24th RSEP International Conference on Economics, Finance & Business – Virtual/Online
24-25 February 2022, Holiday Inn Vienna City, Vienna, Austria

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

How to detect the undetected? The (true) level of fraud related to European Funds

Florin Alexandru Roman[a], Daniela Popescu[b], Monica Violeta Achim[c]
[a]*PhD candidate, Faculty of Economics and Business Administration, Babes-Bolyai University, Cluj-Napoca, Romania*
florin.roman@econ.ubbcluj.ro
[b] *PhD, Faculty of Economics and Business Administration, Babes-Bolyai University, Cluj-Napoca, Romania*
[c]*Professor PhD, Dr. Habil, Faculty of Economics and Business Administration, Babes-Bolyai University, Cluj-Napoca, Romania*

DOI: https://doi.org/10.19275/RSEPCONFERENCES167

Abstract

One of the core mission of the EU is supporting Member States reduce developing disparities among themselves, with the aid of structural and investment funds. To exit the crisis caused by the COVID-19 and support the transition towards a more modern Europe, for the next years, the value of such instruments has been supplemented, representing the biggest recovery plan in Europe since the Marshall Plan.

Since these funds have been accessed and used by Member States, one could observe lots of cases of irregularities (of fraudulent and non-fraudulent nature) in the process of absorption. Still, the European Court of Auditor reports show that data on the detected fraud level is incomplete and the Commission lacks insight into the level of undetected fraud.

Under these circumstances, that show that the true level of fraud related to EU funds is unknown, this paper tries to seek answers to the question of how to evaluate the risk of fraud or to determine the scale of undetected fraud, a question that concerns all the players in the field. Using both a statistical and an empirical approach the authors analyse if it is in fact possible to gain insight on this issue using objective indicators based on administrative data from large-scale public procurement databases (Tender Electronic Daily) alongside the much better known but also more criticized perception and experience-based indicators, in the same way in which the level and the risk of corruption is estimated. The empirical study carried out in this paper, consistent with previous research, proves that objective indicators are practical tools that can be used in measuring fraud as well as they are used in measuring corruption.

Keywords: fraud, EU funds, corruption

Jel Codes: D73, K42

1. Introduction

One of the major legal concerns of the European Union, during its evolution, has been the protection of its financial interests and the fight against fraud in this area. Fraud affecting the Union budget can lead to the misappropriation of the funds designated for the Member States from their legitimate purposes, undermining public confidence in the Unions' policies. In the past ten years the EU faced new challenges ranging from the confidence deficit, the Brexit to the health crisis generated by COVID 19. In this context reducing or eliminating fraud as well as administrative irregularities which affect the fiscal-financial processes of setting up, using, reporting and liquidating the funds allocated to the Member States, becomes crucial.

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[1]. In total, a package of over EUR 1.8 trillion, meaning the largest recovery plan in Europe since the Marshall Plan. Faced with such amounts, there is a strong concern on the part of all the actors involved in the management and control of EU funds about the real level of fraud affecting these funds and how to counteract them, being fears related to an increase in the phenomenon in the near future.

[1] A temporary instrument called Next Generation EU. The Recovery and Resilience Facility (RRF) is at the heart of NGEU with EUR 672.5 billion in loans and non-repayable financial support available between 2021 and 2026.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

There is a continuous struggle in this area at the level of EU institutions and bodies[2], for shaping the required legislative framework and for implementing the underlying policies. Among these efforts, the appearance of The European Public Prosecutor's Office (EPPO)[3], an independent and decentralized prosecution office of the European Union, that has powers to investigate and prosecute crimes affecting the EU's financial interests in the 22 participating EU Member States, should be noticed. Apart from that, as the EU Member States also manage about three quarters of the EU budget expenditure, there are also at national level a number of bodies (managing authorities, paying agencies, audit authorities, certifying bodies, national law enforcement, prosecution and judicial services, anti-fraud or anticorruption offices), who are in a constant struggle to keep things under control. We thus have the image of a complex and complicated process of combating fraud that threatens the EU budget. It is a process in continuous calibration and adaptation whose sole purpose is to photograph the phenomenon as accurately as possible to insure a proper combat.

However, a clear picture of the scale of fraud affecting Union expenditure is very difficult to obtain due to the multitude of concepts used (irregularities and fraud), the legislative and procedural turmoil, and the multitude of actors involved. The Court of Auditors found in 2019, during an audit[4] carried out on the fight against EU expenditure fraud, that the Commission did not have comprehensive information on the extent, nature and causes of fraud against the Union's budget. Its official statistics on detected fraud are incomplete, and there is currently no assessment of undetected fraud.

In these circumstances, there is the question of estimating the real level of fraud involving EU funds and especially of the means by which this can be done. Among the subjects involved in the process of European funds absorption, no survey has ever been conducted on fraud related to them. Moreover, conducting such surveys in order to better understand the global scale of EU subsidy fraud is problematic, as it generates considerable costs and it is not clear to whom such sociological questions should be addressed.

To investigate the extent of undetected fraud, given the indissoluble link between EU funds and public procurement procedures, in this paper, based on the data reported by Member States on the number of cases of irregularities / fraud related to EU funds, we intend to analyse them by comparing to an index used to measure de level/risk of corruption based on objective data (CRI-Corruption risk index). In addition, in order to strengthen our results, we add in the analysis an index of corruption based on perception (CPI-Transparency Organization).

The rest of this paper is structured as follow: section 2 presents a short literature review of the means by which the estimation of the level of fraud can be made; in the section 3 we present the data used, as extracted from the 2009-2020 Commission reports and the methodology (descriptive statistics and empirical study conducted in STATA) used to get insights of the dimension of this phenomenon; section 4 is dedicated to the analysis of the data regarding fraud related to EU funds and the relationship with the objective and subjective indicators used to measure/determined the level of corruption. The paper ends with the formulation of the final conclusion that proves that objective indicators based on administrative data are practical tools that can be used in measuring fraud as well as they are used in measuring corruption.

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

[2] 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

[3] It started its operations on 1 June 2021.

[4] https://www.eca.europa.eu/Lists/ECADocuments/SR19_01/SR_FRAUD_RISKS_EN.pdf

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

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).

The study of Achim (2017) conducted on a sample of 185 countries for the 2012–2015 period shows that corruption significantly reduces the ease of doing business, the level of entrepreneurship and market capitalization, being a major obstacle for economic growth. Regarding the impact of corruption on sustainable development the findings of Absalyamova et al. (2017) reveal a negative effect as follows: a 1% increase in the corruption levels of the socio-economic systems of a state causes a decrease of more than 1% of the value of the human capital sustainable development index (HCSDI) of that state. Similarly, the study of Hoinaru et al. (2020) conducted on 185 for the period 2005–2015 finds that corruption and shadow economy are poverty-driven diseases and they are much more widespread in the low-income countries than in the high-income countries. Another interesting funding of Hoinaru et al. (2020) consists in finding some evidences of functioning the theory „grease the wheels". More exactly they find that corruption is also seen as a way to circumvent the law in order to achieve higher economic benefits, thus conducting to an increase of economic development.

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

Given that there may be a close link between fraud related to EU funds and corruption (Fazekas and King, 2018), the same perceptual and experience-based indicators used to measure corruption could also be used to determine the actual level of that kind of fraud. Widely accepted corruption indicators based on perception include Transparency International's Corruption Perceptions Index (CPI) and the World Bank's Corruption Control Index (WB-CCI). Such surveys are not conducted to replace official statistics, but rather to complete them, their accuracy being the subject of much criticism. Perceptions may not be related to real experience (Rose and Peiffer, 2012), they can be determined by the general feeling that reflects, for example, economic growth (Kurtz and Schrank, 2007) or media coverage of cases of high corruption (Golden and Picci, 2005) or due to the fact that these indicators vary very little over time suggesting that they are too insensitive to change (Mungiu-Pippidi, 2011).

In addition to perception-based surveys, some studies (Fazekas and Kocsis, 2020; Fazekas et al., 2016; Fazekas and Tóth, 2016, Button and Gee, 2015; Golden and Picci, 2005) have been conducted to estimate the risk or the level of control of corruption through the use of objective administrative data. Among them is an innovative Corruption Risk Index (CRI) developed as part of the DIGIWHIST research project at the University of Cambridge. 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.

These examples illustrate that it is in fact possible to gain insight into the scale of undetected fraud or corruption.

3. Methodology and data

As already announced, in this paper the centre point of the analysis, was investigating and understanding the data reported by Member States on the number of cases of irregularities / fraud related to EU funds, by comparing them with the existing corruption identification mechanisms. The main purpose was to explore and evaluate if objective corruption indicators, calculated at country level were relevant when compared to subjective ones.

But first, using descriptive statics, we try to get a clear picture of the magnitude of the phenomenon, and implicitly of the main trends, analysing the data reported by the Member States on the reported irregularities (both fraudulent and non-fraudulent) related to EU spending on agriculture and fisheries, cohesion policy and pre-accession policy, as shown in the 2012-2020 PIF reports[5].

[5] 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

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

We analyse the total number and the total amount of fraud and irregularities reported by all Member States (EU28) over the period 2012-2019, and then in 2020 by all Member States (EU27) without United Kingdom, trying to see which are the main trends in the last years. Then we shift our focus on the number and the total amount of fraud and irregularities reported by individual Member States, trying to see which are the Member States which reported the most frauds and irregularities during this period and which states reported the fewest.

Furthermore, to investigate the extent of undetected fraud, given the indissoluble link between EU funds and public procurement procedures, we analyse these data in STATA, by comparing them to an index used to measure de level/risk of corruption based on objective data and then, in order to strengthen our results, we add in the analysis an index of corruption based on perception. Unfortunately, given the fact that the objective corruption risk index was calculated only for the 2009-2014 period, for comparison, we had to use the data available for that period. Also, the change in the format of the reports, and implicitly the way the data are reported in this particular period, has prevented us from differentiating between Fraudulent and non-fraudulent irregularities.

The objective indicator used was the Corruption Risk Index (henceforth CRI)[6] constructed by Fazekas et al. (2016) which singles out "red flags" in the public procurement process. The method behind CRI construction utilizes publicly available administrative data to create an estimation of the institutionalized corruption which is consistent over time and across countries. This method uses large volumes of data from large public procurement databases (Tenders Electronic Daily[7]), trade register data, as well as financial and proprietary data. By analysing 2.8 million contracts in 28 European countries between 2009 and 2014, the index provides a common definition for corruption: favouring bidders by imposing unjustified restrictions to access public contracts. The CRI was calculated at the contract level as a "simple arithmetic average of individual risk indicators" and can take values between 0 (lowest observed corruption) and 1 (highest observed corruption).

This indicator was compared to the number of Fraudulent and Non-Fraudulent Irregularities related to EU funds (henceforth IFNF) reported by the European Commission for the 2009-2014 period. 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[8] are genuine errors e.g. not filling out a form correctly, or not complying 100% with the tendering procedure. Fraud[9] is an intentionally committed irregularity set off by a malicious intent.

The subjective corruption indicator included in this study is the Corruption Perceptions Index (henceforth CPI), published by Transparency International for the EU countries for the same period. The index ranks the countries based on the perceived level of corruption. It reflects the views of business people and country analysts. The indicator scores countries on a scale from 0 (highly corrupt) to 100 (very clean).

Based on the above indicators, the study aims to examine the correlation between the CRI, CPI and IFNF at country level in the European Union between 2009 and 2014. The lack of data for some of the variables (CRI and IFNF specifically) prevented the inclusion in the study of all the EU28 countries. Therefore, the sample data was limited to 25 EU countries: Austria, Belgium, Bulgaria, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Netherlands, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia and United Kingdom.

---

[6] Data are published at http://digiwhist.eu/resources/data/. Replication data sets are available in Harvard Dataverse at: https://dx.doi.org/doi:10.7910/DVN/6XYZOD and online appendices are available at https://doi.org/10.1017/S0007123417000461.

[7] **TED (Tenders Electronic Daily)** is the online version of the 'Supplement to the Official Journal' of the EU, dedicated to European public procurement. TED publishes 643 thousand procurement award notices a year, including 244 thousand calls for tenders which are worth approximately €545 billion. For more info - https://ted.europa.eu

[8] **'Irregularity'** shall mean any infringement of a provision of Community law resulting from an act or omission by an economic operator, which has, or would have, the effect of prejudicing the general budget of the Communities or budgets managed by them, either by reducing or losing revenue accruing from own resources collected directly on behalf of the Communities, or by an unjustified item of expenditure. As defined in Article 1 of Council Regulation (EC, EURATOM) No 2988/95 of 18 December 1995 on the protection of the European Communities financial interests. OJ L312 of 23.12.1995, p. 1.

[9] In case of intentional behavior, such as any act or omission relating to the use or presentation of false, incorrect or incomplete statements or documents or to non-disclosure of information in violation of a specific obligation, such behavior amounts to '**fraud**'. As defined in Article 3 of the Directive (EU) 2017/1371 of 5 July 2017 on the fight against fraud to the Union's financial interests by means of criminal law (PIF Directive). OJ L 198/29 of 28.7.2017, p.1

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

The panel dataset comprised 150 observations with the following characteristics, as shown in Table 1:

Table 1. Summary statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Corruption Risk Index	150	0.2865	0.0850	0.1054	0.4537
Corruption Perceptions Index	150	63.9133	17.5135	33	94
Fraud and Non-Fraud cases	147	323.585	334.2985	0	1,356

Source: Own processing using STATA

The dataset was analysed using the between effects estimator and the "**xtavplot**" function in **Stata**. Xtavplot enables the creation of an added-variable plot after between effects estimation in panel data.

The between-effects estimation applies ordinary least squares estimation of the time averaged dependent variable on the time averaged regressors for each country as follows:

$\overline{CRI_i} = \alpha_i + \beta_1\overline{CPI_i} + \beta_2\overline{IFNF_i} + \varepsilon_i$, where

$\overline{CRI_i}$ = the average of Corruption Risk Index for country "i" for the period 2009-2014 less the average of the Corruption Risk Index reported by countries "1" to "i-1" for the period 2009-2014

$\overline{CPI_i}$ = the average of the Corruption Perceptions Index for country "i" for the period 2009-2014 less the average of the Corruption Perceptions Index by countries "1" to "i-1" for the period 2009-2014

$\overline{IFNF_i}$ = the average of the number of fraudulent and non-fraudulent irregularities reported by the country "i" between 2009-2014 less the average of the number of fraudulent and non-fraudulent irregularities reported by countries "1" to "i-1" between 2009 and 2014

β_1, β_2 = coefficients

α_i = intercept

ε_i = error term

To test the model's fitness, the Hausman test was applied (see Table2). The results were the following:

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

Table 2. Hausman test

Coefficients

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	Between	Difference	S.E.
Corruption Perceptions Index	-0.0003157	-0.0022351	0.0019193	0.0007577
Fraud and Non-Fraud cases	-0.000053	0.0000985	-0.0001515	.

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 3.64

Prob>chi2 = 0.1623

Source: Own processing using STATA

Prob>chi^2 was higher than 0.05, hence we accepted the null hypothesis and chose the between effects estimator as the main analysis method.

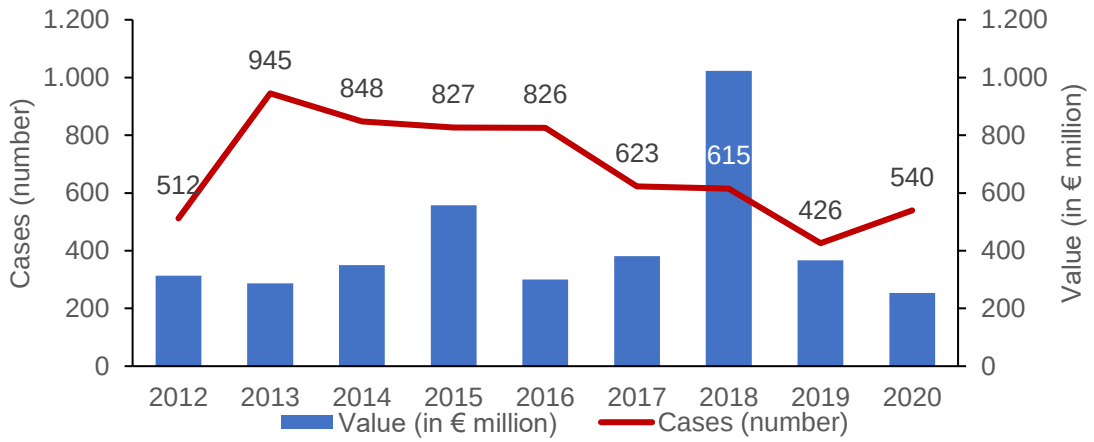
4. Results

4.1. Descriptive statistics

The graph below (**Graph 1**) shows the evolution of the number and the amount of fraud reported by all Member States (EU28) over the period 2012-2020. There is a declining trend in their number in the period 2013-2019, while in 2020 there is a slight increase. As for the amounts affected by the fraud, they stay below the limit of EUR 400 million per year, except for the years 2015 and 2018 (just in the middle of the programming period 2014-2020) when they reach approx. EUR 550 million, respectively EUR 1 billion, in 2020 their value being approx. EUR 250 million, decreasing by approx. 30% over the previous year.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

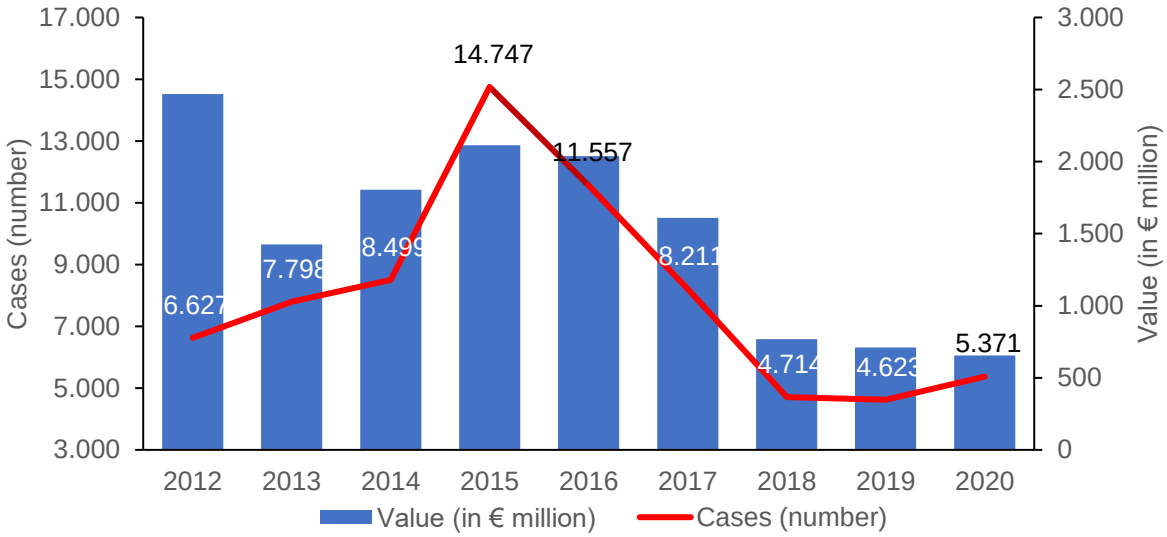
Roman, F.A., Popescu, D., Achim, M.V. pp.179-195



Graph 1. Irregularities reported as fraudulent in EU28 2012 – 2019 + EU27 (less UK) 2020

Source: Own processing

The evolution of the number and the value of non-fraudulent irregularities reported in the same period is presented in **Graph 2**. Here, too, there is a downward trend, for the period 2015-2019, both in terms of their number and in terms of their value, even if there is a slight recovery in 2020 in terms reported cases.



Graph 2. Irregularities reported as non-fraudulent EU28 2012 – 2019 + EU27 (less UK) 2020

Source: Own processing

Just to have a clear image of what these figures mean, we compared the total amounts foreseen in the long-term EU budget for the period 2014-2020[10], in terms of expenditure (EUR 908.51 billion), with the amount reported as being affected by

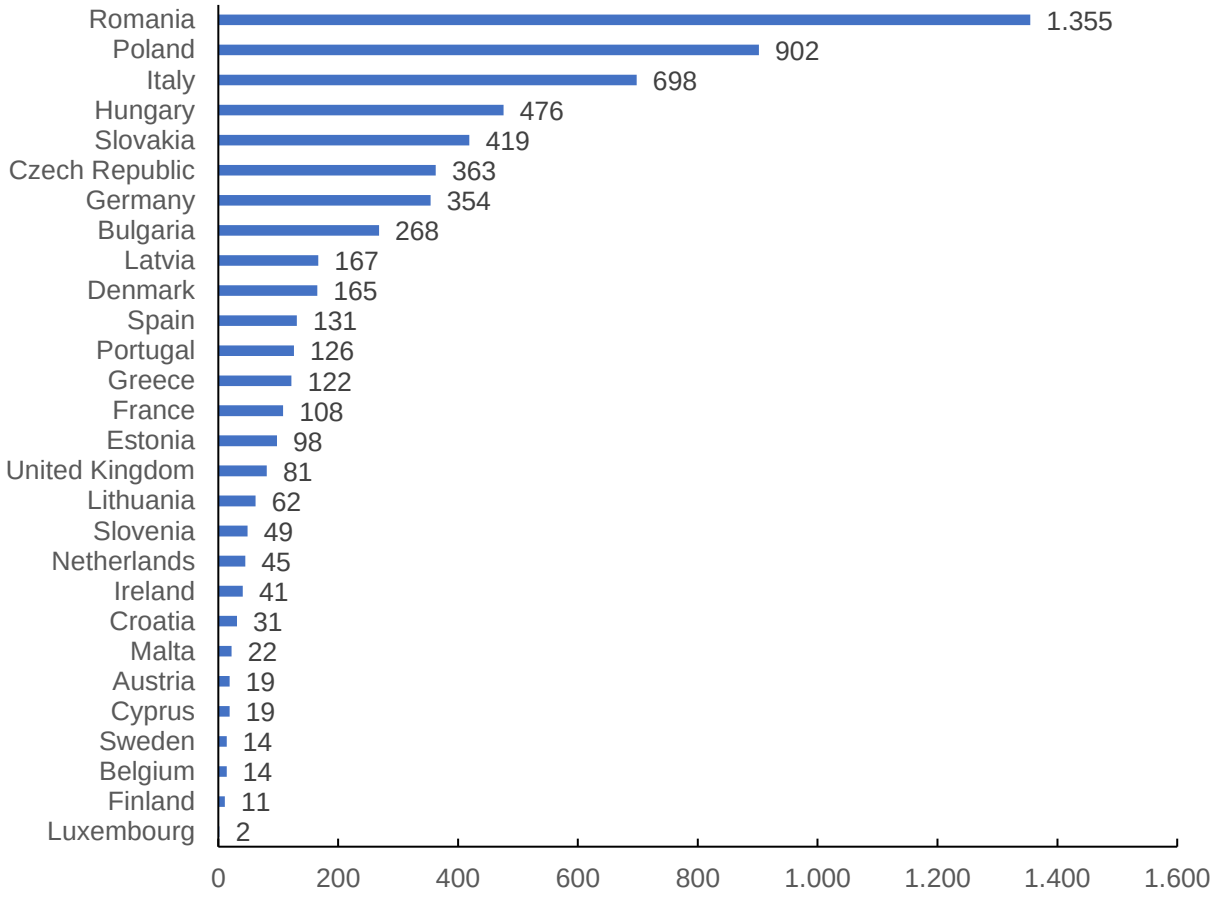
[10] https://www.consilium.europa.eu/en/policies/the-eu-budget/long-term-eu-budget-2014-2020/

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

fraud or irregularities in the same period. It resulted a percentage of 0.35% (EUR 3.23 billion) of the total payments made as being affected by fraud, and a percentage of 1,067% (EUR 9.70 billion) as being affected by irregularities.

The figures, although important, do not stand out. And maybe that is exactly why there should be some signs of concern. The information in the global fraud register created by the Chartered Institute of Public Finance and Accountancy, together with the accountancy firm Moore Stephens, suggests that the risk of fraud could be high in grant spending (which accounts for a big share of EU spending). This register is based on a global survey of over 150 accountancy and fraud risk professionals across 37 countries, in order to gauge the most serious risk areas across the globe. Respondents considered 18 different types of fraud and bribery risk, scoring them from 1 (lowest risk) to 5 (highest risk). Almost half (48 %) of all respondents surveyed said that grant fraud posed a high or very high risk, putting it at number one on the register[11] (European Court of Auditors, 2019). Therefore, the reported figures do not seem to reflect at all, the above mention risks.

The number and the amount of fraud reported by individual Member States, is highlighted in **Graph 3** and **4**.



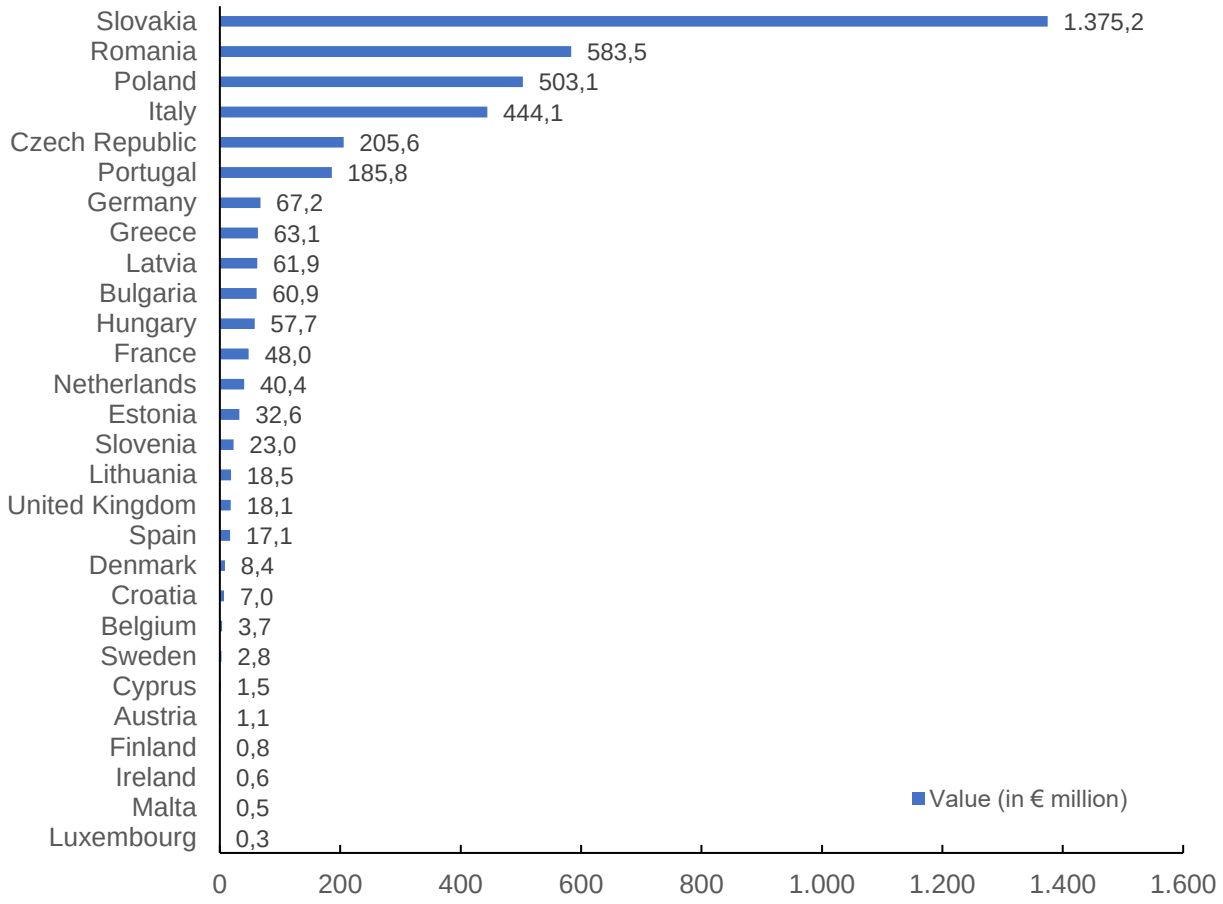
Graph 3. Fraudulent irregularities (no.) EU28 2012 – 2019 + EU27 (less UK) 2020 (country level analysis)

Source: Own processing

[11] https://www.moorestephens.co.uk/services/governance-risk-and-assurance/rhiza-risk-management-tool/global-fraud-risk-register#

www.rsepconferences.com **CONFERENCE PROCEEDINGS/FULL PAPERS** **ISBN: 978-605-70583-6-2/March 2022**

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195



Graph 4. Fraudulent irregularities (in € million) EU28 2012 – 2019 + EU27 (less UK) 2020 (country level analysis)

Source: Own processing

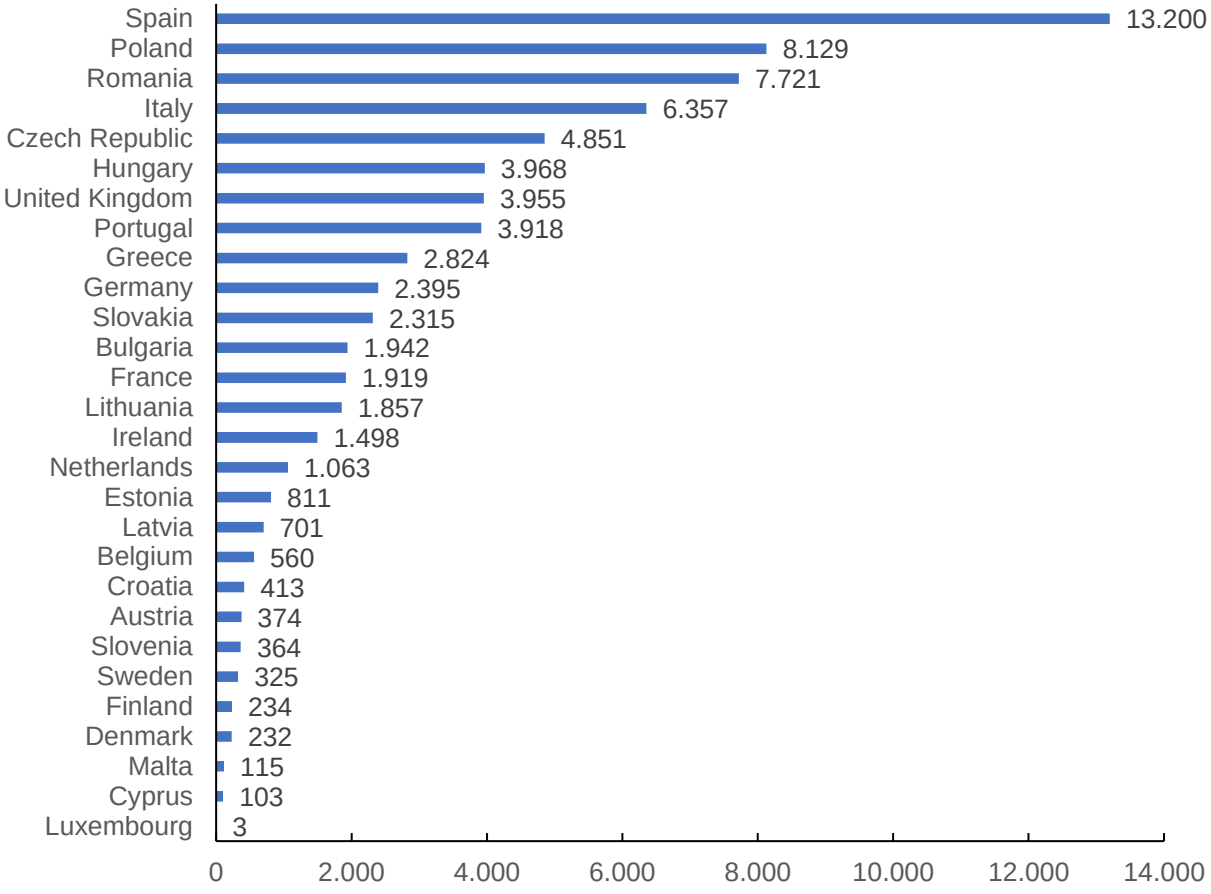
One can observe that both at the top and at the bottom of the ranking are about the same countries, even if not in the same order. Thus, Romania, Poland and Italy dispute their first places both in terms of the number of reported frauds and in terms of their value. On the other hand, Luxembourg appears to be the country with the fewest reported cases of fraud (only 2), followed by countries such as Finland, Malta, Belgium, Sweden, Austria, Cyprus and Ireland. It is also noted that the strange case of Slovakia, which although not in the top 3 in terms of the number of reported cases, leads in terms of fraudulent amounts.

It is noted, with few exceptions (Italy), that the countries where the most cases of fraud are reported are Eastern countries (Romania, Poland, Slovakia, Hungary, Czech Republic), former communist countries, which later became members of the union, while in EU founding countries (Belgium, the Netherlands, Luxembourg, France, Spain), in the Nordic countries (Finland, Sweden) or in the island countries (Malta and Cyprus) the cases are fewer.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

The number and the value of the reported irregularities, their situation is presented in **Graph 5** and **6.**

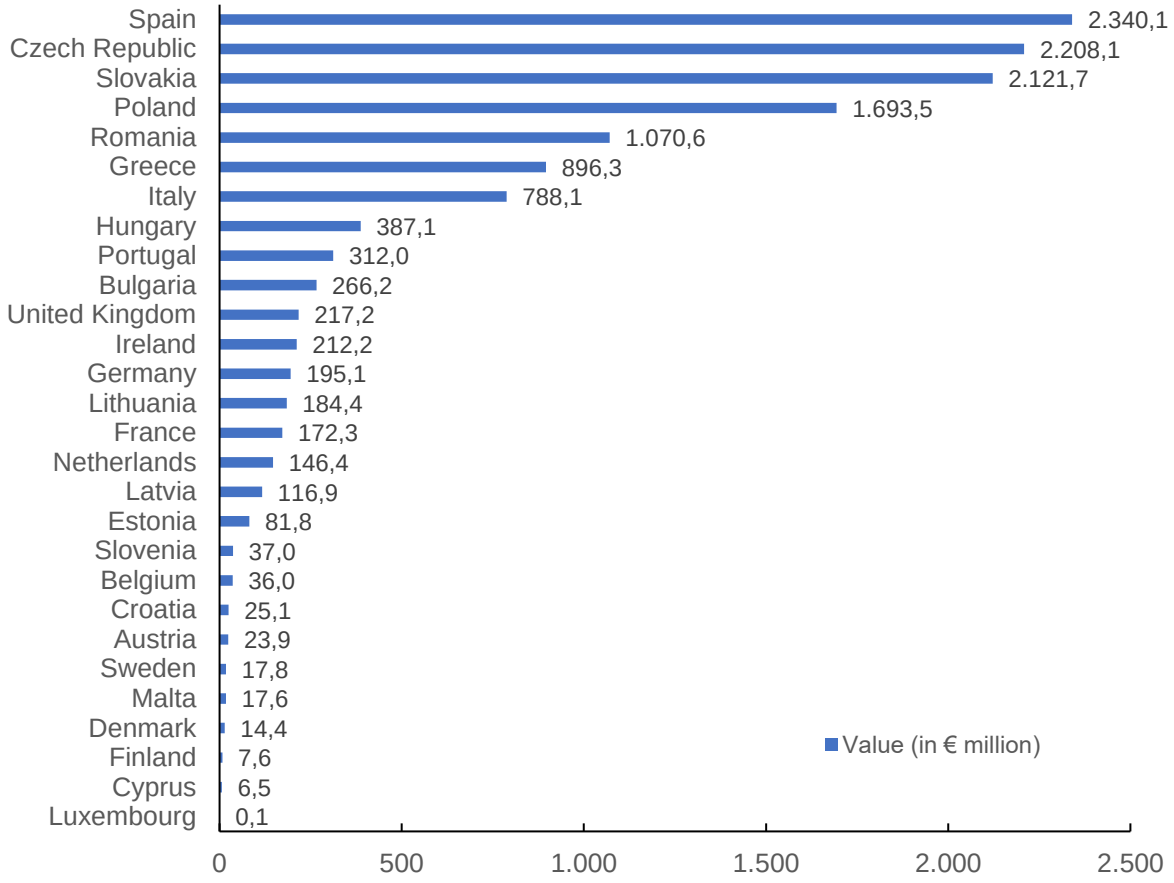


Graph 5. Numbers of Non-fraudulent irregularities EU28 2012 – 2019 + EU27 (less UK) 2020 (country level analysis)

Source: Own processing

www.rsepconferences.com **CONFERENCE PROCEEDINGS/FULL PAPERS** **ISBN: 978-605-70583-6-2/March 2022**

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195



Graph 6. Non-fraudulent irregularities (in € million) EU28 2012 – 2019 + EU27 (less UK) 2020 (country level analysis)

Source: Own processing

Thus, even if in terms of the number of reported irregularities, in the top are the same countries that reported a large number of frauds (Romania, Poland and Italy), it is somewhat surprising the appearance at the top of the ranking of Spain, which leads both in number of reported cases (13,200) as well as the amounts involved (EUR 2.34 billion). Otherwise, due to the value of the money involved, the situation of the Czech Republic, along with that of Slovakia, already noted, has to be highlighted. Instead, at the bottom of the rankings, about the same countries, led by Luxembourg, followed by the island countries (Malta and Cyprus) and the Nordic countries (Finland, Sweden, Denmark).

We also notice here, with the notable exception of Spain, although it seems that the things are not as clear, that at the top of the ranking are countries from the ex-communist bloc (Poland, Romania, Czech Republic, Slovakia) that later adhered to EU values, while at the level of the EU founding countries (Belgium, the Netherlands, Luxembourg, France, Austria) the level of the irregularities it is much lower.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

4.2. Empirical results

Based on the research objective the following hypothesis was formulated:

The null hypothesis: On average within the EU 25 block the CRI data calculated by Fazekas and Kocsis (2020) increases between countries which report, on average, low CPI and high IFNF.

The alternative hypothesis: On average within the EU 25 block the CRI increase between countries it is not influenced by the average decrease in CPI and the average decrease in IFNF data.

The main results of the between effects estimation were the following:

Table 3: Between effects estimation results

	Corruption Risk Index
Variables	b/se
Corruption Perceptions Index	-0.002235***
	(0.001)
Fraud and Non-Fraud cases	0.0000985*
	(0.000)
Constant	0.3981241***
	(0.057)
R-squared	0.479
F (2,22)	12.05***
No of observations	147
No of groups	25

* p<0.1, ** p<0.05, *** p<0.01

Source: Own processing using STATA

On average a change in the CPI and IFNF between countries determined a significant change in the CRI between countries. R^2 for the model was 0.47 with CPI and IFNF reporting a 0.01 and 0.1 significance level respectively.

A decrease in CPI between countries leads to a slight increase in CRI, while an increase in IFNF between countries is associated with a negligible CRI increment.

To visually identify the influential outliers after conditioning on all the other covariates in the model, "**xtavplot**" was applied (Gallup (2019). The plot displays the relationship of the individual means of CRI versus the means of CPI and IFNF, while controlling for the influence of the means of other independent variables, not included in the graph (IFNF in Figure 1 (1) and CPI in Figure 1 (2)).

www.rsepconferences.com **CONFERENCE PROCEEDINGS/FULL PAPERS** **ISBN: 978-605-70583-6-2/March 2022**

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

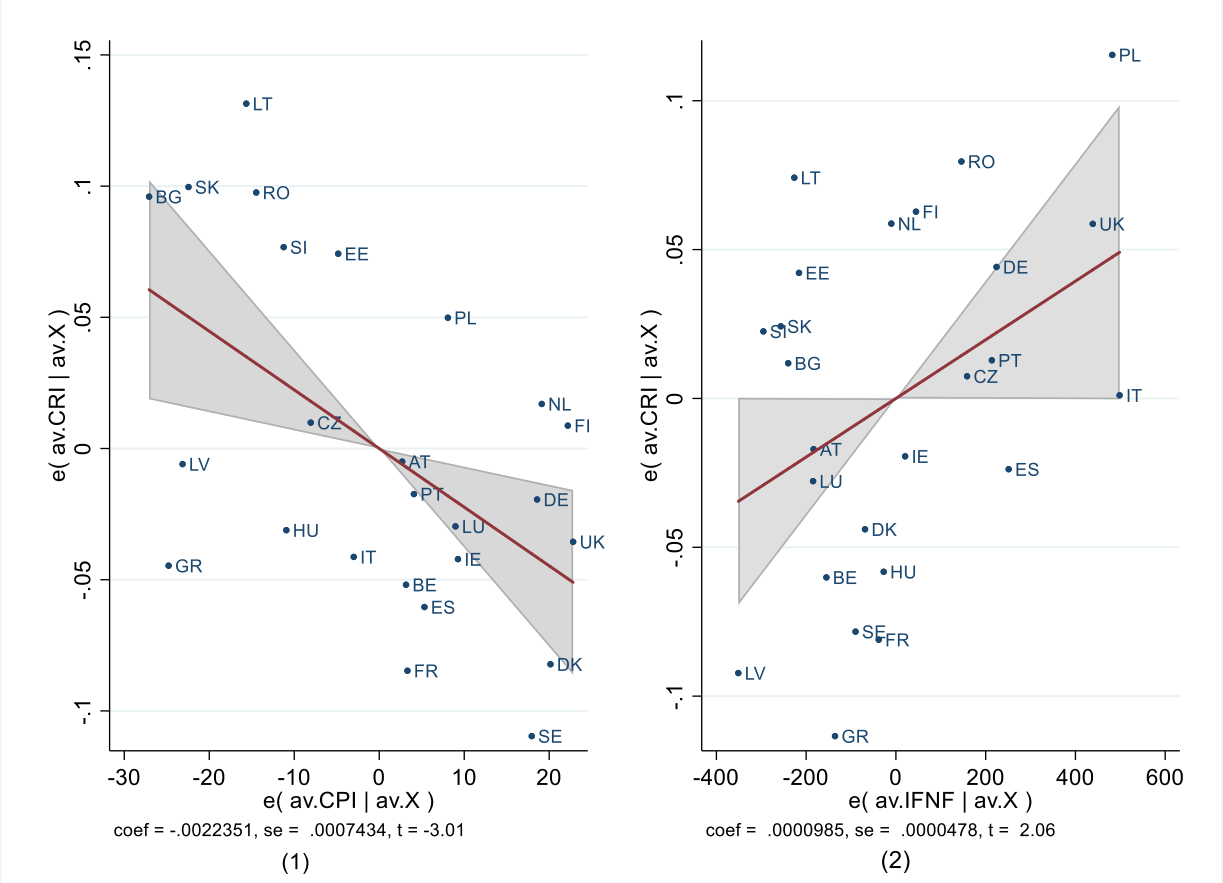


Figure 1. (1) Relationship between CRI and CPI at country level (2) Relationship between CRI and IFNF at country level[12]

Source: Own processing using STATA

Figure 1.1 depicts the relationship of the individual means of CRI versus the means of CPI controlling for the influence of the means of IFNF. Figure 1.2 displays the relationship of the individual means of CRI versus the means of IFNF controlling for the influence of the means of CPI.

As see from Figure 1, the association between the CRI and the independent variables was much stronger for CPI than for IFNF with most of the countries reporting averages outside the confidence interval. Worsening Corruption Perceptions Indexes are associated with an increase in CRI, confirming out null hypothesis.

When analysing the average change in IFNF between countries it can be observed that as the number of reported cases increase between countries the average CRI increases as well. This is consistent with previous research findings. (Fazekas and Toth 2015). In addition, the current model validates the existence of a significant relationship between the average change in CRI, CPI and IFNF, especially in countries such as Austria, Poland, Check Republic, Luxembourg, Germany and United Kingdom.

[12] The plot shows the conditional values e_{CRI}, e_{CPI} and e_{IFNF}, not the actual values CRI, CPI and IFNF respectively

www.rsepconferences.com **CONFERENCE PROCEEDINGS/FULL PAPERS** **ISBN: 978-605-70583-6-2/March 2022**

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

Of the 12 countries that joined European Union between 2004 and 2007, Lithuania, Latvia, Estonia, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania and Bulgaria reported on average lower CPI and higher CRI compared to the EU25 average.

When inspecting the CRI and IFNF correlation we observe that some countries such as Italy, United Kingdom, Portugal, Germany and Czech Republic lead in terms of reported irregularities (fraudulent and non-fraudulent) compared to EU 25 average. This can be an indication that in these countries the reporting mechanisms are on average more efficient that those existing on average in the entire EU 25 block.

Since CRI and IFNF interaction was significant at only 0.1, we wanted to see if the between effect estimator provides different outcomes when only CPI and IFNF are considered.

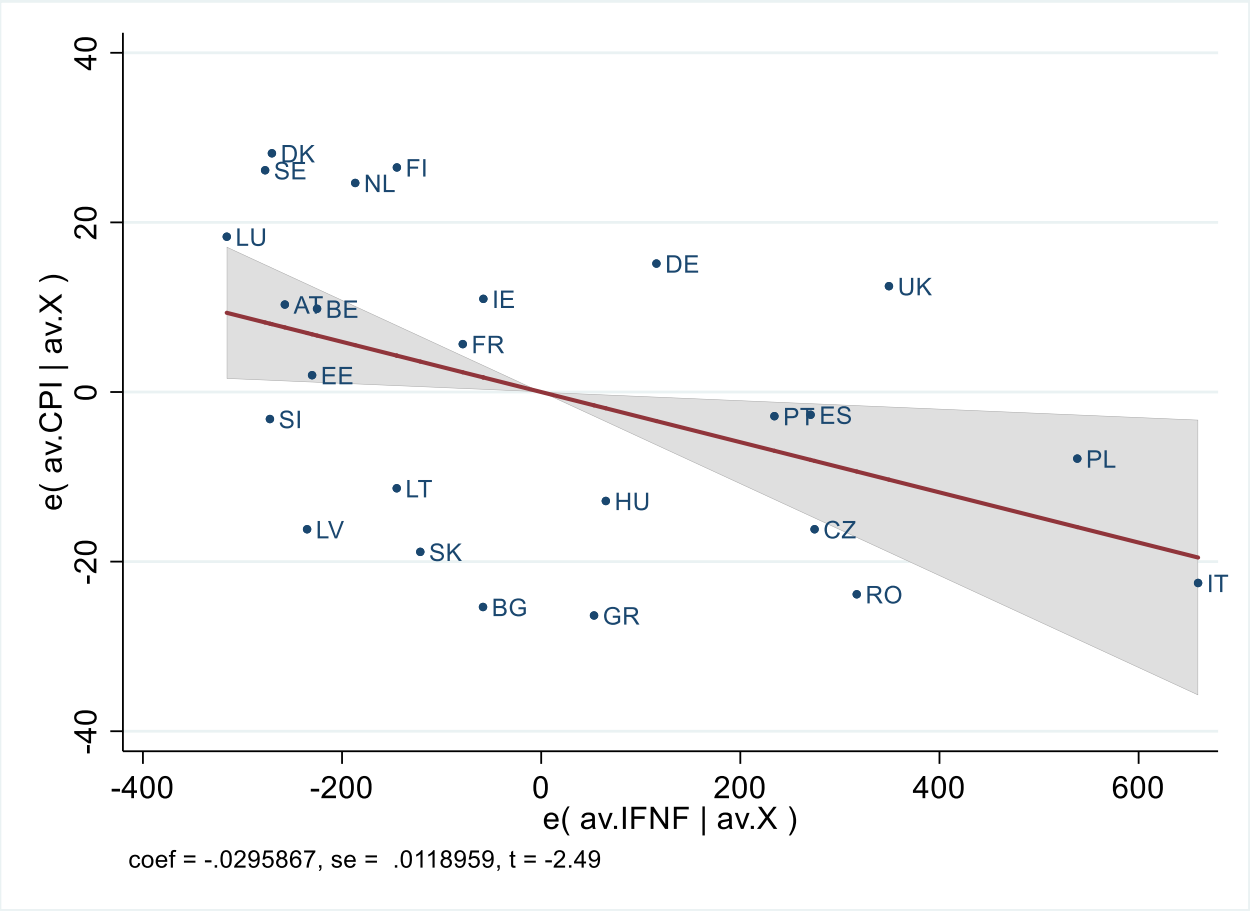


Figure 2. (1) Relationship between CPI and IFNF at country level

Source: Own processing using STATA

The R^2 for the between effects estimator in this case was 0.2211 with IFNF reporting a coefficient of -0.02 significant at 0.05. An average decrease in the IFNF between countries determines a higher average increase in the CPI level between countries when CRI is not considered. Italy and Poland reported the highest number of fraudulent and non-fraudulent cases between 2009 and 2014 with Italy recording on average lower CPI than Poland.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

5. Conclusions

Fraud related to EU funds is perceived as one of the main obstacles in achieving social and economic development, undermining public confidence in Union's policies. Understanding the underlying mechanisms which enable fraud and applying objective measures to halt them is a priority for all European Union's Member States.

This paper aims to address the sensitive issue of undetected fraud or, better said, of the real level of fraud related to European funds. To investigate the extent of undetected fraud, using descriptive statistics we analysed the data reported by the Member States in the last decade using the information available in the PIF reports, and then, through an empirical study conducted in STATA we compared those data both with an index used to measure de level/risk of corruption based on objective data (CRI) and an index of corruption based on perception (CPI). The limits of our study were generated by the quality/the lack of data.

The official data confirms that at the level of certain EU countries, there is a greater appetite for violating the rules when applying for EU funds. It is observed that the countries that come from the former communist bloc (Romania, Poland, Slovakia, Czech Republic) that joined the Union after 2004, occupy a leading position in the top of the countries with the highest number of reported frauds or irregularities. Among the western European countries, Spain, Italy, United Kingdom, Germany and Portugal report a large number of cases.

These data were also validated in some cases by the indicators used in the empirical study. Thus, in countries such as Italy, United Kingdom, Portugal, Germany and Czech Republic, that lead in terms of reported irregularities related to EU funds (both fraudulent and non-fraudulent) compared to EU average, their calculated CRI reflected that phenomenon (see Figure 1). However, countries such as Bulgaria, Estonia, Slovakia, Slovenia and Lithuania reported a low number of fraudulent and non-fraudulent cases while their CRI was higher and their CPI was lower than the EU 25 average. We can conclude that in these countries the irregularity reporting mechanism is not as efficient and further measures should be applied to identify in due time possible deviations from the funding procedures.

The empirical study carried out in this paper, consistent with previous research, proves that objective indicators (such as CRI) are practical tools that can be used in measuring fraud as well as they are used in measuring corruption. Unlike subjective indicators, CRI relays on actual data providing authorities with a pool of possible irregularities which can be further investigated. Indicators such as CRI can be used in objectively detecting the possible irregularities right at the beginning of the public funds' (be it European or national) absorption process.

Unfortunately, given the fact that the objective corruption risk index (CRI) was calculated only for the 2009-2014 period, for comparison, we had to use the data available for that period, preventing us to analyse the last data reported and to have a better look of the present situation. The construction of these objective indicators, such as the one created by Fazekas and his team, should be supported by both the EU institutions and the Member States as well on a regular basis, so that, in addition to the (better known but also more criticized) subjective indicators that are updated annually, they can be used in risk analysis periodically.

For the next years, due to all the challenges on the horizon, it is mandatory for a renewed and joint European vision to fight fraud, corruption and other illegal activities affecting the EU's financial interests. This vision could also be built around a more efficient collection and use of data (TED and EDES[13]), fully exploiting the opportunities offered by IT interconnectivity, pan-European data mining and risk-scoring tools (ARACHNE[14]). Building algorithms that can quickly spot abnormalities in data should be the norm for an effective anti-fraud system.

[13] **Early Detection and Exclusion System (EDES)**. It is a tool to strengthen the protection of the EU's financial interests against unreliable entities and persons by excluding such economic operators from participation in EU funds award procedures under direct and indirect management. Prohibited practices include a broad range of behaviors that affect professional integrity (e.g. fraud, corruption and grave professional misconduct) and bad performances (such as significant deficiencies in the implementation of contracts)

[14] **ARACHNE**, an integrated IT tool for data mining and data enrichment. ARACHNE establishes a comprehensive database of EU projects implemented under the Funds, provided by managing authorities and paying agencies, and enriches these data with publicly available information in order to identify, based on a set of risk indicators, the projects, beneficiaries, contracts and contractors which might be susceptible to risks of fraud, conflict of interest and irregularities. The tool provides highly valuable risks alerts to enrich management verifications, but it does not supply any proof of error, irregularity or fraud. ARACHNE can increase the efficiency of projects selection, management checks and further strengthen fraud identification, prevention and detection

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

Acknowledgement: This work was supported by a grant of the Romanian Ministry of Education and Research, CNCS - UEFISCDI, project number PN-III-P4-ID-PCE-2020-2174, within PNCDI III.

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.

References

Absalyamova, S., Absalyamov, T., Khusnullova, A., & Mukhametgalieva, C. (2016). The impact of corruption on the sustainable development of human capital. Journal of Physics: Conference Series. 738, 1–6.

Achim, M. V. & Borlea, N. S. (2020). Economic and Financial Crime: Corruption, Shadow Economy, and Money Laundering, Studies of Organized Crime, Vol. 20. Cham: Springer International Publishing.

Achim, M. V. & Borlea, N. S. (2015). Determinants of the European funds absorption 2007–2013 in European Union Member States, Proceeding of the WEI International Academic Conference in Vienna, Austria, 12–15 April 2015, 174–188.

Achim, M. V. (2017). Corruption, income and business development, Journal for International Business and Entrepreneurship Development, 10(1), 85–100.

Borlea, N. S., Achim, M. V. & Miron, M. (2017). Corruption, Shadow Economy and Economic Growth: An Empirical Survey Across the European Union Countries. Studia Universitatis „Vasile Goldis" Arad – Economics Series 27(2), 19–32.

Button, M. & Gee, J. (2015). The financial cost of fraud 2015 - What the latest data from around the world shows, PKF Littlejohn LLP and PKF

De Rosa, D., Gooroochurn, N., & Gorg, H. (2010). Corruption and Productivity: Firm-Level. Evidence from the BEEPS Survey; Kiel Working Paper No. 1632; World Bank: Washington, DC, USA.

European Court of Auditors (2019). Special report No. 1 - Fighting fraud in EU spending: action needed - https://www.eca.europa.eu/Lists/ECADocuments/SR19_01/SR_FRAUD_RISKS_EN.pdf [accessed on January 2022]

European Commission (2009-2020). Report from the Commission to the European Parliament and the Council on the Protection of the European Union's financial interests - https://ec.europa.eu/anti-fraud/about-us/reports/annual-reports-protection-eus-financial-interests-pif-report_en [accessed on January 2022]

Gallup, J. L. (2019). XTAVPLOT: Stata module to produce added-variable plots for panel data estimation, Statistical Software Components S458638, Boston College Department of Economics, revised 02 Feb 2020.

Golden, M. A. & Picci, L. (2005). Proposal for a new measure of corruption, illustrated with Italian data. Economics & Politics, 17(1), 37–75.

Gundlach, E. & Paldam, M. (2009). The transition of corruption: From poverty to honesty. Economic letter, 103, 146–148.

Fazekas, M. & Kocsis, G. (2020). Uncovering High-Level Corruption: Cross-National Objective Corruption Risk Indicators Using Public Procurement Data. British Journal of Political Science, 50(1), 155-164.

Fazekas, M. & King, P. (2018), Perils of development funding? The tale of EU Funds and grand corruption in Central and Eastern Europe. Regulation & Governance 2018, 405-430.

Fazekas, M., Tóth, I., & King, P., (2016). An Objective Corruption Risk Index Using Public Procurement Data. European Journal of Criminal Policy and Research, 22(3), 369–397.

Fazekas, M. & Tóth. I. (2016). A Comprehensive Review of Objective Corruption Proxies in Public Procurement: Risky Actors, Transactions, and Vehicles of Rent Extraction, SSRN Electronic Journal. Available at: < http://dx.doi.org/10.2139/ssrn.2891017> [Accessed on December 2021].

Fazekas, M. & Toth. I. (2015). Corruption in EU Funds? Europe-wide evidence on the corruption effect of EU funded public contracting. Working Paper series: GTI-WP/2015:01

Hoinaru, R., Buda, D., Borlea, S. N., Văidean, V. L., & Achim, M. V. (2020). The Impact of Corruption and Shadow Economy on the Economic and Sustainable Development. Do They "Sand the Wheels" or "Grease the Wheels"? Sustainability, 12, 481. Available at: <https://doi.org/10.3390/su12020481> [Accessed on December 2021].

Incaltarau, C., Pascariu, G. C., & Surubaru, N. C. (2020). Evaluating the Determinants of EU Funds Absorption across Old and New Member States – the Role of Administrative Capacity and Political Governance, Journal of common market studies, 58(4), 941–961.

Kurtz, M. J. & Schrank, A. (2007). Growth and governance: models, measures, and mechanisms. The Journal of Politics, 69(2), 538–554.

www.rsepconferences.com CONFERENCE PROCEEDINGS/FULL PAPERS ISBN: 978-605-70583-6-2/March 2022

Roman, F.A., Popescu, D., Achim, M.V. pp.179-195

Mauro, P. (1995). Corruption and growth. The Quarterly Journal of Economics, 10(3), 681–712.
Mungiu-Pippidi, A. (Ed.) (2011). Contextual choices in fighting corruption: Lessons learned. Oslo: Norwegian Agency for Development Cooperation.
Paldam, M. (2002). The big pattern of corruption: Economics, culture and the see saw dynamics. European Journal of Political Economy, 18, 215–240.
Rose, R. & Peiffer, C. (2012). Paying bribes to get public services: A global guide to concepts and survey measures (No. SPP 494). Glasgow: Centre for the Study of Public Policy.
World Bank. (2009). Anticorruption. World Bank: Washington, DC, USA

Websites:

https://www.consilium.europa.eu/en/policies/the-eu-budget/long-term-eu-budget-2014-2020 [Accessed on November 2021]

http://digiwhist.eu/resources/data/ [Accessed on January 2022]

https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/6XYZOD [Accessed on January 2022]

https://www.moorestephens.co.uk/services/governance-risk-and-assurance/rhiza-risk-management-tool/global-fraud-risk-register# [Accessed on December 2021]

https://ted.europa.eu [Accessed on January 2022]

https://www.transparency.org/en/ [Accessed on January 2022]