Government Transparency Institute

Mihály Fazekas[1], *István János Tóth*[2]

Corruption in EU Funds?

Europe-wide evidence on the corruption effect of EU funded public contracting

Working Paper series: GTI-WP/2015:01

June 2015, Budapest, Hungary

[1] University of Cambridge and Government Transparency Institute

[2] Hungarian Academy of Sciences and Corruption Research Center Budapest

Abstract

It is theoretically ambiguous and empirically contested whether EU Funds contribute to lower corruption and better governance or the opposite. Many recipient countries benefit to a substantial degree with allocations amounting to 2-4% of their annual GDP. A range of positive and negative cases has been uncovered by the European Commission, national governments and the media, however, there has been no Europe-wide quantitative evaluation looking at the micro-level, arguably where corruption takes place. This chapter offers just that by utilizing a large-scale public procurement database of more than 2.8 million awarded contracts in 2009-2014 from the EU's Tenders Electronic Daily (TED) database. It systematically matches and compares EU Funded public procurement contracts with nationally funded ones in order to get an approximation of the causal impact of EU funding on corruption. Results point out that overall EU Funds increase corruption risks across Europe by 3-20% depending on the corruption risk indicator used. Findings are robust to multiple matching algorithms. However, this effect shows a remarkable variability across countries and regions underlining the importance of recipient institutional framework for example in terms of broader corruption levels.

Keywords: public procurement, high-level corruption, corruption measurement, EU Funds, aid effectiveness

Introduction

There is an intense public and policy debate on whether European Union Structural and Cohesion Funds contribute to lower corruption and better governance or they fuel government favouritism and erode institutional quality. This debate is fed by striking negative examples: Italian mafia hijacking highway projects, or the European Commission freezing Structural Funds payments in countries such as Romania, Bulgaria, or Hungary. Some of these examples suggest the involvement of high-level politics and organised criminal groups, raising the possibility that the EU in fact extensively finances large-scale corruption in a number of countries. As EU Structural and Cohesion Funds (EU Funds) constitute a considerable part of GDP in many member states, especially in Central and Eastern Europe (CEE) where it amounts to 1.9%-4.4% of annual member state GDPs (KPMG, 2012) and well above 50% of public investment, this debate is crucial for the future of the European Union and its territorial cohesion as well as more broadly the quality of institutions across Europe.

However, academic research has been scant on it which deprives policy makers of crucial evidence underpinning future policy decisions. In order to address this gap in the evidence base, this chapter sets out to

> *systematically assess the impact of EU Funds spending on institutionalised grand corruption risks across the whole EU.*

This chapter focuses on 27 EU Member States with sufficient public procurement spending funded by the EU – that is EU28 except for Malta[1] - throughout 2009-2014. EU Funds are spent in various ways that make it impossible to arrive at a blanket assessment of their impact on corruption. We look at public procurement spending by public or semi-public organisations (e.g. state owned enterprises) financed from EU Funds, which predominantly means the use of Cohesion and Structural Funds. This approach carries the advantage that we can compare projects that are similar in most respects except for the source of financing: predominantly EU or national. Moreover, there is exceptionally good comparative data available on large public procurement tenders in all countries on the level of individual contracts. Our approach is a major departure from prior studies in this area, as it utilizes a large-scale micro-level quantitative database which allows for unearthing a detailed picture of mechanisms on the analytical level where corruption takes place, while also being broad enough to evaluate whole systems of governance.

Theory

In spite of the considerable public and policy interest in corruption risks in EU Funds spending, there is remarkably little scientific work on the question to date (Beblavy & Sičáková-Beblavá, 2014; Dimulescu, Pop, & Doroftei, 2013; Fazekas, Chvalkovská, Skuhrovec, Tóth, & King, 2014). There are, however, two bodies of literature that speak to this issue: the political science literature on aid dependence and the Europeanization literature in political science.

The literature looking at the effect of development aid on quality of institutions and corruption is large. It can only suggest main mechanisms at play as EU Funds are spent in Europe in very different institutional contexts and funding volumes than development aid in developing countries. Nevertheless, according to this literature, foreign aid can have a positive effect on governance by providing clear policy goals of improving the civil service and helping countries to overcome the lack

[1] Malta is a too small country with small public procurement markets making it inadequate for the corruption risk measurement methodology.

of resources for state building (Knack, 2001). However, development aid can also destroy institutions and impede state building in a similar way as natural resources can (Djankov, Montalvo, & Reynal-Querol, 2008). It can weaken accountability and the development of civil society by breaking the link between domestic revenues (i.e. taxation) and government services. It can also damage administrative capacity by: (1) reallocating talented bureaucrats from domestic institutions to aid organisations; (2) providing additional organisational goals that undermine institutional cohesion; and (3) increasing the pool of public resources available for rent seeking which easily translates into additional corruption in contexts with weak administrate capacity (Bräutigam, 2000).

The Europeanization literature delivers good reasons for believing that EU Funds support good government. 1) One of the most important remaining post-accession levers of Brussels for disciplining new member states is EU Funds and the threat of withdrawing them (Epstein & Sedelmeier, 2009). This should motivate recipient countries to manage funds up to a high EU standard, if needed even better than national funds. 2) The disbursement of EU Funds is more heavily regulated, making corruption more costly and motivating recipient organisations to invest into administrative capacity. 3) Extensive monitoring and controls of EU Funds in addition to the national audit frameworks (e.g. OLAF, European Court of Justice) make detection and punishment of corruption more likely than in projects funded with domestic funds (European Commission, 2003; European Court of Auditors, 2012, 2013). There are also arguments in the Europeanization literature that external funding such as EU Funds damage the quality of government and increase corruption. 1) EU Cohesion and Structural Funds are spent on investment projects where public discretion is high. From the wider literature, it is clear that discretionary spending is more likely to involve corruption than non-discretionary spending such as pensions (Mauro, 1998; Tanzi & Davoodi, 2001). 2) EU funding provides a large additional pool of public resources for rent extraction which in effect unlimited as most recipient countries struggle to draw 100% of allocated funds (Mungiu-Pippidi, 2013). 3) EU Funds, like any external funding, weaken the link between domestic civil society, taxation, and policy performance.

In the context of public procurement, institutionalised grand corruption refers to the allocation and performance of public procurement contracts by bending prior explicit rules and principles of good public procurement in order to benefit a closed network while denying access to all others (Fazekas et al., 2014; World Bank, 2009).

From the above discussion, the following null-hypothesis results:

H_0: EU Funds decrease institutionalised grand corruption across the European Union.

The above discussion also suggests that in countries and regions with diverse institutional quality, the effect may also differ due to the relative strength of each causal mechanism linking EU Funds to public procurement corruption. While no systematic analysis of determinants is presented due to lack of space it is suggested that more corrupt countries and regions are less willing to cooperate with EU authorities and more prone to rent seeking which tips the balance towards more corruption in EU Funds.

Data and variables

Data used

The database we use derives from public procurement announcements of 2009-2014 in the EU27 (i.e. EU28 minus Malta) (this database is called Tenders Electronic Daily (TED), which is the online version of the 'Supplement to the Official Journal of the EU, dedicated to European public procurement.) (DG GROWTH, 2015). The data represent a complete database of all public procurement procedures conducted under the EU Public Procurement Directive. The database was released by the European Commission - DG Market which also has conducted a series of data quality checks and enhancements. TED contains variables appearing in 1) calls for tenders, and 2) contract award notices. All the countries' public procurement legislation is within the framework of the EU Public Procurement Directive and are therefore, by and large, comparable. The TED database contains over 2.8 million contracts for the 27 EU Member States considered.

Variables used in the analysis

EU Funds use

The spending of EU Funds in public procurement can be directly identified in each contract award announcement which records the use or non-use of EU Funds along with the reference to the corresponding EU program. However, no information is published as to the proportion of EU funding within the total contract value. Hence, we had to employ a yes-no categorisation of each contract awarded. Public procurement from EU Funds falls under the same procurement rules and thresholds as other funding sources. Common national and European public procurement legal frameworks warrant a meaningful comparison between EU funded and non-EU funded public procurement procedures. The crucial difference between contracts funded from EU Funds and by national governments lies in additional monitoring and controls and different motivation structures associated with spending EU Funds. While EU Funds use differs greatly between countries, there is a large number of observations for matching contracts in each case (Web appendix: Table A1).

Indicators of institutionalised grand corruption

Developing comparative indicators of institutionalised grand corruption in public procurement for all EU27 countries represent the primary methodological innovation of this article. The approach follows closely the corruption risk indicator building methodology developed by the authors making use of a wide range of public procurement 'red flags' (Charron, Dahlström, Fazekas, & Lapuente, 2015; Fazekas et al., 2014; Fazekas, Tóth, & King, 2013a).

The measurement approach exploits the fact that for institutionalised grand corruption to work, procurement contracts have to be awarded recurrently to companies belonging to the corrupt network. This can only be achieved if legally prescribed rules of competition and openness are circumvented. By implication, it is possible to identify the input side of the corruption process, that is fixing the procedural rules for limiting competition, and also the output side of corruption, that is signs of limited competition. By measuring the degree of unfair restriction of competition in public procurement, a proxy indicator of corruption can be obtained.

First, the simplest indication of restricted competition in line with our theoretical definition is when only one bid was submitted in a tender on an otherwise competitive market which typically allows for awarding contracts above market prices and extracting corrupt rents (output side). Hence, the

percentage of single-bidder contracts awarded in all the awarded contracts is the most straightforward measure we use.

Second, a more complex indication of high-level corruption also incorporates characteristics of the tendering procedure that are in the hands of public officials who conduct the tender and suggests deliberate competition restriction (input side) (Fazekas, Tóth, & King, 2013b). This composite indicator, which we call the Corruption Risk Index (CRI), represents the probability of corrupt contract award in public procurement defined as follows:

$$CRI^i = \Sigma_j w_j * CI_j{}^i \quad (1)$$

$$\Sigma_j w_j = 1 \quad (2)$$

$$0 \leq CRI^i \leq 1 \quad (3)$$

$$0 \leq CI_j^i \leq 1 \quad (4)$$

where CRI^i stands for the corruption risk index of contract *i*, $CI_j{}^i$ represents the *j*th elementary corruption indicator observed in the tender of contract *i*, and w_j represents the weight of elementary corruption indicator *j*. Elementary corruption indicators can be either corruption inputs or outputs. CRI = 0 indicates minimum corruption risk while CRI=1 denotes maximum corruption risk observed. Based on qualitative interviews of corruption in the public procurement process, a review of the literature (OECD, 2007; Pricewaterhouse Coopers, 2013; World Bank, 2009), and regression analysis, we identified the components of the CRI in addition to single bidding (Table 1):

1. A simple way to fix tenders is to avoid the publication of the call for tenders in the official public procurement journal as this would make it harder for competitors to prepare a bid. This is only considered in non-open procedures as in open procedures publication is mandatory.
2. While open competition is relatively hard to avoid in some tendering procedure types such as open tender, others such as invitation tenders are by default much less competitive; hence using less open and transparent procedure types can indicate the deliberate limitation of competition, hence corruption risks.
3. If the advertisement period, i.e. the number of days between publishing a tender and the submission deadline, is too short for preparing an adequate bid, it can serve corrupt purposes; whereby the issuer informally tells the well-connected company about the opportunity well ahead.
4. Different types of evaluation criteria are prone to fiddling to different degrees, subjective, hard-to-quantify criteria often accompany rigged assessment procedures as it creates room for discretion and limits accountability mechanisms.
5. If the time used for deciding on the submitted bids is excessively short or lengthened by legal challenge, it can also signal corruption risks. Snap decisions may reflect premediated assessment, while legal challenge and the corresponding long decision period suggests outright violation of laws.

For continuous variables above such as the length of advertisement period, thresholds had to be identified in order to reflect the non-linear character of corruption. This is because most values of continuous variables can be considered as reflections of diverse market practices, while some domains of outlier values are more likely associated with corruption. Thresholds were identified using

regression analysis, in particular analysing residual distributions (for more on this see (Fazekas et al., 2013a)).

We restricted the sample in two ways: 1) Competitive markets: we only examine tenders in markets with at least 10 contracts awarded throughout 2009-2014, where markets are defined by product type (CPV[2] level 3) and location (NUTS[3] level 1) within each country. 2) Regulated tenders: we only used those tenders which are above EU thresholds in order to avoid the noise of too small contracts and voluntary reporting which follows erratic patterns across countries and over time. These together removed 17% of the observations.

TABLE 1. SUMMARY OF ELEMENTARY CORRUPTION RISK INDICATORS ('RED FLAGS' IN BOLD)

Proc. phase	Indicator name	Indicator values
submission	Call for tenders publication (non-open procedures)	0=call for tender published in official journal 1=NO call for tender published in official journal
	Procedure type	0 =accelerated negotiated procedure 1=accelerated restricted procedure 2=award without publication 3=competitive dialogue 4=negotiated with competition 5= negotiated without competition 6=open 7=restricted 8=missing
	Length of advertisement period	Number of days between the publication of call for tenders and the submission deadline
assessment	Weight of non-price evaluation criteria	Sum of weights for evaluation criteria which are NOT related to prices
	Length of decision period	number of days between submission deadline and announcing contract award
outcome	Single bidder contract (valid/received)	0=more than 1 bid received 1=1 bid received

In addition to the identification of thresholds in continuous variables, regression analysis was also used to identify 'red flags' which are most likely to signal corruption rather than any other phenomena such as low administrative capacity. Ultimately, those variables and their categories were selected which were large and significant predictors of single bidder contracts. The regression set-up controlled for a number of likely confounders of bidder numbers: (1) institutional endowments measured by type of issuer (e.g. municipal, national), (2) product market and technological specificities measured by CPV division of products procured, (3) contract size (log contract value in EUR), and (4) regulatory changes as proxied by year of contract award.

The logic of regression analysis is the following: if in a certain country, not publishing the call for tenders in the official journal for open procedures is associated with a higher probability of a single bidder contract award, it is likely that avoiding the transparent and easily accessible publication of a new tender is typically used for limiting competition. This would imply that call for tenders not

[2] CPV=Common Procurement Vocabulary. For more info see: http://simap.europa.eu/codes-and-nomenclatures/codes-cpv/codes-cpv_en.htm

[3] NUTS=Nomenclature of territorial units for statistics. For more info see: http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction

published in the official journal becomes part of the analysed country's CRI. Taking another example, if we found that leaving only 5 or fewer days for bidders to submit their bids is associated with a higher probability of a single bidder contract compared to periods longer than 20 calendar days (a more or less arbitrary benchmark category), this would indicate that extremely short advertisement periods are often used for limiting competition. Then this would provide sufficient grounds to include the '5 or fewer days' category of the decision period variable in the CRI of the country in question. Following this logic, in addition to the outcome variable in these regressions (single bidder) only those variables and variable categories are included in CRI which are in line with a rent extraction logic and proven to be significant and powerful predictors.

Once the list of elementary corruption risk indicators is determined with the help of the above regressions, each of the variables and their categories receive a component weight. As we lack the detailed knowledge of which elementary corruption technique is a necessary or sufficient condition for corruption to occur, we assign equal weight to each variable and the sizes of regression coefficients are only used to determine the weights of categories within variables. For example, if there are four significant categories of a variable, then they would get weights 1, 0.75, 0.5, and 0.25 reflecting category ranking according to coefficient size. The component weights are normed so that the observed CRI falls between 0 and 1.

Each of the two corruption risk indicators have its pros and cons. The strength of the single bidder indicator is that it is very simple and straightforward to interpret. However, it is also more prone to gaming by corrupt actors due to its simplicity. The strength of the composite indicator approach (CRI) is that while individual strategies of corruption may change as the environment changes, they are likely to be replaced by other techniques. Therefore, the composite indicator is a more robust proxy of corruption over time than a single variable approach. In an international comparative perspective, a further strength of CRI is that it balances national specificities with international comparability by allowing for the exact formulation of the components to vary reflecting differences in local market conditions. The main weakness of CRI is that it can only capture a subset of corruption strategies in public procurement, arguably the simplest ones, hence it misses out on sophisticated types of corruption such as corruption combined with inter-bidder collusion.

Validity of corruption risk indicators

While the validity of both corruption risk measures predominantly stem from their direct fit with the definition of high-level corruption in public procurement, their association with widely used survey-based macro-level corruption indicators as well as with further mico-level objective indicators of corruption risks underpin their validity.

Both corruption risk indicators (2009-2014 averages per NUTS region using number of nationally funded contracts) correlate as expected with the regional European Quality of Institutions index (EQI), population corruption perceptions and self-reported bribery of the same regional representative survey of 2013 (Charron, Dijkstra, & Lapuente, 2010) (Table 2).

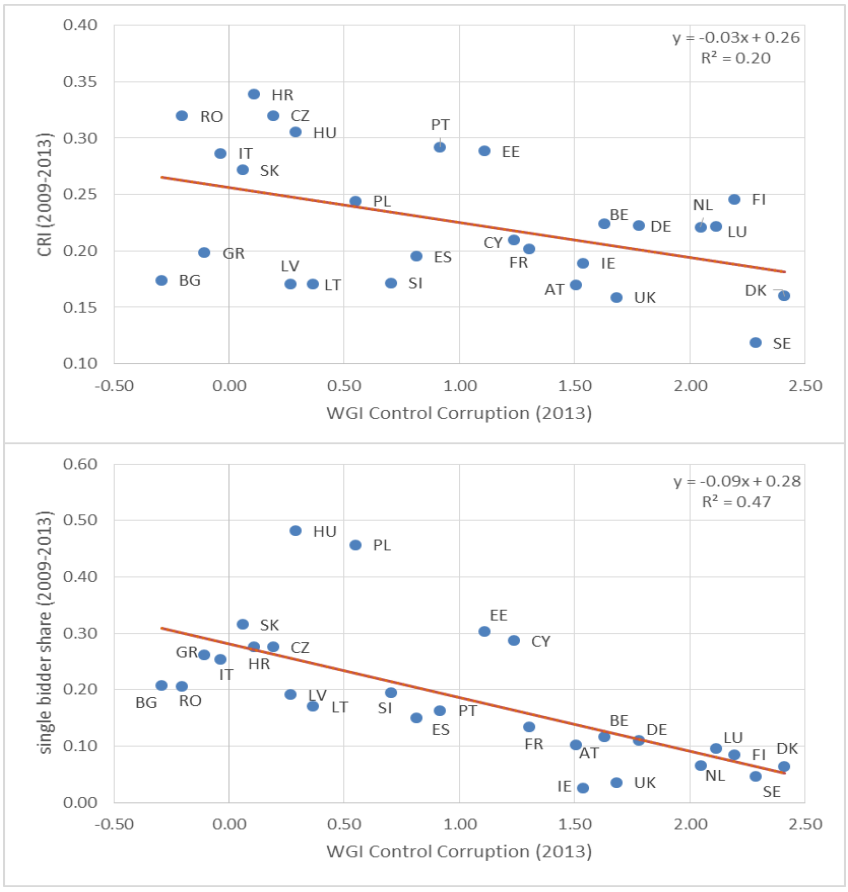
TABLE 2. BIVARIATE PEARSON CORRELATION BETWEEN 'OBJECTIVE' MEASURES OF REGIONAL CORRUPTION AND SURVEY-BASED INDICATORS, NUTS2 REGIONS WITH AT LEAST 5 CONTRACT AWARDED IN 2009-2014

variable	% single bidder	Regional CRI	N
% single bidder		0.51*	178
Regional CRI	0.51*		178
EQI (2013)	-0.41*	-0.11	171
Corruption perception	0.34*	0.12	172
Reported bribery	0.34*	0.20*	172

Source: TED and (Charron et al., 2015)
Note: * = significant at the 5% level

On the level of countries, one simple indication that the corruption indices are valid is their association with widely acknowledged and used corruption indices such as the World Bank's Control of Corruption indicator (Figure 1: top panel for CRI, bottom panel for the share of single bidder contracts). While validity tests are confirmatory in both cases, the association is much stronger for the single bidder indicator than for CRI.

FIGURE 1. BIVARIATE RELATIONSHIP BETWEEN WGI-CONTROL OF CORRUPTION (2013) AND CRI AND SHARE OF SINGLE BIDDER CONTRACTS (BOTH ARE PERIOD AVERAGES FOR 2009-2013)



Source: TED

In addition to macro-level evidence of validity, two micro-level 'objective' risk indicators are inspected for further exploring validity: procurement suppliers' country of origin and contract prices. It is expected that higher corruption risk contracts are won by companies registered in tax havens as their

secrecy allows for hiding illicit money flows (Shaxson & Christensen, 2014). In line with our expectations there is a marked and significant difference with regards to both indicators (Figure 2).

FIGURE 2. AVERAGE CORRUPTION RISKS OF PUBLIC PROCUREMENT SUPPLIERS REGISTERED ABROAD, EU26, 2009-2014, $N_{CONTRACT}$=27,888

Source: TED

We also expect corruption to drive prices up. A simplistic, albeit widely used, indicator of price in the absence of reliable unit prices is the ratio of actual contract value to initially estimated contract value (Coviello & Mariniello, 2014). As expected both the single bidder indicator and CRI are associated with a higher price ratio. Single bidder contracts are associated with 9% higher contract value, while contracts with 1 CRI higher are associated with 17% higher contract value (Table 3).

TABLE 3. LINEAR REGRESSION EXPLAINING RELATIVE CONTRACT VALUE, EU26, 2009-2014

dependent variable	**relative contract value (contract price/estimated price)**	
independent variables		
single bidder contract	0.092	
CRI		0.173
sign.	0.000	0.000
each regression contains constant controls: sector of contracting entity, type of contracting entity, year of contract award, country of contract award, main product market of procured goods and services, and contract value		
N	543,355	543,355
R^2	0.143	0.115

Source: TED

Government Transparency Institute

Findings: EU Funds' effect on corruption risks

In the absence of random assignment of EU Funding, the causal effect of EU Funds on corruption risks is estimated by matching tenders without EU funding (control group) with tenders funded by EU Funds (treatment group) and compare the two groups in terms of corruption risks, measured by the CRI and single bidder share. By comparing tenders which are as similar as possible in every relevant respect except funding source allows for the identification of a causal impact of EU Funds on corruption risks. The obvious limitation of this approach is that we cannot measure all the confounding factors, hence we cannot fully account for all the systematic differences between EU and nationally funded contracts contributing to corruption risks. State of the art matching methods are used which are widely employed in the program evaluation literature (Imbens & Wooldridge, 2009).

Matching is superior to the simple, unmatched comparison of group means as long as the selection of EU funded projects is itself not driven by corrupt considerations such as deliberately channelling EU Funds to markets where hiding corruption is easier. If selection is predominantly strategic driven by corruption, the simple comparison is more appropriate than matching. As it is unclear to what degree EU Funds selection is driven by corrupt considerations we consider the matched results as a lower bound and the simple comparison as an upper bound estimate of the causal impact.

A simple, unmatched comparison of average single bidder share and CRI suggests that EU funded procurement carries higher corruption risks than nationally funded procurement across the whole of the EU (Table 4 and Table 5). These effects are substantial, 38% and 16% increase for single bidder share and CRI respectively compared to nationally funded contracts.

In order to balance the different composition of EU and nationally funded contracts, we employed propensity score matching algorithms[4] that matches contracts on control variables[5]. Corruption risks of any contract are determined on the one hand by the characteristics of the contract itself (e.g. the type of service or good procured such as a consultancy report) and on the other hand by the institutional environment in which it is awarded (e.g. weaker control institutions in a country). Both of these had to be controlled for in the matching process to arrive at a balanced comparison. In terms of characteristics of contracts matched, the following variables were used: 1) the main market of procured goods and services (using CPV 2-digit categorisation once again); 2) log value of contract; 3) year of contract award; 4) type of procuring organisation (e.g. local body, public utility); and 5) main sector of procuring organisation (e.g. education, healthcare). In terms of institutional characteristics, we controlled for the country where the contracting authority resides controlling for all the macro-institutional factors determining corruption risks. This was done in two alternative ways, first allowing for some degree of flexibility where some contracts could be matched to a contract in another country as long as it improved matching on contract-level characteristics (cross-country matching). Second, we restricted matching only to contracts in the same country at the expense of poorer matching on contract-level characteristics and in fact removing some EU funded contracts due to lack of sufficient matches (within country matching). While these two variants do not deliver substantially different results, the more restrictive approach is preferable as country-effects are likely

[4] We used stata 12.0 psmatch2 algorithm.

[5] Coarsened exact matching was also conducted which led to a much tighter matching at the expense of discarding most of the EU funded contracts due to lack of sufficient matches. By implication, the resulting sample was not reliable enough to characterise the whole of EU anymore. Detailed results can be obtained from the authors.

to override contract-level effects. Tables and figures demonstrating the quality of matching procedures can be found in the Web appendix.

The propensity score matching procedures, taking into account confounding factors, reveal a similar picture as the unmatched comparison, although effect magnitudes change somewhat, in particular for CRI comparisons. For the single bidder indicator, the cross-country propensity score matching results in a similarly strong effect (0.1), while the within country propensity score matching delivers a slightly smaller effect (0.06) (Table 4). Both of these effects are substantial in relative terms: they indicate that corruption risks would have been 20-40% lower had the same contracts been financed from national funds rather than EU Funds.

For CRI, both propensity score matching algorithms deliver a substantially smaller effect size than the simple comparison: the cross-country matching show an increase of corruption risks due to EU Funds of 0.003, while the within country matching result in a somewhat larger effect (0.01) (Table 5). Both of these effects are small in relative terms: they indicate that corruption risks would have been 1-3% lower had the same contracts been financed from national funds rather than EU Funds.

In sum, for all the specifications the negative effect of EU funding on corruption risks, i.e. worsening corruption, has stayed by and large the same. The stronger negative effect when measuring corruption risks by single bidder share rather than the CRI is in line with prior research looking at CEE national datasets (Fazekas et al., 2014). This suggests that it is market outcomes which are particularly negatively influenced by EU funding while formal requirements such the use of open procedure or publishing the call for tenders are more positively influenced.

It must be noted that a large portion of the control group was discarded in order to achieve a tight comparison between treatment and control groups while even some EU funded contracts are excluded by the within country propensity score matching algorithm as no sufficiently close match is found. Missing values of control variables were included as a separate value in each matching algorithm, however due to their large numbers in some countries, they may influence the reliability of the results in unclear ways. As data quality is best in biggest beneficiaries of EU funding, such bias is expected to be minor. For the EU-wide average effect, we did not apply any country weights, hence each country contributed to the overall mean in proportion to the number of EU funded contracts it has awarded. This made performance of the Polish EU funding system the single most important factor in determining the overall EU mean as Polish EU funded contracts make up roughly one third of all EU funded contracts in the database.

TABLE 4. UNMATCHED AND MATCHED COMPARISONS OF EU AND NON-EU FUNDED CONTRACTS' SHARE OF SINGLE BIDDERS, 2009-2014, EU27 TOTALS

	unmatched comparison	propensity score matching (cross-country)	propensity score matching (within country)
non-EU funded	0.247	0.242	0.281
EU funded	0.340	0.340	0.338
diff(EU funded - non-EU f.)	**0.093**	**0.098**	**0.057**
95% conf.interval-lower bound	0.091	0.094	0.054
95% conf.interval-upper bound	0.096	0.101	0.061
N non-EU funded	1,407,301	123,678	121,338
N EU-funded	123,696	123,696	121,338

Source: TED

TABLE 5. UNMATCHED AND MATCHED COMPARISONS OF EU AND NON-EU FUNDED CONTRACTS' CRI, 2009-2014, EU27 TOTALS

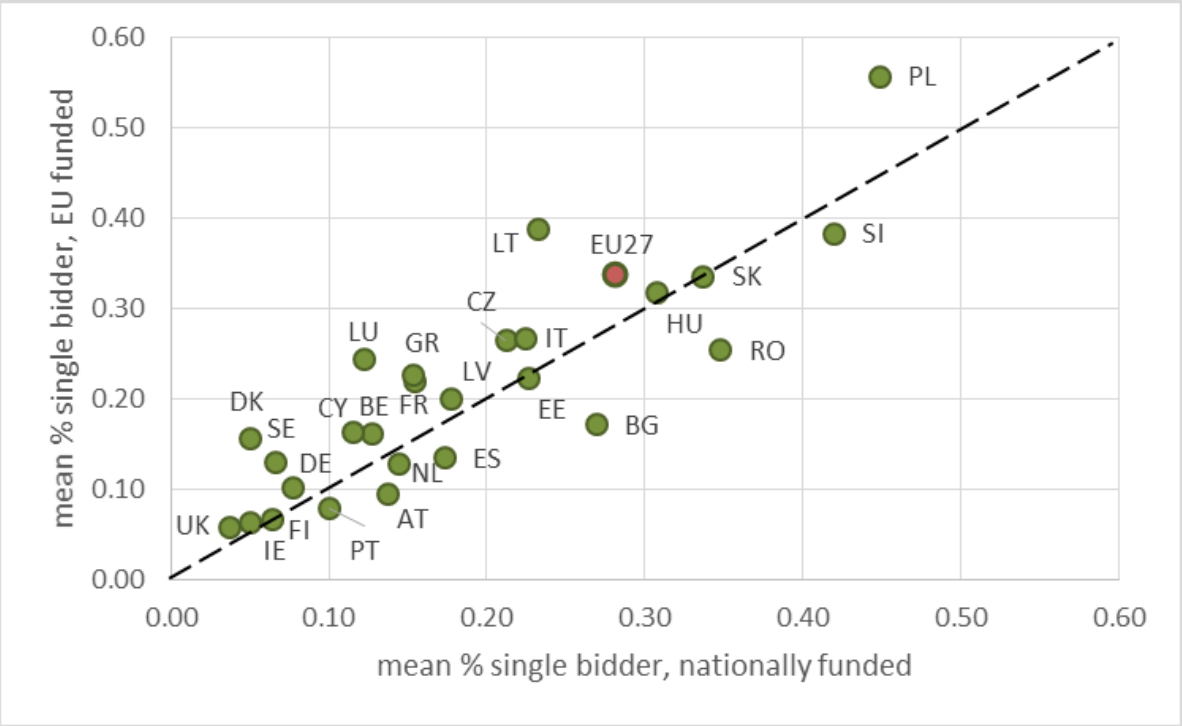
	unmatched comparison	propensity score matching (cross-country)	propensity score matching (within country)
non-EU funded	0.225	0.260	0.254
EU funded	0.262	0.262	0.261
diff(EU funded - non-EU f.)	**0.037**	**0.003**	**0.008**
95% conf.interval-lower bound	0.036	0.001	0.006
95% conf.interval-upper bound	0.038	0.004	0.009
N non-EU funded	1,407,300	123,678	121,338
N EU-funded	123,696	123,696	121,338

Source: TED

Based on these results, we can reject H_1 that is, the moderating effect of EU Funds on grand corruption in public procurement across the whole EU. EU funded public procurement contracts carry a greater risk of corruption than domestically funded ones with and without matching tenders background characteristics. The different effect magnitudes between using single bidder and CRI point out the different effect of EU Funds on the outcomes of competition and the characteristics of the contracting process. This is hardly a surprise given the predominant focus of EU monitoring on bureaucratic inputs rather than competitive outcomes.

The change in effect magnitude when controlling for confounding factors highlight that the contexts in which EU Funds are spent exercise a considerable impact on corruption risks. In order to directly explore this variability on the country-level, EU and nationally funded contracts' shares of single bidders are plotted per country (Figure 3). It is apparent that most countries cluster around the line representing parity between corruption risks in EU and nationally funded public procurement while there are some notable exceptions representing wide deviations between EU and national funding.

FIGURE 3. SINGLE BIDDER SHARES OF EU AND NATIONALLY FUNDED PUBLIC PROCUREMENT CONTRACTS PER COUNTRY, EU22, 2009-2013 (APPLYING WITHIN COUNTRY MATCHING)



Source: TED
Note: The dashed line is when the single bidder shares are equal in EU and national funded contracts.

While no comprehensive explanation of such heterogeneous effect can be offered here due to lack of space, it is suggested that regions with higher levels of corruption risks in general are also less able to control the additional corruption risks attached to EU Funds (e.g. additional discretionary spending). Plotting the CRI difference between EU and nationally funded contracts on matched samples and the total unmatched CRI means at the regional level point at this explanation (Figure 4): With the increase of the general level of corruption in a region increases the relative underperformance of EU Funds, that is EU Funds' corruption risks increase compared to national funds.

FIGURE 4. SCATTER PLOT OF THE CRI DIFFERENCE BETWEEN EU AND NATIONALLY FUNDED CONTRACTS AND TOTAL REGIONAL CRI, BY NUTS-2 REGIONS WHICH AWARDED AT LEAST 200 EU FUNDED CONTRACTS, 2009-2014

Source: TED

Conclusions

While much additional work is needed, this paper has already demonstrated that it is feasible and fruitful to use detailed, contract-level data for tracking corruption risks over time across EU countries. Such monitoring can be done in real-time if the necessary investment into database development is made. Findings indicate that EU funding increases corruption risks in some EU Member States albeit not in others, while on average being of negative effect across the EU. This effect is particularly large where general corruption risks in the region are high. Relative prices in EU funded contract awards (contracted price/estimated price) (Coviello & Mariniello, 2014) are also higher than nationally funded ones on the matched samples (price increase of 0.4%) which implies an approximate 9.9 billion EUR lost to European taxpayers per annum. When interpreting results, it is worth keeping in mind that corruption is a diverse phenomenon which could only partially be captured with the selected red flags. Further work should use more precise measurement based on richer data.

Government Transparency Institute

References

Beblavy, M., & Sičáková-Beblavá, E. (2014). The Changing Faces of Europeanisation: How Did the European Union Influence Corruption in Slovakia Before and After Accession? *Europe-Asia Studies*, *66*(4), 536–556.

Bräutigam, D. A. (2000). *Aid Dependence and Governance*. Stockholm: Almqvist & Wiksell International.

Charron, N., Dahlström, C., Fazekas, M., & Lapuente, V. (2015). *Carriers, connections, and corruption risks in Europe* (No. 2015:6). Gothenburg.

Charron, N., Dijkstra, L., & Lapuente, V. (2010). *Mapping Quality of Government in the European Union: A Study of National and Sub-National Variation* (No. 2010:22). Gothenburg.

Coviello, D., & Mariniello, M. (2014). Publicity requirements in public procurement: Evidence from a regression discontinuity design. *Journal of Public Economics*, *109*, 76–100.

DG GROWTH. (2015). *TED Structured Dataset (2009-2014), Tenders Electronic Daily, supplement to the Official Journal of the European Union*. Brussels.

Dimulescu, V., Pop, R., & Doroftei, I. M. (2013). Corruption risks with EU funds in Romania. *Romanian Journal of Political Science*, *13*(1), 101–123.

Djankov, S., Montalvo, J., & Reynal-Querol, M. (2008). The curse of aid. *Journal of Economic Growth*, *13*(3), 169–194. doi:10.1007/s10887-008-9032-8

Epstein, R. A., & Sedelmeier, U. (Eds.). (2009). *International influence beyond conditionality: postcommunist Europe after EU enlargement*. London: Routledge.

European Commission. (2003). *A Comprehensive EU Policy Against Corruption*. Brussels.

European Court of Auditors. (2012). *Annual Report on the Implementation of the Budget concerning financial year 2011*. Brussels.

European Court of Auditors. (2013). *Are EU Cohesion Policy funds well spent on roads?* Luxembourg: European Court of Auditors.

Fazekas, M., Chvalkovská, J., Skuhrovec, J., Tóth, I. J., & King, L. P. (2014). Are EU funds a corruption risk? The impact of EU funds on grand corruption in Central and Eastern Europe. In A. Mungiu-Pippidi (Ed.), *The Anticorruption Frontline. The ANTICORRP Project, vol. 2.* (pp. 68–89). Berlin: Barbara Budrich Publishers.

Fazekas, M., Tóth, I. J., & King, L. P. (2013a). *Anatomy of grand corruption: A composite corruption risk index based on objective data* (No. CRCB-WP/2013:02). Budapest: Corruption Research Center Budapest.

Fazekas, M., Tóth, I. J., & King, L. P. (2013b). *Corruption manual for beginners: Inventory of elementary "corruption techniques" in public procurement using the case of Hungary* (No. CRC-WP/2013:01). CRC-WP/2013:01,Corruption Research Centre, Budapest.

Imbens, G. W., & Wooldridge, J. M. (2009). Recent Developments in the Econometrics of Program Evaluation. *Journal of Economic Literature*, *47*(1), 5–86.

Knack, S. (2001). Aid Dependence and the Quality of Governance: Cross-Country Empirical Tests. *Southern Economic Journal*, *68*(2), 310–329. doi:10.2307/1061596

KPMG. (2012). *EU Funds in Central and Eastern Europe. 2011*. Warsaw, Poland: KPMG.

Mauro, P. (1998). Corruption and the composition of government expenditure. *Journal of Public Economics*, *69*, 263–279.

Mungiu-Pippidi, A. (Ed.). (2013). *Controlling Corruption in Europe. The Anticorruption Report 1*. Berlin: Barbara Budrich Publishers.

OECD. (2007). *Integrity in Public Procurement. Good Practice from A to Z*. Paris: OECD.

Pricewaterhouse Coopers. (2013). *Identifying and reducing corruption in public procurement in the EU*. Brussels: PricewaterhouseCoopers and Ecorys.

Shaxson, N., & Christensen, J. (2014). *The Finance Curse. How Oversized Financial Centres Attack Democracy and Corrupt Economies*. Chesham, UK: Tax Justice Network.

Tanzi, V., & Davoodi, H. (2001). Corruption, growth, and public finances. In A. K. Jain (Ed.), *The Political Economy of Corruption* (pp. 89–110). New York: Routledge.

World Bank. (2009). *Fraud and Corruption. Awareness Handbook*. Washington DC: World Bank.

Government Transparency Institute

Web appendix: additional tables and figures

TABLE A1. EU FUNDS USE IN THE EU27, 2009-2014, CONTRACTS ABOVE 125,000 EUR, MARKETS WITH AT LEAST 10 CONTRACTS AWARDED

country	N of contracts awarded	% of contracts funded by the EU	% of spending through EU funded public procurement
AT	13,147	1.4%	1.6%
BE	24,901	7.8%	18.2%
BG	33,023	6.8%	33.9%
CY	4,465	4.7%	8.3%
CZ	27,432	38.8%	18.5%
DE	138,477	5.0%	7.6%
DK	22,553	0.8%	1.4%
EE	7,308	21.9%	14.6%
ES	69,022	13.8%	16.3%
FI	8,729	8.8%	11.0%
FR	391,673	4.9%	9.4%
GR	12,963	29.8%	64.5%
HR	4,056	0.6%	0.3%
HU	28,111	21.8%	62.8%
IE	4,338	8.0%	15.7%
IT	74,579	2.8%	4.6%
LT	32,902	11.7%	5.7%
LU	2,264	9.4%	91.0%
LV	56,036	20.1%	38.8%
NL	22,146	3.5%	1.8%
PL	523,797	8.8%	28.1%
PT	6,145	28.4%	54.7%
RO	86,602	3.8%	29.2%
SE	27,235	1.2%	3.1%
SI	29,707	3.9%	35.3%
SK	12,902	13.1%	38.5%
Total	1,769,902	8.0%	14.0%

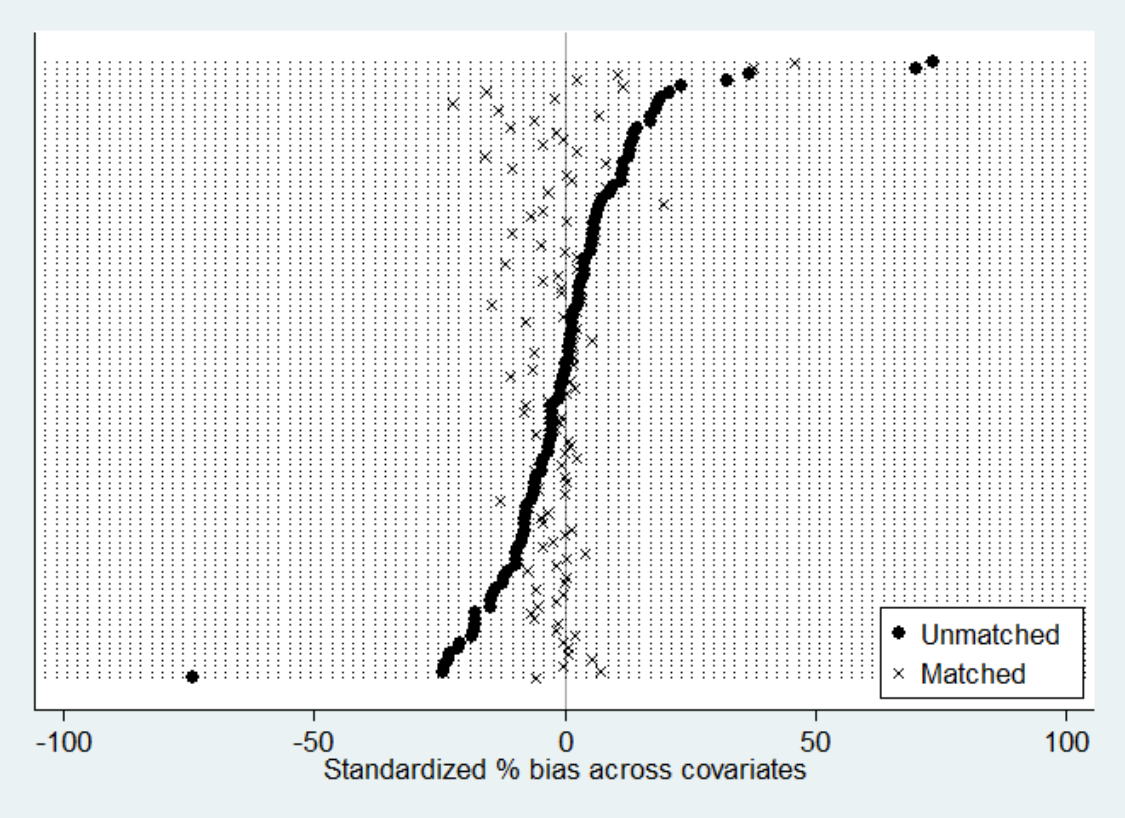
Source: TED

TABLE A2. SUMMARY OF BALANCE IN THE UNMATCHED AND THE TWO MATCHED SAMPLES (USING STATA 12.0 PSTEST COMMAND)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.396	391175	0.000	11.0	7.6	186.5*	1.59	99
propensity score matching (cross-country)	0.070	25682	0.000	5.3	3.3	64.1*	1.83	95
propensity score matching (within country)	0.110	40114	0.000	5.6	3.0	82.0*	1.38	98

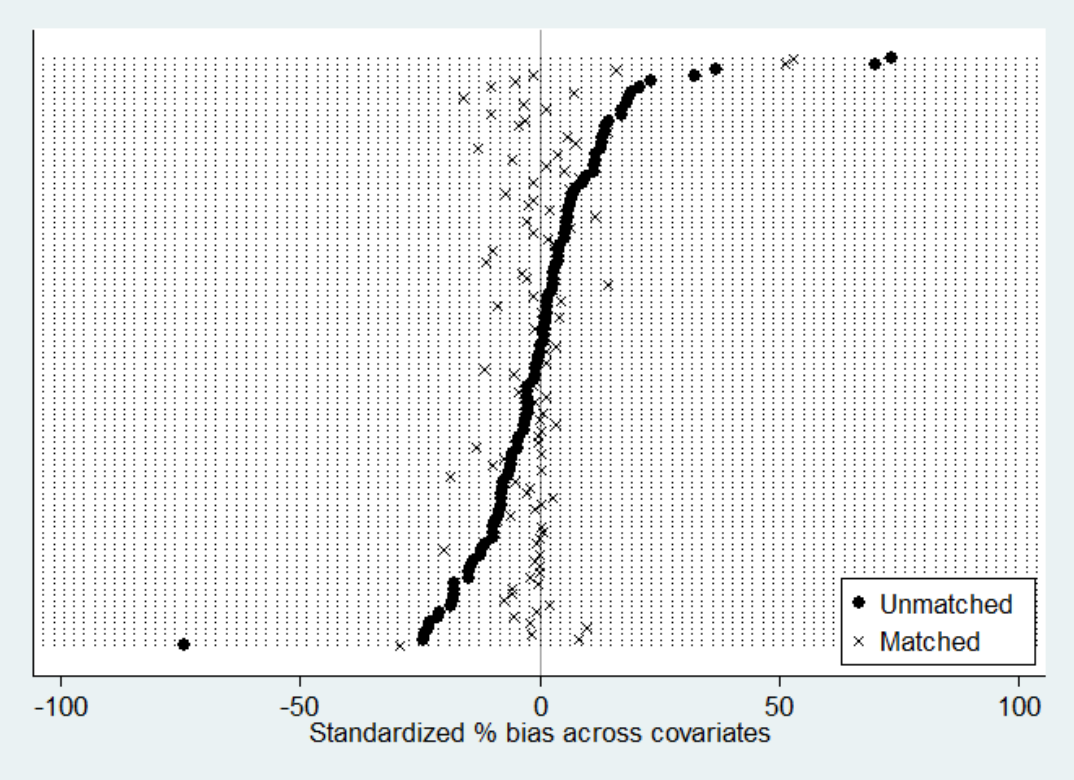
Source: TED

FIGURE A1. OVERVIEW OF BIAS REMAINING AFTER MATCHING PER VARIABLE, PROPENSITY SCORE MATCHING (CROSS-COUNTRY)



Source: TED

FIGURE A2. OVERVIEW OF BIAS REMAINING AFTER MATCHING PER VARIABLE, PROPENSITY SCORE MATCHING (WITHIN COUNTRY)



Source: TED