level, as states with a higher percentage of these resources grow at a slower rate than states with a lower share.

In other words, the growth rate for states with lower indicators is higher than that of states with higher percentages of the indicators. In this way, through this accelerated growth mechanism, a gradual convergence occurs between states that were weaker at the beginning of the period and those that were stronger, the former catching up with the latter.

In economic practice, however, the opposite phenomenon can also occur: divergence. This phenomenon manifests itself by maintaining and sometimes even increasing the initial gap between the analyzed states (Pérez-Esparrells *et al.*, 2010). Suppose at the beginning of the time period, there is a certain difference between the states. In that case, this does not decrease over time due to insufficient allocations, but instead remains maintained or even increases.

4. ANALYSIS AND RESULTS

The percentage of public expenditure reported as a proportion of GDP is one of the most widely used indicators for describing the financing of education at the global and, implicitly, European level. Table 2 presents a comparative situation for the period 1990-2022, covering all EU states, subsequently broken down by West and East, which includes our country. As can be seen, at the EU level, there is an increase in allocations for education from 1990 to 2010 (from 4.39 to 5.32), followed by a decrease in 2022 (to 4.88). When comparing the East and West states, we observe an inverse trend in public education expenditure from 1990 to 2022. At the beginning of the 1990s, spending for the Eastern states was higher than that for the Western states. However, subsequently, there is a relative flattening of them throughout the period, with higher values in 2005 (4.72) and lower values in 2022 (4.59). For the Western states, however, there is a phenomenon of increasing budgetary allocations to education, with a peak in 2010 (5.77) and subsequent decreases. For Romania, the phenomenon of public expenditures on education shows a flattening in the period 1990–2022, experiencing slight variations over time (from 3.24 to 3.32).

Table 2 shows that, in terms of absolute convergence, the coefficient B for education expenditure as a percentage of real GDP is positive and statistically significant for the EU-27. This is achieved for all periods and for all groups of countries. For the EU, convergence begins at a value of 20.95 in 1990 and increases to 26.44 by 1995. After this date, the value begins to decrease towards 20 in the period from 2000 to 2021, reaching the current period's lowest value of 18.54. For Eastern European countries, convergence experiences a sharp acceleration process until the year 2000, followed by negative phenomena of substantial decrease to extremely low values, reaching only 12.25. Romania's situation is similar to that of the other Eastern states, converging until 2000, followed by a substantial decrease to 11.69.

Table 2. Evolution of public spending on education in EU28 (% of GDP and beta convergence)

	1990	1995	2000	2005	2010	2015	2020	2021	2022
EU countries mean	4.39	4.636	4.948	5.062	5.323	5.055	5.170	5.039	4.885
Eastern Europe means	4.45	4.496	4.843	4.721	4.618	4.654	4.658	4.597	4.597
Western Europe means	4.35	4.727	5.017	5.282	5.779	5.314	5.501	5.325	5.072
Romania	3.24	3.24	2.868	3.500	3.417	3.106	3.589	3.324	3.324
	1990	1995	2000	2005	2010	2015	2020	2021	2022
EU convergence	20.95	26.44	22.54	19.28	20.26	21.36	20.65	20.48	18.54
Eastern Europe convergence	21.14	23.54	22.32	16.32	15.92	15.47	11.53	12.25	12.25
Western Europe's convergence	21.45	28.48	23.22	19.91	17.84	22.74	21.86	22.04	20.61
Romania	19.05	20.16	21.86	16.31	14.47	14.67	10.91	11.69	11.69

Source: own calculations using data from Eurostat

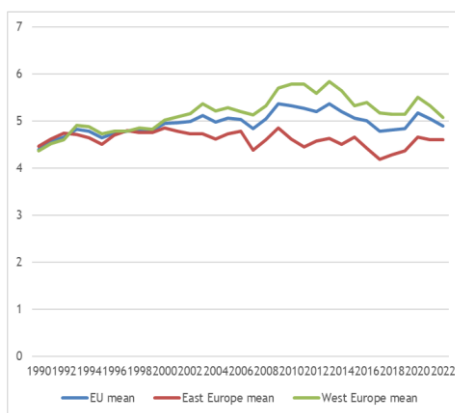


Figure 1a

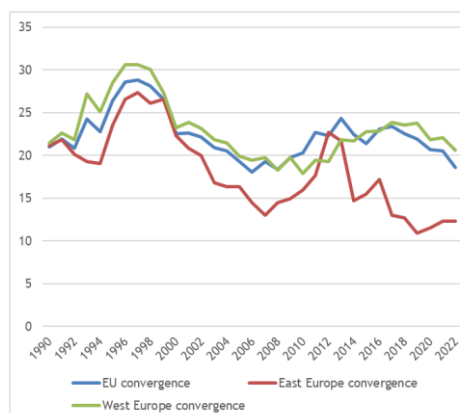


Figure 1b

Source: own calculations using data from Eurostat

Figure 1. Evolution of public spending on education in EU28 (% of GDP and beta convergence)

Figure 1 shows the temporal evolution of the two indicators: the budgetary allocation for education as a percentage of GDP. As shown in Figure 1a, the evolution of education spending is an upward trend for the three groups of countries. For the EU average, it starts at 4.5 in 1990 and reaches above 5 in the period 2008-2016, then decreases to 4.7-4.9. For the Western states, the values are higher, approaching a value of 6, and have declined in recent years to around 5.5; for the Eastern states, the values are below 5. For convergence (Figure 1b), the situation can be divided into two distinct periods: a period of growth until the 2000s, during which all European states reached values of 25-30, followed by a sharp decrease after 2000, resulting in values between 10 and 20.

Table 3 presents the results obtained for budgetary allocations regarding primary education expenditures in the upper part and beta convergence in the

lower part. For fiscal allocations, it is observed that they have increased from 1995 to 2022. This is achieved for the EU average, ranging from 3,545 to 6,577; for Western countries, from 4,958 to 8,853; for Eastern countries, from 1,130 to 3,059; and for Romania, from 981 to 2,773. The second part of the table presents beta convergence with decreasing evolutions for all categories of analysis.

Table 3. Estimation results: Primary education (per capita + beta convergence)

	1995	2000	2005	2010	2015	2020	2021	2022
EU mean	3454.84	4001.56	4772.80	5930.44	5708.38	5971.94	6383.28	6577.28
Western Europe means	4958.61	5732.86	6621.88	8166.42	7772.20	8035.18	8578.92	8853.51
Eastern Europe means	1130.83	1325.93	1915.13	2474.82	2518.84	2783.30	2990.01	3059.45
Romania	981.07	1141.35	1495.46	1949.86	2249.86	2532.62	2654.16	2773.56
	1995	2000	2005	2010	2015	2020	2021	2022
EU convergence	81.27	79.52	69.21	77.96	68.59	66.76	66.01	64.86
Western Europe's convergence	52.76	50.76	43.65	56.88	47.55	47.48	46.71	44.93
Eastern European convergence	65.61	68.32	59.57	50.24	41.72	39.54	39.41	38.66
Romania	52.19	55.99	56.99	48.74	37.56	34.60	34.55	34.36

Source: own calculations using data from Eurostat

Figure 2 shows the evolution of expenditure and beta convergence for primary education.

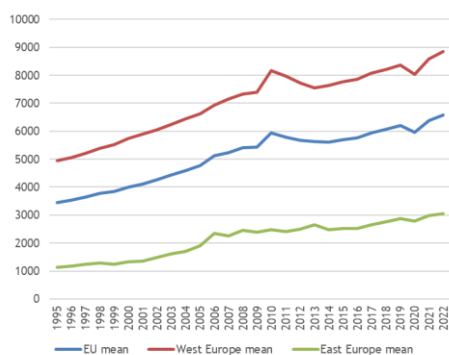


Figure 2a

Source: own calculations using data from Eurostat

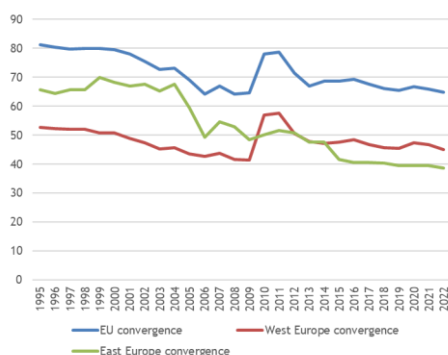


Figure 2b

Figure 2. Evolution of public spending on primary education in EU28 (% of GDP and beta)

Figure 2a shows the evolution of spending on primary education during the period 1995-2022. The evolution is an ascending one for all categories of countries: the EU average starts at 3400 and reaches 6500; the average for Western

countries is the highest, exceeding 8000, while the average for Eastern countries is the lowest, at only 3000. Figure 2b illustrates the beta convergence for expenditure on primary education from 1995 to 2022. As can be seen, the convergence is sharply decreasing for all types of analysis. For the EU average, the value decreases from over 80 in 1995 to 65 in 2022; for Western countries, from 52 to 44; and for Eastern countries, from 65 to 38.

Table 4 shows the evolution of education expenditure and convergence in the tertiary sector for the period 1995-2022. The EU average starts at 7,200 in 1995 and reaches 9,800 in 2022; the average for Western countries ranges from 10,400 to 13,700; for Eastern countries, it ranges from 2,100 to 3,800.

Table 4. Estimation results: Tertiary education (per capita + beta convergence)

	1995	2000	2005	2010	2015	2020	2021	2022
EU mean	7210.93	8069.80	8286.39	8936.24	8932.35	8965.56	9565.85	9839.83
Western Europe means	10490.91	11839.96	12268.34	13208.06	12507.89	12495.11	13315.60	13709.79
Eastern Europe means	2141.86	2242.38	2132.47	2334.33	3406.51	3510.81	3770.78	3858.97
Romania	1742.38	2043.18	2059.59	2198.74	2770.86	3093.27	3153.06	3203.73
	1995	2000	2005	2010	2015	2020	2021	2022
EU convergence	92.87	99.03	95.09	94.52	84.12	78.07	77.23	76.06
Western Europe's convergence	64.77	69.96	63.86	63.54	61.57	55.27	54.46	52.88
Eastern European convergence	38.00	47.89	41.87	42.14	43.65	41.03	40.77	39.46
Romania	34.62	42.32	38.48	40.58	40.95	33.94	35.98	37.25

Source: own calculations using data from Eurostat

Figure 3 shows the evolution of public spending on tertiary education from 1995 to 2022. As can be seen from Figure 3a, the evolution is upward for all types of countries analyzed; however, it is not linear, but somewhat non-linear. The highest values are found for Western countries. Eastern European countries show low values in the 2000-4000 range. Regarding convergence (Figure 3b), it is decreasing for all groups of countries analyzed. The EU average decreases from 100 to 76 in 2022; the average of Western countries decreases from 64 to 52. In contrast, an interesting phenomenon occurs in Eastern countries: even if there are increases or decreases in the value, they remain close to the initial value of 40.

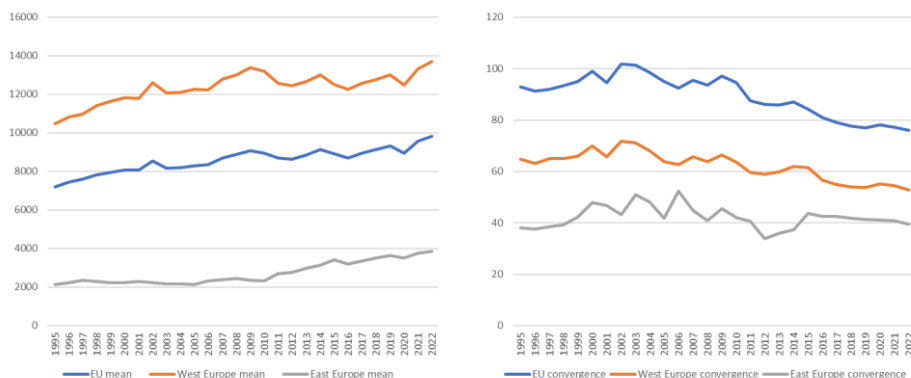


Figure 3a

Figure 3b

Source: own calculations using data from Eurostat

Figure 3. Evolution of public spending on Tertiary education in EU28 (% of GDP and beta)

5. CONCLUSIONS

Our analysis aims to examine the convergence of the three categories of public expenditure on education, corresponding to the three sub-components: primary, secondary, and tertiary education. To make a series of comparisons between the West and the East, we carry out our analysis at the level of the entire EU28.

The analysis's findings indicate a mixed situation: convergence is observed for some indicators, albeit to varying degrees. Regarding the financing of education, we can observe some convergence in terms of the total value of public expenditure on education. The findings demonstrate that Member States' spending on the sub-components of schooling does not achieve full convergence as a result of EU accession. According to our research, by 2015 at the latest, there was partial convergence between Western and Eastern countries in terms of the allocation of funds for basic and secondary education, and subsequently for tertiary education. The standardization of education expenditure across the three sub-components at the level of Member States was not a direct result of the EU's eastern enlargement.

Our findings also raise significant research questions: we observed changes in several indices, even though we could not identify any notable convergence in education policy. Countries are changing their education policies, and it might be interesting to compare this area with other areas of social policy.

Public spending on education in Europe is gradually converging. In particular, it entails matching national aims and characteristics with EU assistance policies and initiatives. Considering their past, there are notable differences, but progress has been made, especially in the eastern regions. To achieve shared prosperity and mobility inside the EU, as well as equity among individuals, it is

imperative to accomplish as much convergence as possible. Several initiatives, including tracking learning outcomes, engaging with vulnerable populations, and assessing the effectiveness of public investment, could serve as the foundation for this. To achieve convergence, EU nations could employ several measures, including monitoring the use of education funds, increasing investment in education from both national budgets and EU instruments, and pursuing goals such as social inclusion, teacher training, and digital education.

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