

European funds for sustainable transport and economic growth

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Abstract. *The study demonstrates how European Funds can play a key role in developing infrastructure, promoting green transport alternatives and influencing regional economic growth. Assessing the allocation, execution and results of these funds, the paper highlights the symbiotic relationship between investment in sustainable transport and economic progress in different regions of Romania. The research uses a panel data regression approach to assess the impact of structural funds on regional economic growth. Results prove the positive impact of ESIF investments and reveal a convergence effect between regions, indicating a "catch-up" effect.*

Keywords: European funds, development region, sustainable transport, green transport, sustainable development.

JEL Classification: F63, O12, R11, Q01.

Introduction

The analysis of the impact of EU funding on sustainable transport in Romania was determined by the existence of gaps in the existing literature, for example the exact impact of political interventions, the effectiveness of the allocation of funds and its apparent effects. While there are numerous studies on the overall impact of EU funds on Economic Development, few studies explicitly address Romania, especially in terms of sustainable transport. Studies in this area could contribute to: reducing carbon emissions, improving urban mobility and economic benefits. The question is whether these funds are used optimally to achieve the desired results in terms of sustainability and economic development of a region. Current EU policies place particular emphasis on reducing regional inequalities, so we consider it important to understand how investments in sustainable transport support these goals in our country. Answering specific research questions could make an important contribution to the knowledge of the impact of EU funding on sustainable transport in Romania and could provide valuable information to policy makers, practitioners.

The European Structural and Investment Funds (ESIF) can be a significant element in promoting regional economic growth, and ESIF investments play a crucial role in supporting the economic development of European Union (EU) regions. Among those drivers of economic growth that are at the heart of ESIF investments are investments in sustainable transport. Improving transport infrastructure leads to lower transport costs and attracts investment to the region, thereby stimulating economic growth.

The aim of this research paper is to estimate the effects of ESIF investments targeting the thematic objective 7 of the Cohesion Policy "Promoting sustainable transport systems and removing bottlenecks in major network infrastructure" on regional economic development in Romania for the programming period 2014-2020. Therefore, the following hypotheses were put forward:

H1: ESIF investments positively influence, even if slightly, the regional economic development in Romania.

H2: The regional governmental quality index positively influences regional economic development.

H3: There is a convergence effect between regions based on the initial value of real GDP per capita.

H4: The governmental quality index exhibits a moderating effect on the relationship between ESIF investments and economic development.

The research is based on the analysis of sustainable transport - as the main source of pollution reduction. Sustainable transport is an integral part of the Green Economy (Romanian Government, 2015), and also a key element for promoting sustainable

economic development in Romania. Sustainable transport is an important element of sustainable development by promoting a low-carbon economy and reducing pollution. The Green New Deal (The Green New Deal) foresees activities at the intentional level but mentions that concrete actions occur at the local and regional levels. Therefore, in our research, we analyse the impact of European funds allocated to sustainable transport at the level of each region in Romania. Sustainable development is a concept of regional development, i.e. a process of changing the balance between economic, social and environmental aspects (Mach, L. et al, 2021). The green economy is defined as, an economy concerned with a better quality of life for all, within the ecological limits of the planet (Green Economy). The European Commission, through the packages of legislation adopted, has set itself the target of a reduction in the Union's net greenhouse gas emissions of at least 55% below 1990 levels by 2030 (European Commission, 2021). Reducing emissions is essential because Europe wants to become the first climate neutral continent by 2050 and the commitments of the European Green Pact to become a reality (European Commission, 2021). The EU regulation on sharing efforts to reduce greenhouse gas emissions by EU member states in the period 2021-2030 (European Commission, 2021); requires each member state to reduce emissions in the transport, agriculture, buildings and waste sectors. All of these targets mentioned above are set taking into account each country's baseline situation, the different capacities of each member state and are based on GDP per capita, adjusted to ensure profitability. Executive vice-president for the European Green pact-notes that in order to achieve our climate and zero pollution targets, all parts of the transport sector must actively contribute (European Commission, 2021). Thus, within the National Strategy for Sustainable Development it is mentioned that, using the appropriate means of economic policy, the productivity of material and energy consumption resources can increase at an average annual rate of 3-4% in the period 2008-2030 (Ardeleanu, C. et al, 2012). A positive aspect to mention about Romania is that it is among the countries with the lowest greenhouse gas emissions per capita in the European Union (Popovici, O., 2021). Thus, Romania has made commitments in terms of climate policy and pollution reduction. Since, at the moment, there is no system of indicators for assessing the green economy (Adarina, R., 2019), in our research we analysed the financial allocation of EU funds in the field of sustainable transport and, respectively, the impact of these funds on the GDP of the regions in Romania. The development of a country is conditioned by the development of its regions, whose growth potential has been and continues to be stimulated thanks to the support of the European Union structural funds (Mach, L. et al, 2021). The indicators used in this research are financial allocations for sustainable transport and GDP by region. Research in the field of sustainable development demonstrates that green economic development can contribute to the growth of gross domestic product (GDP) (Baba Ali, E. et al, 2021).

Research shows that the implementation of projects within regional operational programs has a positive impact on the regional entrepreneurial and socio-institutional capital (Zhironkin, S. et al, 2022). This positive impact can be translated into a premise of regions on the path of Sustainable Development, which reflects the efficiency of spending from EU funds. Some studies, (Mach, L. et al, 2021) demonstrate that structural funds are an important vector for green project initiatives and can also have a positive impact on the country's macroeconomic indicators. It is already well known that sustainable transport policies lead to the reduction of air pollution, thus contributing to the better health of citizens and to the development of a part of the green economy.

Literature review

Investments in transport infrastructure can be an important factor in the development of an economy, thus, these investments can contribute to reducing local inequalities, resulting in a sustainable economy and social stability (Mohmand, Y., Aihu Wang and Abubakr Saeed. 2016). Research in India shows that there is a bilateral causality between road transport infrastructure and economic growth (Pradhan, Bagchi 2012). Thus, road transport can generate economic growth and vice versa. Increased investment in sustainable transport aravia a positive effect on economic growth. The same research also highlights the bidirectional causal relationship between road transport infrastructure and GDP and between economic growth and GDP (Pradhan, Bagchi 2012). Research findings show that transport infrastructure plays a positive role in promoting economic growth (Chao Wang et al., 2020).

Sustainable transport development aims to build a transport structure that supports economic growth, improves public health and contributes to a sustainable environment (Hmamed H., et al., 2023). Results from studies suggest that transport development has a positive effect on economic development and growth (Yijia Zhang, Lu Cheng 2023; Ghosh et al., 2019). US studies show that transport infrastructure spending leads to an increase in the economy's capital stock, thus increasing its capacity to produce goods and services and leading to more employment opportunities and higher GDP (IHS Markit 2021). And, studies in China show that transport infrastructure is an important factor for regional economic growth (Qiuming Lai 2020).

The Investment Plan for Europe, foresees more than €500 million to be invested in transport, but also in other important sectors through the European Fund for Strategic Investments (European Commission, 2016). At EU level, transport is a major cause of greenhouse gas emissions. Means of transport are an important category of indispensable accessories for the population, but at the same time they are polluting (Dănciulescu, 2008) (Militaru, C. et al.). Karl Burkart, divided the green economy into 6 sectors, among them

sustainable transport. It is already well known that the transport system in developing countries is facing various problems such as traffic congestion, lack of reliable and safe public transport (Mona, M.A.W.A. et al., 2020) and can cause social inequalities or irreversibly damage the environment, that can affect sustainability targets. In the urban environment, in order to overcome and meet the growing transport requirements of the population, one option would be to develop a sustainable and environmentally friendly transport system (Rinkesh, online). Research in the field of ecological transport indicates that there are many benefits of implementing and developing this type of transport, these benefits are varied, from saving money, reducing pollution and improving the health of citizens and, respectively, building a green economy, (Mona, M.A.W.A. et al., 2020). The field of sustainable transport cannot be analysed as an isolated aspect; the most important aspects of urban life must also be considered and studied. The objective of green transport is to minimize the impact of pollution on the environment while taking into account current and future transport needs (Wang, H. et al., 2021). On the other hand, sustainable transport, as part of the green economy, takes care of Public Health and meets the needs of citizens taking into account the use of renewable resources (Ministry of European Investments and Projects).

In terms of cooperation relations with the European Union and the allocation of European funds, Romania became a member state of the European Union in 2007. Romania has received EUR 54 billion since accession (Ang, G. et al., 2013). Governments play a key role in supporting private sector investment by improving transport infrastructure conditions and developing investment policies (Constantinescu, D. et al., 2017). Romania, as a full EU member state, for most of the funding needed for transport infrastructure, relies on EU cohesion funds and Regional Development Funds. In this respect, the objectives of transport development in Romania must be consistent with EU policies. In the Transport White Paper, some clear objectives are set out, such as an efficient and integrated mobility system; innovation; technology and behaviour; modern infrastructure, and smart finance (European Commission, 2020). Research in the field of urban planning reveals that in the planning stages, it is necessary to interact between various fields of Architecture, Engineering, Public Health, and sociology, focusing on the use of renewable energies and increasing energy efficiency (Holdren et al., 2016, pp. 23-24) (Boc, E., 2017). At the regional level, the development of urban mobility can be achieved through POAT funds 2014-2020 (Operational Programme of Technical Assistance), being in complementarity with other programs with European funding - ROP 2014-2020.

Taking into account the above theoretical observations, the research paper aims to assess the impact of investments from the ESI funds that refer to the thematic objective 7 of the cohesion policy "promoting sustainable transport systems and eliminating bottlenecks in the infrastructure of major networks" on the regional economic growth in Romania for the

2014-2020 programming period. So, 4 hypotheses were assigned: H1: investments in ESI funds have a slightly positive impact on regional economic growth in Romania. H2: regional government Quality Index positively influences regional economic growth. H3: there is a convergence effect between regions based on the initial value of real GDP per capita. H4: the government Quality Index shows a moderating effect on the relationship between investment in ESI funds and economic growth. Therefore, the impact of investments from the ESI funds on economic growth is amplified by the quality of good governance.

Dates and methodology

The research aims to analyze the impact of investments in sustainable transport, and investments made through European funds (POIM and POR) on the sustainable development of regions in Romania. The research methodology is based on a panel regression of data from the development regions of Romania. The data are analysed in the period 2014-2020, taking into account the implementation of projects at the horizon "n+3 years (the last available data are from 2022). Our research analyses projects that have been implemented under the thematic objective O. 7 "Promotion of sustainable transport systems and removal of bottlenecks in major network infrastructures". This thematic objective has been financed by two funding programs ROP and POIM, programs related to the Cohesion Fund (CF) and the European Regional Development Fund (ERDF). The European Regional Development Fund (ERDF) prioritizes the social and economic development of all regions and cities in the EU and the Cohesion Fund (CF) invests in the environment and transport in less developed countries of the European Union (EU).

Data collection: the statistical panel data were extracted from the Ministry of European Funds database. This database is available in Open Data - List of operations/ beneficiaries and operations for projects contracted on Operational Programmes, published by the Romanian Government (Romanian Government, Ministry of European Funds (MFE), Statistics, 2022). From this database, the financial data, i.e. eligible expenditure and project value of all projects financed to achieve the thematic objective OT7: "Promoting sustainable transport systems and removing bottlenecks in major network infrastructures" have been extracted. Thus, after screening all projects, with all thematic objectives, a total of 15553 projects covering the 14 thematic objectives related to the POIM and the POR resulted. The next step was to filter also by thematic objective 7, the objective we submitted for analysis, resulting in 380 projects. The third step was to select the 2014-2020 period with n+3 extension, resulting in 364 projects. The data was then aggregated at the region level, according to the location of the Beneficiary and by year and project start date, respectively.

The dependent variable corresponds to the per capita real GDP, adjusted using the GDP deflator with a fixed base of 2015=100.

Regarding the explanatory factors, the following were employed:

- Real per capita ESIF investments (in millions of lei) were adjusted to comparable prices using the GDP deflator with a constant base year of 2015=100.
- The initial value of per capita real GDP at the commencement of the programming period in 2014 was converted to comparable prices through deflation using the GDP deflator with a fixed base of 2015=100.
- The quality of governance index at the regional level, derived from a survey conducted over three years (2013, 2017, and 2021) by the European Commission (EQI, 2021).
- Additionally, a spillover effect variable, the average GDP in neighbouring regions (weighted average), was considered. This supplementary variable has been constructed to account for the spatial spill-over effects of economic growth.

To capture the effect of ESIF funds on regional development, a dynamic panel model, also known as a dynamic panel data model or dynamic panel regression, has been used for analyzing panel data that includes both time series and cross-sectional data. It accounts for the time-dependent nature of the data by incorporating lagged values of the dependent variable and/or lagged values of the independent variables. Dynamic panel models are commonly used in econometrics and social sciences to study the impact of variables that change over time.

The specification of a dynamic panel model can be represented as follows:

$$y_{it} = \alpha + \beta y_{i,t-1} + \gamma x_{it} + \delta x_{i,t-1} + \varepsilon_{it}$$

Where:

y_{it} represents the dependent variable for individual i at time t .

α is the intercept term.

β represents the coefficient of the lagged dependent variable, which captures the effect of the dependent variable's past values on its current value.

$y_{i,t-1}$ is the lagged dependent variable.

γ represents the coefficient vector for the current values of the independent variable x_{it} .

x_{it} represents the current values of the independent variables for individual i at time t .

δ represents the coefficient vector for the lagged values of the independent variables $x_{i,t-1}$.

$x_{i,t-1}$ represents the lagged values of the independent variables for individual i at time $t-1$.

ε_{it} is the error term, capturing unexplained variations in the dependent variable at time t .

This specification accounts for the dynamic nature of the data by including lagged values of both the dependent and independent variables. The coefficients β and δ capture the short-term and long-term effects, respectively, of the independent variables on the

dependent variable. Dynamic panel models are estimated using techniques such as the Generalised Method of Moments (GMM) or the Arellano-Bond estimator.

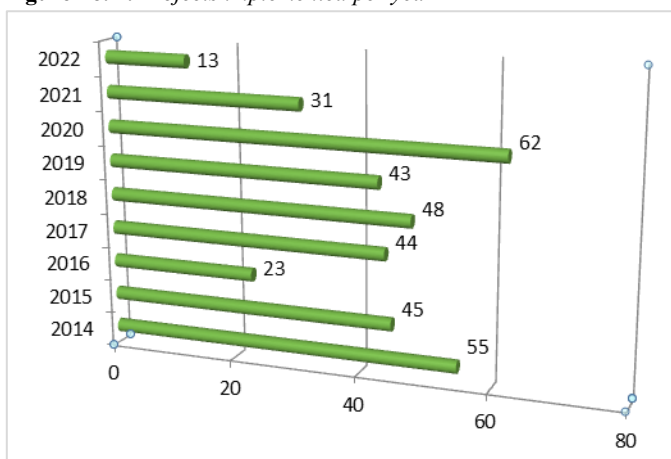
In our case, the methodological demarche has been built on a dynamic panel model in which the lagged dependent variable played the role of the predictor variable to capture the persistence effect, as follows:

$$\begin{aligned} \log(\text{realGDP}_{per\ capita})_{it} = & \alpha_0 + \alpha_1 \cdot \log(\text{ESIF invest per capita})_{it} + \alpha_2 \cdot \\ & EQI_{it} + \alpha_3 \cdot \text{initial}_{levelGDP_{percapita}_{it}} + \alpha_4 \cdot \log(\text{realGDP}_{percapita})_{it-1} \end{aligned}$$

Results and discussion

After going through the selection steps for the Cohesion Policy Objective 7 projects Promotion of sustainable transport systems and removal of bottlenecks in major network infrastructures, a total of 364 projects were implemented at national level through the two main operational programs POIM and POR. Thus, some 234 projects were implemented under the POIM and 130 projects under the POR. Then we analyzed the distribution of projects by years. Thus, we noticed that 2020 is the year in which the most projects related to thematic objective 7 were implemented. As can be seen in Figure 1, in 2020 a total of 62 projects were implemented. The average number of projects per year is 40.4. In 2022 there were the fewest projects, namely 13 projects. The low number of projects this year is due to the fact that 2022 is the year of extension of the funding session.

Figure no. 1. Projects implemented per year

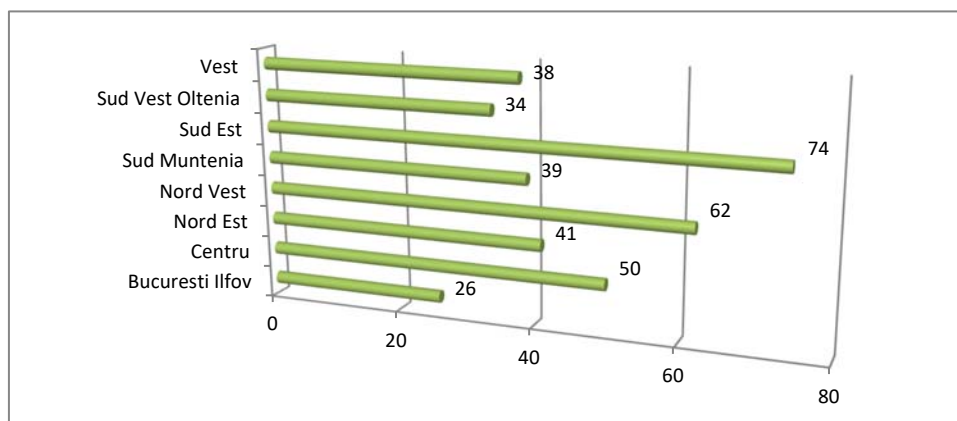


Source: author's own

In the following figure no. 2, we present the distribution of projects implemented in the 8 development regions. We can see that the most projects were implemented in the South-East region, 74 projects, followed by the North-West region with 62 projects. The fewest

projects were in the Bucharest-Ilfov region, because this region is the most developed in the country, and the thematic objective OT 7 was also achieved through other sources of funding.

Figure no. 2. *Projects implemented per region*



Source: author's own

Another analysis was related to the distribution of eligible expenditure by region. The highest amount of eligible expenses, respectively, the value of the implemented projects, was in the center region, with a value of RON 11,492,754,812, followed by the West and North-West regions. The average eligible expenses in the 8 development regions are 5.933,391,000 RON.

Another aspect of our research was identifying good practices for implementing projects having thematic objective O7. Out of the 364 projects implemented, we selected the largest project, regarding eligible expenditures in each region, and analyzed for the assumed objectives and the results obtained. From the analysis of the table below, it can be seen that the objectives and results of the projects have been successfully implemented and are in line with the requirements of objective O7.

Table no. 1. *Examples of good practices of projects implemented in the 8 regions*

No	Region	Eligible expenditure (RON)	Name of project	Objectives and results
1	Bucharest-Ilfov	221283406,21	Modernization and capacity development of the Port of Constanta-development of the port infrastructure in the development zone a, MOL II-s Port Constanta South by extending the port platform facilitating multimodal transport	Specific project objectives: - To develop the port of Constanta by ensuring increased storage and handling capacities for RORO cargo; - To provide the necessary infrastructure in the port of Constanta for the development of multimodal transport; - Modernization of the port of Constanta in order to increase the volume of cargo transported.

No	Region	Eligible expenditure (RON)	Name of project	Objectives and results
				<p>Results:</p> <ul style="list-style-type: none"> - 16 hectares of port platforms developed; - Development of water and electricity supply networks, both for supplying ships and for operation of equipment and other facilities located on the port platform; - Increase the annual volume of cargo to approximately 1,700,000 tons/year; - 969,054 TEU- volume of containerized cargo; - Reduction of CO2 emissions by a minimum of 177,000 tons equivalent per year in 2030 and a minimum of 240,000 tons equivalent per year in 2030. per year in 2049.
2	Centre	5268325335,9	Integrated infrastructure for the orbital area of Bucharest	<p>Objective: completion of the orbital road network of Bucharest to ensure an adequate interconnection between the 3 existing highways and national/European roads, highways, and European roads starting from km 0 in Bucharest.</p> <p>Results: reducing travel time, reducing vehicle operating costs by approximately 15%, reducing the number of accidents as a result of avoiding crossing urban areas improving environmental conditions, reducing the amounts of pollutant emissions, noise, and local air pollution, construction of 51,195 km of a section of Highway 2x2 (Southern Section of the Ring Road)</p>
3	North East	313179154,52	Targu Mures bypass	<p>Objective: to create a modern road transport network, with a view to the regional development of the area, improving traffic flow, reducing travel time, reducing pollution and reducing the number of road accidents in the region.</p> <p>Results: construction of 11,463 km of bypass, 5 bridges, 2 overpasses, 1 viaduct, 2 roundabout road junctions and 2 car parks.</p>
4	North West	3315689879,31	Preparation of the Sibiu-Pitesti Highway project and construction of Sections 1, 4 and 5	<p>Objective: to improve the economic efficiency of the transport network in Romania by shortening the travel time between Sibiu and Pitesti and implicitly improving the connectivity at regional level.</p> <p>Results: construction of 53.38 km of Highway 2x2, including 6 intersections, 28 bridges and overpasses, 10 viaducts, 1 Tunnel, a parking lot, two service areas, 3 Coordination and maintenance centers.</p>
5	South Muntenia	353734274,55	Modernization of locks. Equipment and installations - Phase 2	<p>Objective: to ensure the availability and safety of navigation on the two channels, the Black Sea Danube Canal and the White Gate Canal Midia Navodari, providing a sustainable alternative to road and rail transport along an important national and international transport route.</p>

No	Region	Eligible expenditure (RON)	Name of project	Objectives and results
6	South East	363261081,05	Construction of the Braila - Galati Expressway	Objective: the development of the road network, by creating a modern way of communication that ensures an adequate connection to the TEN-T network, with implications in the regional development of the Braila – Galati area. Results: construction of 10.77 km of New Road, 1 bridge over the irrigation canal at km 6+620 and a bridge - viaduct - overpass structure at km 10 + 963; - reduction of travel time on the TEN-T road network by mimim 4%, in the first year of operation, from 43.34 min at the beginning of the project, to 41.08 min at the end of the project, for cars, and from 47.87 min at the beginning of the project, to 39.37 min at the end of the project for cargo.
7	South West	1620299408,8	Sebes - Turda Highway	The project aims to create a modern road transport network, with a view to the regional development of the area, improving traffic efficiency by reducing travel time, reducing pollution, and reducing the number of road accidents in the region. In this way, the project contributes to the promotion of a sustainable transport system in Romania, which will facilitate the safe, fast, and efficient transport of people and goods at European standards. Results: 70.00 km of newly built ten-T Road: 66 bridges and overpasses; - 4 short-term parking lots; - 4 service spaces; 1 maintenance and Monitoring Center; - 1 maintenance and Coordination Center; - reduction of travel time between Sebes and Turda from 85.83 minutes at the beginning of the project implementation period, to 79.42 minutes at the end of the project implementation period for heavy traffic vehicles and 53.35 minutes for motor vehicles.
8.	West	4082728145,81	Express Road Craiova-Pitesti	Objective: to create a modern communication route between the cities of Craiova and Pitesti, with implications for the regional development of the area, through the implementation of this project, the connection between the two branches of the Ten-t Core Rhine-Danube corridor in Romania will be achieved.

Source: author's own

From the analysis of the 8 projects, which can be considered as examples of good practice in the field of implementation of EU funds under O.7 “Promotion of sustainable transport systems and removal of bottlenecks in major network infrastructures” we can conclude that

the project activities have achieved their objectives. Thus, through each project we can observe results related to sustainable transport and reduction of transport-related pollution.

To evaluate the *effects of ESIF investments on regional economic development*, various specifications were tested, including fixed effects models for cross-sections (regions) and time periods, employing the Ordinary Least Squares method. Empirical results from the Hausman test consistently favored the estimator based on random effects (REM). Robust standard errors were utilized to correct errors in the estimated models. Furthermore, the model has been estimated using Dif-GMM. Difference-in-Generalized Method of Moments (Dif-GMM) is preferred because it allows for more robust modelling of dynamic relationships and better addresses issues of endogeneity, making it an effective choice for estimating complex economic models. Table 1 presents the results of a Difference-in-Generalized Method of Moments (Dif-GMM) regression analysis on the effect of ESIF funds on regional economic development.

We chose the DIF-GMM approach due to its robustness in dealing with endogeneity issues, which are prevalent in our dataset due to the dynamic nature of the relationships we are examining. The DIF-GMM method is particularly suited for our dataset, despite its relatively short time span of three years, because it allows us to exploit the panel nature of our data more effectively than traditional estimation techniques. This approach helps in controlling for unobserved heterogeneity and in capturing the dynamic behavior of the variables under study, which is crucial for our research question. The decision to aggregate data at the regional level was driven by the need to balance detail with statistical power. We acknowledge that such aggregation can potentially dilute the granularity of information. However, it was necessary to ensure a sufficient number of observations per unit, which is critical for the validity of DIF-GMM estimations. To mitigate the concerns regarding data dilution, we conducted robustness checks using alternative aggregation levels (where applicable) and included these in the supplementary materials section of our paper. These checks confirm that our main findings hold across different levels of data aggregation.

Table no. 2. *The effect of ESIF funds on regional economic development*

	Dif-GMM ¹⁾
Log(Real GDP per capita)(-1)	0.600***
Log(ESIF funds per capita)	0.088**
Log(Initial level of GDP per capita)	0.482***
EQI	0.135***
Observations	48
No of groups	8
No. instruments	26
Wald test	1504***
Sargan test	98.34
Prob.	(0.28)

Note: ¹⁾ Arellano–Bond dynamic panel-data estimation.

Source: author's own

Log(Real GDP per capita)(-1): The coefficient of log of lagged real GDP per capita(0.600) indicates that the lagged value of real GDP per capita has a highly significant positive effect on current real GDP per capita. This suggests that regions with higher GDP per capita tend to experience continued economic growth in the previous period.

Log(ESIF funds per capita): The coefficient of 0.088 suggests that an increase in ESIF funds per capita has a statistically significant positive impact on regional economic development. This implies that higher levels of ESIF funding are associated with increased GDP per capita.

Log(Initial level of GDP per capita): The coefficient of 0.482 indicates that the initial level of GDP per capita (a measure of the region's economic starting point) has a highly significant positive effect on current GDP per capita. This means regions with higher initial GDP per capita tend to experience higher economic growth.

EQI (Quality of Governance Index): The coefficient of 0.135 indicates a statistically significant positive relationship between the quality of governance at the regional level (measured by EQI) and the current period's real GDP per capita. This suggests that regions with better governance tend to have higher GDP per capita.

The F-test statistic is highly significant, suggesting that the overall model is statistically significant, while the Sargan test checks the validity of overidentifying restrictions in the model. The probability value (0.28) suggests that the overidentifying restrictions are valid, indicating that the model's instruments are appropriate. The research results highlighted the positive impact of ESIF investments related to O7 sustainable transport systems and elimination of bottlenecks in major network infrastructures on economic growth. But this impact exists to a small extent. Research shows that investments through O7 sustainable transport systems and improvement of infrastructure networks have positive, but reduced, effects on regional economic growth in Romania. The low positive effect is statistically significant, so investments through EU funds are a useful tool for regional economic development. Regarding the political implications of this research, we found that allocating ESIF funds for sustainable transport and infrastructure projects is beneficial, future policy decisions could consider increasing funding in these areas to stimulate regional economic growth. The research results also highlighted the impact of the country's over-Sustainable Development. The low positive impact suggests that investment in sustainable transport and infrastructure can contribute to sustainable economic growth.

in terms of the quality of governance, it can be judged that political decisions can also affect investment decisions.

There is a possibility that in regions with a well-developed development strategy, investments will be stimulated, which will further stimulate economic growth. Governing

according to a well-developed strategy is not only important for economic growth, but also for Social Development and people's standard of living.

In terms of GDP impact, a process of convergence has been observed, so that poorer regions catch up with richer ones. Regions with lower GDP per capita are developing at a faster rate than those with higher GDP per capita. In this respect, it is important that local actors continue to develop entrepreneurship initiatives, focusing on Sustainable Development and pollution reduction.

The results of the research highlight the importance of local actors supporting investments in ESI funds, the funds representing a useful tool in stimulating regional economic growth. The conclusions of the research can be a guide of recommendations regarding the directions of regional policies, respective, future research directions, especially in the context of regional development and the implementation of projects from EU funds. Although, the impact is small, in the long term, in the development of these types of investments, one can see the effects, which can lead to the improvement of sustainable transport, which can have a favorable impact on attracting investors.

Regarding the potential limitations imposed by a three-year observation period; we conducted additional analysis to assess the sensitivity of our results to the temporal scope of the data. Specifically, we used moving window analyses and out-of-sample validations to test the stability and predictive power of our findings. These analyses, detailed in the appendix, support the robustness of our findings despite the relatively short time span.

Conclusions

The research reveals that investments from ESI funds with thematic objective promoting sustainable transport have little positive effect on regional economic growth.

In Romania, the lack of coherence in planning at national level is an obstacle that prevents the realization of investments in the transport infrastructure in Romania. Therefore, the existence of good practice examples in the transport sector can adequately and effectively represent a roadmap with clear objectives and results for local authorities. examples of good practices mentioned in research can be an impetus to mobilize other organizations in investments that support sustainable development and sustainable transport. Regarding the impact of the funds, which is relatively small, we can predict that an increase in the volume of investments in the sustainable transport sector could trigger a significant increase in investments in other areas, the attraction of investors.

Unfortunately, the lack of coherence in planning at national level also reflects in the quality of regional governance, therefore, a meeting with local actors is recommended, so that they are the ones to stimulate and support local/regional development. Let it be a snowball effect.

Regions with a better quality of governance and a higher economic growth rate, are examples and collaborators of the other regions. The efficient use of funds, which is often linked to the quality of governance, is crucial for economic development. In addition, efforts are needed to ensure that these funds are used efficiently and effectively, contributing to substantial economic development. Good project implementation practices and governance policies can ensure the efficient use of investments and foster a growth-friendly environment.

As regions with lower GDP have been shown to grow faster, targeted investment could promote balanced regional development and reduce economic disparities.

This study identifies the mechanisms through which the quality of governance influences economic development, namely: transparency and the fight against corruption. Good governance increases transparency and accountability in public administration. This fosters a more predictable and secure environment for business and investment. Effective governance ensures the efficient allocation and use of public resources and maximises the impact of investments such as transport and sustainable infrastructure on economic growth. The quality of governance generally shapes the business environment and influences investment decisions, operating costs and regional competitiveness. Good governance attracts investment and stimulates economic activity and growth.

The positive relationship between the quality of governance (EIQ) and a region's GDP per capita indicates that efficient, transparent and accountable government structures are essential in promoting sustainable economic growth. The results of the study provide a basis for possible policy recommendations for improving governance standards to promote regional development. Thus, the limited effectiveness of ESI funds in promoting sustainable transport is due to the complex interaction between funding, management effectiveness, strategic direction and situational factors.

Addressing these challenges requires streamlining administrative processes, strengthening project management capacity, strategic planning to align investments with local needs, and evaluating and adapting funding strategies to increase their effectiveness. A comprehensive evaluation mechanism is also needed to monitor the medium and long-term impact of these investments. As the main limitations of the study, the period can be highlighted, the longer period of analysis could reveal different results, as well as refining measures of key variables and exploring alternative model specifications. Within the study, the analysis period covers 2014-2020. This period includes numerous economic fluctuations, political changes and external events, all of which can affect the allocation and efficiency of ESIF in terms of sustainable transport. All these factors—from economic fluctuations to national and EU political changes, to more recent events, the COVID-19 pandemic, armed conflicts; undoubtedly affect the effectiveness and orientation of infrastructure investments. The

research methodology of our study was designed primarily to assess the direct impact, without taking into account these dynamic external variables. The onset of the COVID-19 pandemic could have a significant impact on the last part of the study, affecting the use of public transport, project implementation deadlines, and possibly shifting the priorities of policy decisions towards health and safety.

These issues could include future studies of political events to capture the results of ESIF investments in sustainable transport. Therefore, addressing the issues outlined above in further research may provide a deeper insight into optimizing the use of ESIF funds. Thus, resulting in certain policy recommendations for the sustainable development of transport in Romania. In conclusion, future research directions in the field of the impact of EU funds on regional development in Romania can be directed multiple directions. Regarding examples of best practices, the projects implemented and analyzed in our research can be implemented by other beneficiaries, secondly, the research can be developed at European level and also the research could include studying the impact of major events such as COVID-19 pandemic, war, on transport systems.

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