The impact of fraud and corruption on the level of absorption of EU funds (2014-2020)

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Abstract

Fraud and corruption in connection with European funds allocated to the Member States of the European Union have always been a source of concern for those directly involved in this process. In view of the huge sums of money made available for the next period (EUR 1,824.3 billion), these concerns are taking on new dimensions. This paper examines the extent to which the level of fraud reported by Member States in relation to European funds in the 2014-2020 period, as evidenced by the Commission's annual reports on the protection of the EU's financial interests and the fight against fraud (PIF reports), and the level of corruption as shown by the World Bank (Control of Corruption Index) is connected with the level of absorption rate of these funds during the same period. Our conclusions confirm that for the period 2014-2020, the level of absorption of European funds is negatively influenced by corruption. An element of novelty is the fact that an objective indicator has been included in this equation, consisting in the number of frauds reported by the states regarding these funds. We noticed, that the level of absorption rate is better explained by an objective indicator (in this case The European Funds Fraud Index) than a subjective fraud indicator (in this case the Control of Corruption). Therefore, when analyzing the cause of EU funds absorption rates, it would be advised to look for and construct indicators that rely on facts rather than perception.

Keywords: fraud, EU funds, corruption

Jel Codes: D73, K42

1. Introduction

The level of absorption of European funds and its determinants has always been in the attention of the actors[1] involved in this process. Here we are talking about the European funds that the European Commission provides to the Member States through 8 European sources, including the Cohesion Fund, the European Regional Development Fund, the European Social Fund and the European Rural Development Fund. At national level, this money is managed through a number of bodies (managing authorities, paying agencies, audit authorities, certification bodies), the number of which may vary depending on the size of the country, the amount of EU funds to be managed and their degree of decentralization. Practically, there are European funds for all the development needs of the member countries: national road and railway infrastructure, sewerage, water, landfills, village development, schools, hospitals, small private businesses in villages and towns and so on. This discussion has

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[1] The **Commission** that defines the strategies and translates into policies and initiatives the overall political goals developed collectively by the EU institutions, the **European Parliament** that exercises democratic oversight to ensure that the Commission and the other institutions deal properly with EU funds, the **European Court of Auditors** that assesses the economy, effectiveness, efficiency, legality and regularity of EU action to improve accountability, transparency and financial management, the **European Anti-Fraud Office** (OLAF) that carries out independent investigations into fraud and corruption involving EU funds and develops EU anti-fraud policy to fight fraud, corruption and any other illegal activity affecting the EU's financial interests, the **European Union Agency for Law Enforcement Cooperation** (EUROPOL) serves as a support center for law enforcement operations, hub for information on criminal activities, and center for law enforcement expertise, the **Eurojust**, the European Union Agency for Criminal Justice Cooperation, coordinates the work of national authorities – from the EU Member States as well as non-EU countries – in investigating and prosecuting cross-border crime.

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gained special relevance with the approval of the additional funds that will be made available to Member States through the post-COVID support packages[2]. In total, a package of over EUR 1.8 trillion, meaning the largest recovery plan in Europe since the Marshall Plan.

Given that some countries fail for various reasons to achieve a consistent absorption rate even in relation to the funds usually provided through multiannual budgeting, it is curious how they will be able to absorb these considerable additional amounts.

In this debate about the inability of some Member States to cope with the European funds provided, there has been a lot of talk about fraud and corruption as associated phenomena, considering that there is an indissoluble link between these determinants and the level of absorption.

The present paper aims to continue similar analyzes dedicated to the determinants of absorption rates for the period 2000-2006 (Tossun, 2014), respectively 2007-2013 (Achim, 2015) and to focus on the latest available data, analyzing the relationship between the level of absorption of European funds allocated to Member States for the 2014-2020 programming period (according to what was reported at the end of the budget execution of 31 December 2021) and the number of frauds reported by these states in relation to European funds, on the one hand, and with the World Bank's corruption control index, on the other hand.

We appreciate that an update of the existing analyzes on this subject is opportune in the context in which, on the one hand, as we mentioned, there are record amounts of money available, and on the other hand, a new actor has recently appeared in this landscape: the European Public Prosecutor's Office[3], a transnational judicial institution with ample powers to combat corruption and fraud related to European funds.

We found that for the period 2014-2020, even if there are differences from country to country, differences that can be explained given their particularities (amounts provided, soundness of institutions, expertise in the implementation process etc.), at EU28 level, on average, it is noted that the absorption rate of funds tends to be influenced by the level of corruption and fraud, being higher in states where the level of fraud and corruption is kept under control and lower where it is higher. We also noticed that the level of absorption rate is better explained by an objective indicator (in this case The European Funds Fraud Index) than a subjective fraud indicator (in this case the Control of Corruption).

The rest of this paper is structured as follows: section 2 presents a short literature review of relationship between corruption and European funds; in section 3 we present the data used, as extracted from the 2014-2020 Commission reports and the methodology (descriptive statistics and empirical study conducted in STATA) used to get insights on the robustness of this relation; section 4 is dedicated to the analysis of the data regarding fraud related to EU funds and the corruption (World bank – control of corruption index) and relationship with the data regarding the rate of absorption of the Member states for the programming period 2014-2020. The paper ends with the formulation of the final conclusion that proves that that for the period 2014-2020, the level of absorption of European funds is negatively influenced by corruption, and when analysing the cause of EU funds absorption rates, it would be advised to look for and construct indicators that rely on facts rather than perception.

2. Literature review

Numerous studies have suggested that the quality of public governance including the level of corruption have a negative effect on economic development, being an impediment to increasing investments (Mauro, 1995; Paldam, 2002; Gundlach and Paldam, 2009), absorption of European funds (Achim and Borlea, 2015; Incaltarau et al., 2020), business development and performance (De Rosa et al., 2010; Achim, 2017), and, finally on economic and sustainable development (World Bank, 2009; Achim and Borlea, 2020; Hoinaru et al., 2020).

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[2] To overcome the crisis caused by the COVID-19 and support the development of a future, greener, stronger Europe, EU Member States have approved for 2021-2027 a long-term EU budget of EUR 1.074 trillion, which add to another 750 billion EUR - Next Generation EU and the Recovery and Resilience Facility (RRF) available between 2021 and 2026.
[3] The **European Public Prosecutor's Office** (EPPO) has powers to investigate and prosecute crimes affecting the EU's financial interests in the 22 participating EU Member States. It started its operations on 1 June 2021.

Regarding the studies strictly related to the absorption of the European funds, the work of Achim and Borlea (2015) analyses the determinants of the absorption performance of the European funds 2007-2013 among the 28 Member States. It was found that Voice and Accountability, Rule of Law, Control of Corruption, Government effectiveness and Regulatory Quality have a high and positive role on the increasing rates of European funds absorption. Similarly, the study of Incaltarau et al. (2020) reveals that increasing government effectiveness and combating corruption significantly increase the rate of EU absorption funds, in the new EU member states.

Regarding the performance of the new Member States, the study of Achim and Borlea (2015) reveals that the new Member States generally had lower absorption rates than the old Member States for the period 2007-2013. For the previous period, Tosun's (2014) study that analyzed data available for 2000-2006 found that new Member States generally had higher absorption rates than old Member States.

Regarding the link between corruption and European funds, there is a debate in the literature about the extent to which they contribute to reducing corruption and improving governance or, on the contrary, fueling government favoritism and eroding the quality of institutions.

There are arguments in favor of the beneficial effect of European funds on governance: that they are one of Bruxelles most important post-accession levers for disciplining new Member States and motivating them to manage the funds with the highest standards (Epstein and Sedelmeier, 2009), the fact that the settlement of these funds is much more strictly regulated, making corruption more expensive and motivating recipient organizations to invest in administrative capacity (Knack, 2001), the fact that these funds benefit from extensive monitoring (national and European) leading to better detection and punishment of corruption (European Court of Auditors, 2019).

On the other hand, regarding the negative role of these funds on the quality of government and in terms of encouraging corruption, the following arguments were put forward: European funds are spent on investment projects where civil servants have a wide margin of appreciation which makes them more exposed to corruption (Tanzi and Davoodi, 2001), provides an additional amount of resources for rent extraction (Brautigam, 2000; Mungiu, 2013; Dimulescu et al., 2013), and, like any external funds, weakens the connection between society, taxation and politics (Djankov et al. 2008).

In this debate highlights the studies conducted by Fazekas and Toth (2017) and Fazekas and King (2018), which, using information from the Tenders Electronic Daily (TED)[4] from 2009-2014, and an objective indicator for measuring corruption Corruption Risk Index (CRI)[5] has sought to determine whether or not European funds encourage corruption in the Member States. Its results show that in some Member States European funds increase the risk of corruption, while in other Member States it discourages it, on average having a negative effect at EU level. In this sense, it is found that the price of contracts concluded in connection with European funds are higher than those based on national funds.

In this context, our paper seeks to reanalyze the link between corruption and European funds, introducing as a novelty in this equation the number of frauds detected in connection with them, all being related to the latest available data related to the level of absorption of these funds by Member States in the period 2014-2020, our null hypothesis being that the absorption rate was influenced by the number of reported European funds fraud cases and the level of Control of Corruption.

3. Methodology and data

The present analysis focuses on EU28 countries (Austria, Belgium, Bulgaria, Cyprus, Croatia, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia and United Kingdom) and includes country data level for the period between 2014 and 2020. The paper, focuses on the analysis of the

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[4] TED (Tenders Electronic Daily) is the online version of the 'Supplement to the Official Journal' of the EU, dedicated to European public procurement.
[5] Corruption Risk Index (CRI) developed as part of the DIGIWHIST research project at the University of Cambridge. DG GROWTH (2015). This method uses large volumes of data from large public procurement databases (Tenders Electronic Daily), trade register data, as well as financial and proprietary data.

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relationship between the level of absorption of European funds for the 2014-2020 programming period according to the budget execution at the end of 2021 and the level of fraud related to them as reported by Member States in the period 2014-2020.

First, using descriptive statistics, we try to get an idea of the main trends, analyzing the rates reported by the Commission and the Member States on the level of absorption of European funds, both by reference to an objective indicator, namely the number fraud reported by Member States in the 2014-2020 period, as evidenced by the 2014-2020 PIF reports[6], as well as by reference to a subjective, perception-based indicator, namely the World Bank corruption measurement index - Control of Corruption calculated at the level of each Member State in the period 2014-2020. The main purpose was to determine the link between these data, respectively to what extent the (reported) level of fraud and the (estimated) level of corruption influences (and in what way) the level of the absorption rate.

Subsequently, in order to verify the robustness of this relationship, we analyze these data in STATA.

The main indicators considered are the following:

1. Absorption Rate Index (henceforth Absorption) is calculated at EU28 country level as Total Net Payments divided by Total Net Planned EU Amount for each year between 2014 and 2020. The amounts for Total Net Payments and Total Net Planned EU Amount were sourced from the European Commission's reports on European Structural and Investment Funds. (see Annex)

2. The European Funds Fraud Index (henceforth Fraud) is the number of fraudulent European funds cases reported by the European Commission, at EU28 country level between 2014 and 2020.

3. Control of Corruption: Percentile Rank (henceforth Corruption) is an indicator compiled by the World Bank which captures the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. The indicator can take a value between 0% which represents the lowest rank, and 100% which is the highest rank.

4. Unemployment rate (henceforth Unemployment) is the annual unemployment rate in % at EU28 country level between 2014 and 2020. The indicator was sourced from Eurostat for EU27 and the UK Office for National Statistics for the United Kingdom.

5. Government consolidated gross debt (henceforth Debt) is the annual government consolidated gross debt as a % of GDP at EU28 country level between 2014 and 2020. It was sourced from Eurostat for EU27 and the UK Office for National Statistics for the United Kingdom.

6. GDP indexed to 2010 is the gross domestic product and the main components - Chain linked volumes, index 2010=100 at EU28 country level between 2014 and 2020. This indicator was sourced from Eurostat for all countries.

The number of observations, mean, standard deviation, minimum and maximum values of the above-mentioned indicators in presented in Table 1.

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[6] Annual reports from the Commission to the European Parliament and the Council on the protection of the EU's financial interests ("PIF" Reports) - https://ec.europa.eu/anti-fraud/about-us/reports/annual-reports-protection-eus-financial-interests-pif-report_en . EU Member States as beneficiaries of EU funds need to protect the EU budget, and to counter fraud and any other illegal activities affecting the financial interests of the EU. As such, they are obliged to report all irregularities - both fraudulent and non-fraudulent - to the European Commission. An irregularity is a non-compliance with the EU rules and requirements connected to EU funds spending. Oftentimes irregularities are genuine errors e.g. not filling out a form correctly, or not complying 100% with the tendering procedure. Fraud is an intentionally committed irregularity set off by a malicious intent

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Table 1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Absorption	196	23.97296	20.52694	0.3	79.2
Fraud	196	24.0051	42.45245	0	237
Corruption	196	78.5027	15.38577	46.15385	100
Unemployment	196	7.962245	4.403437	2	26.5
Debt	196	69.85969	38.65948	8.2	206.3
GDP	195	114.3569	16.21194	77.3	187.4

Source: Own processing using STATA

As depicted in Table 1, Absorption rate ranges between 0.3% (Ireland in 2014) and 79.2% (Finland in 2020) with a mean of 23.9%. The Fraud cases span between 0 (Austria and Luxembourg in 2014 and various other countries between 2015 and 2020) and 237 case (Romania in 2020) with a mean of 24 cases. Corruption varies between 46.2% (Bulgaria in 2020) and 100.0% (Denmark in 2014 and 2020 and Finland in 2018) with a mean of 78.5%

Unemployment rate was between 2.0% and 26.5% while Debt was between 8.2% (Estonia in 2018) and 206.3% (Greece in 2020). GDP reported values between 77.3% (Greece in 2020) and 187.4% (Ireland in 2020)

Table 2: Correlation matrix

	Absorption	Fraud	Corruption	Unemployment	Debt	GDP
Absorption	1					
Fraud	-0.1742	1				
Corruption	0.1405	-0.4181	1			
Unemployment	-0.2948	-0.1023	-0.3041	1		
Debt	-0.0237	-0.129	-0.1713	0.6372	1	
GDP	0.3365	0.0809	0.0723	-0.572	-0.5977	1

Source: Own processing using STATA

Table 2 displays a low correlation (below 0.34) between Absorption rate (as dependent variable) and the considered independent variables (Fraud, Corruption, Unemployment, Debt and GDP). In other words, the independent variables taken separately determine a small variation of the Absorption rate

Based on the gathered data presented in Table 1 and Tabel 2, the focus of the study was two folded: analyzing the relationship between fraud and absorption rate at EU28 level by considering fraud as both an objective indicator (the European Funds Fraud Index) and as a subjective indicator (Control of Corruption: Percentile Rank).

First, we tried to determine if there was a statistically significant correlation between the European Funds Fraud Index and Absorption Rate Index at EU28 level between 2014 and 2020. Second, we looked into comparing the Control of Corruption for the EU28 Member States between 2014 and 2020 and their respective Absorption Rate Index for the same period. To control for country specificity at macro-economic level, we concluded that it would be necessary to identify other variables and include them in both models. In choosing the control variables we consulted similar studies Ahmad et al. (2021) and Achim and Borlea (2015).

Therefore, two models were constructed in which the European Funds Fraud Index and Control of Corruption: Percentile Rank took in turn the role of an independent variable along with three more indicators: GDP indexed to

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2010 (in %); annual unemployment rate (in %) and Government consolidated gross debt (as % of GDP). The Absorption Rate Index was considered as the dependent variable in both models.

The general equation of the model was the following:

Absorption = α_i + β_1Fraud$_{it}$/Corruption$_{it}$ + β_2Debt$_{it}$ + β_3Unemployment + β_4GDP$_{it}$ + Ω_{it} + ε_{it}, where

Absorption = the Absorption Rate Index for country "i" for the period 2014-2020

Fraud$_{it}$/Corruption$_{it}$ = The European Funds Fraud Index for country "i" for the period 2014-2020; Control of Corruption: Percentile Rank for country "i" for the period 2014-2020

Debt$_{it}$ = Government consolidated gross debt (as % of GDP) for country "i" for the period 2014-2020

Unemployment $_{it}$ = Annual unemployment rate for country "i" for the period 2014-2020

GDP$_{it}$ = Gross Domestic Product indexed to 2020 in % for country "i" for the period 2014-2020

β_1, β_2, β_3, β_4 = coefficients

α_i = intercept

Ω_{it} = between error

ε_{it} = within error term

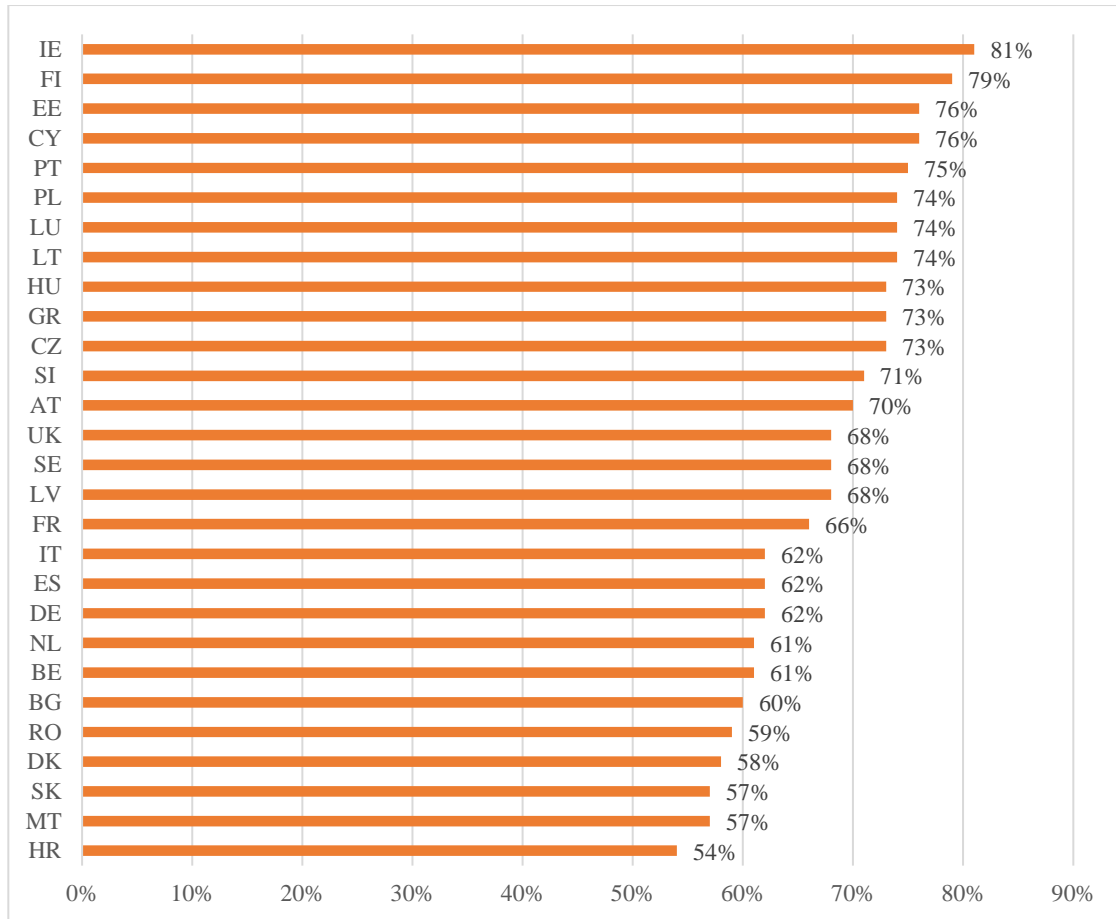## 4. Results
4.1. Descriptive statistics

Graph 1 shows the absorption rate of EU funds for each as net payments attracted from the European Commission, the European Structural and Investment Funds (ESF) from the 2014-2020 programming period, as executed on 31 December 2021[7].

We took a closer look at these figures, taking as a benchmark the situation in Romania whose particularities the authors of this study are familiar with. With 15 years of experience in the European Union, in the third financial cycle, to which is added the experience gained during the pre-accession period, Romania still seems to be unable to take advantage of the funds provided by the EU.

59% - this is the rate of absorption of European funds achieved by Romania[8]. The European Union average of the absorption rate of these FESI funds is 67%.

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[7] The data can be found in a document on the implementation of European funds, sent by the European Commission to the Committee on Regional Development (REGI) of the European Parliament available on https://www.startupcafe.ro/fonduri-europene/romania-absorbtie-fonduri-europene-miliarde-euro.htm

[8] The amount of money accessed by Romania is 19.8 billion euros, out of a total of 33.4 billion euros, FESI funds made available to our country through the Multiannual Financial Framework (MFF) 2014-2020. The remaining almost 14 billion euros are in the budget of the European Union and we are waiting to attract them. The money can be spent by Romania until the end of 2023.

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Graph 1. Absortion rate in EU 28 between 2014 and 2021 (country level analysis)

Source: Own processing

Romania is the fifth in the EU28 ranking (along with the United Kingdom, which has come out in the meantime) of the absorption rate. Below Romania is also Denmark (58%), a very rich country, clearly contributing to the EU budget, whose development does not depend on these aids. The Danes have drawn 1 billion euros and still have less than 1 billion to take. Another country with lower absorption than Romania is Malta (57%), the smallest EU member state. The islanders have taken 500 million euros and still have to draw 452 million euros, small amounts compared to the capital flows that flow through Malta, from investments from private companies around the world.

Croatia is also below Romania with the absorption rate (54%), but this country entered the EU only in 2013, 6 years after Romania. The Croatians, who are preparing to enter the Eurozone and the Schengen area, have taken 6.1 billion euros and need to attract another 5.5 billion euros as FESI funds.

Finally, Romania can be "proud" that with the FESI absorption rate is higher than Slovakia's as well (57%). The Slovaks have raised almost 9 billion euros and still need to attract almost 8 billion euros.

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Otherwise, over Romania with the absorption rate are 22 EU countries, including Bulgaria (60%) and Hungary (73%). Poland, which, along with Hungary, has been threatened with blocking EU funds due to violations of the rule of law, has so far absorbed 75% of FESI funds.

The best performing country, with an 81% absorption rate, is Ireland, a state known for its high standard of living. Once one of the poorest countries in Europe, Ireland has miraculously developed since joining the European Union (1973), attracting investors from all over the world[9], eager to enter the EU's single market quickly.

Graphs 2 and 3 show the total number of frauds reported by each of the Member States in the period 2014-2022 and the WBI index - Control of corruption calculated for the Member States as an average for this period.

It is noted that the Nordic countries (Graph 2) have the highest levels of corruption control, with Denmark, Finland and Sweden at the top. As we move south and especially east, this index decreases, with Romania on the second place from the end in this ranking of shame, being surpassed only by Bulgaria.

At the same time, we note (Graph 3) that Romania holds the first place when it comes to reported frauds, followed, it is true, at a great distance, by other countries form the Eastern bloc, such as Poland, Hungary, Slovakia and the Czech Republic, while the Nordic countries, Finland and Sweden, are at the opposite end, with the fewest with reported cases of fraud.

Thus, it can be concluded that in countries where the phenomenon of corruption seems to be under control the number of frauds detected in connection with European funds is lower or almost non-existent. On the other hand, the lower the corruption control indicator is, the higher the number of detected frauds is. Or, in other words, the greater the corruption in a country, the greater the predisposition to fraudulent European funds spending in that state.
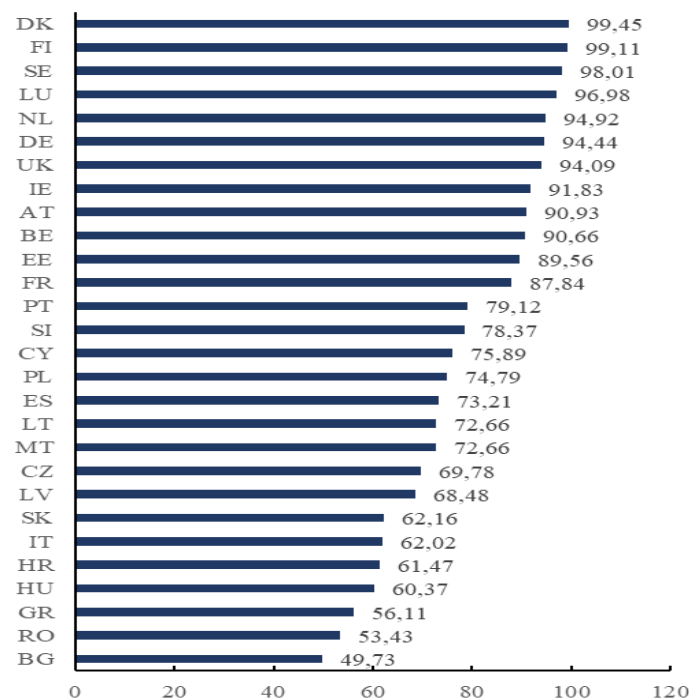
Graph 2. Control of Corruption in EU 28 between 2014 and 2020 (country level analysis) (average for the period)

Source: Own processing

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[9] American tech giants, including Alphabet (Google) and Meta (Facebook), have estabilshed their european headqusters here.

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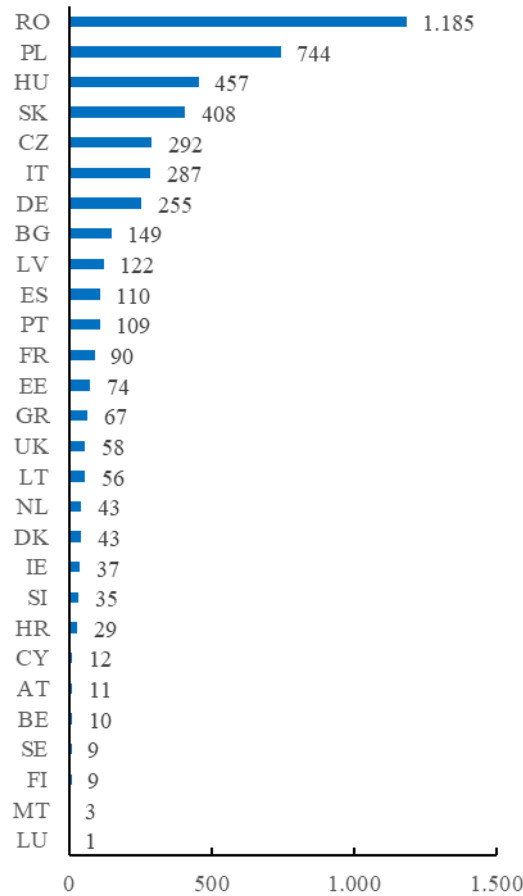
Graph 3. Total number of irregularities (fraudulent) in EU 28 between 2014 and 2020 (country level analysis)
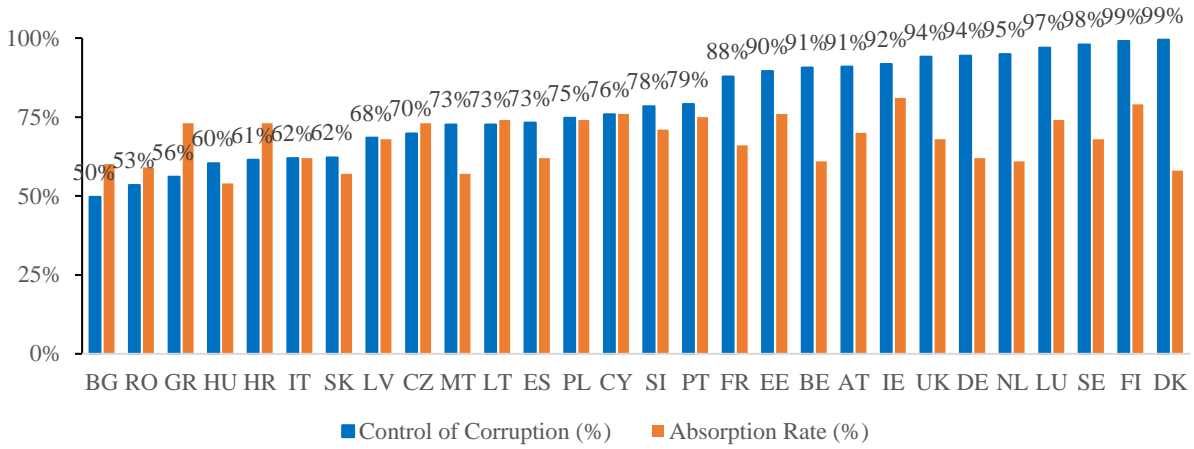
Source: Own processing

Furthermore, we compared these data with the level of absorption rate in the Member States, Graphs 4 and 5.

Thus it is observed (Graph 4) that the absorption rate is more modest in countries such as Romania, Bulgaria, Slovakia and Hungary where the phenomenon of corruption seems more widespread, while in countries such as Finland, Luxembourg or Ireland, where the phenomenon of corruption is under control, it tends to increase. Although the situation differs from country to country, this trend is still evident at EU 28 level: the higher the indicators of corruption control, the higher the level of absorption of European funds.

On the other hand, (Graph 5), the higher the level of fraud in countries such as Romania, Hungary or Slovakia, the lower the absorption rate seems, while in countries such as Finland, Sweden, Luxembourg and Austria in that the number of reported frauds is small, the absorption rate increases. Here, too, at EU28 level, on average, the conclusion seems to be validated that the higher the number of frauds, the lower the level of absorption rate.

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Graph 4. Control of Corruption and Absorption rate in EU-28 between 2014 and 2020

Source: Own processing
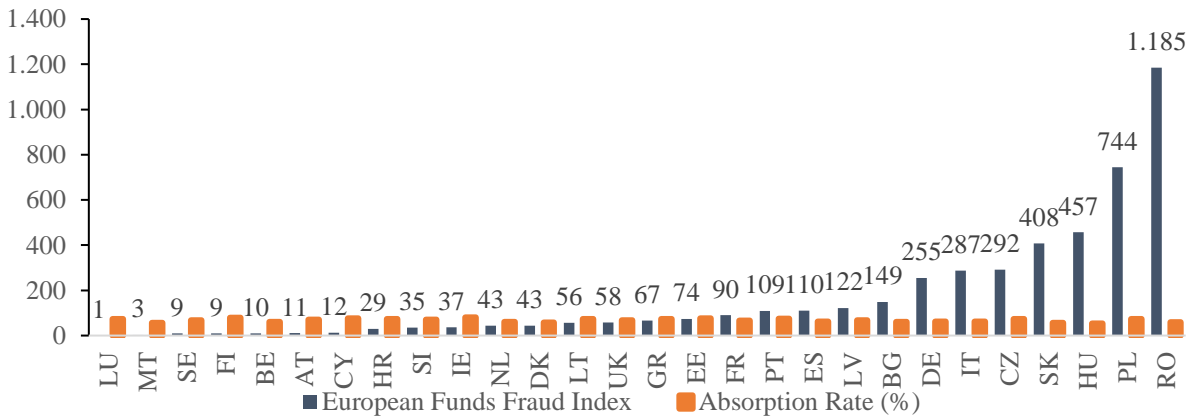
Graph 5. European Funds Fraud Index (number of fraudulent cases) and Absorption rate in EU-28 between 2014 and 2020

Source: Own processing

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Graph 6. European Funds Fraud Index (number of fraudulent cases), Control of Corruption and Absorption rate in EU-28 between 2014 and 2020

Source: Own processing

In order to be able to draw a general conclusion, in Chart 6, we overlapped all these data, noting that, even if there are differences from country to country, differences can be explained given their particularities (amounts provided, sound implementation etc.), at the E28 level, on average, it is observed that the absorption rate of funds tends to be influenced by the level of corruption and fraud, being higher in states where the level of fraud and corruption is controlled and smaller where it is higher.

The European countries which fit best with this conclusion are Romania and Finland. Thus, Romania, of all the countries of the union, has among the lowest absorption percentages, the highest number of reported frauds and one of the lowest indicators of corruption control. On the other hand, Finland, with one of the highest indicators of corruption control, and a relatively small number of reported fraud cases, has one of the best absorption rates.

On the other hand, Denmark and Greece appear to be the countries that do not fit into this pattern at all, the first having a low absorption rate although the level of corruption control is very high, and the latter having an absorption level relatively high, although the level of corruption control is low, in both states the number of detected fraud cases being relatively modest.

4.2. Empirical results

Based on the research objective the following hypothesis was formulated:

The null hypothesis: Between 2014 and 2020 at EU28 level, the Absorption Rate index was influenced by the number of reported European Funds Fraud cases and Control of Corruption amongst other factors.

The alternative hypothesis: Between 2014 and 2020 at EU28 level, the Absorption Rate index was not influenced by the number of reported European Funds Fraud cases and Control of Corruption amongst other factors.

Following the analysis of the panel dataset we observed the presence of heteroskedasticity especially when mapping the Absorption Rate Index along with European Funds Fraud Index and Control of Corruption.
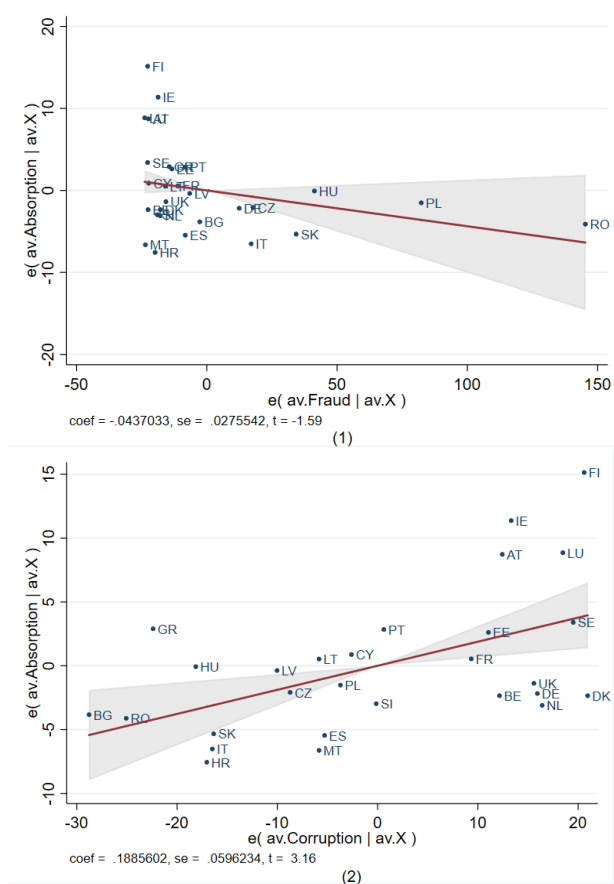
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coef = -.0437033, se = .0275542, t = -1.59

(1)

coef = .1885602, se = .0596234, t = 3.16

(2)

Figure 1. (1) Relationship between Absorption rate and Fraud at country level; (2) Relationship between Absorption rate and Corruption at country level[10]

Source: Own processing using STATA

Figure 1.1 depicts the relationship of the individual means of Absorption rate versus the means of Fraud while Figure 1.2 displays the relationship of the individual means of Absorption rate versus the means of Corruption.

The association between the Absorption rate and Fraud (Figure 1.1) is less strong and not as significant as the association of Absorption rate and Corruption (Figure 1.2) with both models reporting averages for the countries outside the confidence interval (data is heteroskedastic). Eliminating the outliers (Romania, Poland and Hungary) did not solve the heteroskedasticity problem. As a consequence, we applied a random-effect model with robust errors.

The main results of the random-effect model are presented in Table 3

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[10] The plot shows the conditional values $e_{Absorption}$, e_{Fraud} and $e_{Corruption}$, not the actual values Absorption, Fraud and Corruption respectively

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Table 3. Random-effects model results

Variables	Absorption Rate (Model 1) b/se	Absorption Rate (Model 2) b/se
Fraud	-0.094***	
	(0.035)	
Corruption		0.105
		(0.143)
Debt	0.283***	0.265***
	(0.067)	(0.067)
Unemployment	-2.038***	-1.683***
	(0.434)	(0.46)
GDP	0.638***	0.597***
	(0.181)	(0.163)
Constant	-50.401**	-57.793**
	(22.959)	(26.614)
R-squared	0.254	0.227
N	195	195

* $p<0.1$, ** $p<0.05$, *** $p<0.01$
Source: Own processing using STATA

Model 1 and Model 2 were built to compare and see which of the two fraud indicators (the European Funds Fraud Index and Control of Corruption) had a bigger impact on the Absorption rate while considering the same set of other variables that control for EU28 countries macro-economic environment. The European Funds Fraud Index was considered an objective fraud indicator as it represents the number of European funds fraudulent cases reported at EU28 country level while Control of Corruption was considered as a subjective indicator as it depicts the perception of fraud.

The regression results show that the Absorption rate change was significantly dependent on the European Funds Fraud Index (the objective fraud indicator) and not significantly influenced by the Control of Corruption (the subjective fraud indicator) while considering in both models the same macro-economic variables as controlling factors for the countries specificity.

In Model 1 it can be observed that on average the Absorption rate decreases by 0.094 when the European Funds Fraud Index changes by one unit across countries and time period. The European Funds Fraud Index coefficient was significant at 0.01 level.

In Model 2 we can see that the Absorption Rate Index is not significantly influenced by a change in the Control of Corruption indicator.

In both models the controlling macro-economic variables had a significant impact on Absorption Rate Index with Government consolidated gross debt and GDP exerting a positive impact and unemployment rate a negative impact.

The conclusion is that changes in Absorption Rate Index are better explained by an objective indicator (in this case The European Funds Fraud Index) than a subjective fraud indicator (in this case the Control of Corruption). Therefore, when analysing the cause of EU funds absorption rates, it would be advised to look for and construct

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indicators that rely on facts rather than perception. This conclusion aligns with those we have argued in a previous paper (Roman et al., 2022).

5.Conclusions

Fraud and corruption in connection with European funds allocated to the Member States of the European Union have always been a source of concern for those directly involved in this process.

This paper examines the extent to which the level of fraud reported by Member States in relation to European funds in the 2014-2020 period, as evidenced by the Commission's annual reports, and the level of corruption, as results from World Bank – Control of Corruption Index, is connected with the level of absorption rate of these funds reported by Member States at the end of 2021.

The main purpose was to determine the link between these data, respectively to what extent the (reported) level of fraud and the (estimated) level of corruption influences (and in what way) the level of the absorption rate.

Our conclusions confirm that for the period 2014-2020, the level of absorption of European funds is negatively influenced by corruption as in the period 2007-2013, validating the results of the previous study conducted by Achim and Borlea (2015). An element of novelty is the fact that an objective indicator has been included in this equation, consisting in the number of frauds reported by the states regarding these funds.

First of all, it can be concluded that in countries where the phenomenon of corruption seems to be under control the number of frauds detected in connection with European funds is lower or almost non-existent. On the other hand, the lower the corruption control indicator, the higher the number of detected frauds. Or, in other words, the greater the corruption in a country, the greater the predisposition to fraudulent European funds spending in that state.

Secondly, it can be concluded that, even if there are differences from country to country, differences can be explained given their particularities (amounts made available, soundness of institutions, expertise in the implementation process, etc.), at EU28 level, on average, it is noted that the absorption rate of funds tends to be influenced by the level of corruption and fraud, being higher in states where the level of fraud and corruption is kept under control and lower where it is higher.

The European countries for which this conclusion is best suited are Romania and Finland. Thus, Romania, of all the countries of the union, has among the lowest absorption percentages, the highest number of reported frauds and one of the lowest indicators of corruption control. On the other hand, Finland, with one of the highest indicators of corruption control, and a relatively small number of reported fraud cases, has one of the best absorption rates.

On the other hand, Denmark and Greece appear to be countries that do not fit into this pattern at all, the former having a low absorption rate although the level of corruption control is very high, and the latter having an absorption level. relatively high, although the level of corruption control is low, in both states the number of detected fraud cases being relatively modest.

Last but not least, we noticed, as in the previous study (Roman et al., 2022) that the level of absorption rate is better explained by an objective indicator (in this case The European Funds Fraud Index) than a subjective fraud indicator (in this case the Control of Corruption). Therefore, when analyzing the cause of EU funds absorption rates, it would be advised to look for and construct indicators that rely on facts rather than perception.

Declaration of Competing Interest

The authors of this paper certify that there is no financial or personal interest that could have appeared to influence the work reported in this paper.

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Appendix

Table 3. State of execution of net payments per Member State (2014-20) – (31st December 2021)

Fund	Total allocation of programs	Net Pre-financing payments paid in 2014 to 2021	Net interim payments paid in 2014 to 2021	Total Net payments paid in 2014 to 2021	Implementation Rate [%]
	[a]	[b]	[c]	[d]=[b]+[c]	[e]=[d]/[a]
AT	6.096	186	4.068	4.253	70%
BE	3.002	176	1.666	1.842	61%
BG	10.534	576	5.706	6382	60%
CY	974	60	681	741	76%
CZ	24.465	1.408	16.398	17.806	73%
DE	30.979	1.514	17.739	19.253	62%
DK	1.782	70	961	1.030	58%
EE	4.627	273	3.237	3.510	76%
ES	42.889	2.604	23.918	26322	62%
FI	4.575	165	3.449	3.613	79%
FR	31.814	1.557	19.401	20.957	66%
GR	23.091	2.496	14.259	16.755	73%
HU	25.968	1.543	17347	18.890	73%
HR	11.365	658	5320	6.178	54%
IE	4.077	145	3.177	3.322	81%
IT	48.351	2.866	27.159	30.024	62%
LT	8.948	536	6.070	6.606	74%
LU	170	6	119	125	74%
LV	5.936	375	3.686	4.061	68%
MT	875	48	452	500	57%
NL	2342	94	1367	1360	61%
PL	88.889	5.206	60323	65.529	74%
PT	27.067	1.747	18323	20.270	75%
RO	33.472	2.153	17.735	19.888	59%
SE	4.105	178	2399	2.777	68%
SI	4.193	247	2.723	2.970	71%
SK	15.768	1.042	7.932	8.974	57%
UK	16.348	892	10371	11.164	68%
ETC	9.409	636	5367	5.902	63%
TOTAL	492.012	29.455	301.652	331.107	67%

ETC = Multi-country programmes

Source: European Commision