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Corruption risk and EU funding in public procurement across EU member states, 2007–2023

ISTVÁN JÁNOS TÓTH[1,2,3*] and MIKLÓS HAJDU[4]

[1] SGH Warsaw School of Economics, Warsaw, Poland

[2] Corruption Research Center Budapest, Budapest, Hungary

[3] ELTE Centre for Economic and Regional Studies, Institute of Economics, Budapest, Hungary

[4] Department of Sociology, Corvinus University of Budapest, Hungary

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ABSTRACT

Aid and subsidies can support development by addressing resource gaps, improving infrastructure, and strengthening institutional capacity. However, both theoretical and empirical research also highlights the potential adverse effects of aid—particularly in weak institutional environments—where it can undermine accountability, facilitate rent-seeking and corruption, and entrench corrupt elites. A key question, therefore, is how EU subsidies correlate with levels of corruption. This paper investigates this question using public procurement contract data from EU Member States between 2007 and 2023.

The analysis draws on contract-level data from the EU's Tenders Electronic Daily (TED) database, which contains over 8.2 million contracts from the 2007–2023 period. The findings reveal that, after controlling for various characteristics of public procurement contracts, EU-funded contracts are associated with higher levels of corruption risk. This result holds across both traditional corruption risk indicators, such as the proportion of non-competitive contract awards, and alternative indicators better suited to capturing the institutional context of corruption. We observe a strong positive correlation between EU subsidies and corruption risk in Western European countries as well. These findings carry important policy implications: the European Commission should enhance its monitoring of EU-funded public procurement in all Member States, including those in Western Europe.

KEYWORDS

corruption risk, public procurement, European Union, EU subsidies

* Corresponding author. E-mail: istvanjanos.toth@crcb.eu

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1. INTRODUCTION

This paper examines whether the risk of corruption in public procurement contracts financed by the European Union differs significantly from that observed in contracts financed from national sources. A crucial empirical question is whether EU structural and cohesion funds contribute to reducing corruption and improving governance or exacerbate corruption and deteriorate governance quality. In this analysis, we build upon and expand previous studies by incorporating new data and indicators to examine the correlation between EU funding and corruption risk, using public procurement contract data from all EU Member States. Such analyses are important, as the Cohesion Policy of the European Union allocates resources that can be used in a manner analogous to foreign aid to developing countries, the effectiveness of which has been analyzed (and criticized) extensively.

The EU Cohesion Policy, although formally distinct from international development aid—for example, because beneficiary countries also contribute resources—shares several functional similarities with foreign aid mechanisms. It redistributes resources from wealthier to poorer regions, imposes conditionalities, and aims to foster convergence and institutional capacity—much like aid programs in developing countries. A stream of literature (Casas et al., 2025; Clark, 2019; Dettmann & Ftirz, 2025; Pinho et al., 2015) supports this analogy, suggesting that the policy's effectiveness hinges on local absorptive capacity and governance quality, echoing findings from global aid research.

A prominent development economist, known for his critical stance on foreign aid, Peter T. Bauer, argued that foreign aid often hinders rather than helps economic development, often acting as a curse ("aid course"). It does not promote sustainable development and, in many cases, produces adverse effects. Instead of fostering inclusive growth, aid often strengthens state control, weakens economic freedoms, and inhibits the emergence of an autonomous civil society. Moreover, it tends to consolidate the power of entrenched elites, perpetuating political capture, reinforcing corruption, while simultaneously generating patterns of dependency that discourage the mobilization of domestic resources and innovation (Bauer, 1972, 1984). Bauer believed it could distort local economies, encourage corruption, and undermine incentives for reform (Shleifer, 2009). These thoughts are supported by empirical evidence too: there is no robust evidence that foreign aid consistently promotes economic growth, even in countries with sound policies (Easterly, 2003), as systemic issues, such as poor incentives in aid agencies, donor fragmentation, and ineffective conditionality, undermine aid effectiveness (Easterly, 2007). Higher aid levels in Africa are strongly associated with deteriorating governance and lower tax revenue, even after controlling for income and political violence, indicating that aid has an independent adverse effect on governance (Bräutigam & Knack, 2004).

Foreign aid and windfalls also increase corruption in countries with strong competing social groups, as these resources intensify rent-seeking incentives and alter political equilibria, making economically inefficient outcomes even politically rational (Svensson, 2000). The effects of

foreign aid are somewhat similar to the rent-seeking behavior as documented in the "curse of natural resources" literature; indeed, foreign aid can be a bigger curse than oil (Djankov et al., 2008). Both the "resource curse" and "aid curse" can distort governance and development outcomes through mechanisms strikingly similar to one another, as both can reduce government accountability and promote rent-seeking behavior in poorly governed states (Morrison, 2012). Foreign aid inflows, like natural resource booms, can trigger Dutch Disease through slightly different macroeconomic channels, but the political economy concerns are often similar (Adam, 2013).

Additionally, reliance on aid can weaken governance and public sector institutions by diminishing accountability, promoting rent-seeking behavior and corruption, creating conflicts over the control of aid funds, diverting skilled individuals from the bureaucracy, and reducing the urgency to reform inefficient policies and institutions (Knack, 2001). However, there are contradictory research findings as well, indicating that foreign aid can reduce corruption, though mostly in less corrupt countries (Okada & Samreth, 2012). It is important to consider aid heterogeneity, as its effects depend on the type of aid (Efobi et al., 2014). Foreign aid can have both democratizing and authoritarian effects, too. However, its impact on autocratic regime survival is conditional rather than direct: research shows that autocrats are more likely to survive when donors lack political leverage, while regimes highly dependent on democratic donors – especially the United States – tend to have shorter survival rates due to stronger conditionality and political pressure, thus, the effectiveness of aid in promoting regime change depends mainly on the donor's ability to enforce democratic norms (Nieto-Matiz & Schenoni, 2017). However, Banerjee and Duflo (2011) argue that aid effectiveness can be increased through micro-level, context-sensitive interventions rather than generalized, macro-level programs, by taking local-level knowledge about beneficiaries into account.

Such issues are also related to the EU Structural and Cohesion Funds, which contribute to economic growth only in countries with strong institutions (low corruption, strong rule of law, effective governance). However, in member states with weak institutions (and the lack of quality governance), funds are often misused or lead to inefficiencies (Augusztin et al., 2025). It is worth noting that empirical evidence also suggests that the Cohesion Policy can yield highly heterogeneous positive effects across regions in Europe, and even spatial spillovers may occur in industrial regions (Amendolagine et al., 2024). However, while EU structural funds are concentrated in the poorest regions and conditional convergence exists, the funds themselves show no significant positive impact on regional growth, even if their spillover and neighborhood effects are important. Innovation and human capital drive growth; policies promoting education, innovation, and decentralized governance would enhance the effectiveness of the aid (Antunes et al., 2020).

In addition to the doubts about the effectiveness of the Cohesion Policy, it has become increasingly important to protect the EU's financial interests against fraud, a core responsibility of the European Commission. However, it lacks comprehensive and comparable data on detected fraud, has not assessed undetected fraud, and provides limited analysis of fraud drivers, reducing the effectiveness of its anti-fraud strategy; moreover, OLAF investigations lead to prosecutions in fewer than half of cases and recover less than one-third of unduly paid funds, partly due to lengthy procedures and insufficient reporting (European Court of Auditors, 2019). The importance of these deficiencies is highlighted by the fact that improved monitoring and fairer allocation of EU funds may, in the long run, reduce corruption in the new Member States.

However, in the short term, funds can temporarily exacerbate corruption through clientelism and the structural legacy of the socialist era (Mutascu, 2024). If this is the case, corruption can undermine cohesion policy by reducing social welfare, as discretionary decision-making and a lack of accountability in allocating Structural Funds create a high risk of misuse (Győrfi et al., 2016).

This question can be examined using microdata and objective indicators in one sub-area—specifically, data from public procurement contracts: Are the corruption risks associated with public procurement financed by EU funds lower than those associated with public procurement financed by national funds? It is important to empirically clarify whether EU structural and cohesion funds contribute to lower corruption and better governance, or, conversely, lead to higher corruption and thus worsen governance quality.

In a previous study (Fazekas et al., 2014), the authors examined the impact of EU funds on corruption risk in public procurement in three countries (the Czech Republic, Hungary, and Slovakia) between 2009 and 2013. The results of an another study (Fazekas & King, 2018) showed that EU funds increase the risk of corruption in Hungary and the Czech Republic. In another study (Fazekas & Tóth, 2017), the authors examined public procurement in 27 EU Member States between 2009 and 2014 from this perspective. The results suggest that EU funding may increase the overall risk of corruption, although significant differences exist between countries and regions. This impact is particularly high in countries with already high corruption risk. Tóth and Hajdu (2021) also examined European public procurement contracts, covering data from 2006 to 2018. In their analysis, the difference in corruption risk between the new Member States and Western European countries was interpreted as a difference in institutional quality between the two groups. The trends in the difference in corruption risk can thus be seen as indicators of institutional convergence. Countries with high institutional quality (low corruption risk) were considered as benchmarks for the new Member States. The results confirmed the research on the poor performance of EU countries in Southern Europe, while pointing to significant differences between the new Member States. While Slovakia, Estonia, and Lithuania are characterized by strong institutional convergence, Italy, Greece, Bulgaria, and Slovenia exhibit very weak convergence or, rather, divergence. Tóth and Palócz (2022) investigated differences in corruption risk by funding type (EU or national) for public procurement contracts across European countries from 2006 to 2019. Descriptive statistics revealed that EU-funded public procurement contracts carry a higher corruption risk, especially at the beginning of the period, compared to nationally funded contracts, in both Eastern European countries and the Western and Southern European countries group.

While many of the European Union's efforts to combat corruption and collusion have yet to yield substantial results, the EU retains a robust set of legal and financial instruments that, if fully leveraged, can effectively address both individual cases of suspected misconduct in Member States such as Hungary and broader, systemic violations of EU law (Anderson et al., 2024). These tools include infringement procedures, conditionality mechanisms, and funding suspensions. Notably, the EU's approach aligns with international standards, such as the Government Procurement Agreement (GPA), which promotes transparency, non-discrimination, and competition in public procurement—principles essential for mitigating corruption risks.

Our findings confirm that EU subsidies are associated with a high risk of corruption. EU aid is often associated with an increased risk of corruption, which supports theoretical assumptions

of a positive correlation between foreign aid and corruption. This elevated risk is not confined to Southern European countries or the new Member States but is also observable in Western European countries. These results underscore the importance of incorporating this insight into public policies to mitigate the vulnerability of EU funds to corruption.

In the second section of the paper, we introduce the dataset and variables employed in the analysis, followed by a presentation of the empirical strategy in the third section. The fourth section presents the main results, and the paper concludes with key insights and public policy recommendations. In Appendix, we present the data-cleaning process, the detailed definitions of the variables used, the classification of EU Member States, and the results of the robustness tests.

2. DATA AND VARIABLES

We draw on contract-level data from the European Union's Tenders Electronic Daily (TED)[1] database, covering the period 2007–2023. The dataset comprises information on more than 8.2 million public procurement contracts. Since the EU publishes these data in annual files, we first merged the yearly datasets into a unified database. To ensure comparability across time, variable names and formats were standardized. Our analysis relies on the Contract Award Notice (CAN) files, which contain detailed information on awarded contracts. We provide a step-by-step description of the database construction process in Appendix 1.1.[2]

We estimate whether the corruption risk of EU-funded contracts differs significantly from that of nationally funded contracts, after controlling for the type of procedure (open or non-open), the contract value, the economic sector of the product/service purchased during the contract, and the corruption level of the countries. The corruption risk (*CR*) is measured as a binary variable: 0 if more than one bidder competed for the contract, and one if only one bidder (the eventual winner) submitted a bid. In addition, we also examine another corruption risk indicator (*CRX*), which measures how well corruption risks have been controlled. The *CRX* takes a value of 0 if the number of bids exceeds three and a value of 1 if there are no more than three bids. The two variables (*CR* and *CRX*) are therefore constructed as follows:

CR [0,1]:	0, if there was more than one bid in the tender; 1, if there was only one bid in the tender; and
CRX [0,1]:	0, if there were more than three bids in the tender; 1, if there were no more than three bids in the tender.

The use of the *CRX* is justified because corruption remains possible in countries with systemic corruption, even with two or three seemingly independent bids, due to collusion between the contracting authority and bidders. In such cases, the corrupt official of the contracting

[1]See: https://data.europa.eu/data/datasets/ted-csv?locale=en.

[2]The data tables analyzed in the study are available at https://www.crcb.eu/?p=3756.

authority tells the corrupt company executive, '*You will win, but to comply with formal rules, bring two losing bids as well.*' (Tóth & Hajdu, 2022). In such cases, the corrupt transaction is facilitated by two phantom or collusive bids, enabling the actors involved to circumvent EU and national regulations that mandate a minimum of three competing bids. Such an anomaly rarely occurs with four or more bids, as organizing three or more losing (corrupt) bids would be costly and challenging for the corrupt winning company to achieve.

The type of financing—whether EU funds or national resources supported a public procurement contract—was operationalized as a binary variable (*EU*), coded 1 for EU-funded contracts and 0 for nationally financed contracts. Several additional contract characteristics were likewise represented as binary indicators: the type of procedure (*LTI*), i.e., the procedure was open or not-open, whether the contract formed part of a government agreement or was covered by the Government Procurement Agreement (*GPA*), and the use of an electronic auction (*EAUCTION*). Detailed definitions and coding rules for these variables are provided in Appendix 1.2.

We determined the product or service's economic sector based on the CPV codes of the purchased product or service (distinguishing 35 economic sectors), and we also included the natural logarithm of the net contract value (*LNNCV*) in the estimates.

During the analysis, we categorized the EU member states into three groups: Western European countries (*WEC*), Southern European countries (*SEC*), and new Member States (*NMS*). See Appendix 2 for a list of countries in each group.

In addition to the *CR* and *CRX* corruption risk indicators, we used two other variables in the robustness tests to examine the relationship between EU funding and corruption risk: we recoded the number of competing bids into a variable (*NBIDX*).

In addition to the contract-level analysis, we also examined the correlation between corruption risk and EU funds based on annual aggregate data from EU Member States, i.e., at the country level. This method can be used to investigate how the proportion of contracts awarded with a high risk of corruption is related to the proportion of contracts with EU support. In addition, we analyze a new corruption risk indicator (*NCV_CRR*) that measures, by year, the share of contracts awarded in a country with a high risk of corruption (those with only one bid) relative to the total annual net value of contracts in that country. The higher the ratio, the higher the weight of contract value with high corruption risk in the country in a given year.

3. EMPIRICAL STRATEGY

To examine the relationship between corruption risk and EU subsidies (*EU*), we employed logit models, given that our outcome variables (*CR* and *CRX*) are binary. In this framework, the odds ratios associated with EU funding provide an intuitive interpretation, indicating the extent to which EU financing increases or decreases the likelihood of a contract being associated with high corruption risk relative to nationally financed contracts. For robustness, we supplemented the logit estimations with probit models, and ordered logit specifications (see Appendix 3).

The equations for estimating the probability of corruption risk at the contract level for each contract j are as follows:

$$P(CR_j = 1) = \frac{1}{1 + e^{-z_j}}$$

$$\text{where } z_j = \alpha_j + \beta_{1j} EU_j + \sum_{k=1}^{n} \gamma_{kj} X_{kj} + \varepsilon_j \quad (1)$$

and

$$P(CRX_j = 1) = \frac{1}{1 + e^{-z_j}}$$

$$\text{where } z_j = \alpha_j + \beta_{1j} EU_j + \sum_{k=1}^{n} \gamma_{kj} X_{kj} + \varepsilon_j \quad (2)$$

where X is the vector of independent variables that describe the characteristics of each contract, we use as independent variables, the type of procedure, open or non-open (*LTI*), the logarithm of the net contract value (*LNNCV*), whether the contract was covered by the Government Procurement Agreement (*GPA*), whether an electronic auction was used (*EAUCTION*), the economic sector of the product or service purchased (*SECTOR*), and country and year dummies.

Across the EU Member States, the proportion of single-bid contracts in open procedures was 31.1% during the period under review. In contrast, in non-open procedures (e.g., restricted procedures), it was higher, 38.6%. For contracts covered by the Government Procurement Agreement (*GPA*), we expect fewer minor differences in corruption risk between EU-funded and nationally funded contracts, because *GPA* contracts are subject to additional national regulations beyond the standard legal and procedural requirements that apply equally to both types of funding. For contracts covered by the Government Procurement Agreement (*GPA*), the average corruption risk (*CR*) is considerably lower (0.258) than for non-GPA contracts (0.360). Previous studies (Tóth & Hajdu, 2022; Tóth & Palócz, 2022) have shown that the risk of corruption increases with contract value and varies considerably across procurement sectors (Fazekas & Kocsis, 2020). Electronic auctions should substantially reduce the risk of corruption, as the rules are predetermined and the process is transparent to all participants. Empirical results confirm this expectation: the average corruption risk (*CR*) is 0.267 in procedures involving electronic auctions, compared to 0.322 in other types of procedures. This result suggests that greater transparency in electronic auctions increases the likelihood of broader bidder participation. Consequently, these factors should be taken into account and controlled for in the analysis (see Table 1). In the second part of our estimations, we also included interaction terms between EU funding and the variables *LTI*, *GPA*, *EAUCTION*, and LNNCV in order to assess how EU funding, when combined with these characteristics, is associated with corruption risk.

In addition to contract-level analysis, we examine relationships between variables at the country level. Specifically, we analyze correlations among country-level variables and compare the averages of contract-level variables across countries. The corruption risk variables at the country level include *CRR*, *CRXR*, and *NCV_CRR*. (See their precise definitions in Appendix 1.2). The corruption risk ratio (*CRR*) is defined as the proportion of contracts awarded on the basis of a single bid relative to the total number of contracts. *CRXR* measures

Table 1. The level of corruption risk (*CR* and *CRX*) by the categorical variables

	CR			*CRX*		
	Mean	Standard error of mean	*N*	Mean	Standard error of mean	*N*
EU = 0	0.314	0.000	6,069,576	0.636	0.000	6,069,576
EU = 1	0.400	0.001	476,114	0.718	0.001	477,114
LTI = 0	0.311	0.000	5,651,292	0.640	0.000	5,651,292
LTI = 1	0.386	0.001	878,604	0.659	0.001	878,604
GPA = 0	0.360	0.000	4,017,855	0.679	0.000	4,017,855
GPA = 1	0.258	0.000	2,527,835	0.584	0.000	2,527,835
EAUCTION = 0	0.322	0.000	6,391,240	0.643	0.000	6,391,240
EAUCTION = 1	0.267	0.001	154,450	0.628	0.001	154,450

Source: Authors own calculations.

the proportion of contracts awarded with at most three bids submitted. *NVC_CRR* denotes the value of single-bid contracts as a percentage of the total value of all contracts.

4. RESULTS

4.1. Descriptive statistics

Data from 2007 to 2023 indicate that the number of bids submitted varies remarkably by funding type. In general, EU-funded procurements tend to attract fewer bids than nationally funded ones. This pattern is observable both in the new Member States (*NMS*) and in Western European countries (*WEC*), while in Southern European countries (*SEC*) the difference is marginal (see Figure 1a–d). Fewer bids also increase the risk of corruption.

There is a significant difference in corruption risk across country groups from 2007 to 2023: the risk of corruption (*CR*) was lower in Western European countries (0.17) than in new Member States (0.42) or Southern European countries (0.29) (see Table 2). The second corruption risk indicator (*CRX*) shows the same pattern: the highest level of corruption risk was in the new Member States (0.75), lower levels were observed in Southern European countries (0.58), and the lowest level was in Western European countries (0.50). The mean number of bids (*NBIDX*) is highest in Western European countries (2.5) and lowest in the new Member States (1.9).

Western European countries also had public procurements financed by EU funds. However, their proportion was much lower (3.2 percent) than in the new Member States (9.3 percent) or in the Southern European countries (9.0 percent). The proportion of public procurement contracts awarded through non-open procedures, which are less transparent than open procedures, was more than twice as high in Western European countries (21.7 percent) as in the new Member States (7.9 percent). Electronic auctions were used to a small extent in EU countries: only 2.3 percent of tenders were conducted this way. Electronic auctions were held nearly three

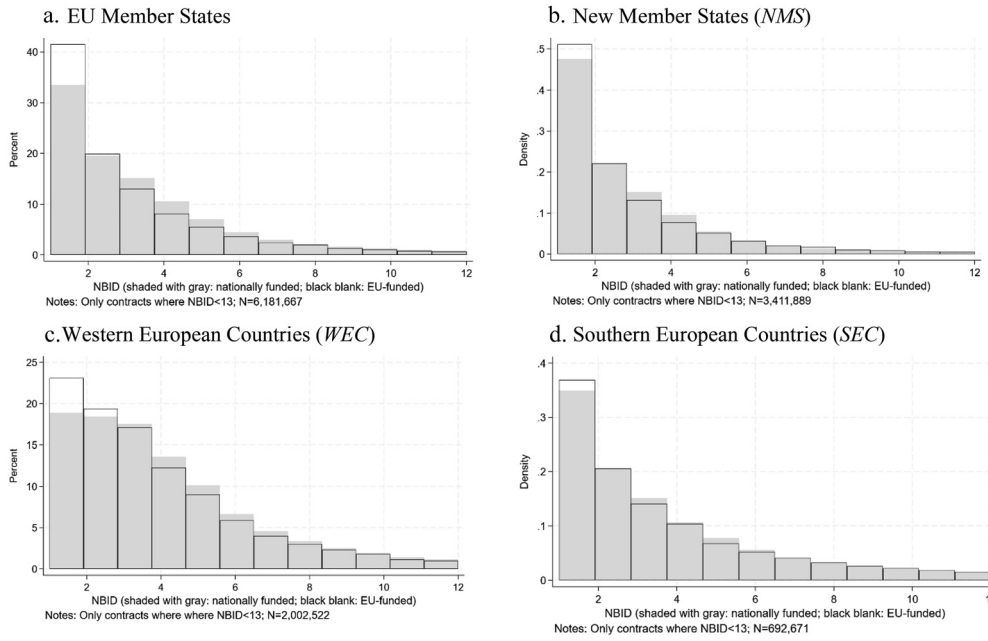

Fig. 1. Histograms of *NBID* by funding types and groups of countries analyzed, 2007–2023
Notes: only if the number of bidders is less than 13; without framework agreements.
Source: Authors own calculations.

times as frequently in the new Member States (3.3 percent) as in Western European countries (1.3 percent). The mean of net contract value was slightly higher in Western European countries than in the new accession countries (see the *LNNCV* column in Table 2). We see the same differences examining country-level data.

The EU Commission in the Single Market and Competitiveness Scoreboard[3] defines two levels for the share of non-competitive public procurement: a share of less than 10% is considered satisfactory performance, which corresponds to a *CRR* indicator of less than 0.1, while a share of more than 20% is considered unsatisfactory performance, which corresponds to a *CRR* indicator of more than 0.2.

The annual data for EU countries between 2007 and 2023 paint a concerning picture compared to the corruption risk threshold (0.2), deemed unacceptable by the European Commission. Analyzing country-year observations ($N = 495$), we find that in nearly 60% of these cases, the corruption risk exceeded the 0.2 threshold (see Table 3). This share is notably higher for EU-funded public procurement (68%) than for nationally funded procurement (57%) (see Column 4 in Table 3). The performance of the new Member States is particularly problematic: in 93% of their country-year observations, corruption risk levels surpassed the 0.2 benchmark. Significant differences are also observed within Western

[3]See https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

Table 2. Descriptive statistics of main variables analyzed at contract level data from 2007 to 2023

	Statistics	*CR*	*CRX*	*EU*	*LTI*	*LNNCV*	*GPA*	*EAUCTION*	*NBIDX*
New Member States (*NMS*)									
	Mean	0.420	0.745	0.092	0.079	10.248	0.224	0.033	1.921
	Standard Deviation	0.494	0.436	0.289	0.270	2.037	0.417	0.178	0.999
	N	3,563,391	3,563,391	4,367,157	4,359,034	2,892,609	4,367,157	4,367,157	3,531,810
Western European Countries (*WEC*)									
	Mean	0.173	0.499	0.033	0.217	11.879	0.607	0.013	2.504
	Standard Deviation	0.378	0.500	0.177	0.412	1.975	0.488	0.111	1.040
	N	2,203,512	2,203,512	2,904,995	2,887,226	1,775,897	2,904,995	2,904,995	2,134,004
Southern European Countries (*SEC*)									
	Mean	0.286	0.577	0.090	0.148	11.837	0.326	0.015	2.334
	Standard Deviation	0.452	0.494	0.286	0.355	2.095	0.469	0.123	1.173
	N	778,784	778,784	1,010,366	1,006,899	817,223	1,010,366	1,010,366	753,845
EU Member States									
	Mean	0.321	0.642	0.071	0.136	11.013	0.371	0.023	2.163
	Standard Deviation	0.467	0.479	0.257	0.343	2.182	0.483	0.152	1.070
	N	6,545,687	6,545,687	8,282,518	8,253,159	5,485,729	8,282,518	8,282,518	6,419,659

Note: LNNCV is the ln of net contract value (in EUR); without framework agreements.
Source: Authors own calculations.

Table 3. Unsatisfactory rate by group of contracts and country groups at country level data from 2007 to 2023

Group of contracts	Group of countries			
	New member states (*NMS*) (1)	Western European countries (*WEC*) (2)	Southern European countries (*SEC*) (3)	EU member states (4)
All Contracts	92.8	23.0	70.6	60.2
EU Funded Contracts	89.5	51.9	56.9	67.5
Nationally Funded Contracts	89.5	20.7	68.5	57.2
Number of observations	181	187	102	470

Note: Unsatisfactory rate refers to the proportion of observations (country–year combinations) in which the corruption risk rate (CRR)—defined as the share of contracts awarded to a single tenderer—exceeded the 0.2 threshold set by the European Commission. We consider years where the country was an EU member.
Source: Authors own calculations.

European countries: while 52% of EU-funded procurements exceeded the 0.2 threshold, only 23% of nationally funded contracts did so. These findings suggest that EU-funded procurement is consistently more exposed to corruption risk, even in countries with otherwise strong institutional frameworks.

Figure 2a–d illustrate the differentials described above. In these figures, each circle or plus sign represents the data for a single country in a single year. The black horizontal line marks the European Commission's benchmark of 0.2, above which the corruption risk rate (*CRR*) is considered unsatisfactory. The horizontal axis shows the logarithm of net contract value by year and country, and the vertical axis shows the corruption risk rate (*CRR*). The figures show the annual data for each country twice: contracts financed from EU sources (black plus signs) and contracts financed from national sources (gray circles) are shown separately. The horizontal axis plots the logarithm of the total net value of public procurement in a given country and year. In the new Member States, there are very few instances where the corruption risk fell below the 0.2 threshold. A similar, though less pronounced, pattern is evident in Western and Southern European countries. Across all three groups, the figures indicate no significant correlation between the corruption risk level and the total value of contracts awarded.

Figure 3a and b present the same data from different perspectives. Here, EU countries are grouped into three categories: Western European countries (black triangles), Southern European countries (gray × signs), and new Member States (black circles). The horizontal axis plots the logarithm of the net value of public procurement in a given year and country (*LNNCV*), while the vertical axis shows the corruption risk rate (*CRR*) level. The figures show that the corruption risk rate is consistently higher in the new Member States than in the other two groups, regardless of whether contracts are nationally or EU-funded. Figure 3a and b reveals that in Western European countries, the rate of corruption risk in public procurement—particularly for EU-

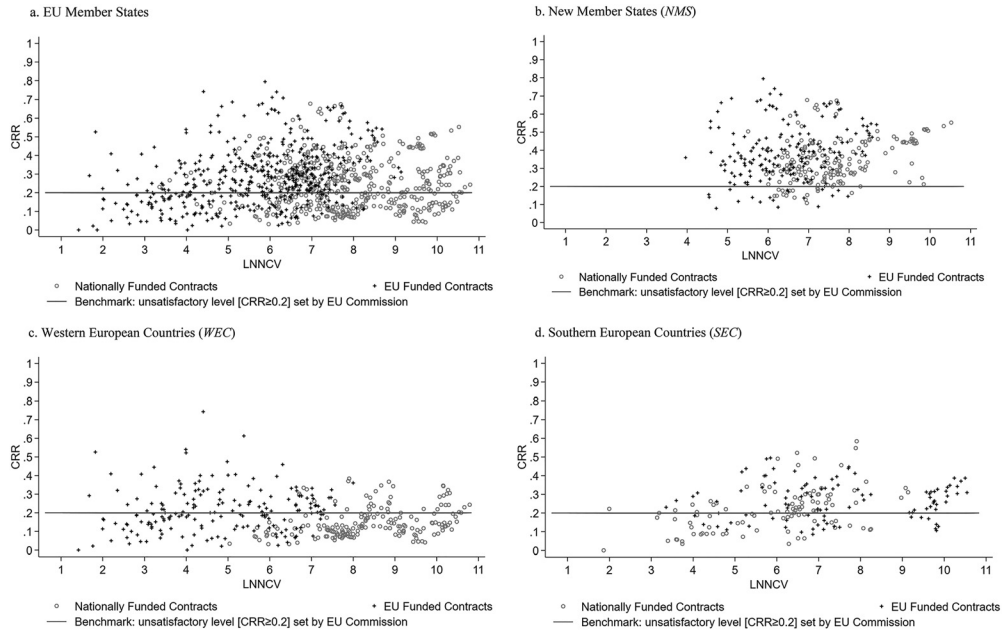

Fig. 2a–d. Scatterplots of *CRR* and *LNNCV* in EU funded and nationally funded contracts by the group of EU countries analyzed, 2007–2023

Notes: only if the number of contracts is greater than 12 in any year; without framework agreements; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

Source: Authors own calculations.

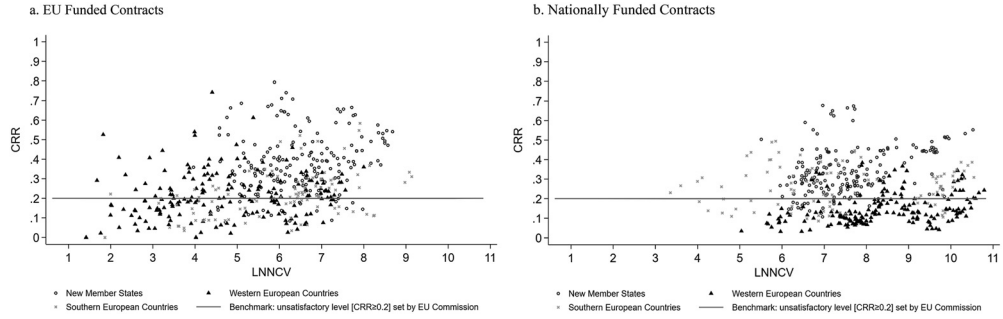

Fig. 3a–b. Scatterplot of *CRR* and *LNNCV* by group of contracts and EU countries from 2007 to 2023

Notes: only if the number of contracts is greater than 12 in any year; without framework agreements; LNNCV: ln of net contract value in EUR million; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

Source: Authors own calculations.

funded contracts—exceeded the European Commission's unsatisfactory threshold (0.2) in several years and in multiple countries.

From the Figure 4a–d, it is clear that the corruption risk indicators (*CRR*, *CRXR*, and *NCV_CRR*) distinctly separate Western European countries and new Member States.

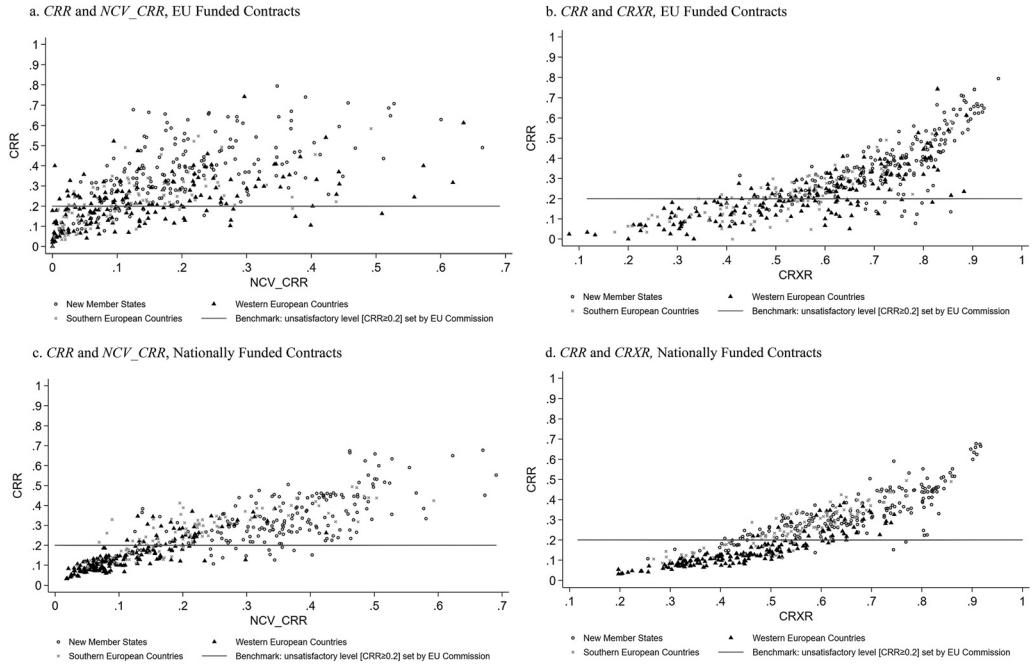

Fig. 4a–d. Scatterplot of *CRR*, *CRXR*, and *NCV_CRR* by group of contracts and EU countries from 2007 to 2023

a. *Notes: r* = 0.61; NCV_CRR: share of net contract value of high corruption risk contracts in total net contract value by countries and years; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

b. *Notes: r* = 0.82; only if the number of contracts is greater than 12 in any year; without framework agreements; CRXR: share of contracts with no more than three bids in total number of contracts; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

c. *Note: r* = 0.84 only if the number of contracts is greater than 12 in any year; without framework agreements; NCV_CRR: share of net contract value of high corruption risk contracts in total net contract value by countries and years; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

d. *Note: r* = 0.89; only if the number of contracts is greater than 12 in any year; without framework agreements; CRXR: share of contracts with no more than three bids in total number of contracts; source of benchmark: https://single-market-scoreboard.ec.europa.eu/business-framework-conditions/public-procurement_en.

Source: Authors own calculations.

Figure 4a and b show that, in the case of EU-funded contracts, the relationships between corruption risk indicators (*CRR*, *NCV_CRR*, and *CRXR*) are less tight than in the case of nationally funded contracts (Figure 4c and d). The correlation coefficients are 0.61, 0.82, 0.84, and 0.89, respectively. Additionally, the traditional corruption risk indicator (*CRR*), which is the proportion of single-bidder contracts in all contracts, presents a more favorable picture in the case of EU-funded contracts than in reality: the low value of this indicator often merely indicates that only two or three companies competed for the public procurement contract, rather than four or more companies (see Figure 4b).

Across all three corruption indicators (*CRR, NCV_CRR*, and *CRXR*), Western European countries generally exhibit lower corruption levels (bottom left), while the new Member States cluster at the higher end (top right). Southern European countries occupy an intermediate position. Notably, over several years, several Western European countries (black triangles) with EU-funded contracts appear in the same high-corruption group by *CRR* and *CRXR* as the new Member States (black circles) (Figure 4b).

Based on contract-level data, the pairwise correlations among the analyzed variables do not indicate strong relationships (Table 4). The moderately strong positive correlation between the two corruption risk indicators (*CR* and *CRX*) suggests that both should be included in the analysis, as they may capture different dimensions of corruption risk.

4.2. Estimations

An analysis of approximately 5 million public procurement contracts from EU Member States between 2007 and 2023 shows that EU-funded contracts are associated with a significantly higher corruption risk than those financed by national sources. The estimations control for procedure type (*LTI*), contract value (*LNNCV*), government procurement agreement coverage (*GPA*), use of electronic auctions (*EAUCTION*), and sector of the procured product or service (*SECTOR*). In addition, the models incorporate country (*COUNTRY*) and year (*YEAR*) fixed effects to control for unobserved heterogeneity across countries and over time.

Table 4. The pairwise correlation matrix of the variables analyzed, contract-level data, 2007–2023

	CR	*CRX*	*EU*	*LTI*	*LNNCV*	*GPA*
CRX	0.5127***	1.0000				
EU	0.0477***	0.0440***	1.0000			
LTI	0.0554***	0.0131***	−0.0047***	1.0000		
LNNCV	−0.0920***	−0.1093***	0.0290***	0.1631***	1.0000	
GPA	−0.1058***	−0.0965***	0.0320***	0.0695***	0.1668***	1.0000
EAUCTION	−0.0179***	−0.0047***	−0.0018***	−0.0250***	0.0070***	−0.0119***

Notes: contract level data; without framework agreements.
***: $P < 0.01$.
Source: Authors own calculations.

Table 5 and Figure 5 report the estimated odds ratios from the logit models examining the relationship between corruption risk indicators and key characteristics of public procurement contracts. Odds ratios greater than 1 indicate an increased likelihood of a contract being classified as high-risk, while values below 1 imply a reduced likelihood. The results suggest that EU-funded contracts (*EU*) are systematically more prone to corruption risk than nationally funded ones (see Column 1, Table 5). In EU member states, the EU funding increases the odds of high-corruption-risk contracts by approximately 20% compared to national funding. This finding holds both when using the traditional corruption risk indicator (*CR*) and when applying

Table 5. The estimation of corruption risk indicators (*CR* and *CRX*) in all EU member states and group of EU countries, 2007–2023

Variables	Dependent variable *CR*				Dependent variable *CRX*			
	EU member states (1)	*NMS* (2)	*SEC* (3)	*WEC* (4)	EU member states (5)	*NMS* (6)	*SEC* (7)	*WEC* (8)
EU	1.197***	1.226***	1.082***	1.442***	1.207***	1.257***	1.146***	1.344***
	(0.005)	(0.006)	(0.011)	(0.015)	(0.005)	(0.007)	(0.011)	(0.012)
LTI	2.500***	2.527***	3.777***	2.193***	1.785***	1.710***	2.469***	1.680***
	(0.008)	(0.012)	(0.030)	(0.012)	(0.006)	(0.010)	(0.022)	(0.008)
LNNCV	1.021***	1.063***	0.986***	0.938***	0.980***	1.006***	0.975***	0.965***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GPA	0.973***	0.927***	0.933***	1.024***	1.005**	0.929***	0.966***	1.046***
	(0.003)	(0.003)	(0.006)	(0.005)	(0.003)	(0.004)	(0.006)	(0.004)
EAUCTION	0.549***	0.519***	0.956	0.686***	0.673***	0.647***	1.010	0.668***
	(0.004)	(0.004)	(0.027)	(0.017)	(0.005)	(0.005)	(0.027)	(0.011)
Constant	0.110***	0.131***	0.171***	0.255***	0.972	0.849***	1.664***	1.023
	(0.003)	(0.003)	(0.011)	(0.011)	(0.020)	(0.023)	(0.098)	(0.031)
N	5,029,979	2,826,076	691,593	1,512,310	5,029,979	2,826,076	691,593	1,512,310
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.1096	0.0647	0.0770	0.0728	0.1067	0.0883	0.0710	0.0616

Notes: contract level data; logit estimations; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.

***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.

Source: Authors own calculations.

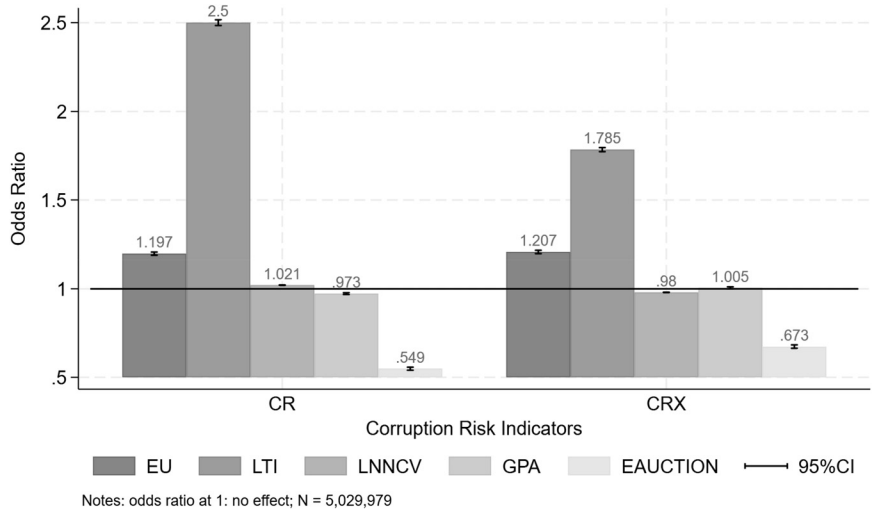

Fig. 5. Estimated odds ratios examining the relationship between corruption risk indicators (*CR* and *CRX*) and key characteristics of public procurement contracts in all EU countries, 2007–2023
Notes: From models without interaction terms.
Source: Authors own calculations.

an alternative indicator (*CRX*) that focuses on tenders with more than three offers (see Columns 1 and 5 in Table 5 and Figure 5).

Notably, the elevated corruption risk associated with EU funding is consistent across all three country groups: new Member States (*NMS*), Southern European countries (*SEC*), and Western European countries (*WEC*). Specifically, EU funding increases the likelihood of high-corruption-risk contracts by 23% in *NMS*, 8% in *SEC*, and 44% in *WEC* compared to national funding. Although EU-funded contracts account for only 3.5% of total contracts in *WEC*, it is in these countries that EU funding is linked to the highest increase in corruption risk (see Column 4 in Table 5 and Figure 5).

These findings underscore the need to mitigate corruption risks in EU-financed procurement not only in new Member States (*NMS*) or South European countries (*SEC*) but also in Western European countries (*WEC*).

The results also highlight that less transparent (i.e., non-open) procurement methods (where $LTI = 1$) increase the corruption risk (see Tables 5 and 6). The odds ratios (1.7–3.8) indicate that the use of non-open procedures significantly increases the likelihood that contracts are classified as high-risk, compared to open procedures. This finding underscores the importance of procedural transparency: limiting competition through restricted or negotiated procedures tends to exacerbate the risk of corruption. Therefore, the EU Commission's efforts to encourage member states to increase the share of open procedures are commendable.

By contrast, contracts covered by the Government Procurement Agreement (*GPA*) are associated with significantly lower corruption risk, highlighting the importance of international regulatory frameworks and transparent bidding mechanisms. The effect of contract size

Table 6. The estimation of corruption risk indicators (*CR* and *CRX*) in all EU member states and group of EU countries with interaction terms, 2007–2023

Variables	Dependent variable *CR*				Dependent variable *CRX*			
	EU member states (1)	*NMS* (2)	*SEC* (3)	*WEC* (4)	EU member states (5)	*NMS* (6)	*SEC* (7)	*WEC* (8)
EU	3.244***	4.794***	4.087***	2.790***	3.321***	3.700***	2.999***	3.190***
	(0.063)	(0.108)	(0.262)	(0.199)	(0.075)	(0.102)	(0.185)	(0.201)
LTI	2.452***	2.448***	3.765***	2.196***	1.746***	1.639***	2.454***	1.668***
	(0.008)	(0.013)	(0.030)	(0.013)	(0.006)	(0.010)	(0.022)	(0.008)
LNNCV	1.032***	1.081***	0.994***	0.940***	0.988***	1.019***	0.981***	0.967***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GPA	0.959***	0.902***	0.934***	1.031***	0.988***	0.899***	0.947***	1.047***
	(0.003)	(0.004)	(0.006)	(0.005)	(0.003)	(0.004)	(0.006)	(0.004)
EAUCTION	0.528***	0.494***	0.967	0.648***	0.647***	0.615***	1.035	0.643***
	(0.004)	(0.004)	(0.028)	(0.017)	(0.005)	(0.005)	(0.028)	(0.011)
*EU*LTI*	1.190***	1.200***	1.049	0.984	1.295***	1.360***	1.078**	1.207***
	(0.013)	(0.017)	(0.032)	(0.025)	(0.017)	(0.025)	(0.038)	(0.027)
*EU*LNNCV*	0.906***	0.870***	0.897***	0.953***	0.904***	0.892***	0.917***	0.930***
	(0.002)	(0.002)	(0.005)	(0.006)	(0.002)	(0.002)	(0.004)	(0.005)
*EU*GPA*	1.175***	1.254***	0.966*	0.878***	1.267***	1.339***	1.265***	0.952***
	(0.009)	(0.011)	(0.019)	(0.019)	(0.010)	(0.014)	(0.024)	(0.017)
*EU*EAUCTION*	1.625***	1.747***	0.663***	2.487***	1.923***	2.011***	0.487***	2.441***
	(0.045)	(0.051)	(0.096)	(0.232)	(0.058)	(0.066)	(0.069)	(0.216)
Constant	0.098***	0.112***	0.156***	0.247***	0.877***	0.745***	1.571***	0.989
	(0.002)	(0.003)	(0.010)	(0.010)	(0.018)	(0.020)	(0.093)	(0.031)
N	5,029,979	2,826,076	691,593	1,512,310	5,029,979	2,826,076	691,593	1,512,310
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.110	0.0662	0.0775	0.0730	0.107	0.0895	0.0716	0.0618

Notes: contract level data; logit estimations; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.

***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.

Source: Authors own calculations.

(*LNNCV*) on corruption risk is unclear. In the new Member States, a positive association emerges, consistent with earlier literature that larger projects tend to provide greater opportunities for rent extraction. By contrast, in Western and Southern European countries, the relationship is negative, suggesting that higher-value contracts in these regions may be subject to stricter oversight and controls, thereby reducing corruption risk.

One promising finding from this research is the impact of electronic auctions (*EAUCTIONS*) on mitigating corruption risk. This procurement method effectively reduces the odds of high corruption risk across the EU member states by approximately 32–45 percentage points (see Table 5 and Figure 5). This effect can be observed in two groups of countries: most strongly in the new Member States and less firmly in the Western European countries (48 and 31 percentage points at *CR*, and 35 and 33 percentage points at CRX, respectively). Despite its limited use in only 2 percent of contracts between 2007 and 2023 in EU member states, our results suggest that a wider application of this method could be a powerful tool in limiting corruption risk.

We also estimated models that include interactions between EU funding and other contract characteristics (see Table 6). The results indicate that even when interaction terms are included, a significant and unidirectional relationship between EU support and higher corruption risk persists—both for the EU as a whole and across all three country groups. In other words, EU funding is consistently associated with higher corruption risk, and this direction of association is unaffected by the inclusion or exclusion of interaction terms.

The results also highlight that in the new Member States, the interaction between EU funding and the type of procedure (open or non-open) has a significant unidirectional relationship with corruption risk: the combination of EU funding and non-open public procurement procedures ($LTI = 1$) further increases the risk of corruption (odds ratio: 1.2), while no such effect is observed in the other Member States. In the new Member States, non-open EU-funded procedures generally entail a significantly higher corruption risk. If corruption risk is measured using the indicator for procedures with up to 3 bidders (*CRX*), this conclusion holds across all three country groups.

It is also noteworthy that, among the new Member States, the results show higher corruption risk associated with EU-funded procurement in Government Procurement Agreement procedures (*EU*GPA)* and in electronic auctions *(EU*EAUCTION*), with odds ratios of 1.254 and 1.747, respectively. These results suggest the presence of systemic anomalies in EU-funded procurement in the new Member States—anomalies that not only persist but are reinforced in open procedures, *GPA* procedures, and electronic auctions. It is also striking that EU-funded electronic auctions increase corruption risk even in Western European countries (odds ratio: 2.487). However, the policy relevance of this finding is limited by the tiny share of such procedures in total procurement in Western Europe (1.2%).

Finally, we also find that increases in contract volume in EU-funded tenders (*EU*LNNCV*) are associated with a decrease in corruption risk in all country groups.

The robustness tests (see Appendix 3) corroborate these findings. Probit estimates for *CR* and *CRX* (Table A1) and ordinal logit estimates for the number of competitors (*NBIDX*) (Table A2) confirm the existence of a unidirectional relationship between EU funding and corruption risk. The Young and Holsteen Model Uncertainty Robustness tests in most of the examined cases confirm the stability of the estimates: the exceptions are the estimates for the new Member States in the case of *CR*, and those for the Southern European countries in

Table 7. The estimation of corruption risk (*CR*) in new member states (*NMS*), 2007–2023

Variables	Bulgaria (1)	Czech Rep. (2)	Estonia (3)	Croatia (4)	Hungary (5)	Lithuania (6)	Latvia (7)	Poland (8)	Romania (9)	Slovenia (10)	Slovakia (11)
EU	0.818***	1.643***	0.951	1.383***	0.713***	1.487***	2.368***	1.251***	1.628***	1.325***	0.612***
	(0.017)	(0.021)	(0.044)	(0.053)	(0.015)	(0.032)	(0.065)	(0.009)	(0.026)	(0.047)	(0.022)
LTI	4.573***	1.205***	2.435***	7.713***	2.415***	3.253***	2.960***	3.505***	2.847***	2.007***	2.988***
	(0.085)	(0.014)	(0.113)	(0.499)	(0.046)	(0.074)	(0.080)	(0.033)	(0.039)	(0.047)	(0.105)
LNNCV	0.981***	0.929***	1.047***	1.086***	1.020***	1.034***	1.074***	1.158***	1.019***	0.885***	1.176***
	(0.003)	(0.002)	(0.011)	(0.007)	(0.004)	(0.004)	(0.005)	(0.001)	(0.002)	(0.003)	(0.009)
GPA	0.628***	1.075***	0.834***	0.785	0.976*	0.814***	0.716***	0.878***	1.059**	1.066	1.131***
	(0.041)	(0.012)	(0.032)	(0.240)	(0.014)	(0.024)	(0.051)	(0.004)	(0.026)	(0.051)	(0.032)
EAUCTION	0.065***	0.217***	–	1.946	0.239***	0.414***	0.537	0.374***	1.190***	1.867***	0.579***
	(0.010)	(0.009)	–	(6.665)	(0.014)	(0.077)	(0.325)	(0.005)	(0.017)	(0.130)	(0.021)
Constant	0.558***	1.080	0.285***	0.607**	0.508***	0.107***	0.107***	0.089***	0.098***	1.544***	0.364***
	(0.071)	(0.119)	(0.089)	(0.137)	(0.065)	(0.022)	(0.015)	(0.004)	(0.006)	(0.171)	(0.112)
Observations	174,252	189,060	18,924	50,542	101,088	139,987	84,058	1,505,994	395,257	138,243	28,476
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.143	0.094	0.099	0.139	0.094	0.083	0.141	0.052	0.083	0.072	0.143

Notes: contract level data; logit estimations; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.
***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.
Source: Authors own calculations.

the case of *CR* and *CRX*, which also included interaction terms. This result suggests that the EU coefficients in the models are sensitive to the set of control variables included. Consequently, we re-estimated the models for each country separately (Tables 7–9). The results indicate that, in all but four countries—Bulgaria, Estonia, Hungary, and Slovakia—EU-funded public procurement carries a significantly higher corruption risk than nationally funded procurement. For Bulgaria and Hungary (Column 1 and 5 respectively in Table 7), the absence of a significant difference may be linked to decisive and sustained actions by the European Commission and the European Anti-Fraud Office (OLAF), both of which have repeatedly addressed the high levels of corruption in these countries in their annual reports. In contrast, in Estonia and Slovakia, the reduction in corruption risk appears to result primarily from domestic policy interventions and high level of institutional convergence from 2007 to 2020 (Tóth & Hajdu, 2021). These measures lowered the corruption risk in EU-funded procurement to the level of nationally funded procurement in Estonia (Column 3 in Table 7), and even below it in Slovakia (Column 11 in Table 7).

Table 8. The estimation of corruption risk (*CR*) in Southern European countries (*SEC*), 2007–2023

Variables	Cyprus (1)	Greece (2)	Italy (3)	Malta (4)	Portugal (5)	Spain (6)
EU	0.931	1.794***	0.859***	0.984	0.820***	1.080***
	(0.124)	(0.041)	(0.021)	(0.097)	(0.034)	(0.017)
LTI	38.374***	0.618***	2.365***	24.528***	12.703***	6.165***
	(4.425)	(0.031)	(0.028)	(4.229)	(0.464)	(0.077)
LNNCV	1.032**	0.947***	0.977***	1.015	0.928***	1.008***
	(0.016)	(0.005)	(0.002)	(0.022)	(0.006)	(0.002)
GPA	1.723***	1.069***	0.866***	1.275**	0.764***	0.965***
	(0.185)	(0.022)	(0.008)	(0.140)	(0.031)	(0.010)
EAUCTION	0.454	1.324***	1.040	–	0.363**	0.330***
	(0.520)	(0.072)	(0.035)	–	(0.156)	(0.033)
Constant	0.044***	0.189***	0.224***	0.138***	0.214***	0.084***
	(0.034)	(0.034)	(0.030)	(0.084)	(0.050)	(0.008)
Observations	10,882	66,422	248,194	6,372	46,542	313,048
Year dummies	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.292	0.105	0.0410	0.134	0.176	0.117

Notes: contract level data; logit estimations; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.
***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.
Source: Authors own calculations.

Table 9. The estimation of corruption risk (*CR*) in Western European countries (*WES*), 2007–2023

Variables	Austria (1)	Belgium (2)	Germany (3)	Denmark (4)	Finland (5)	France (6)	Ireland (7)	Luxemburg (8)	Netherlands (9)	Sweden (10)	United Kingdom (11)
EU	0.929	1.418***	1.323***	2.507***	1.685***	1.723***	2.315***	0.976	1.667***	0.980	0.971
	(0.110)	(0.056)	(0.028)	(0.345)	(0.137)	(0.025)	(0.227)	(0.101)	(0.174)	(0.145)	(0.043)
LTI	3.652***	1.805***	3.090***	1.221***	1.603***	2.090***	2.302***	5.474***	3.115***	2.535***	1.540***
	(0.128)	(0.052)	(0.046)	(0.045)	(0.051)	(0.018)	(0.133)	(0.477)	(0.099)	(0.084)	(0.024)
LNNCV	0.934***	0.958***	1.015***	0.887***	0.968***	0.915***	1.002	0.981	0.907***	0.973***	0.864***
	(0.009)	(0.006)	(0.003)	(0.008)	(0.006)	(0.002)	(0.014)	(0.020)	(0.009)	(0.006)	(0.003)
GPA	0.850***	0.991	0.932***	0.876***	1.047	1.023***	0.771***	1.503***	0.854***	1.265***	1.350***
	(0.028)	(0.024)	(0.009)	(0.032)	(0.031)	(0.008)	(0.040)	(0.099)	(0.032)	(0.051)	(0.021)
EAUCTION	0.558**	1.816**	0.429***	0.665	0.822	0.975	0.323	11.923***	0.333***	1.255	0.652***
	(0.156)	(0.513)	(0.027)	(0.180)	(0.526)	(0.031)	(0.238)	(4.728)	(0.064)	(0.502)	(0.042)
Constant	0.074***	0.184***	0.017***	1.394	0.333***	0.308***	0.021***	1.078	0.229***	0.122***	0.478***
	(0.020)	(0.044)	(0.003)	(0.665)	(0.065)	(0.016)	(0.011)	(0.545)	(0.075)	(0.023)	(0.063)
Observations	36,890	55,680	356,310	29,924	48,811	694,611	13,209	8,080	35,713	84,675	148,353
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.253	0.0549	0.145	0.131	0.0490	0.0542	0.226	0.167	0.107	0.0697	0.123

Notes: contract level data; logit estimations; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.
***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.
Source: Authors own calculations.

Among the Southern European countries (see Table 8), the estimated significant unidirectional relationship between EU funding and corruption risk holds for only two countries: Greece and Spain. The unidirectional relationship is powerful in the case of Greece (odds ratio = 1.8) and there is no significant relationship in the case of Cyprus and Malta. In contrast, in Italy, the corruption risk associated with EU funding is estimated to be lower than that associated with nationally funded public procurement.

The picture is more uniform in Western European countries (see Table 9). In seven out of eleven countries, we find a significant unidirectional relationship between EU funding and corruption risk. There is no significant correlation in Austria, Luxembourg, Sweden, and the United Kingdom (TED continues to include UK data after 2020). The results for the EU's two strongest economies, Germany and France, are noteworthy. Public procurement in these two countries accounts for two-thirds of the total disclosed by the TED across Western European countries. In both countries, EU-funded contracts (only 4.5% in total contracts in Germany and 3.3% in France between 2007 and 2023) show a significantly higher risk of corruption than nationally funded contracts (the odds ratios are 1.323 and 1.723 respectively). The elevated corruption risk observed in EU-funded public procurement projects in Western European countries suggests that the relationship between EU funding and corruption risks in these countries warrants more in-depth analysis.

5. CONCLUSIONS

The paper investigated whether corruption risk in public procurement contracts financed by the European Union differs significantly from that observed in contracts financed from national sources. The analysis draws on contract-level data covering more than 5 million public procurement contracts across EU member states between 2007 and 2023.

The results provided a clear answer to this question. Controlling for relevant characteristics of public procurement contracts, EU-funded procurements are systematically associated with a higher risk of corruption compared to those financed from national sources. This finding proves robust across multiple corruption risk indicators. Both the conventional measure of corruption risk—defined as the proportion of contracts awarded without competition (*CR*)—and the more context-sensitive indicator—the share of contracts awarded with no more than three bidders (*CRX*)—point to the same conclusion. The robustness tests underline these results. The findings underscore an important policy implication: EU-funded procurement contracts warrant heightened scrutiny by the European Commission and relevant supervisory bodies (OLAF, the European Public Prosecutor's Office), as they appear systematically more susceptible to corruption risk than nationally financed contracts. These results underscore the importance of policies to strengthen competition in public procurement and confirm the relevance of the ECA's 2023 report findings (ECA, 2023).

Another finding of the research is that the effect of EU funding on elevated corruption risk is not confined to the new Member States or South European countries. The results indicate that this phenomenon is present across the entire European Union. In fact, the strongest positive correlation between EU financing and increased corruption risk is also observed in Western European countries. This finding highlights the need to investigate the underlying

causes and mechanisms that render EU-funded projects more susceptible to corrupt practices, regardless of a member state's status or historical accession date. Addressing these questions constitutes a promising direction for future research. A deeper understanding of these dynamics would enable the European Union to design more effective indicators and oversight mechanisms to reduce corruption risk and strengthen transparency and accountability in public procurement.

The analysis also noted that there are modern solutions, such as e-auctions, whose wider use could help limit public procurement corruption in EU countries. E-auctions strengthen competition and, according to some estimates, result in savings of 10–50 percent compared to the initial bid price.[4] In 2023, the contracting authorities in the EU used electronic auctions in only 2.3 percent of contracts. In e-auctions, the corruption risk (*CR*) value was 0.267. In other procurement methods that do not use electronic auctions, this value was higher, 0.322. Based on our estimates, if the proportion of e-auctions had been 10 percent in 2023, the corruption risk level at the EU level could have been reduced by 1.2 percentage points, ceteris paribus. Therefore, it is worth exploring methods that leverage modern online IT systems to simultaneously enhance transparency in public procurement, strengthen competition, and ultimately reduce corruption risk.

Finally, it is worth asking, even if we cannot answer it within the scope of this study: what could explain why the risk of corruption in public procurement projects financed by EU funds is significantly higher than in projects financed solely by national budgets? We propose three possible explanations, none of which are mutually exclusive.

1. "Windfall money" and weaker domestic accountability

The first explanation is supported by the international literature: the foreign aid is often perceived as "windfall money." in recipient countries. For the organization conducting the public procurement, it is less irresponsible to spend foreign aid without paying attention to the risk of corruption, or, in extreme cases, public procurement financed by foreign aid may become more easily a source of corruption or a source of financing for the ruling elite than public procurement financed by taxpayers in that country.

Taxpayers in the country concerned generally exercise stricter control over projects financed from their own tax payments (nationally financed projects) and are less tolerant of wasteful use and anomalies (such as corruption) in these projects. At the same time, they are more lenient with projects financed from foreign sources, such as EU-funded projects. This mechanism reduces political and social pressure to ensure efficient, corruption-free use, but it can also weaken oversight incentives and create opportunities for corruption. This asymmetric behavior may be one explanation for the higher risk of corruption in public procurement financed by EU funds. If EU institutions pay greater attention to countries where EU funds are highly exposed to corruption, as shown by analyses of Hungary and Bulgaria, this measure could reduce the corruption risk of EU funds.

[4]Estimation of the Office of Government Commerce, see: OGC. 2010. The Forward Plan for e-auctions. https://joinup.ec.europa.eu/sites/default/files/document/2014-12/The%20Forward%20Plan%20for%20e-auctions.pdf.

2. Administrative burden, complexity, and weakened oversight capacity

The second possible explanation is related to the fact that the implementation of public procurement financed by foreign aid may place an additional burden on the organizations issuing the public procurement contracts. As a result, they are less able to focus on strengthening competition and reducing corruption risk. In addition, EU-funded projects usually require compliance with more complex rules and more extensive documentation than those implemented with national funds. The complex rules place an additional burden on the organizations conducting public procurement. The rules imposed by the EU require complex procedures, which can reduce transparency and, paradoxically, create more opportunities for corruption-related irregularities.

3. More frequent use of complex, non-standardizable products or services

The third possible explanation is that the proportion of complex products that are difficult or impossible to standardize (such as infrastructure development projects) may be higher in EU-funded public procurement than in nationally funded ones. In the market for complex products that are difficult to standardize, there are potentially fewer producers able to compete in the public procurement market. As a result, in EU-funded public procurement, due to the market structure for the products or services to be purchased, there are fewer potential competitors and a higher risk of corruption.

Further research can examine the relevance of these explanations and other possible explanations. On the one hand, it would be necessary to examine corruption risks and EU funding at the levels of specific public procurement product markets and organizations involved in public procurement. On the other hand, future research should analyze changes in corruption risks and their political consequences.

Lastly, several limitations of the present study must be acknowledged, which suggest avenues for future research. First, our analysis was restricted to public procurement processes only. We did not examine targeted government programs or direct non-repayable grants to businesses, which account for approximately 50% of the EU funding allocation (ECA, 2015). This narrow focus may limit the generalizability of our findings across the full spectrum of EU funding mechanisms.

Second, our research adopted a descriptive rather than causal approach. We did not investigate the underlying reasons why EU-funded tendering poses higher corruption risks than procurement without such funding sources. Consequently, several critical questions remain unanswered: What institutional factors contribute to these elevated risks? How do differences in EU funding distribution and oversight mechanisms influence corruption outcomes? What role do regional differences play in explaining these patterns?

These limitations highlight several promising avenues for future investigation, primarily a comprehensive examination of all EU funding instruments, including direct grants and targeted programs. It is worth noting that these channels of European funds have already been examined from other perspectives (Alexopoulos et al., 2025; Antunes et al., 2020; Banai et al., 2020; Biagini et al., 2022; De Castris & Di Gennaro, 2018; Kisiała & Stępiński, 2024; Muraközy & Telegdy, 2016, 2023; Scotti et al., 2022). However, there is a lack of studies examining the correlation of EU subsidies and corruption that cover the entire range of financial support received from the EU. Additionally, causal research designs could help identify the specific institutional,

procedural, and regional factors that drive corruption risks in EU funding systems. Understanding these causal mechanisms would be particularly valuable for policymakers seeking to design more effective distribution systems that minimize corruption while maintaining the effectiveness of EU funding programs.

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Appendices

A1. Definition of variables and database creation

A1.1. Creation and cleaning of analyzed dataset

Steps	Descriptions	Number of records
1.	We downloaded the annual CSV datasets available on the EU TED website (https://data.europa.eu/data/datasets/ted-csv?locale=en) for the period between 2006 and 2023 and merged them into a unified data structure	11,820,110
2.	We filtered out and excluded invalid contracts, contract modifications, and records with missing contract identifiers (ID_AWARD)	10,790,568
3.	The EU TED database also contains data from non-EU countries (e.g., Israel, Liechtenstein, North Macedonia, Norway, Switzerland). These were excluded, and due to additional data quality issues, we also omitted data from the year 2006	10,407,590
4.	We excluded framework agreements from the analysis, as they differ fundamentally from individual contracts. A framework agreement establishes the general terms and conditions that will govern future transactions or projects, providing a broad foundation for ongoing cooperation. In contrast, a contract specifies the detailed terms of a particular transaction or project carried out under the framework	8,604,072

A1.2. Definition of variables

We defined the variables analyzed in the contract-level analysis as follows:

NBID Number of bidders, where the value of original variable (NUMBER_OFFERS) < 31; else *NBID* has missing value;

CR [0,1]: 0, if there was more than one bid in the tender,
1, if there was only one bid in the tender, and missing, if NUMBER_OFFERS > 200;

CRX [0,1]: 0, if there were more than three bids in the tender,
1, if there were no more than three bids in the tender and missing, if NUMBER_OFFERS > 200;

NCVALUE: Net contract value (in EUR) if the value of original variable (AWARD_VALUE_EURO_FIN_1) > 1,000 and < 50,000,000.

NCV_CR: *NCVALUE* if $CR = 1$

LNNCV:	ln of *NCVALUE*
EU [0,1]:	0, if the procurement contract was financed by national sources; 1, if the contract was financed by EU funds.
LTI [0,1]:	0, if the procurement procedure was open; 1, if the procurement procedure was not open.
GPA [0,1]:	0, if the contract was not covered by the Government Procurement Agreement; 1, if the contract was covered by the Government Procurement Agreement.
EAUCTION [0,1]:	0, if electronic auctions were not used; 1, if electronic auctions were used.
NMS [0,1]:	0, if the contract was in a Western European country; 1, if the contract was in a new Member State.
SEC [0,1]:	0, if the contract was in a Western European country; 1, if the contract was in a Southern European country.
WEC [0,1]	0, if the contract was not in a Western European country; 1, if the contract was in a Western European country.

The following variables were used for the analysis based on country level data:

$$CRR_{i,t} = \frac{\sum_{j=1}^{k} CR_{j,i,t}}{N_{i,t}},$$

$$CRXR_{i,t} = \frac{\sum_{j=1}^{k} CRX_{j,i,t}}{N_{i,t}},$$

$$NCV_{CRRi,t} = \frac{\sum_{j=1}^{k} NCV_{CR\,j,i,t}}{NCVALUE_{i,t}},$$

$$EUR_{i,t} = \frac{\sum_{j=1}^{k} EU_{j,i,t}}{N_{i,t}},$$

$$LTIR_{i,t} = \frac{\sum_{j=1}^{k} LTI_{j,i,t}}{N_{i,t}},$$

$$EAUCTIONR_{i,t} = \frac{\sum_{j=1}^{k} EAUCTION_{j,i,t}}{N_{i,t}} \text{ and}$$

$$LNNCV_{i,t} = \ln \textit{ of total net contract value in country } i \textit{ and year } t.$$

where $CR_{j,i,t}$ takes a value of one if only one bid was received before the contract j was awarded in country i and year t; $CRX_{j,i,t}$ takes a value of one if there were no more than three bids before

the contract j was awarded in country i and year t; $NCV\_CRR_{j,i,t}$ is the net contract value of contract j for which there was only one bid in country i and year t; the $NCV_{i,t}$ is the total net contract value in country i and year t; $EU_{j,i,t}$ takes a value of one if contract j was financed by EU funds in country i and year t; $EAUCTION_{j,i,t}$ takes a value of one if in the tender electronic auctions was used before the contract j was awarded in country i and year t; and $N_{i,t}$ is the total number of contracts in country i and year t.

A2. The groups of EU member states

Western European countries (*WEC*)
- Austria
- Belgium
- Denmark
- Finland
- France
- Germany
- Ireland
- Luxemburg
- Netherland
- Sweden
- United Kingdom

Southern European countries (*SEC*)
- Cyprus
- Greece
- Italy
- Malta
- Portugal
- Spain

New Member States (*NMS*)
- Bulgaria
- Croatia
- Czech Republic
- Estonia
- Hungary
- Lithuania
- Latvia
- Poland
- Romania
- Slovakia
- Slovenia

A3. Robustness tests

To test for robustness, first we ran probit estimations using the exact specification as the logit model (see Table A3.1).

Table A1. The estimation of corruption risk indicators (*CR* and *CRX*), 2007–2023

Variables	Dependent variable: *CR*				Dependent variable: *CRX*			
	EU member states analyzed (1)	*NMS* (2)	*SEC* (3)	*WEC* (4)	EU member states analyzed (5)	*NMS* (6)	*SEC* (7)	*WEC* (8)
EU	0.104***	0.121***	0.043***	0.205***	0.108***	0.127***	0.084***	0.181***
	(0.002)	(0.003)	(0.006)	(0.006)	(0.002)	(0.003)	(0.006)	(0.005)
LTI	0.539***	0.565***	0.805***	0.436***	0.346***	0.306***	0.538***	0.320***
	(0.002)	(0.003)	(0.005)	(0.003)	(0.002)	(0.003)	(0.005)	(0.003)
LNNCV	0.010***	0.037***	−0.009***	−0.036***	−0.011***	0.005***	−0.015***	−0.022***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
GPA	−0.015***	−0.047***	−0.040***	0.011***	0.001	−0.045***	−0.022***	0.027***
	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.002)
EAUCTION	−0.344***	−0.382***	−0.023	−0.209***	−0.248***	−0.270***	−0.006	−0.248***
	(0.004)	(0.005)	(0.016)	(0.013)	(0.004)	(0.005)	(0.016)	(0.011)
Constant	−1.310***	−1.229***	−1.022***	−0.812***	−0.018	−0.093***	0.310***	0.149
	(0.014)	(0.016)	(0.038)	(0.010)	(0.013)	(0.016)	(0.036)	(0.019)
Observations	5,029,979	2,826,076	691,593	1,512,310	5,029,979	2,826,076	691,593	1,512,310
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES	YES	YES
Pseudo R^2	0.109	0.0643	0.0765	0.0723	0.106	0.0880	0.0707	0.0616

Notes: probit estimations; contract level data; robust standard errors are in the brackets; without framework agreements.
***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.

Second, instead of using the corruption risk indicators (*CR* and *CRX*), we applied an alternative indicator measuring the competitive intensity (*NBIDX*) measured by the number of bids submitted by competitors. We defined the *NBIDX* as follows:

$$
\begin{aligned}
NBIDX &= 1 \quad \text{if } NBID = 1 \\
&= 2 \quad \text{if } NBID > 1 \text{ and } NBID < 4 \\
&= 3 \quad \text{if } NBID > 3 \text{ and } NBID < 8 \\
&= 4 \quad \text{if } NBID > 7 \text{ and } NBID < 16 \\
&= 5 \quad \text{if } NBID > 15 \text{ and } NBID < 32
\end{aligned}
$$

We excluded from the analysis the cases with more than 31 bids (which accounted for 1.6% of the sample). The histogram of *NBIDX* by EU funding see in Figure A1.

In this case, we employed ordered logit regression estimation. We present the results in Table A2.

Finally, we examined model uncertainty using Young and Holsteen's Model Uncertainty Robustness Test (see Table A3), assessing how the inclusion of different combinations of variables affects the coefficient of the EU variable in our estimations.

All three tests confirm the logit estimates' results regarding the unidirectional relationship between EU funding and corruption risk. However, the results of the Model Uncertainty Robustness Test highlight uncertainty regarding the relationship between EU funding and corruption risk (*CR*, *CRX*) in the case of the new Member States and Southern European countries. Therefore, we considered it desirable to examine the relationship between EU funding and corruption risk at the country level. We present these results in Tables 7–9.

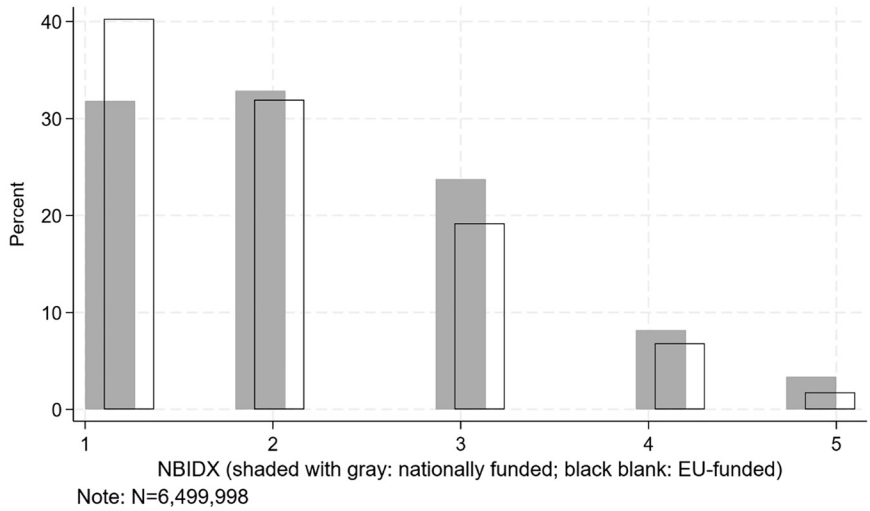

Fig. A1. Histogram of *NBIDX* by EU funding

Table A2. The estimation of competitive intensity (*NBIDX*), 2007–2023

Variables	Dependent variable: *NBIDX*			
	EU member states analyzed (1)	*NMS* (2)	*SEC* (3)	*WEC* (4)
EU	0.306***	0.252***	0.402***	0.337***
	(0.005)	(0.005)	(0.020)	(0.018)
LTI	0.480***	0.459***	0.307***	0.528***
	(0.001)	(0.002)	(0.002)	(0.002)
LNNCV	0.988***	0.944***	1.015***	1.035***
	(0.000)	(0.002)	(0.001)	(0.000)
GPA	1.037***	1.124***	1.083***	0.963***
	(0.002)	(0.004)	(0.006)	(0.003)
EAUCTION	1.652***	1.712***	0.992	1.500***
	(0.009)	(0.011)	(0.022)	(0.023)
EU LTI*	0.797***	0.849***	0.982	0.855***
	(0.008)	(0.012)	(0.029)	(0.017)
EU LNNCV*	1.108***	1.130***	1.075***	1.067***
	(0.002)	(0.002)	(0.004)	(0.005)
EU GPA*	0.810***	0.753***	0.899***	1.064***
	(0.005)	(0.006)	(0.014)	(0.017)
EU EAUCTION*	0.603***	0.583***	1.702***	0.437***
	(0.012)	(0.012)	(0.192)	(0.033)
Observations	4,946,878	27,998,409	672,955	1,475,514
Year dummies	YES	YES	YES	YES
Country dummies	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES
Pseudo R^2	0.0659	0.0494	0.0481	0.0400

Notes: contract level data; ordinary logit regressions; odds ratios are in the cells; robust standard errors are in the brackets; without framework agreements.
***: $P < 0.01$; **: $P < 0.05$; *: $P < 0.1$.

Table A3. Young and Holsteen's model uncertainty robustness test for the effect of EU funding

Sample	Corruption risk indicator	Number of models	Mean coefficient (odds ratio)	Robustness ratio	*N*
EU member states analyzed[a]	*CR*	16	**0.2752**	**13.6186**	5,102,779
	CRX	16	**0.3377**	**17.5218**	5,102,779
New Member States (*NMS*)[a]	*CR*	16	0.0157	0.8208	2,848,809
	CRX	16	**0.1536**	**7.4184**	2,848,809
Southern European Countries (*SEC*)[a]	*CR*	16	**0.1135**	**3.2481**	710,035
	CRX	16	**0.0780**	**3.3523**	710,035
Western European Countries (*WEC*)[a]	*CR*	16	**0.4053**	**30.9000**	1,543,935
	CRX	16	**0.3056**	**32.1162**	1,543,935
EU member states analyzed[b]	*CR*	32	**0.1925**	**2.2482**	5,102,779
	CRX	32	**0.2656**	**3.5537**	5,102,779
New Member States (*NMS*)[b]	*CR*	32	0.0445	1.3136	2,848,809
	CRX	32	**0.1760**	**6.3315**	2,848,809
Southern European Countries (*SEC*)[b]	*CR*	32	**0.0891**	**2.3649**	710,035
	CRX	32	**0.0878**	**3.6713**	710,035
Western European Countries (*WEC*)[b]	*CR*	32	**0.3920**	**21.4499**	1,543,935
	CRX	32	**0.2875**	**13.9581**	1,543,935
EU member states analyzed[c]	*CR*	128	**0.2265**	**2.9177**	5,102,779
	CRX	128	**0.2878**	**4.3522**	5,102,779
New Member States (*NMS*)[c]	*CR*	128	−0.0143	−0.3444	2,848,809
	CRX	128	**0.1153**	**2.9547**	2,848,809
Southern European Countries (*SEC*)[c]	*CR*	128	0.0584	0.6767	710,035
	CRX	128	0.0026	0.0341	710,035
Western European Countries (*WEC*)[c]	*CR*	128	**0.3951**	**5.5638**	1,543,935
	CRX	128	**0.2600**	**4.8947**	1,543,935

Note: a: variables included in the analyses are EU, LTI, LNNCV, GPA, EAUCTION.
b: variables included in the analyses are EU, LTI, LNNCV, GPA, EAUCTION and country dummies.
c: variables included in the analyses are EU, LTI, LNNCV, GPA, EAUCTION and interaction terms.
Logit models; critical values of Robustness Ratio are 1.96 (where the coefficient is greater than zero) or −1.96 (where the mean coefficient is less than zero), see (Young & Holsteen, 2017). Robustness Ratio at $P < 0.05$ significance level is in bold.