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Does Higher EU Spending Lead to a Crowding-Out Effect on National Public Investments in the Environment Protection Sector?

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Abstract

Aim: An assessment of whether in the environmental protection sector, an increase in ESIF spending for a country results in a decrease in national spending and to identify countries where this is the case.

Methodology: Annual data from Eurostat and Structural Funds databases were used. The values of ESIF and national expenditures transferred to environmental protection for the period 2007–2020 (the last two multiannual budget periods) to GDP and per capita were identified and compared with linear regression models between EU and national spending. A group of countries with the largest increase in ESIF expenditure in the study area was selected, and an analysis of national expenditure trend models was carried out for them.

Results: No crowding-out effect of increased ESIF spending on environmental investment at the national level was found. Countries with a downward trend in national environmental expenditure

were also identified: Cyprus, Lithuania and, in one dimension, also Poland. This indicates that these countries are ceding competence in environmental funding to the EU.

Implications and recommendations: Giving out the financial sovereignty of the environment protection sector to the EU may trigger non-desirable social trends to act against sustainable development. For EU countries it would be better to pursue ecological policies convergent with international needs.

Originality/value: The topic is relevant given the vast increase in the EU's commitment to the environment and sustainable development in each successive multiannual budgetary perspective.

Keywords: ESIF, environment protection, public spending, environmental subsidy

1. Introduction

The subject of environment protection has gained high priority in the EU in recent years, reflected by the number of adopted programmes and politics in this scope. In principle they are based on the concept of sustainable development, joining environmental and socioeconomic aspects. This results in cooperation at various political levels (international, national and local) together with social groups interested in joining the process, such as non-government organisations, however the multitude of regulations introduced in the European Union may obscure the full picture of these activities. This is particularly significant when examining the importance of European funds for the member states that are their beneficiaries.

The goal of this article was to assess whether the higher EU spending leads to a crowding-out effect on national public investment in the environment protection sector. Furthermore, it also aimed to single out member states in which this effect may be occurring. The article extends current research in the area, pointing to countries which would need the implementation of additional control mechanisms from the European Union should their expenditure in the environmental protection field decrease further in the following years. The first hypothesis for the article is as follows: in environmental protection themes there is a negative correlation between the amount of EU funds and national spending, which leads to the second hypothesis: some EU member states that gain the most environmentally connected structural and investment funds are mostly relying on EU funding instead of their own public spending when it comes to environment protection. The research span 2007–2020 was imposed by two periods of the Multiannual Financial Framework in which EU funds were operating, with 27 member states taken into consideration (excluding the United Kingdom). The authors used studies of domestic and foreign literature, elements of comparative analysis, analysis of economic aspects of legal acts and simple statistical methods. Original economic models were adopted for the study, whilst annual data were collected from Eurostat and the Structural Funds databases.

The first part of the article is devoted to a review of the literature on the topic, which also factors in the influence of environmental policy, indicating a research gap in the area. Next, the study to put in order environment protection themes in both structural funds and national expenditure accounts, and describes in detail the raw data and variables used in the empirical analysis. The last section comprises an analysis of structural and investment funds with national expenditure accounts, performed by creating three econometric models based on the least squares method to focus on the correlation between EU ecological expenditure and national spending in all EU countries (regression models 1a–1b), and EU countries with a very high increase in EU funding (regression models 2a–2b), and in each of those countries separately (trend models 3a–3b).

2. Literature Review

Environmental policy, understood as "the conscious and purposeful activity of the state (or a group of states[1]), consisting of the rational use of resources and values of the natural environment, its proper protection and skillful shaping based on theoretical and practical knowledge acquired by mankind" (Fiedor & Graczyk, 2015), allows detailing the international aspect of this problem: the competent decision-making aspect of public authorities and the resulting value of knowledge, among other things. Although there have been many scientific publications over the years that have tried to study the relation between globalisation and environmental policy, this has not translated into the emergence of a single coherent theoretical framework that helps in environmental management (Delgado et al., 2019).

In the case of knowledge in environmental governance, its essence is also beginning to be recognised; Van der Molen (2018), among others, advocated the creation of solutions related to reflexive governance. Sand and McGee (2022), in analysing the progress of international environmental agreements over two decades, also pointed to the significant influence of academic literature (mainly the potential impact of the first twenty volumes of International Environmental Agreements (INEA)).

Currently, when considering European Structural and Investment Funds (ESIF), the concept of sustainable development is inherent. Although the concept of 'sustainability' itself appeared in the popular consciousness relatively recently (1980s) and 'sustainable development' officially in the UN document "Our Common Future" in 1987, some researchers trace the roots of the idea much earlier – from the mid-1800s to the end of the 19th century (Gunnarsdottir et al., 2021; Harlow et al., 2013, cited by Lumley & Armstrong, 2004; Purvis et al., 2019). While it might seem that due to the prevalence of the use of sustainable development in policies at national and international levels, this is a clear and correctly used idea. Yet, in reality, this was overused and/or incorrectly understood, which posed a significant problem for its realisation (Waas et al., 2011). It is also important to point out the emerging criticism of the concept itself. Kotzé and Adelman (2023), among others, presented a position that explicitly calls for the rejection of the idea of sustainable development, among other reasons, due to its failure to counter the socio-ecological crisis, and as an alternative proposed the concept of *buen vivir*[2]. Károly (2011) also highlighted, among other things, the misuse of the concept of sustainable development (compared to its original meaning) and proposed a return to understanding sustainability as "ecological sustainability." In this respect, research by Radu et al. (2011) on Romania, also showed that assumptions related to the introduction of sustainable development were not necessarily widely realised.

Sustainable development and environmental protection are reflected in European budgets. Besides direct environmental programmes, there are three European policies from which countries can derive money for that purpose: a cohesion policy under which there are four separate funds (two of which deal with environmental themes), and separate funds from agricultural and maritime policies. These tools are commonly referred to as ESIF (European Union, 2023), and their structure, concerning only those applicable to this article, is presented in Figure 1. The ecological themes of those funds are the subject of this study.

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1 In different definitions, the emphasis on the type of entity can vary, e.g. Kożuch (2015) pointed to the state, local government, and in some cases business entities.

2 'Good living' denounces the drifts of the civilisational project associated with the idea of development as irremediable, while at the same time it draws on the social and ecological imperatives that gave rise of the development in the 1970s. As a result the concept is portraying itself as an attempt to overcome the limitations of sustainable development (Vanhulst & Beling, 2014).

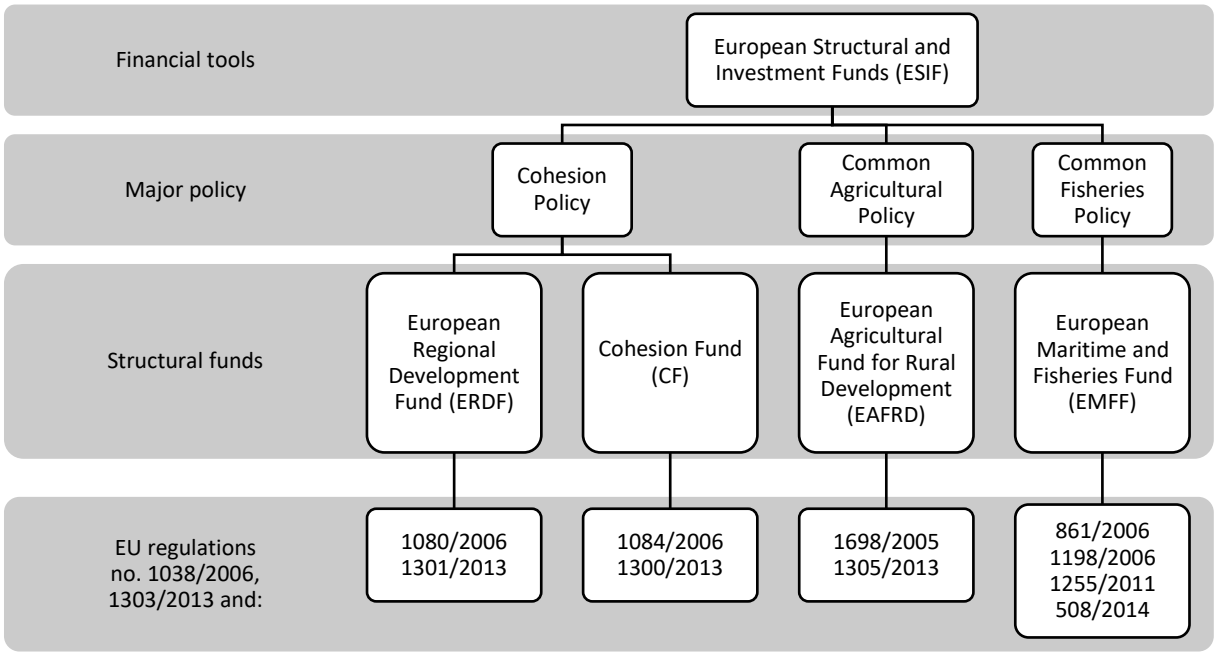

Fig. 1. Structure of European Structural and Investment Funds

Source: own elaboration based on (Ferasso et al., 2021; Ivascu, 2021; European Union, 2023).

Research on the use of ESIF in the area of environmental protection, as it is a specifically narrow field, is very scarce and often limited to a selected member state. Davidescu et al. (2022) studied ESIF effects in transitioning to low carbon economy in Romania. Zikouli et al. (2021) examined the ESIF contribution to the sustainable development of national forest parks in Greece, while some research focused on the ESIF mutual correlation with the Strategic Environ-mental Assessment procedure in Italy (Galassi et al., 2018) and Green Public Procurement in Czechia (Nicolas et al., 2023). In particular, it is worth highlighting Poland and the multiplicity of studies conducted there, compared to other countries, which dealt with the use of European funds for environmental purposes. Among others, Sej-Kolasa (2009) suggested the growing importance of non-domestic resources in environmental protection, whilst Hajdys (2021) studied the 2014–2027 period, and Berbeka and Bugdol (2022) determined the administrative efficiency of funds. Some research focused on the correlation between the ESI funds and various variables, such as the economic disparities between the EU member states (Bostan et al., 2022), sustainable development of degraded areas in Latvia (Stepina & Pelse, 2022), the investment activity of large cities in Poland focused on low carbon economy transition (Standar et al., 2022), and renewable energy production in Spain (Mugambi et al., 2021).

There are also several EU summary reports for a multiannual perspective (Martens et al., 2016) reviewing contributions of policies to specified objectives (e.g. environmental protection), however they take into consideration only the resources originating in the common budget.

In order to examine the importance of ESI funds across the European Union, one should point to the research of Pajewski (2015), who conducted a general analysis of the expenditures of the European Union member states (considering 28 countries) for environmental purposes, which covered the years 2003–2012. His study showed that total expenditures for environmental protection in the public sector increased from 60 to over 85 bn euros during that time. Argüelles and Benavides (2014) examined 45 funds in ten member states between 2000 and 2006, and found that there were several regional strategies where the practical implementation of ecological modernisation was low, and that the objectives adopted in the directives were reflected in the measures adopted in the regions. A study that took into account the next timeframe of 2007–2013 was carried out by Popescu and Holt (2014), where the EU Member States primary and secondary environmental priorities were discussed, arriving

at a very important conclusion that "European funding grant cannot compensate for the absence of a national system of financing environmental policy", while a research gap remained related to the determination of the ratio of state expenditure to ESIF received.

3. Methodology

3.1. Environmental Protection Themes in Structural Funds and National Accounts

This section shows environmental protection themes, the values of which were subjected to analysis. For the 2007–2013 period only one theme level is applicable, however it could be grouped. Originally they were only organised regarding cohesion policy funds, whereas for agriculture policy only one category of 'environment' was highlighted among the other main expenditure groups. From 2014 to 2020, the data are presented in the main and more detailed themes, and based on this it was possible to present the major and minor themes of environmental protection (see Table 1).

Table 1. Environment protection themes in structural funds

<table>
<tr><td rowspan="2">2007–2013</td><td colspan="5">ERDF / CF</td></tr>
<tr><td>Energy
• energy efficiency and management
• renewable energy:
– biomass
– solar
– wind
– hydroelectric
– geothermal and other
EAFRD: environment</td><td>Transport
• cycle tracks
• railways
• mobile rail assets</td><td>Pollution
• air quality
• integrated prevention and pollution control
• treatment of water waste</td><td>Preservation
• mitigation and adoption to climate change
• preserving environment and preventing risk
• compensation of additional costs due to climate conditions and relief difficulties
• protection of natural heritage</td><td>Promotion
• environmentally friendly products and production process – assistance to SMEs
• promotion of biodiversity and nature protection
• promotion of clean urban transport
• promotion of natural assets</td></tr>
<tr><td rowspan="2">2014–2020</td><td colspan="5">ERDF / CF / EAFRD ⟨ climate change adaptation and risk prevention
environment protection and resource efficiency
low-carbon economy ⟩ EMFF</td></tr>
<tr><td colspan="2">Climate change adaptation and risk prevention
• water waste management
• adaptation to climate change, preventing and managing climate risks
• preventing and managing non-climate related natural risks</td><td colspan="2">Environment protection and resource efficiency
• water waste management
• water infrastructure for human consumption
• household waste management
• air quality measures
• protection, restoration and sustainable use of Nature2000 sites
• biodiversity, nature protection and green infrastructure
• rehabilitation of industrial sites and contaminated land
• development and promotion in tourism potential of natural areas
• protection, development and promotion of public tourism and cultural assets / services
• development and promotion of public cultural heritage services</td><td>Low-carbon economy
• air quality measures
• generic productive investment in SME
• renewable energy: solar, biomass
• energy efficiency renovation of public infrastructure / housing stock and demonstration projects
• intelligent energy distribution systems (including smart grids)
• high-efficiency co-generation and district heating
• clean urban transport infrastructure and promotion
• intelligent transport systems
• research & innovation processes, tech-transfer and cooperation in firms on 'Loss Control Engineering'
• energy efficiency and demonstration projects in SMEs
• support to environmentally-friendly production processes in SMEs
• promotion of energy efficiency in large enterprises
• cycle tracks and footpaths</td></tr>
</table>

Source: own elaboration based on (DG REGIO, 2024; European Commission DG REGIO, 2020).

It is apparent that in the 2014–2020 period, environmental protection treatment was wider and standardised. There is no indication that the European Fisheries Fund (EFF), a predecessor of the EMFF in the 2007–2013 period, had any environmental protection theme, as all the programmes were generally referred to as the Fisheries Operational Programme. The EAFRD showed only the main

environmental protection theme for the earlier period. All the other themes for the 2007–2013 period were financed both by the ERDF and the CF. Both these funds, together with the EARFD and the EMFF in 2014–20, financed all the three main themes of environmental protection, except for the EMFF not focusing on climate change adaptation.

National data, to provide comparability on an international level, are structured by The Classification of Functions of Government (COFOG). Originally developed for OECD purposes the classification has been implemented in the European Union in a three-level classification with ten main divisions by an ESA 2010 regulation (Regulation 549/2013).

The COFOG framework for environmental protection is coherent with two other classifications for environmental economic accounts, mainly to present interactions between the economy and the environment. They measure the amounts of natural resources (raw materials) used as inputs to economic activities, the impact of the economy on the environment (such as emissions and contamination), trace production activities and jobs related to environmental products and environmentally relevant monetary transactions (taxes, subsidies or investments in environment protection). The environmental activities have been split into two parts: environmental protection – for which classification of environment protection activities (CEPA 2000) was assigned, and resource management – for which classification of resource management activities (CReMA) was assigned. Both classifications are multipurpose and have both types of statistical classifications: functional and economic activities and products (Eurostat, 2019). There is a clear correspondence between the COFOG division 5 (environmental protection) and the second level breakdown to the CEPA, whereas the CReMA activities are connected to the two other COFOG divisions (see Figure 2 for comparison).

3.2. Data and Variables

This section presents the calculations of raw data and defines the variables used for the final estimation. The research period 2007–2020 was dictated by the last two multiannual structural funds budgets, and the subjects of the study were all the EU countries excluding the United Kingdom[3].

Environmental protection spending in the ESIF was calculated by summing up all the themes considered to be related to the field of research as referenced in Table 1 (DG REGIO, 2024; European Commission DG REGIO, 2020). Besides the ESIF related to the United Kingdom, the amounts dedicated to cross-border regions were also excluded, as assigning those amounts to specific countries was difficult. As the 2007–2013 period is closed, the final amounts are still being considered. Given the availability of the dataset for the 2014–2020 period, the amounts allocated for the ERDF/ CF funds and the planned amounts for the EAFRD/EMFF are being analysed[4].

National expenditure relating to environmental protection was taken from the Eurostat dataset (Eurostat, 2024a, 2024b, 2024c) concerning government expenditure by function in monetary values provided yearly, summed up as referenced in Figure 2. Furthermore, two additional yearly Eurostat datasets were used to calculate the employed variables: GDP monetary values in current prices and population at the beginning of the year. The created variables are described in Table 2.

It is expected that increasing EU funds for environmental protection does not influence the level of national expenditure for this purpose. It is clear however that within the EU, two groups can be distinguished, with the first group being the main focus of this research: Poland, Czechia, Portugal, Romania, Hungary, Greece, Slovakia, Croatia, Bulgaria, Lithuania, Latvia, Estonia, Slovenia, Cyprus and Malta. In those countries, as referenced in Figure 3 (sorted by Highest to lowest advantage of EU funds), the increase in the ESIF funding for environment protection was visibly higher, whereas the other twelve EU states show little or no increase.

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[3] Caused by data unavailability for this country in national expenditure analysis.

[4] It is worth noting that the final settlements were shifted in time. For 2014–2020 Multiannual Financial Framework the ‘n + 3’ rule was accepted, resulting in the need to deliver the remaining planned investment by the end of 2023, hence the ‘decided’ amounts for that time should be final (European Commission, 2024b).

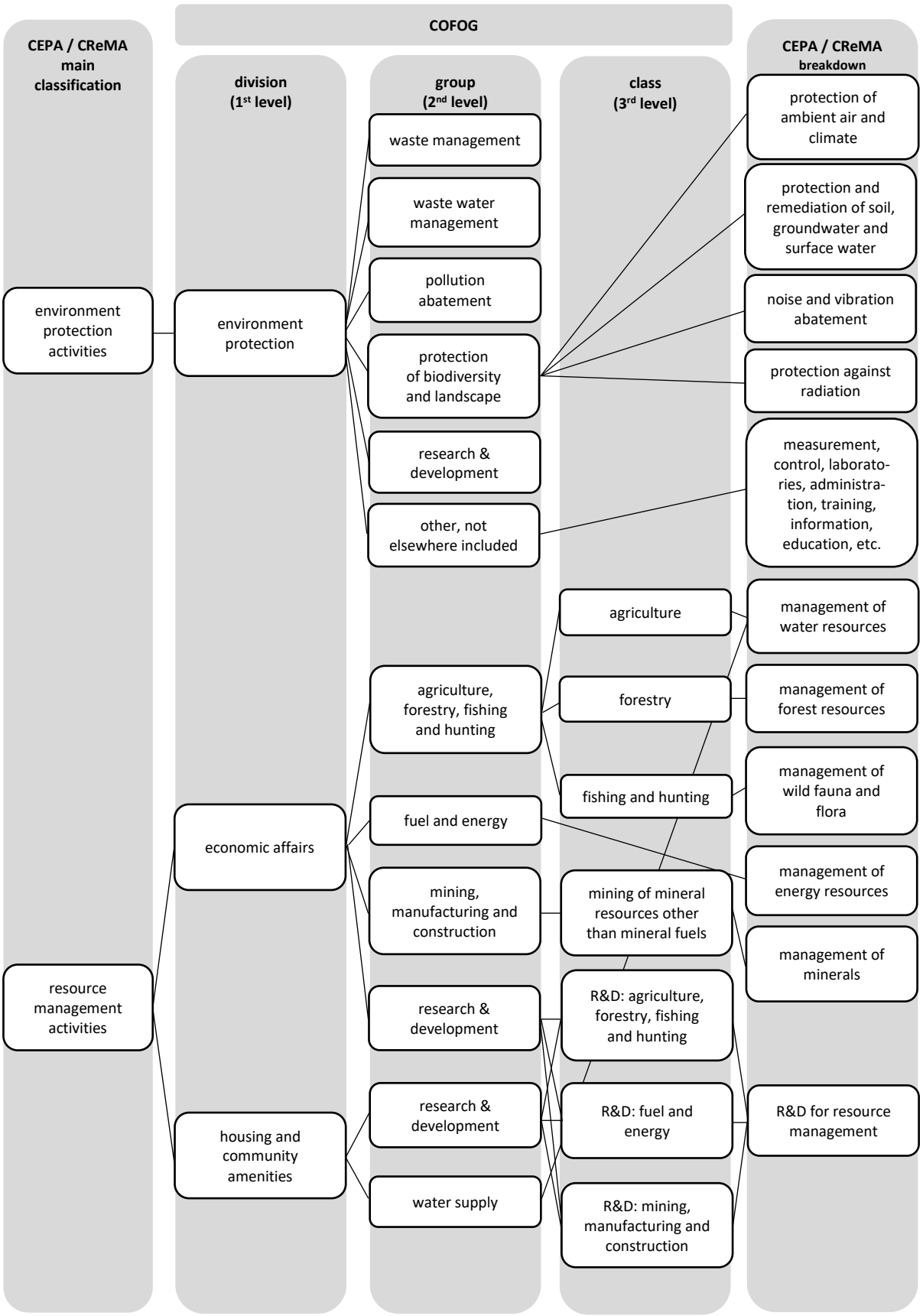

Fig. 2. Environment protection themes in national accounts

Source: own elaboration based on (Eurostat, 2019; Statistics Division, 2024).

Table 2. Variables created to test hypotheses

Model variable		Variable	Description
Model 1a / 2a: x	regression	$\Delta {EU_{7y}}/{GDP_{7y}}$	difference between 2014–2020 and 2007–2013 periods of environment protection ESIF spending in relation to GDP (cumulated for the 7-year periods) per country.
Model 1b / 2b: x		$\Delta {EU_{7y}}/{\overline{per_{7y}}}$	difference between 2014–2020 and 2007–2013 periods of environment protection ESIF spending calculated *per capita* (using mean population in the 7-year periods) per country.
Model 1a / 2a: y		$\Delta {nat_{7y}}/{GDP_{7y}}$	difference between 2014-2020 and 2007-2013 periods of national environment protection spending cumulated for the 7-year periods in relation to GDP (cumulated for the 7-year periods).
Model 1b / 2b: y		$\Delta {nat_{7y}}/{\overline{per_{7y}}}$	difference between 2014-2020 and 2007-2013 periods of national environment protection spending cumulated for the 7-year periods *per capita* (using mean population in the 7-year periods).
Model 3a	trend	${nat}/{GDP}$	Yearly national environmental protection spending in relation to yearly GDP.
Model 3b		${nat}/{per}$	Yearly national environmental protection spending *per capita*.

Source: own elaboration.

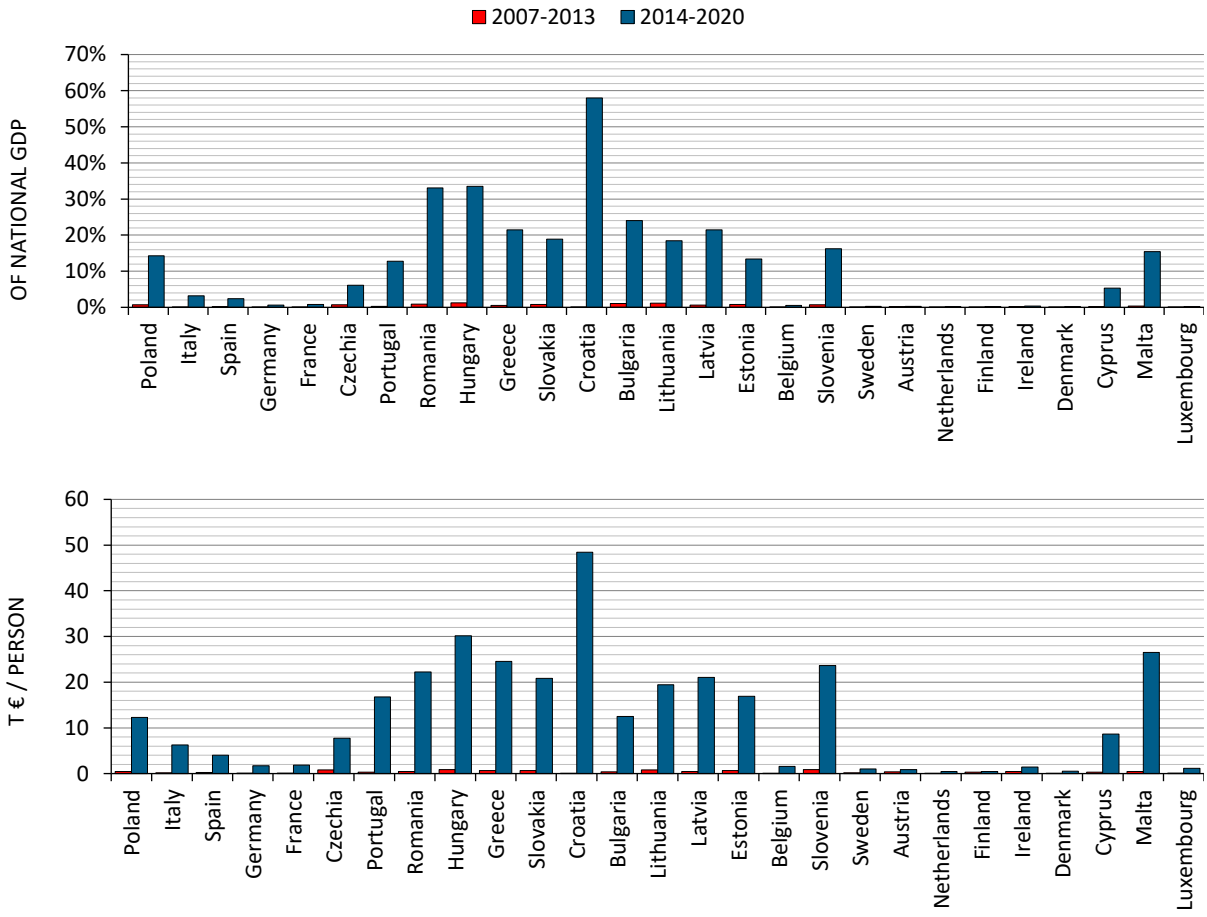

Fig. 3. ESIF environment protection expenditure in relation to national GDP and per person

Source: own elaboration based on (DG REGIO, 2024; European Commission DG REGIO, 2020; Eurostat, 2024a, 2024b, 2024c).

To test the first hypothesis, the correlation between the ESIF and national spending was compared in two ways, once using values in relation to GDP, and once with amounts per person in each country of the European Union. For both model variations, the standard linear regression model was created

$$y_i = \alpha_0 + \alpha_1 x_i + \varepsilon_i, \quad (1)$$

where x, y – variables referenced in Table 2; i – member state, ε – random component.

As no resolution could be reached regarding the influence of an increase in the environmental protection ESIF on national spending in that field, it was necessary to apply a different approach, namely to examine if there were visible trends in yearly national expenditure. This calculation was performed for each of the countries with the biggest increase in EU funding (as referenced in Figures 1 and 2). The classic least squares method was applied to create linear regression trends for each chosen country:

$$\hat{z}_t = \beta_0 + \beta_1 z_t + \varepsilon_t, \quad (2)$$

where z – yearly national expenditure variable defined as in Table 2, t – year, ε – random component.

4. Results

The correlation was calculated with Gretl software, using the classic least square method on a change in variables between the two seven-year periods of the EU budget. The results are presented in the summary of models 1a and 1b (Table 3).

Twelve high-income countries created disturbances in the data, as their observations focused on amounts up to a 1.14% change in the ESIF per GDP (with a maximum value higher than 36%), and to approximately 4 200 euros per person (with a maximum higher than 36 000 euros). Due to this, this mirror models 2a–2b containing only data for countries with high increases in ESIF spending values were created (also referenced in Table 3).

Table 3. Influence of increase in EU environment protection budget on national spending in this field

Model	y	x	α_0	α_1	R^2	DH test	
						$\chi^2(2)$	*p-value*
1a (27 countries)	$\Delta^{nat_{7y}}/_{GDP_{7y}}$	$\Delta^{EU_{7y}}/_{GDP_{7y}}$	-0.133630 (± 0.0899154) *p:* 0.1497	0.0033811 (± 0.00506972) *p:* 0.5163	0.017046	1.98300	0.37098
1b (27 countries)	$\Delta^{nat_{7y}}/_{\overline{per_{7y}}}$	$\Delta^{EU_{7y}}/_{\overline{per_{7y}}}$	246.261 (± 113.341) *p:* ** 0.0395	0.00597366 (± 0.00674521) *p:* 0.3843	0.030418	0.27553	0.87130
2a (15 countries)	$\Delta^{nat_{7y}}/_{GDP_{7y}}$	$\Delta^{EU_{7y}}/_{GDP_{7y}}$	-0.175245 (± 0.204719) *p:* 0.4075	0.00463840 (± 0.00861143) *p:* 0.5992	0.021830	0.51322	0.77367
2b (15 countries)	$\Delta^{nat_{7y}}/_{\overline{per_{7y}}}$	$\Delta^{EU_{7y}}/_{\overline{per_{7y}}}$	169.682 (± 233.932) *p:* 0.4811	0.00868118 (± 0.0104200) *p:* 0.4198	0.050686	1.09770	0.57762

Source: own elaboration based on (DG REGIO, 2024; European Commission, 2024b; Eurostat, 2024a, 2024b, 2024c).

The results of the second pair of models are similar to the first one , leading to the conclusion that no visible correlation existed between the ESIF and national expenditure. This points to the calculation of trends for national expenses measured year by year. The results (see Table 4) are shown for each factor (factor value, standard deviation and *p*-value), coefficient of determination R^2, and the Doornick--Hansen normality test of the distribution of residuals with $\chi^2(2)$ and *p*-values.

Table 4. Trends in national environmental protection expenditure for countries with large increases in EU funding in this field

Country	Model 3a				Model 3b			
	β_0	β_1	R^2	DH test	β_0	β_1	R^2	DH test
Bulgaria	1.73474 (± 0.318215) *p*: 0.0001	0.080327 (± 0.037372) *p*: 0.0527	0.27787	$\chi^2(2)$: 2.52963 *p*: 0.282292	46.4311 (± 26.7031) *p*: 0.1076	14.3573 (± 3.13612) *p*: 0.0006	0.63591	$\chi^2(2)$: 1.818 *p*: 0.402927
Czechia	2.05807 (± 0.191547) *p*: 1.64×10^{-7}	0.0424813 (± 0.022496) *p*: 0.0834	0.22909	$\chi^2(2)$: 5.02235 *p*: 0.081173	259.477 (± 24.4489) *p*: 1.88×10^{-7}	18.1916 (± 2.87138) *p*: 3.74×10^{-5}	0.76984	$\chi^2(2)$: 3.39033 *p*: 0.183569
Estonia	2.08974 (± 0.279871) *p*: 7.56×10^{-6}	-0.0698295 (± 0.032869) *p*: 0.0551	0.27332	$\chi^2(2)$: 3.71977 *p*: 0.155690	217.662 (± 36.7808) *p*: 7.06×10^{-5}	1.85669 (± 4.31968) *p*: 0.6749	0.01516	$\chi^2(2)$: 5.41431 *p*: 0.066726
Greece	1.09971 (± 0.142416) *p*: 5.39×10^{-6}	0.0739059 (± 0.016726) *p*: 0.0008	0.61934	$\chi^2(2)$: 0.19876 *p*: 0.905397	243.580 (± 22.2550) *p*: 1.34×10^{-7}	6.16421 (± 2.61372) *p*: 0.0362	0.31671	$\chi^2(2)$: 0.86518 *p*: 0.648826
Croatia	3.02364 (± 0.111221) *p*: 3.78×10^{-12}	0.0122608 (± 0.013062) *p*: 0.3664	0.06840	$\chi^2(2)$: 4.78525 *p*: 0.091340	294.229 (± 18.8226) *p*: 2.42×10^{-9}	7.69493 (± 2.21060) *p*: 0.0045	0.50242	$\chi^2(2)$: 0.06313 *p*: 0.968930
Cyprus	2.46092 (± 0.123452) *p*: 1.45×10^{-10}	-0.0550590 (± 0.014499) *p*: 0.0025	0.54582	$\chi^2(2)$: 3.17761 *p*: 0.204170	555.146 (± 25.6469) *p*: 5.53×10^{-11}	-11.1514 (± 3.01207) *p*: 0.0030	0.53319	$\chi^2(2)$: 1.12408 *p*: 0.5740046
Latvia	2.84895 (± 0.228362) *p*: 3.13×10^{-8}	-0.0402974 (± 0.026820) *p*: 0.1588	0.15834	$\chi^2(2)$: 0.83627 *p*: 0.658275	244.856 (± 28.8263) *p*: 2.02×10^{-6}	7.78213 (± 3.38548) *p*: 0.0403	0.30571	$\chi^2(2)$: 1.45427 *p*: 0.483291
Lithuania	2.83488 (± 0.156110) *p*: 4.29×10^{-10}	-0.118695 (± 0.018334) *p*: 3.05×10^{-5}	0.77742	$\chi^2(2)$: 2.73051 *p*: 0.255316	240.101 (± 11.4496) *p*: 8.02×10^{-11}	-1.54339 (± 1.34469) *p*: 0.2734	0.09892	$\chi^2(2)$: 0.70869 *p*: 0.701633
Hungary	1.62084 (± 0.263040) *p*: 4.86×10^{-5}	0.00664386 (± 0.030893) *p*: 0.8333	0.00384	$\chi^2(2)$: 6.51434 *p*: 0.038497	142.709 (± 28.5338) *p*: 0.0003	6.53895 (± 3.35112) *p*: 0.0748	0.24087	$\chi^2(2)$: 6.12197 *p*: 0.046841
Malta	2.98683 (± 0.226661) *p*: 1.69×10^{-8}	-0.056264 (± 0.026620) *p*: 0.0562	0.27128	$\chi^2(2)$: 0.67291 *p*: 0.714297	380.491 (± 46.3026) *p*: 2.85×10^{-6}	17.6415 (± 5.43797) *p*: 0.0070	0.46724	$\chi^2(2)$: 0.06844 *p*: 0.710223
Poland	1.95738 (± 0.088016) *p*: 4.03×10^{-11}	-0.0562985 (± 0.003369) *p*: 0.0001	0.71197	$\chi^2(2)$: 2.97819 *p*: 0.225577	157.999 (± 11.3458) *p*: 9.06×10^{-9}	0.728119 (± 1.33250) *p*: 0.5948	0.02428	$\chi^2(2)$: 1.3162 *p*: 0.517835
Portugal	1.06587 (± 0.077760) *p*: 1.08×10^{-8}	0.00832899 (± 0.009133) *p*: 0.3797	0.06482	$\chi^2(2)$: 6.8129 *p*: 0.033159	163.088 (± 12.5786) *p*: 2.03×10^{-8}	4.85496 (± 1.47728) *p*: 00.65	0.47370	$\chi^2(2)$: 2.86297 *p*: 0.238954
Romania	2.79120 (± 0.124268) *p*: 3.58×10^{-11}	-0.0699590 (± 0.014595) *p*: 0.0004	0.65692	$\chi^2(2)$: 0.48496 *p*: 0.784678	153.045 (± 13.9821) *p*: 1.34×10^{-7}	3.58323 (± 1.64211) *p*: 0.0497	0.28407	$\chi^2(2)$: 0.59188 *p*: 0.743830
Slovenia	2.14257 (± 0.256890) *p*: 2.45×10^{-6}	-0.0124792 (± 0.030170) *p*: 0.6864	0.01406	$\chi^2(2)$: 8.00771 *p*: 0.018245	356.388 (± 42.0916) *p*: 2.09×10^{-6}	4.72430 (± 4.94341) *p*: 0.3581	0.07073	$\chi^2(2)$: 7.87792 *p*: 0.019468
Slovakia	1.56627 (± 0.131163) *p*: 5.11×10^{-8}	0.227586 (± 0.015404) *p*: 0.0845	0.22759	$\chi^2(2)$: 0.52983 *p*: 0.767273	165.787 (± 16.3176) *p*: 3.02×10^{-7}	11.8777 (± 1.91640) *p*: 4.60×10^{-5}	0.76197	$\chi^2(2)$: 0.47643 *p*: 0.788035

Source: own elaboration based on (Eurostat, 2024a, 2024b, 2024c).

The results varied between different countries when comparing the coefficient of determination, making it clear that in some states the linear trends were more visible. Positive trends could be distinguished using both variables in Bulgaria, Czechia, Greece, Croatia and Slovakia, whereas negative trends were clearly visible for Cyprus and Lithuania, and the weak negative trend could be observed in the expenditure per GDP in Poland.

Note that the majority of the country models did not have a normal distribution of residuals, making the trend biased. However, this is difficult to correct with relative instrumental variables, as raw data do not have many components into which they could be divided – it would suffice to point out the general trends while using only one financial category. An additional issue with the raw data concerns a short period of only 14 years of research, creating limited trends and without an outlook on a longer period.

5. Discussion and Conclusions

The results of the models 1a to 2b indicate that there was no correlation between an increase in the ESIF environmental protection expenditure and a change in national spending in this field, proving that the first hypothesis is false, as an increase in the ESIF expenditure did not cause a crowding-out effect in national investments. Fifteen countries recorded a large increase in EU funding for the environment: Poland, Czechia, Portugal, Romania, Hungary, Greece, Slovakia, Croatia, Bulgaria, Lithuania, Latvia, Estonia, Slovenia, Cyprus and Malta. Among those member states, linear trends in national expenses were created to verify that the second hypothesis is true. There were countries which obtained the most environmentally connected ESIF and seemed to rely mostly on EU funding instead of their own public spending, namely Cyprus and Lithuania, with a small indication towards Poland. The conducted research is an extension of the previous research in the area to the 2014–2020 multiannual budgetary period, proving that there are still countries with limited national systems of financing environmental policy. This may indicate the need to include additional mechanisms in EU spending should the decreasing trends in national environment protection persist.

It is clear that the European Union is attempting to induce environmentally friendly policies resulting from international agreements in time of rapid climate change. Such actions come in a variety of solutions, providing a vast network of institutional resources in this area, whilst also heavily supporting regional sustainable development with EU funding. The high-income developed EU states usually do not gain more than they contribute from their own resources for the cause, however countries that joined the European Union after 2004, are visibly weaker regarding sustainable development, providing less resources to finance it, and also showing a worse state of the environment resulting in their higher financial needs. This discrepancy in views on the natural environment and various definitions of needs, creates socio-political friction among various states and the European Union, with Poland and Hungary being examples in this case. In fact, increasing international funding gives actual authority in dealing with the threat of climate change to the EU, removing the possibility of dealing with local environmental issues by individual nations, especially if national resources allocated for this purpose are being reduced, which is not necessarily incorrect. Given that climate change is a global issue, the transformation of the way of life seems impossible to be conducted on a local national level, while European funding focuses on a major scale implementing changes regionally.

Despite various national political debates, the politics of the European Union in this field can only be rated positively, giving its member states the possibility to address other socio-economic regional issues in times of constant crises.

The limitations of this article are mainly related to the differences between the COFOG and ESIF environmental protection themes, and the COFOG being used internationally on a wider scope than the European Union needs to be more generalised to be useful for data comparison. Even with common guidelines from the OECD and the EU, each country's approach may differ. Structural funds themes are much more detailed and in unison as they relate only to the budgeting of one institution, namely the EU, however they are being upgraded in every budgeting period. Additionally, the article is limited only to the ESIF, while in both budgetary periods there were many more EU programmes and financial instruments dedicated to environmental protection (such as LIFE, Horizon etc.), yet these values would not influence national data and therefore should only have a small impact on the general

result. Moreover, trends in national expenditure are limited by the short period of 14 years. Earlier budgetary periods were not being taken into consideration as the vast majority of the considered states only joined the EU institutional structures in the 2000s.

Future research should include the next period of 2021–2027, divided into five main objectives, one of which is a 'Greener Europe' aiming for a transition to a more environmentally friendly economy (European Commission, 2024a) and also to consider other programmes and financial instruments of the European Union and also funds originating from the European Economic Area.

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Czy zwiększenie funduszy strukturalnych powoduje efekt wypierania krajowych inwestycji w obszarze ochrony środowiska?

Streszczenie

Cel: Ocena, czy w sektorze ochrony środowiska wzrost wydatków z EFSI dla danego kraju powoduje spadek wydatków krajowych, oraz identyfikacja krajów, w których ma to miejsce.

Metodyka: Wykorzystano dane roczne z baz danych Eurostatu i funduszy strukturalnych. Zidentyfikowano wartości EFSI i wydatków krajowych przekazanych na ochronę środowiska w latach 2007–2020 (ostatnie dwa wieloletnie okresy budżetowe) w odniesieniu do PKB i na mieszkańca i porównano je z modelami regresji liniowej między wydatkami UE i krajowymi. Wybrano grupę krajów o największym wzroście wydatków z EFSI w badanym obszarze i przeprowadzono dla nich analizę modeli trendów wydatków krajowych.

Wyniki: Nie stwierdzono efektu wypierania inwestycji na poziomie krajowym przez zwiększenie wydatków EFSI. Zidentyfikowano również kraje o tendencji spadkowej pod względem krajowych wydatków na ochronę środowiska. Są to: Cypr, Litwa i w jednym wymiarze również Polska. Wskazuje to, że kraje te cedują kompetencje w zakresie finansowania ochrony środowiska na rzecz UE.

Implikacje i rekomendacje: Oddanie finansowej suwerenności w sektorze ochrony środowiska w ręce UE może wywołać niepożądane tendencje społeczne do działania przeciwko zrównoważonemu rozwojowi. Dla krajów UE lepiej byłoby prowadzić politykę ekologiczną zbieżną z potrzebami międzynarodowymi.

Oryginalność/wartość: Temat ten jest niezwykle istotny, biorąc pod uwagę znaczny wzrost zaangażowania UE w ochronę środowiska i zrównoważony rozwój w każdej kolejnej wieloletniej perspektywie budżetowej.

Słowa kluczowe: ESIF, ochrona środowiska, wydatki publiczne, dotacje na ochronę środowiska