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Are EU funds a corruption risk?
The impact of EU funds on grand corruption in Central and Eastern Europe

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Abstract[1]

The paper explores the impact of EU funds on institutionalised grand corruption in public procurement between 2009-2012 in three countries: Czech Republic, Hungary, and Slovakia. We analyse a unique pooled database containing contract-level public procurement information for all three countries. We develop a composite corruption risks indicator based on the incidence and logical structure of 'red flags' in individual public procurement transactions. Preliminary findings indicate that EU funds impact institutionalised grand corruption, first, by providing additional public resources available for corrupt rent extraction; second, by changing the motivations for and controls of corruption for the additional resources. Preliminary calculations indicate that the first effect increases the value of particularistic resource allocation by up to 1.21% of GDP, while the second effect decreases it by up to 0.03% of GDP. The latter effect is entirely driven by Slovakia; in Czech Republic and Hungary even this effect increases particularism. Policy recommendations call for radically improving the EU's monitoring and controlling framework.

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1. Introduction

It is hard to miss the 'buzz' around how extensively corruption affects the spending of European Union (EU) funds across many new and old member states: Italian mafia hijacking highway projects, or the European Commission freezing Structural Funds payments in countries such as Romania, Bulgaria, or Hungary. Some of these cases point at 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.

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. Even if only a fraction of these amounts is impacted by corruption, the negative effects are likely to be considerable in terms of mis-investment (e.g. empty highways leading to nowhere) and distorted economic incentives, jeopardizing regional convergence, one of the primary goals of EU funds. If corruption in EU funds spending is indeed connected to high-level politics and organised crime, then ramifications are more severe, impacting political competition, democracy, and social welfare eventually.

Given high – suspected – corruption risks in EU funds spending, especially in CEE, the large sums involved, and the potential negative consequences, this paper sets out to explore the following research question:

> **What is the impact of EU funds spending on institutionalised grand corruption in CEE?**

It focuses on three new EU member states: **Czech Republic, Hungary, and Slovakia** throughout 2009-2012. These three EU member states represent different levels of wealth and development trajectories. Their political institutions differ considerably with Hungary increasingly displaying some authoritarian characteristics lately and generally failing to tackle corruption (Batory, 2012); Slovakia making some progress towards clean government albeit with question marks (Beblavy, 2009), and Czech Republic being one of the good performers of CEE while displaying some signs of a deteriorating situation (Transparency International, 2012). In spite of differences, these countries share a broadly similar post-communist heritage and a relatively homogenous regulatory framework defined by the EU.

2009-2012 constitutes a turbulent period with the global economic crisis unfolding and turning into a sovereign debt crisis in Europe, with the three countries being affected in different ways. There was at least one general election in 2009-2012 in each of these countries. This turbulent environment

provides the perfect setting for testing the robustness of our theory in different political and economic contexts.

EU funds are spent in various forms which make it hard to arrive at a blanket assessment. Therefore, we opted for looking only 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 projects can be compared which are similar in most respects except for the source of financing: predominantly EU or national. Moreover, there is exceptionally good data available on public procurement spending in all three countries on the level of individual contracts for the period.

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 rich detailed picture on the level of individual actors while also being broad enough to evaluate whole systems of governance.

The paper is structured as follows: first, a brief overview of key arguments in the literature is provided; second, the data sources and our new indicators are discussed; third, our hypotheses are assessed; fourth, conclusions and further research directions are offered.

2. 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**[2]. Looking into the broader discussion, there are two potential sources of theoretical underpinning: the broad economic, sociological, and political science literature on aid dependence and the Europeanization literature in political science. These two literatures offer no unambiguous theoretical expectation on whether and how EU funds contribute to the quality of institutions and impact corruption. Rather, what we find is a set of conflicting predictions and mechanisms which need empirical evaluation.

The literature looking at the effect of development aid on quality of institutions and corruption is vast; however, it can be applied to the context of CEE countries and EU funds only with caution due to the greatly different contexts and funding volumes (i.e. EU funding amounts to 3-4% of recipient countries' GDP whereas many developing countries receive aid more than 10% of GDP (Bräutigam & Knack, 2004)). 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 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). Development aid 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 directly destruct domestic administrative capacity by reallocating talented bureaucrats from domestic institutions to aid organisations and by providing additional organisational goals potentially increasing institutional fragmentation. Probably most importantly, development aid increases the pool of public resources available for rent seeking which easily translates into additional corruption in contexts with weak controls of corruption (Bräutigam, 2000). While these causal pathways may work differently in the CEE context, the above arguments may still account for a large part of the mechanisms linking EU funds to corruption in the region. Combining these insights with scholarship specific to CEE and EU governance leads to more robust theoretical underpinnings.

In the Europeanization literature, few would debate that that the **EU contributed to institution building and improvement of governance in CEE countries throughout the accession process** (Epstein & Sedelmeier, 2009). The EU provided the highly popular goal of accession for

[2] Keyword searches using "EU funds" and "corruption" returned not a single article in search engines: Google scholar, Jstor, Wiley online, Business Source Complete, Project Muse, and Sage Journals when searching only in the title. Only the Web of Knowledge database returned an article: (Dimulescu et al., 2013). However, searching in the main text of articles returns a large number of hits. For example, Google scholar found 98400 hits for the same keywords (25/9/2013).

CEE governments and guidance on which institutional improvements should be implemented to reach this goal albeit with varying clarity (Meyer-Sahling, 2011). These resulted in a wealth of reforms of public administration, democratic checks and balances, or financial management.

However, many authors expressed **concerns that CEE countries reversed a range of reforms after accession** and left many EU-supported and/or requested new rules as 'empty shells' (Dimitrova, 2009; Epstein & Sedelmeier, 2009; Mungiu-Pippidi, 2007). These concerns stem from the EU's diminishing leverage to keep new member states in line with principles of good government and the perceived limited embeddedness of many pre-accession reforms. Many of these reforms were either 'implemented' only on paper or created islands of excellence isolated from the rest of public administration (Goetz, 2001).

Similarly to the literature on aid dependency, the Europeanization literature delivers good reasons for believing that **EU funds advance good government**. First, 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) which should, in principle, motivate recipient countries to manage funds well. This argument implies a macro to micro causal mechanism whereby governments in general and national managing authorities in particular, take additional steps to guard the integrity of EU funds spending compared to national spending. Second, the disbursement of EU funds is more heavily regulated, making, in principle, corruption more costly. For example, project management and payments have to be rigorously documented and detailed regulations followed. Heavy administrative and regulatory requirements can also contribute to higher administrative capacity in the recipient organisations as they often have to invest in their capacities to be able to receive and manage EU funds. Third, more extensive monitoring and controls of EU funds also point at potential beneficial effects (Pricewaterhouse Coopers, 2013). Public spending financed from EU funds are subject to EU monitoring in addition to the usual national audit frameworks making detection and punishment of wrongdoing more likely (European Commission, 2003; European Court of Auditors, 2012, 2013). Moreover, the European Court of Justice represents an additional venue for judicial review, making the capture of domestic courts a less effective way of avoiding punishment for corruption.

Similar to the development aid literature, the Europeanization literature also delivers arguments stating that external funding such as **EU funds in CEE deteriorate the quality of government and increase corruption**. There are at least three reasons. First, 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, albeit the direction of causality is far from clear (Mauro, 1998; Tanzi & Davoodi, 2001).

Second, EU funding provides a large additional pool of public resources for rent extraction. Hence, all else being equal, EU funds add to the pool of particularistically allocated public resources (Mungiu-Pippidi, 2013). Third, EU funds, like external funding in developing countries, weaken the link between domestic civil society, taxation, and policy performance. While the relative value of EU funding in CEE countries' budgets is considerably lower than development aid in least developed countries, for particular public organisations the proportion can be extremely high (e.g. in 24.5% of Hungarian issuing bodies between 2009-2012, all the public procurement contracts awarded were financed from EU funds).

In addition to the above broader arguments, preliminary evidence from Hungary (Fazekas, Tóth, & King, 2013a) and Romania (Dimulescu, Pop, & Doroftei, 2013) suggest that corruption in EU funds reaches up to high-level politicians. Therefore, it is conceivable that EU funds, in fact, fuel high-level corruption networks which can simultaneously control business and political positions. This implies that EU funding keeps corrupt elites in power rather than promoting integrity.

From the above discussion, the following hypotheses result: on the one hand,

H_0: EU funds decrease institutionalised grand corruption in CEE,

on the other hand:

H_{A1}: EU funds increase institutionalised grand corruption in CEE.

While the literature doesn't discuss this possibility extensively, theoretically, it is also possible that

H_{A2}: EU funds leave institutionalised grand corruption unchanged in CEE.

In the context of public procurement, institutionalised grand corruption refer 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 (Kaufmann & Vincente, 2011). Particularistic allocation of public resources such as public procurement contracts is one of the principal means of institutionalised grand corruption (Mungiu-Pippidi, 2006; North, Wallis, & Weingast, 2009; Rothstein & Teorell, 2008).

While causal mechanisms cannot be tested one by one in detail, three major effects can be identified and hence will be tested separately: 1) the effect of additional resources represented by EU funding; 2) the effect of different monitoring and incentive structures attached to EU funding; and 3) the spillover effect of managing EU funds in the public administration (unfortunately this third effect could not be tested in this version of the paper, more work is in progress).

The above hypotheses assume a simple, linear relationship between EU funding and corruption which may be an oversimplification of reality. The aid dependency literature touches upon a number

of crucial factors mediating the effect of external funding on institutional quality. Among these, the most essential is prior quality of government in the recipient countries (Moss, Pettersson, & van de Walle, 2006). Extrapolating from this argument, it is also possible that EU spending's effect on corruption depends on the level of corruption and administrative capacity in the recipient organisations. We will return to this consideration in light of the empirical findings.

3. Data and Variables

3.1. Data Sources

The database derives from public procurement announcements of 2009-2012 in Czech Republic, Hungary, and Slovakia (this database is called Public Procurement Comparative database, referred to as **PPC** henceforth). The data represent a complete database of all public procurement procedures conducted under national public procurement laws. PPC contains variables appearing in 1) calls for tenders, 2) contract award notices, 3) contract modification notices, and 4) administrative corrections notices. As not all of these kinds of announcements appear for each procedure, for example depending on procedure type, we only have the information deriving from contract award notices consistently across every procedure. All the countries' public procurement legislation is within the framework of the EU Public Procurement Directive and hence is, by and large, comparable. Utilization of certain regulatory tools are different, nevertheless, which provides useful variability for later analysis.

The data derives from official government online sources in each country (Table 1). As there is no readily available database, we used a crawler algorithm to capture every announcement available online. Then, applying a complex automatic and manual text mining strategy, we created a structured database which contains variables with well-defined categories. As the original texts available online contain a range of errors, inconsistencies, and omissions, we applied several correction measures to arrive at a database of sufficient quality for scientific research[3]. For a full description of database development, see Soudek & Skuhrovec (2013) on the Czech Republic, Fazekas & Tóth (2012a, 2012b) on Hungary, and Transparency International Slovakia (2009) on Slovakia.

[3] For example, contract award announcements and calls for tenders are directly linked through a unique procedure ID in the Czech Republic only. Whereas in Hungary and Slovakia, the announcements refer to each other in varying formats making our linking procedure imperfect.

Table 1. Primary sources of public procurement data and minimum thresholds

Country	Source of PPC data	URL	Minimum thresholds (EUR)[4]
Czech Republic	Ministerstvo pro místní rozvoj ČR	http://www.isvzus.cz/usisvz/	39,000
Hungary	Közbeszerzési Értesítő	http://www.kozbeszerzes.hu/	27,300
Slovakia	Úrad pre verejné obstarávanie	http://www.uvo.gov.sk/sk/vestnik	30,000

A potential limitation of PPC is that it only contains information on public procurement procedures under national public procurement laws as there is no central depository of other contracts. The law defines the minimum estimated contract value for its application depending on the type of announcing body and the kind of products or services to be procured (see for example Table 1). By implication, PPC is a biased sample of total public procurement of these countries, containing only the larger and more heavily regulated cases. This bias makes PPC well suited for studying more costly and higher stakes corruption where coverage is close to complete. Although, as removing contracts from the remit of the Public Procurement Law can in itself be part of corrupt strategies there remains some non-random bias in the data. This bias is, however, estimated to be small based on Hungarian data, where the linear correlation between the proportion of procurement spending not reported in the Public Procurement Bulletin and the public agency's average corruption risk index is small and negative (r=-0.12) (Fazekas, Tóth, & King, 2013c).

As **contract award notices** represent the most important part of a procedure's life-cycle and they are published for each procedure under national public procurement laws, their statistics are shown in Table 2 to give an overview of the database. In spite of the relative similarity of thresholds for applying national public procurement laws, the three countries have very different proportions of transparent public procurement spending to total GDP (see last row in Table 2). On the one hand, this is due to the use of exceptions, most notably in Hungary, and announcing contract awards in

[4] Thresholds refer to 2012, classical issuers, in services sector. National currencies are converted to EUR using official exchange rates of 5/2/2013 of the European Central Bank.

the official journal even if they would fall outside the remit of the law, most typically in the Czech Republic. On the other hand, this is due to the different total amounts spent on public procurement in the three countries whereby Hungary spends the least (OECD, 2013).

Table 2. Main statistics of the analysed data by country, total public procurement spending, 2009-2012

	Czech Republic	Slovakia	Hungary	Total
Total number of contracts awarded (with valid contract value)	46945	20841	51231	119017
Total number of unique winners	11015	4912	10739	26666
Total number of unique issuers	5838	2069	5171	13078
Combined value of awarded contracts (million EUR)*	41591	22947	12514	77052
Combined value of awarded contracts (% GDP)**	6.9%	8.5%	3.2%	6.1%

Source: PPC

*Notes: * Exchanged into EUR using average monthly exchange rate of the contract award, not corrected for inflation;** GDP figures are from Eurostat (GDP at market prices).*

3.2. Variables used in the analysis

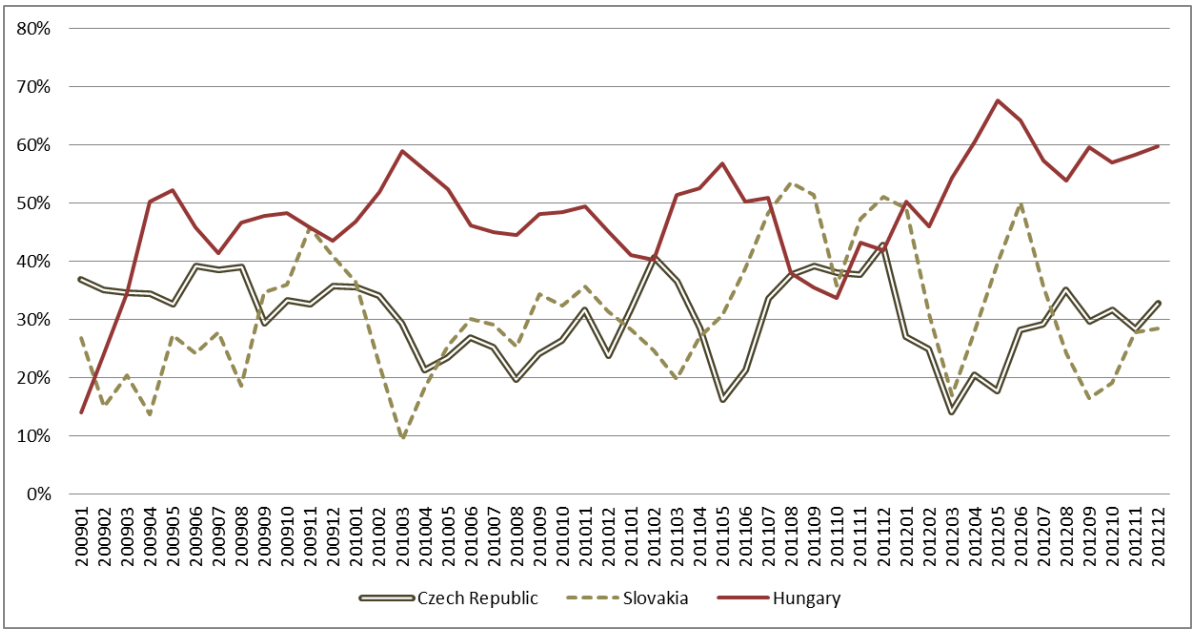
3.2.1. EU funds use

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 (this latter information will only be used at a later research stage as it requires text mining procedures for precise program identification). However, no information is published as to the proportion of EU funding within the total contract value. Hence, we had to employ a simplistic **yes-no categorisation of each contract awarded**. In most cases, regulation allows for the EU contribution to cover 80-95% of total investment. Data from large investment projects indicate that EU funds amount to the majority of project costs if EU funding is involved. Our approach nevertheless implies that throughout this paper, EU funding figures also include some national co-financing of between 5-20%.

Contrary to popular perceptions, public procurement from EU funds does not fall under a different procedural regime. The same procurement rules and thresholds apply regardless of funding source. **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 procurement procedures funded from EU funds and by national governments lies in additional monitoring and controls and different motivation structures associated with spending EU funds.

The three countries have made use of EU funding in their procurement spending to varying degrees with Hungary spending most extensively (**Hiba! Érvénytelen könyvjelző-hivatkozás.**).

Figure 1. Proportion of contract value making use of EU funding to total contract value, 2009-2012, by country (% of total contracted value*, 3-month rolling averages)



Source: PPC

*Notes: * contract values are converted to EUR using the average exchange rate of the month of contract award, and they are corrected for inflation differentials across the 3 countries. Values are in 2009 Slovak EUR.*

3.2.2. Indicators of institutionalised grand corruption

Developing comparative indicators of institutionalised grand corruption in public procurement for all three countries represent the primary methodological innovation of this article. The approach follows closely the composite indicator building methodology developed by the authors (Fazekas et al., 2013b) making use of a wide range of elementary indicators of corruption in public procurement

deriving from a review of international academic and policy literature, key informant interviews in Hungary, and content analysis of the Hungarian media (Fazekas, Tóth, & King, 2013c).

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 bent or broken. By implication, it is possible to identify the input side of the corruption process, that is techniques used for limiting competition (e.g. leaving too little time for bidders to submit their bids), and also the output side of corruption, that is signs of limited competition (e.g. a single bid received). By measuring the degree of unfair restriction of competition in public procurement, an indirect indicator of corruption can be obtained. This indicator, called **corruption risk index (CRI) represents the probability of particularistic contract award and delivery in public procurement** falling between 0 and 1.

The variables describing the input side of the corruption process in public procurement, that is **elementary corruption techniques**, are reported in **Hiba! Érvénytelen könyvjelző-hivatkozás.**. There is a more complete list of conceivable and measurable elementary corruption indicators (see Fazekas et al., 2013c); however for the purposes of comparability only a subset is used in this paper. Indicators are grouped according to the phase of the procurement process they relate to. This is a work in progress; data will be processed for 2-3 additional elementary corruption risk indicators in each country.

Table 3. Summary of elementary corruption risk indicators

Proc. phase	Indicator name	Indicator values	availability CZ	HU	SK
submission	Single bidder contract (valid/received)	1=1 bid received 0=more than 1 bid received	x	x	x
	Call for tenders not published in official journal	1=NO call for tender published in official journal 0=call for tender published in official journal	x	x	x
	Procedure type	0 =open procedure 1=invitation/restricted procedure 2=negotiation procedure 3=other/framework procedures 4=outside PP law 5=missing/erroneous procedure type	x	x	x
	Call for tender modification	1=modified call for tenders 0=NOT modified call for tenders	x	x	
	Length submission period	Number of days between the publication of call for tenders and the submission deadline (for short submission periods weekends are deducted)	x	x	x
assessment	Number of evaluation criteria	number of distinct evaluation criteria (separate rows)	x	x	
	Length of decision period	number of days between submission deadline and announcing contract award	x	x	x
overall	winner contract share	12-month total contract value of winner / 12-month total awarded contract value (by issuer)	x	x	x
Number of components			*8*	*8*	*6*

Source: PPC

Component weights are assigned to elementary corruption risk indicators using a set of regressions directly modelling corrupt rent extraction in public procurement (Table 4 and Table 5). In

these regressions, two likely corrupt outcomes of the corruption process: 1) single bidder contracts and 2) winner's share of issuer's contracts are regressed on elementary corruption risk indicators (Table 3)[5] and variables controlling for alternative explanations:

- low administrative capacity: number of employees of the issuer,
- institutional endowments: type of issuer,
- market specificities: CPV division of products procured (2 digit level),
- number of competitors on the market: number of unique winners throughout 2009-2012 on CPV level-3 product group (4 digit level) and NUTS-1 geographic region,
- contract size and length, and
- regulatory changes: year of contract award;

and using a restricted sample in order for the regressions to adequately fit a corrupt rent extraction logic as opposed to market specificities or inexperience with public procurement:

- markets with at least 3 unique winners throughout 2009-2012 for markets defined by cpv (level 3) and nuts (level 1) categories for each country; and
- issuers awarding at least 3 contracts in the 12 months period prior to the contract award in question.

For continuous variables such as the length of submission period, **thresholds** had to be identified in order to reflect the non-linear character of corruption. This was done in two steps in each country. First, the above regression models were fit using the continuous version of the variable and the residual distribution was analysed in order to identify distinct patterns lending themselves to categorisation; second, the same regression models were re-estimated using the categorical version of the continuous variable and the residual distribution checked for remaining patterns. If some systemic error remained, further categories were introduced. As a result thresholds are different for each country. These differences can be interpreted as reflections on different regulatory and market conditions. For example, submission period thresholds differ per country, year, and procedure type, primarily because the legally permissible submission period lengths and the degree to which actors abide by these rules greatly differ.

[5] Note that 'single bidder' is a variable which both constitutes an output and input of the a particularistic allocation process. It is an output in as much as it signals the lack of competition; while it is an input in as much as it serves as a means of recurrently awarding the contract to the same company.

Regression results indicate that there is considerable market access restriction, hence likely institutionalised grand corruption, going on in all three countries during the 2009-2012 period, by and large following the same techniques and 'tricks' (Table 4 and Table 5). These results on their own demonstrate that corruption is systemic in public procurement in these countries. Arriving at robust regression models with considerable explanatory power (pseudo R^2 between 0.11 and 0.30 for binary logistic regressions; and R^2 between 0.19 and 0.29 for linear regression) by using the same regression set-up and variables point at the feasibility of cross-country measurement.

While there is not enough space to discuss each variable in detail, some examples show the logic of analysis and our approach to interpretation. In the **Czech Republic**, the modification of the call for tenders is associated with a 0.6% higher probability of receiving a single bid and with a 1.5% higher winner's contract share. Both results point at a likely interpretation that modifying call for tenders during the bidding phase is systematically used for restricting access and recurrently benefiting the same company. This result warrants that the modification of call for tenders will be part of the Czech CRI. In **Slovakia**, not publishing the call for tenders in the official journal is associated with 9.0% higher probability of a single bidder contract award and a 1.3% higher winner's contract share. Both results suggest that avoiding the transparent and easily accessible publication of a new tender can typically be used for limiting competition to recurrently benefit a particular company. This implies that call for tenders not published in the official journal becomes part of the Slovak CRI. In **Hungary**, leaving only 5 or fewer days, inclusive the weekend, for bidders to submit their bids is associated with 20% higher probability of a single bidder contract and with a 7.9% higher winner's contract share compared to periods longer than 20 calendar days. These indicate that extremely short submission periods are often used for limiting competition and awarding contracts recurrently to the same company. Once again, this provides sufficient grounds for including this category in the Hungarian CRI.

Following this logic, 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 in at least one of the two regressions for each country[6].

[6] Being significant and of substantive size in only one of the two regressions is a sufficient condition for inclusion in the CRI of the given country because some corruption techniques are most typically used during the bidding phase or at later phases. Recall that single received bid is a likely corrupt outcome of the bidding phase while the winner's contract share is indicative of corrupt outcomes for the whole public procurement process.

Table 4. Binary logistic regression results on contract level, 2009-2012, by country, average marginal effects, for markets where nr. of winners >=3

Dependent var: single bidder contract (1), multi-bidder contract (0)					
Independent vars-CZ	CZ	Independent vars-SK	SK	Independent vars-HU	HU
NO call for tenders in off. journal	0.116***	**NO call for tenders in off. journal**	0.091***	**NO call for tenders in off. journal**	0.098***
P(Fisher)	0.000	P(Fisher)	0.002	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
procedure type		**procedure type**		**procedure type**	
ref. cat.=open procedure		ref. cat.=open procedure		ref. cat.=open procedure	
1=invitation procedure	-0.042***	1=invitation procedure	0.01	1=invitation procedure	0.082***
P(Fisher)	0.126	P(Fisher)	0.796	P(Fisher)	0.212
P(permute)	0.000	P(permute)	0.575	P(permute)	0.000
2=negotiation procedure	0.4***	2=negotiation procedure	0.498***	2=negotiation procedure	0.074***
P(Fisher)	0.000	P(Fisher)	0.000	P(Fisher)	0.001
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
3=outside PP law	-0.087***	3=other procedure types	0.344***	3=other procedure types	0.276***
P(Fisher)	0.000	P(Fisher)	0.000	P(Fisher)	0.000
P(permute)	0.435	P(permute)	0.000	P(permute)	0.000
4=other/missing/erroneous procedure typ	-0.049	4=outside PP law	-0.029	4=missing/error	0.025***
P(Fisher)	0.278	P(Fisher)	0.629	P(Fisher)	0.171
P(permute)	1.000	P(permute)	0.190	P(permute)	0.000
modification of call for tenders	0.006***	**modification of call for tenders**	n.a.	**modification of call for tenders**	n.a.
P(Fisher)	0.747				
P(permute)	0.000				
short submission period		**short submission period**		**short submission period**	
ref.cat.=s.period>55*		ref.cat.= s.period>25		ref.cat.=s.period>20	
1= 47<s.period<=55	0.044***	1= 14<s.period<=25	0.078***	1= 17<s.period<=20	0.001
P(Fisher)	0.060	P(Fisher)	0.011	P(Fisher)	0.944
P(permute)	0.000	P(permute)	0.000	P(permute)	0.875
2= 43<s.period<=47	0.067***	2= s.period<=14	0.02	2= 5<s.period<=14	0.103***
P(Fisher)	0.014	P(Fisher)	0.776	P(Fisher)	0.005
P(permute)	0.000	P(permute)	0.680	P(permute)	0.000
3= 38<s.period<=43	0.05***	3= missing	0.064	3= 0<s.period<=5 (incl.weekend)	0.2***
P(Fisher)	0.049	P(Fisher)	0.657	P(Fisher)	0.002
P(permute)	0.000	P(permute)	0.600	P(permute)	0.000
4= 27<s.period<=38	0.007			4=missing	0.05***
P(Fisher)	0.811			P(Fisher)	0.213
P(permute)	0.440			P(permute)	0.000
5= 0<s.period<=27	0.009				
P(Fisher)	0.734				
P(permute)	0.230				
6=missing submission period	-0.053				
P(Fisher)	0.559				
P(permute)	0.455				
number of assessment criteria		**number of assessment criteria**	n.a.	**number of assessment criteria**	
ref.cat.= nr.of criteria=0				ref.cat.=2<nr.of criterioa<=4	
1= 0<nr.of criteria<=2	0.053			1=nr.of criterioa=0	0.053***
P(Fisher)	0.014			P(Fisher)	0.014
P(permute)	1.000			P(permute)	0.000
2= 2<nr.of assessment criteria<=8	-0.006***			2= 0<nr.of criterioa<=2	0.087***
P(Fisher)	0.772			P(Fisher)	0.003
P(permute)	0.000			P(permute)	0.000
3= 8<nr.of criteria	0.009			4= 4<nr.of criterioa	0.068***
P(Fisher)	0.713			P(Fisher)	0.007
P(permute)	0.520			P(permute)	0.000
length of decision period		**length of decision period**		**length of decision period**	
ref.cat.= 113<dec.period<=201		ref.cat.=62<dec.period<=120		ref.cat.= 44<dec.period<=182	
1= 0<dec.period<=54	0.212	1= 0<dec.period<=62	0.127***	1= 0<dec.period<=32	0.14***
P(Fisher)	0.000	P(Fisher)	0.000	P(Fisher)	0.000
P(permute)	0.470	P(permute)	0.000	P(permute)	0.000
2= 54<dec.period<=67	0.111***	3= 120<dec.period<=227	0.134***	2= 32<dec.period<=44	0.056***
P(Fisher)	0.000	P(Fisher)	0.034	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
3= 67<dec.period<=100	0.083***	4= 227<dec.period<=322	0.16***	4= 182<dec.period	0.16***
P(Fisher)	0.000	P(Fisher)	0.016	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
4= 100<dec.period<=113	0.053***	5= 322<dec.period	0.173***	missing	-0.045***
P(Fisher)	0.010	P(Fisher)	0.698	P(Fisher)	0.179
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
6= 201<dec.period	0.075***	6= missing	0.047		
P(Fisher)	0.003	P(Fisher)	0.000		
P(permute)	0.000	P(permute)	0.550		
7= missing decision period	0.128				
P(Fisher)	0.521				
P(permute)	1.000				
constant included in each regression control variables: type of issuer, number of employees, product market; number of winners on the market; year of contract award; log contract value; contract length					
N	39423		16957		32006
Pseudo-R2	0.295		0.231		0.108

*Source: PPC; Note: * p<0.05; ** p<0.01; *** p<0.001; clustered standard errors clustered by issuer for P(Fisher), Monte Carlo random permutation simulations for P(permute) (200 permutations) using stata 12.0*

Table 5. Ordinary least squares regression results on contract level, 2009-2012, by country, average marginal effects, for markets where nr. of winners >=3

Dependent var: winner's contract share in the last 12 months					
Independent vars-CZ	CZ	Independent vars-SK	SK	Independent vars-HU	HU
single bidder contract	0.032***	**single bidder contract**	0.021***	**single bidder contract**	0.02***
P(Fisher)	0.00	P(Fisher)	0.021	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
NO call for tenders in off. journal	-0.002***	**NO call for tenders in off. journal**	0.013	**NO call for tenders in off. journal**	0.021***
P(Fisher)	0.869	P(Fisher)	0.320	P(Fisher)	0.005
P(permute)	0.000	P(permute)	0.055	P(permute)	0.000
procedure type		**procedure type**		**procedure type**	
ref. cat.=open procedure		ref. cat.=open procedure		ref. cat.=open procedure	
1=invitation procedure	0.015***	1=invitation procedure	0.099***	1=invitation procedure	-0.037***
P(Fisher)	0.000	P(Fisher)	0.000	P(Fisher)	0.205
P(permute)	0.000	P(permute)	0.000	P(permute)	0.005
2=negotiation procedure	0.01***	2=negotiation procedure	-0.014	2=negotiation procedure	0.011***
P(Fisher)	0.000	P(Fisher)	0.347	P(Fisher)	0.299
P(permute)	0.000	P(permute)	0.115	P(permute)	0.025
3=outside PP law	-0.009***	3=other procedure types	0.054***	3=other procedure types	0.03***
P(Fisher)	0.290	P(Fisher)	0.008	P(Fisher)	0.001
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
4=other/missing/erroneous procedure typ	0.004***	4=outside PP law	-0.003	4=missing/error	-0.005
P(Fisher)	0.000	P(Fisher)	0.942	P(Fisher)	0.417
P(permute)	0.000	P(permute)	0.820	P(permute)	0.275
modification of call for tenders	0.015***	**modification of call for tenders**	n.a.	**modification of call for tenders**	n.a.
P(Fisher)	0.328				
P(permute)	0.000				
short submission period		**short submission period**		**short submission period**	
ref.cat.=s.period>55*		ref.cat.= s.period>25		ref.cat.=s.period>20	
1= 47<s.period<=55	-0.009***	1= 14<s.period<=25	0.016	1= 17<s.period<=20	0.014***
P(Fisher)	0.402	P(Fisher)	0.517	P(Fisher)	0.026
P(permute)	0.000	P(permute)	0.170	P(permute)	0.000
2= 43<s.period<=47	0.016***	2= s.period<=14	0.036	2= 5<s.period<=14	0.05***
P(Fisher)	0.252	P(Fisher)	0.559	P(Fisher)	0.149
P(permute)	0.000	P(permute)	0.210	P(permute)	0.000
3= 38<s.period<=43	-0.016***	3= missing	-0.019	3= 0<s.period<=5 (incl.weekend)	0.079***
P(Fisher)	0.160	P(Fisher)	0.613	P(Fisher)	0.073
P(permute)	0.000	P(permute)	0.845	P(permute)	0.000
4= 27<s.period<=38	-0.005			4=missing	-0.01***
P(Fisher)	0.664			P(Fisher)	0.683
P(permute)	0.735			P(permute)	0.485
5= 0<s.period<=27	-0.005***				
P(Fisher)	0.657				
P(permute)	0.000				
6=missing submission period	0.155**				
P(Fisher)	0.034				
P(permute)	0.010				
number of assessment criteria		**number of assessment criteria**	n.a.	**number of assessment criteria**	
ref.cat.= nr.of criteria=0				ref.cat.=2<nr.of criterioa<=4	
1= 0<nr.of criteria<=2	-0.01			1=nr.of criterioa=0	-0.01***
P(Fisher)	0.144			P(Fisher)	0.144
P(permute)	1.000			P(permute)	0.010
2= 2<nr.of assessment criteria<=8	0.014			2= 0<nr.of criterioa<=2	-0.005***
P(Fisher)	0.293			P(Fisher)	0.622
P(permute)	0.610			P(permute)	0.430
3= 8<nr.of criteria	0.092*			4= 4<nr.of criterioa	0.022*
P(Fisher)	0.002			P(Fisher)	0.053
P(permute)	0.040			P(permute)	0.000
length of decision period		**length of decision period**		**length of decision period**	
ref.cat.= 113<dec.period<=201		ref.cat.=62<dec.period<=120		ref.cat.= 44<dec.period<=182	
1= 0<dec.period<=54	0.006	1= 0<dec.period<=62	0.033***	1= 0<dec.period<=32	0.013
P(Fisher)	0.507	P(Fisher)	0.113	P(Fisher)	0.066
P(permute)	0.365	P(permute)	0.000	P(permute)	1.000
2= 54<dec.period<=67	0.008**	3= 120<dec.period<=227	-0.001	2= 32<dec.period<=44	0.017***
P(Fisher)	0.430	P(Fisher)	0.368	P(Fisher)	0.026
P(permute)	0.010	P(permute)	0.830	P(permute)	0.000
3= 67<dec.period<=100	0.011***	4= 227<dec.period<=322	0.016	4= 182<dec.period	0.047***
P(Fisher)	0.235	P(Fisher)	0.496	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.205	P(permute)	0.000
4= 100<dec.period<=113	0.03***	5= 322<dec.period	0.014	missing	0.026***
P(Fisher)	0.016	P(Fisher)	0.114	P(Fisher)	0.063
P(permute)	0.000	P(permute)	0.115	P(permute)	0.000
6= 201<dec.period	0.001	6= missing	-0.039		
P(Fisher)	0.910	P(Fisher)	0.000		
P(permute)	0.270	P(permute)	0.370		
7= missing decision period	-0.11				
P(Fisher)	0.005				
P(permute)	1.000				
constant included in each regression control variables: type of issuer, number of employees, product market; number of winners on the market; year of contract award; log contract value; contract length					
N	26830		12847		20658
Pseudo-R2	0.294		0.185		0.234

*Source: PPC; Note: * p<0.05; ** p<0.01; *** p<0.001; clustered standard errors clustered by issuer for P(Fisher), Monte Carlo random permutation simulations for P(permute) (200 permutations) using stata 12.0*

Once the list of elementary corruption risk indicators is determined with the help of the above regressions (note that corruption outcomes are also part of this list even though they don't have regression coefficients), each of the variables and their categories receive a component weight (**Table 6**). 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 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 sizes. The component weights are normed so that the observed CRI falls between 0 and 1.

The strength of this composite indicator approach is that the individual components of CRI are vulnerable to changes in regulation, competitive environment, or elite power balance on their own, but taken together they are a more **robust proxy of legal corruption over time**.

In an international comparative perspective, a further strength of CRI is that it **balances national specificities with international comparability**. On the one hand, it provides a comparative indicator in as much as the logic of indicator building and the underlying indicators are the same in each country (of course, as much as data availability permits, further work is in progress). On the other hand, component weights and variable category thresholds (e.g. the definition of accelerated procedure in terms of submission period length differs by country and year) reflect the different national contexts. The same overall scale of country level CRI (i.e. 0-1) lends some meaning to the 'which country is more corrupt' question; nevertheless, the primary purpose of the measurement exercise is to go beyond simplistic understandings of corruption and explore the structure of corruption within each context.

Table 6. Component weights of CRI reflecting variable and category impact on corruption outcomes, normed to have an overall sum of 1

Czech Republic		Slovakia		Hungary	
variable	weight	variable	weight	variable	weight
single bid	0.16	**single bid**	0.17	**single bid**	0.15
NO call for tenders published in o. journal*	0.16	**NO call for tenders published in o. journal***	0.17	**NO call for tenders published in o. journal***	0.15
Procedure type		**Procedure type**		**Procedure type**	
open	0.00	open	0.00	open	0.00
invitation	0.00	invitation	0.06	invitation	0.11
negotiation	0.16	negotiation	0.17	negotiation	0.07
outside pp law	0.00	other/framework	0.11	other	0.15
other/missing/error	0.00	outside pp law	0.00	missing/error	0.04
		missing/error	0.00		
Modification of call for tenders	0.16	**Modification of call for tenders**	n.a.	**Modification of call for tenders**	0.00
Length of submission period		**Length of submission period**		**Length of submission period*** **	
s.period>55**	0.00	s.period>25	0.00	s.period>20	0.00
47<s.period<=55	0.08	14<s.period<=25	0.17	17<s.period<=20	0.04
43<s.period<=47	0.16	s.period<=14	0.08	5<s.period<=14	0.11
38<s.period<=43	0.12	missing	0.00	0<s.period<=5 (incl.weekend)	0.15
27<s.period<=38	0.04			missing	0.07
0<s.period<=27	0.04				
missing	0.00				
Number of assessment criteria		**Number of assessment criteria**	n.a.	**Number of assessment criteria**	
nr.of criteria=0	0.00			nr.of criteria=0	0.05
0<nr.of criteria<=2	0.00			0<nr.of criteria<=2	0.10
2<nr.of criteria<=8	0.00			2<nr.of criteria<=4	0.00
8<nr.of criteria	0.16			4<nr.of criteria	0.15
missing	0.00			missing	0.00
Length of decision period		**Length of decision period**		**Length of decision period**	
0<dec.period<=54	0.16	0<dec.period<=62	0.17	0<dec.period<=32	0.10
54<dec.period<=67	0.12	62<dec.period<=120	0.00	32<dec.period<=44	0.05
67<dec.period<=100	0.08	120<dec.period<=227	0.04	44<dec.period<=182	0.00
100<dec.period<=113	0.04	227<dec.period<=322	0.08	182<dec.period	0.15
113<dec.period<=201	0.00	322<dec.period	0.13	missing	0.00
201<dec.period	0.08	missing	0.00		
missing	0.12				
Winner contract share	0.16	**Winner contract share**	0.17	**Winner contract share**	0.15

** for procedures with missing call for tenders, component weights are proportionately increased to account for missing information on variables: 1) modification of call for tenders; 2) length of submission period; and 3) length of decision period.*

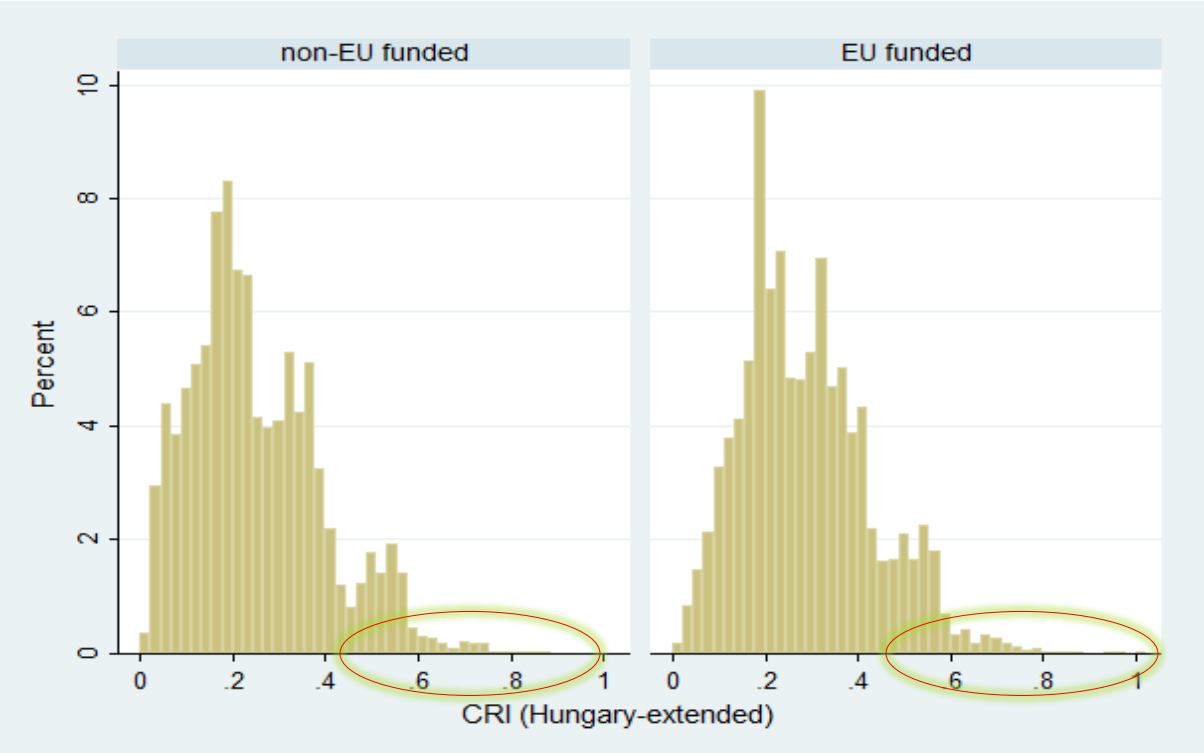
*** for invitation procedures: submission period>31*

**** exact thresholds deviate from the given numbers depending on the year and procedure type, for full description see (Fazekas et al., 2013c)*

Applying the weights specified in **Table 6**, each contract receives a corruption risk index (CRI) falling into a 0 – 1 band, where 0 indicates the lowest observed probability of corruption (i.e. every component takes the value of 0); and 1 indicates the highest observed probability of corruption. The latter is lower than the theoretically possible highest probability of corruption (i.e. every component takes the value of 1) which reflects the observation that it is certainly not necessary to employ all the possible 'corruption techniques' for rendering a project fully corrupt, rather only a subset of them. This definition of the CRI scale allows it to be interpreted as a probability of institutionalised grand corruption to occur.

For example, in Hungary throughout 2009-2012, there are very few contracts with CRI higher than 0.6 (**Hiba! Érvénytelen könyvjelző-hivatkozás.**). The distribution of contracts does not deviate extensively from a normal distribution (CRIs based on fewer elementary indicators follow less neat distributions), albeit it has a long tail to the right. These contracts with CRI higher than 0.6 represent particularly high corruption risks. As a precursor for latter analysis, it is worth noticing the somewhat different distributions of EU and non-EU funded procurement procedures in Hungary

Figure 2. Frequency distribution of winning Hungarian public procurement procedures according to CRI, 2009[7]-2012, N=39142



Source: PPC

[7] In order to calculate CRI for 2009 where the 12-month values of the winner's share within issuer's contracts is not available we had to input this variable using model 5 in **Hiba! A hivatkozási forrás nem található.**.

While the principal demonstration of **validity** of CRI is to be found in the regressions directly modelling corrupt rent extraction in public procurement, external validity tests are also constructed by using other 'objective' indicators of high-level corruption. For example, **in Hungary, companies owned or managed by political office holders have a significantly higher CRI** (CRI difference=0.01, approximately one standard deviation). There are further validity tests using company profitability, turnover growth and the dependence of winning companies' contract volumes on which government is in power, each pointing at the robust validity of CRI (Fazekas et al., 2013b).

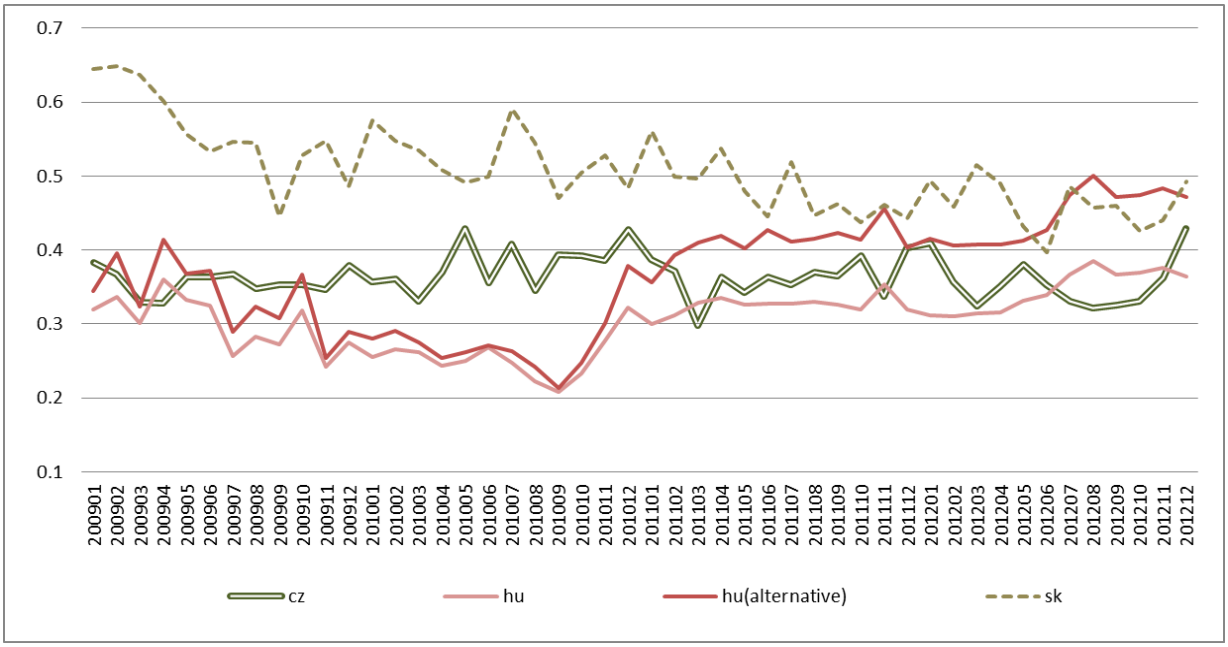
In a comparative perspective, CRI of the average contract awarded can be calculated for each country even for short periods such as months (**Figure 3**). This aggregate CRI comes closest to frequently used subjective indicators of the prevalence of corruption. Monthly average CRIs allow for **tracking the countries' changing corruption performance over time**: albeit starting from a much higher level, Slovakia appears to permanently improve its performance; Czech Republic remains largely stable; while Hungary greatly deteriorates since the May 2010 change of government. As a result of these movements, the three countries have somewhat converged in terms of their average level of grand corruption.

There are two alternative CRI lines for Hungary as the new government greatly decreased transparency in public procurement, for example by loosening the requirement for publishing call for tenders, and there are alternative ways of taking this change into account. The lower corruption risk path ignores missing variables due to non-published calls for tenders and re-weights components in order to take into account only the non-missing information; while the higher corruption risk path assumes that the non-published calls for tenders are as corrupt as the worst published call for tenders. While there is no data available to test which assumption is more appropriate, interview evidence points out that deliberate decreases in transparency are associated with high levels of corruption (Fazekas et al., 2013c).[8]

Depicting data only on markets with at least three competitors (i.e. three different companies which have won at least one procurement contract on the market) corrects for the small market and small country biases by removing them from the sample. Only looking at issuers who have awarded at least 3 procurement contracts in the 12 months preceding the contract award analysed, assures that data from issuers with little experience in public procurement does not bias the results.

[8] While the scale of decreasing transparency clearly sets Hungary apart, the same arguments apply to the two other countries as they have many tenders submitted without a published call for tenders. Nevertheless, the difference between alternative calculations is only small in their case.

Figure 3. Average CRI of the representative contract awarded, by country and month, 2009-2012 (markets with at least three competitors, issuers with at least three contracts awarded over 12 months), N_{cz}=39445, N_{hu}=39367, N_{sk}=16986



Source: PPC

4. Corruption Risks and particularistic allocation of EU funding

EU funds can exert influence on institutionalised grand corruption in CEE countries in two principal ways: **first, by providing additional funding for public investment hence increasing the pool of potential rents to earn; second, by changing the motivation structure and constraints of corrupt networks**. Motivations and constraints of corruption are different for EU Structural and Cohesion Funds because monitoring may be more intense and thorough, and because national accountability mechanisms may work in a different way when funding comes from outside. The first approach focuses attention on increased amount of spending, whereas the second on the different motivations for and controls of corruption.

4.1. Corruption risks of spending more

Institutionalised grand corruption thrives on public resources, especially on public resources whose allocation can be influenced to benefit a small circle of businessmen and politicians without restraint (Auriol, Flochel, & Straub, 2011; Goldman, Rocholl, & So, 2013; Soreide, 2002). Hence, by increasing the overall value of public procurement spending, corruption risks and corrupt rent extraction increase, unless they are offset by more stringent controls of corruption. This section estimates the increase in corruption risks due to increased spending only while holding motivations and controls, that is average corruption risks, constant.

As EU regulation prescribes that EU Structural and Cohesion Funds should represent additional spending rather than substituting national spending (European Council, 2006), we assumed 100% additionality, including national co-financing. This means that every euro of EU funding spent in public procurement is considered to come on top of nationally funded public procurement.

Changes in overall prevalence of corruption due to the increased amount of spending are approximated by the expected value of EU funds allocated in a particularistic way, where this expected value is calculated by relying on expected value theory (Kahneman & Tversky, 1979):

Expected total value of particularistic resource allocation (EUR) =

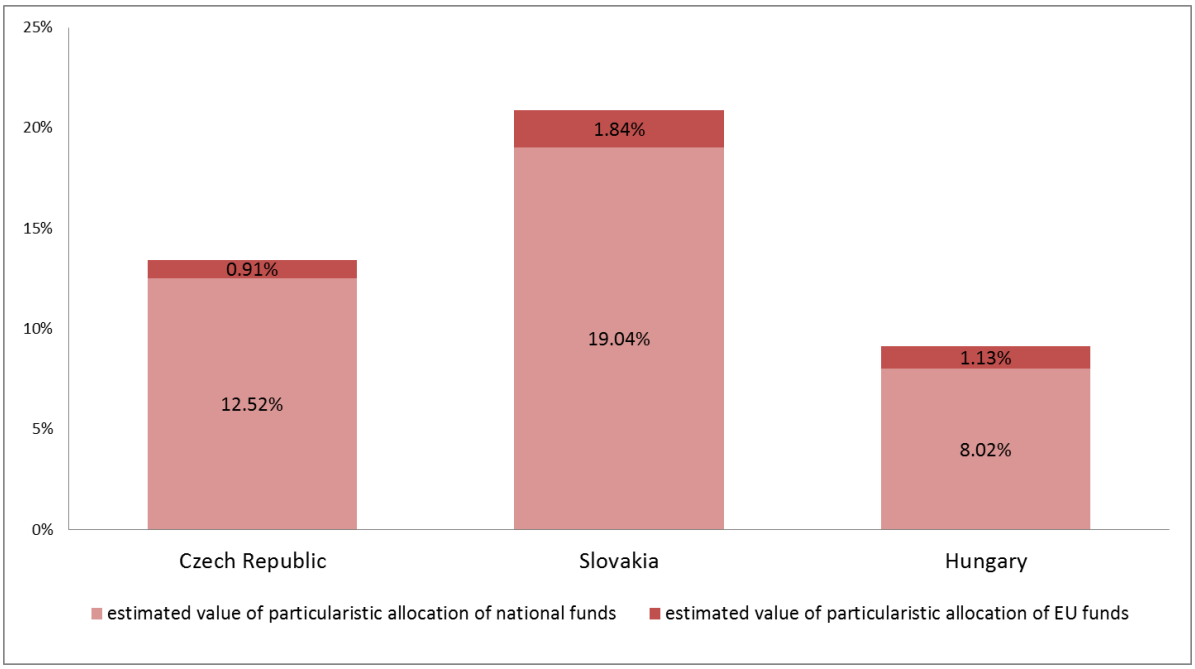
probability of corruption (%) * total value spent (EUR)

where the probability of corruption to occur is measured by CRI. This value captures the amount of resources allocated in a particularistic way which, by no means, equates with the value of corruption rents extracted or cost of corruption. Rather, it implies the overall value of public funds most likely available for rent extraction, while this rent very much depends on the profitability and cost structure of benefiting companies (e.g. even in a very corrupt road construction project, something must be built which costs at least some amount to the contractor). The total social cost of corruption is

composed of many components of which corruption rent is only one, and perhaps not even the biggest. Imagine, for example the misallocation of public investment to high corruption rent, but low social return projects such as barely used stadiums which are expensive to maintain.

Using this formula and holding corruption risks (CRI) constant at the national funding's average, **the value of additional particularistically allocated public resources generated by EU funding was between 0.9% and 1.8% of national GDPs in 2009-2012 in the three countries** (Figure 4). Recall, CRI of EU funding has to be held constant (i.e. at the average CRI of nationally funded public procurement) in order to separate the effect of additional spending from the effect of different motivation for and control of corruption. This second factor will be estimated in the next section.

Figure 4. Estimated value[9] of national and EU funded public procurement disbursed in a particularistic way, by country, % of 2009-2012 total GDP



Source: PPC

Note: In order to arrive at an approximate total public procurement spending figure, spending values based on announcements in the National Public Procurement Bulletins were approximated to total public procurement spending estimated by the OECD based on the system of national accounts (OECD, 2013). As the total public procurement spending figures are upper bound estimations and the proportion of EU funding within public procurement spending not reported in the National Public Procurement Bulletin is unknown, figures in the graph may be overestimations.

[9] Estimation followed a simple **expected value formula** whereby corruptly spent public money equals the probability of corruption multiplied by the total amount of public money spent.

4.2. Corruption risks of spending differently

While additional public resources available for discretionary allocation have considerably increased prevalence of corruption in the Czech Republic, Hungary, and Slovakia, it is possible that such additional corruption is counter balanced by more stringent regulation, monitoring, and transparency. If such controls are effective, overall corruption risks would not increase at all or would increase only slightly. In order to check the effectiveness of EU and national institutional frameworks to control corruption of the additional resources available, we compare the corruption risks (CRI) in public procurement procedures of EU and non-EU funding. Furthermore, the defining aspects of corruption risk differentials are also explored in detail in order to develop policy recommendations.

4.2.1. Corruption risks in EU and non-EU funded procurement procedures

In order to identify the causal impact of EU funding on corruption risks, EU and non-EU funded procurement procedures are compared which are as similar in every major respect as possible except for the funding source. As EU funding is not randomly assigned to procurement procedures, we have to rely on state-of-the-art statistical methods to select similar procedures, that is constructing the treatment (EU funding) and control groups (no EU funding) (Imbens & Wooldridge, 2009). Therefore, first, we show a baseline comparison of CRI between EU and non-EU funded procedures in the three countries; second, we employ propensity score matching using stata (Leuven & Sianesi, 2003).

EU and non-EU funded procurement procedures' CRIs are compared within each country. In Hungary, two alternative comparisons are made: one using a comparative CRI (henceforth hu(comparative)), and another one using a CRI composed of a wider indicator set indicators (henceforth hu(extended) (for a full description see: Fazekas et al., 2013b). The reason for also including the extended CRI for Hungary is that it paints a richer picture of the driving forces behind corruption risks of EU funding.

A simple comparison of average CRI scores within each country suggests that EU funded procurement carries higher corruption risks than nationally funded procurement in the Czech Republic and Hungary, while it carries lower corruption risks in Slovakia. However, these comparisons may very well be biased as EU and non-EU funded projects could be fundamentally different. For example, if EU funded projects are larger and more complex, then comparisons are inadequate.

Table 7. Naïve comparison of EU and non-EU funded procedures' CRI, 2009-2012, by country

	cz	sk	hu (comparative)	hu (extended)
non-EU funded	0.360	0.522	0.291	0.251
EU funded	0.369	0.421	0.310	0.289
Difference (non-EU - EU funded)	**-0.009**	**0.101**	**-0.019**	**-0.038**
95% c.interval-lower bound	-0.014	0.092	-0.023	-0.041
95% c.interval-upper bound	-0.005	0.110	-0.015	-0.035
N non-EU funded	26975	14159	25437	25460
N EU-funded	12470	2827	13698	13711

Source: PPC

The propensity score matching technique employed here controls for 1) the main market of procured goods and services; 2) log value of contract; and 3) contract length, as corruption risks can be very different for procurement procedures on different markets and of different sizes or complexities. While it would also be possible to control for the characteristics of awarding public bodies, it is not done because it would remove a crucial impact mechanism. For example, if non-corrupt awarding bodies select EU funded projects *because* these projects have low corruption risks, then equalizing the composition of awarding bodies among the EU funded and non-EU funded projects would underestimate the beneficial effects of EU funding.

Propensity score matching, taking into account confounding factors, reveals a similar picture as above, albeit one different in effect magnitudes (Figure 5).[10] The negative effect of EU funding on corruption, that is worsening corruption, has stayed the same in the Czech Republic, while it slightly decreased in Hungary. The positive effect in Slovakia greatly diminished compared to the baseline. All the effects are statistically significant at the 0.1% level. **In the Czech Republic, EU funded projects have 0.011 or 3% higher CRI compared to similar non-EU funded projects. In Slovakia, EU funded projects have 0.065 or 13% lower CRI than similar non-EU funded projects. In Hungary, EU funded projects have 0.01 or 3% higher CRI compared to similar non-EU funded projects using the comparable CRI definition.**

The effect on **Hungarian extended CRI is a great deal larger than for the comparative CRI: 0.022 or 8% higher CRI for EU funded projects than for comparable non-EU funded projects**. This suggests that corruption risks may come from harder to track factors such as complexity of eligibility criteria or factors associated with the delivery phase such as contract modification (note that Hungary is unique among the three countries in the mandatory publication of every contract

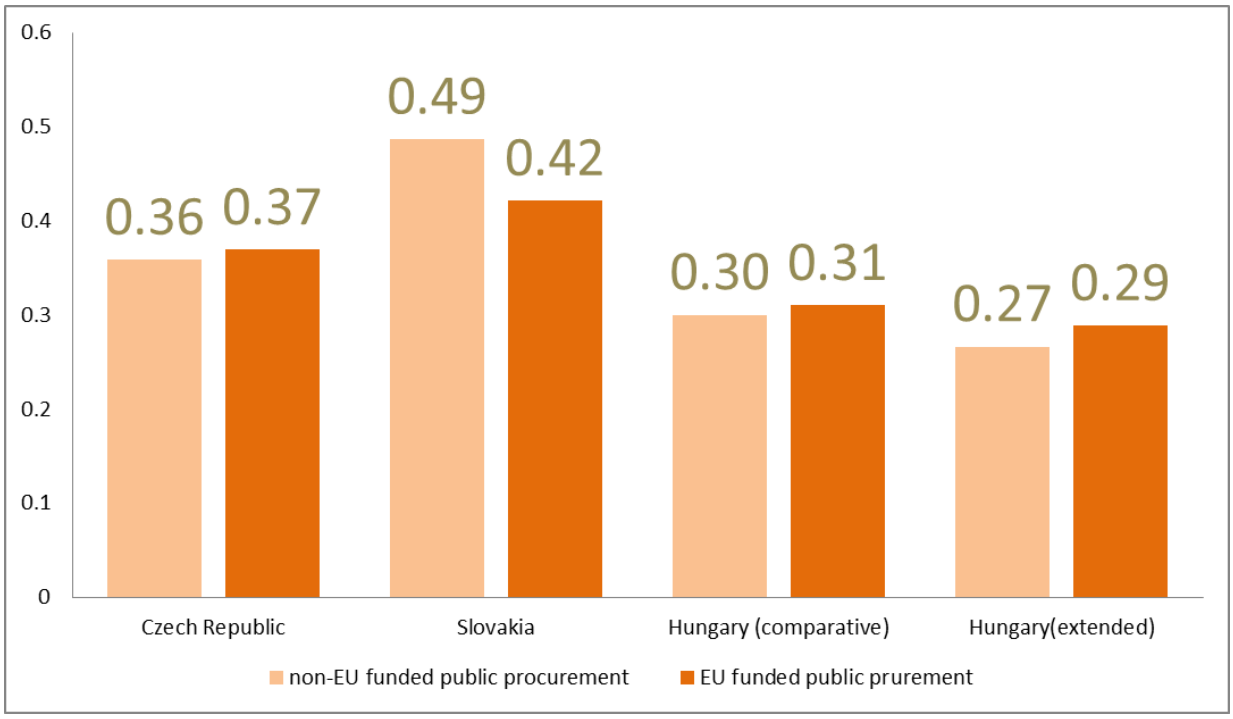
[10] Figures depicting the goodness of matching can be found in Appendix A.

modification and contract fulfilment notice). As the differences in driving factors may reveal additional findings, they are explored in the next section.

In order to get a sense of how big these differences are, we calculated the expected value of changes once again. **In the Czech Republic, the increase in the expected value of particularistic resource allocation due to higher corruption risks of EU funds amounts to 158 million EUR or 0.03% of the total 2009-2012 GDP. In Hungary, the same figure is only 52 million EUR or 0.02% of total 2009-2012 GDP.** The difference in overall values between the Czech Republic and Hungary are due to lower public procurement spending in Hungary and slightly smaller average effect**. In Slovakia, the expected value of lower average corruption risks associated with EU funds translate into a 381 million EUR or 0.23% of total 2009-2012 GDP.** While this positive effect appears very large in comparison to the other two analysed countries, it must be borne in mind that Slovakia seems to have a much higher overall prevalence of institutionalised grand corruption. This improvement of 0.23% of GDP is only a small correction in comparison to the 1.84% of GDP additional particularistic resource allocation (see Figure 4). Taken together, the overall effect of EU funds spending in Slovakia is still considerably higher than in the two other countries: 1.61% (1.84% minus 0.23%) as opposed to 0.94% and 1.15% for Czech Republic and Hungary, respectively.

Overall, effect sizes are dwarfed by the effect of additional amount of spending, discussed in the previous section. **This implies that the increasing corruption risks due to the greatly increased amount of public resources available for allocation could not be met with more stringent controls of corruption preventing a worsening corruption situation**. In spite of being designed for controlling fraud and misuse, the EU's monitoring system have failed to moderate increasing corruption risks in Hungary and Czech Republic, while it only partially offset increasing risks in Slovakia. What is most striking is that EU funds are of slightly higher corruption risks in Czech Republic and Hungary than comparable nationally funded procurement procedures calling into question the overall institutional framework in place in these countries.

Figure 5. Average CRI scores of EU and non-EU funded public procurement procedures, by country, 2009-2012, N_{cz}=39320, N_{sk}=15760 N_{hu}=38862



Source: PPC

Note: The differences within each country is significant at p<0.001 level, standard errors obtained using monte carlo random permutations (200 repetitions)

4.2.2. Components driving corruption risk differentials

In order to identify the driving factors behind corruption risk differences between EU and non-EU funded public procurement procedures, we performed binary logistic regression with EU funds use on the left hand side of the equation and corruption risk components on the right hand side of the equation, while also including the control variables used for propensity score matching.

The comparison of elementary corruption risk indicators driving CRI differences between EU and non-EU funded procurement procedures reveals a remarkably consistent picture across the three countries (Table 8). First, EU funded procedures perform better in highly visible formally required aspects of procurement such as publishing the call for tenders, using open procedure type, or allowing sufficient time for bidders to bid. For example, procurement tenders are 3%-12% more likely to be funded by the EU rather than nationally if they have a published call for tenders, clearly indicating that transparency requirements are implemented in all three countries.

Second, less strictly regulated aspects such as period of time for making an award decision, call for tender modification, or complexity of assessment criteria represent consistently higher corruption risks for EU funded projects. Although, effects are multi-directional in most of the cases. For

example, Czech procurement tenders are 9% more likely to be funded by the EU than nationally if the call for tenders was modified or Slovakian procurement tenders 17% more likely to be EU funded with lengthy decision periods (between 227 and 322 days).

Third, the key dimension according to which **EU funded projects are underperforming is corruption risks associated with lack of competition**: single bidder contract award and winners' contract share. The extensive efforts to make EU funded projects high value for money through competition seem to be insufficient. Procurement procedures are 3%-4% more likely to be EU funded if they have a single bidder and their markets are much more concentrated too: Procurement procedures are 12%-28% more likely to be funded by the EU if their winner market share is high (i.e. every prior contract is won by the same winner compared to no prior contract won by the winner).

Taking into account the broader set of elementary corruption risk indicators in Hungary alters the picture considerably (Table 9). First, the detrimental corruption risk effect of weak competition remains very strong. Second, the effects of procedure type, submission period length, and decision period length have become insignificant or only weakly negative. Third and most importantly, some less visible procurement corruption risk characteristics take on a crucial role in increasing EU funds corruption risks: weight of non-price evaluation criteria, length of eligibility criteria, and contract modification during delivery.

Table 8. Binary logistic regressions on EU funding (EU funding used=1), marginal effects, by country, 2009-2012

Independent vars-CZ	CZ	Independent vars-SK	SK	Independent vars-HU	HU
winner contract share	0.284***	**winner contract share**	0.122***	**winner contract share**	0.275***
P(Fisher)	0.00	P(Fisher)	0.000	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
single bidder contract	0.04***	**single bidder contract**	0.029***	**single bidder contract**	0.037***
P(Fisher)	0.01	P(Fisher)	0.075	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
NO call for tenders in off. journal	-0.116***	**NO call for tenders in off. journal**	-0.03***	**NO call for tenders in off. journal**	-0.085***
P(Fisher)	0.005	P(Fisher)	0.121	P(Fisher)	0.079
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
procedure type		**procedure type**		**procedure type**	
ref. cat.=open procedure		ref. cat.=open procedure		ref. cat.=open procedure	
1=invitation procedure	-0.015***	1=invitation procedure	0.134***	1=invitation procedure	-0.08***
P(Fisher)	0.584	P(Fisher)	0.000	P(Fisher)	0.256
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
2=negotiation procedure	-0.115***	2=negotiation procedure	-0.112***	2=negotiation procedure	-0.018***
P(Fisher)	0.000	P(Fisher)	0.000	P(Fisher)	0.697
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
3=outside PP law	-0.071***	3=other procedure types	-0.106***	3=other procedure types	-0.103***
P(Fisher)	0.028	P(Fisher)	0.000	P(Fisher)	0.009
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
4=other/missing/erroneous procedure type	-0.08***	4=outside PP law	0.084***	4=missing/error	0.009
P(Fisher)	0.065	P(Fisher)	0.407	P(Fisher)	0.679
P(permute)	0.000	P(permute)	0.000	P(permute)	0.440
modification of call for tenders	0.088***	**modification of call for tenders**	n.a.	**modification of call for tenders**	n.a.
P(Fisher)	0.000				
P(permute)	0.000				
short submission period		**short submission period**		**short submission period**	
ref.cat.=s.period>55*		ref.cat.= s.period>25		ref.cat.=s.period>20	
1= 47<s.period<=55	-0.025***	1= 14<s.period<=25	-0.043***	1= 17<s.period<=20	-0.012***
P(Fisher)	0.330	P(Fisher)	0.020	P(Fisher)	0.461
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
2= 43<s.period<=47	-0.069***	2= s.period<=14	-0.049*	2= 5<s.period<=14	-0.029***
P(Fisher)	0.006	P(Fisher)	0.562	P(Fisher)	0.570
P(permute)	0.000	P(permute)	0.045	P(permute)	0.000
3= 38<s.period<=43	-0.072***	3= missing	-0.142***	3= 0<s.period<=5 (incl.weekend)	-0.146***
P(Fisher)	0.007	P(Fisher)	0.000	P(Fisher)	0.007
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
4= 27<s.period<=38	-0.004			4=missing	-0.096***
P(Fisher)	0.900			P(Fisher)	0.028
P(permute)	0.735			P(permute)	0.000
5= 0<s.period<=27	-0.081***				
P(Fisher)	0.001				
P(permute)	0.000				
6=missing submission period	-0.176*				
P(Fisher)	0.027				
P(permute)	0.010				

Independent vars-CZ	CZ	Independent vars-SK	SK	Independent vars-HU	HU
number of assessment criteria		**number of assessment criteria**	**n.a.**	**number of assessment criteria**	
ref.cat.= nr.of criteria=0				ref.cat.=2<nr.of criterioa<=4	
1= 0<nr.of criteria<=2	-0.028			1=nr.of criterioa=0	-0.028***
P(Fisher)	0.337			P(Fisher)	0.337
P(permute)	1.000			P(permute)	0.000
2= 2<nr.of assessment criteria<=8	-0.019			2= 0<nr.of criterioa<=2	-0.031***
P(Fisher)	0.454			P(Fisher)	0.317
P(permute)	0.610			P(permute)	0.000
3= 8<nr.of criteria	-0.011*			4= 4<nr.of criterioa	0.019*
P(Fisher)	0.735			P(Fisher)	0.584
P(permute)	0.040			P(permute)	0.025
length of decision period		**length of decision period**		**length of decision period**	
ref.cat.= 113<dec.period<=201		ref.cat.=62<dec.period<=120		ref.cat.= 44<dec.period<=182	
1= 0<dec.period<=54	-0.022	1= 0<dec.period<=62	-0.084***	1= 0<dec.period<=32	-0.009
P(Fisher)	0.383	P(Fisher)	0.000	P(Fisher)	0.726
P(permute)	0.365	P(permute)	0.000	P(permute)	1.000
2= 54<dec.period<=67	0.06*	3= 120<dec.period<=227	0.162***	2= 32<dec.period<=44	-0.023***
P(Fisher)	0.349	P(Fisher)	0.000	P(Fisher)	0.313
P(permute)	0.010	P(permute)	0.000	P(permute)	0.000
3= 67<dec.period<=100	0.026***	4= 227<dec.period<=322	0.168***	4= 182<dec.period	-0.106***
P(Fisher)	0.263	P(Fisher)	0.010	P(Fisher)	0.000
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
4= 100<dec.period<=113	-0.012***	5= 322<dec.period	0.114***	missing	-0.02***
P(Fisher)	0.701	P(Fisher)	0.000	P(Fisher)	0.668
P(permute)	0.000	P(permute)	0.000	P(permute)	0.000
6= 201<dec.period	-0.012	6= missing	0.721***		
P(Fisher)	0.657	P(Fisher)	0.000		
P(permute)	0.270	P(permute)	0.000		
7= missing decision period	0.094				
P(Fisher)	0.576				
P(permute)	1.000				
constant included in each regression control variables: product market (cpv divisions); year of contract award(only for Hungary); log contract value; contract length					
N	39351		11831		38908
Pseudo-R2	0.255		0.4357		0.192

*Source: PPC; Note: * p<0.05; ** p<0.01; *** p<0.001; clustered standard errors clustered by issuer for P(Fisher), Monte Carlo random permutation simulations for P(permute) (200 permutations) using stata 12.0*

Table 9. Binary logistic regressions on EU funding (EU funding=1), marginal effects, Hungary (extended), 2009-2012

Independent vars / dependent var	EU funding=1
winner contract share	0.187***
P(Fisher)	0.000
P(permute)	0.000
single bidder contract	0.034***
P(Fisher)	0.002
P(permute)	0.000
no call for tenders published in official journal	-0.036*
P(Fisher)	0.519
P(permute)	0.010
procedure type	
ref. kat.=open procedure	
1=invitation procedure	0.001
P(Fisher)	0.986
P(permute)	0.950
2=negotiation procedure	-0.01
P(Fisher)	0.864
P(permute)	0.060
3=other procedures	-0.006
P(Fisher)	0.771
P(permute)	0.390
4=missing/erroneous procedure type	0.006
P(Fisher)	0.706
P(permute)	0.345
length of eligibility criteria	
ref.kat.=length<-2667.145	
1= -2667.145<length<=520.7038	0.045***
P(Fisher)	0.217
P(permute)	0.000
2= 520.7038<length<=3369.102	0.1***
P(Fisher)	0.016
P(permute)	0.000
3= 3369.102<length	0.177***
P(Fisher)	0.000
P(permute)	0.000
4= missing length	0.177***
P(Fisher)	0.025
P(permute)	0.000
short submission period	
ref.kat.=normal submission period	
1=accelerated submission period	-0.008
P(Fisher)	0.584
P(permute)	0.165
2=exceptional submission period	-0.063***
P(Fisher)	0.151
P(permute)	0.000
3=except. submission per. abusing weekend	-0.171***
P(Fisher)	0.002
P(permute)	0.000
4=missing submission period	0.084***
P(Fisher)	0.126
P(permute)	0.000
relative price of tender documentation	
ref.kat.= relative price=0	
1= 0<relative price<=0.0004014	-0.004
P(Fisher)	0.891
P(permute)	0.645
2= 0.0004014<relative price<=0.0009966	-0.018
P(Fisher)	0.548
P(permute)	0.080
3= 0.0009966<relative price<=0.0021097	-0.034***
P(Fisher)	0.238
P(permute)	0.000

Independent vars / dependent var	EU funding=1
4= 0.0021097<relative price	-0.031***
P(Fisher)	0.293
P(permute)	0.000
5=missing relative price	-0.05***
P(Fisher)	0.165
P(permute)	0.000
call for tenders modified	0.013
P(Fisher)	0.512
P(permute)	0.080
weight of non-price evaluation criteria	
ref.kat.= only price	
2= 0<non-price criteria weight<=0.4	-0.008
P(Fisher)	0.656
P(permute)	0.120
3= 0.4<non-price criteria weight<=0.556	0.033***
P(Fisher)	0.122
P(permute)	0.000
4= 0.556<non-price criteria weight<1	0.094***
P(Fisher)	0.023
P(permute)	0.000
5=only non-price criteria	0.015
P(Fisher)	0.411
P(permute)	0.065
length of decision period	
ref.kat.= 44<decision period<=182	
1= decision period<=32	-0.026***
P(Fisher)	0.211
P(permute)	0.000
2= 32<decision period<=44	-0.035***
P(Fisher)	0.063
P(permute)	0.000
4= 182<decision period	0.016
P(Fisher)	0.755
P(permute)	0.110
5= missing decision period	-0.009
P(Fisher)	0.811
P(permute)	0.380
contract modified during delivery	0.136***
P(Fisher)	0.000
P(permute)	0.000
contract extension(length/value)	
ref.cat.=c.length diff.<=0 AND c.value diff.<=0.001	
2=0<c.length d.<=0.162 OR 0.001<c.value d.<=0.24	-0.061***
P(Fisher)	0.009
P(permute)	0.000
3= 0.162<c. length diff. OR 0.24<c.value diff.	-0.032**
P(Fisher)	0.191
P(permute)	0.010
4= missing (with contr. completion ann.)	-0.04***
P(Fisher)	0.053
P(permute)	0.000
5= missing (NO contr. completion ann.)	-0.058***
P(Fisher)	0.001
P(permute)	0.000
constant included in each regression control variables: product market (cpv divisions); number of winners on the market (market defined by cpv level 4 & nuts2); year of contract award; log contract value; contract length; framework contract; issuer type, status, and sector	
N	31770
R2/pseudo-R2	0.301

5. Conclusions and policy consequences

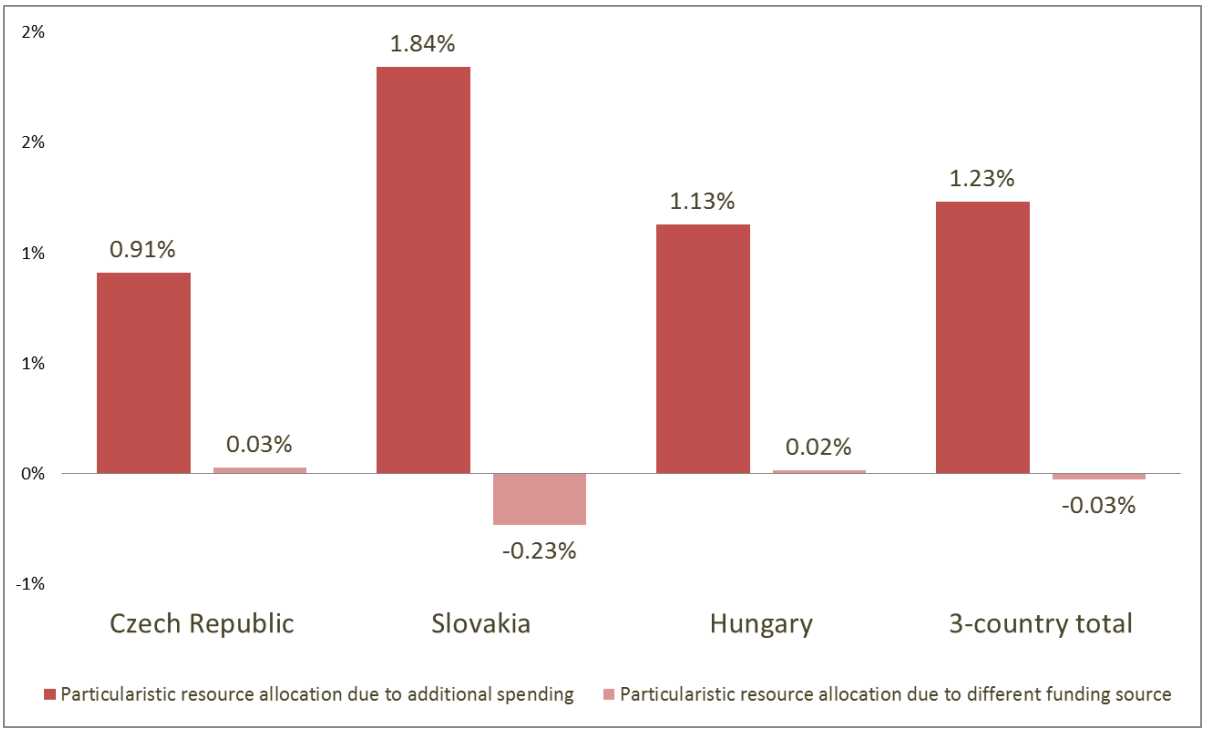
While much additional work is needed, this paper has already demonstrated that it is feasible and fruitful to use detailed, contract-level data for tracking corruption risks over time across EU countries. Such monitoring can be done in real-time if the necessary investment into database development is made. Fazekas et al., 2013b discusses data availability in Europe and beyond in detail.

Our preliminary findings indicate that EU funding considerably increase corruption risks in Central and Eastern Europe in at least two principal ways (**Hiba! Érvénytelen könyvjelző-hivatkozás.**). First, by making a large amount of additional public resources available for rent extraction in public procurement; second, by failing to implement sufficient controls of corruption counter-balancing additional resources for corruption. In spite of extensive monitoring efforts of EU authorities, EU funded procurement spending represents even higher corruption risks than the comparable national spending in Czech Republic and Hungary. EU funded public procurement in Slovakia carries only slightly lower corruption risks than comparable national procurement spending, albeit national spending is generally of much higher corruption risk than in the two other countries. In either case, this positive effect falls long way short of offsetting the negative effect of increased discretionary spending available. Nevertheless, the comparatively better performance of Slovakian public procurement projects funded by the EU suggests that EU funding can have a somewhat positive effect in a very high corruption risk environment. Based on this finding further research could look at the conditional effect of EU funding on corruption.

For the three countries combined, our results imply an estimated additional particularistic resource allocation worth up to 1.20% of combined GDP of the three countries throughout 2009-2012. This is the result of an estimated maximum 1.23% of GDP in terms of additional funding disbursed in a particularistic way, and an estimated maximum 0.03% of GDP in terms of lower corruption risk of EU funded procurement than national procurement. These figures are exceptionally high, for example compared to total EU funds allocation to these countries which is about 3.3% of their GDP.

While EU funded public procurement may well be effective in lifting growth rates in Central and Eastern Europe, its desired benefits stand in contrast with corruption risks and potential corruption costs. While further work is needed to get more precise estimates of particularistic resource allocation and the associated corruption costs, our preliminary findings already indicate that such costs may not be negligible.

Figure 6. Estimated value[11] of additional particularistic resource allocation due to EU funding in national public procurement, decomposition into effect of additional spending and different funding source, by country, % of 2009-2012 total GDP



Source: PPC

Note: In order to arrive at an approximate total public procurement spending figure, spending values based on announcements in the National Public Procurement Bulletins were approximated to total public procurement spending estimated by the OECD based on the system of national accounts (OECD, 2013). *As the total public procurement spending figures are upper bound estimations and the proportion of EU funding within public procurement spending not reported in the National Public Procurement Bulletin is unknown, figures in the graph may be overestimations.*

Looking at the driving forces behind corruption risks in EU funding reveals that salient, easily controlled corruption risks are considerably lower, while risks of more subtle procedure characteristics and overall strength of competition considerably increase corruption risks in EU funded public procurement procedures (Table 10).These findings highlight the importance of monitoring the whole project cycle from initiation to completion as well as the need for a wide indicator set for adequately measure corruption.

[11] Estimation followed a simple **expected value formula** whereby corruptly spent public money equals the probability of corruption times the total amount of public money spent.

Table 10. Summary of driving factors of CRI differences between EU and non-EU funded projects, 2009-2012

variable/country	cz	sk	hu(comp)	hu(ext)
Winner contract share	++	++	++	++
Single bid	+	+	+	+
NO call for tenders published in o. journal	- -	-	-	-
Procedure type	- -	-/+	-	0
Length of submission period	- -	- -	- -	-/0
Length of decision period	-/+	-/+	-/0	-/0
Modification of call for tenders	+			0
Number of assessment criteria	-/0		-/+	
Weight of non-price evaluation criteria				++
Length of eligibility criteria				++
Relative price of documentation				-
Annulled procedure re-launched subsequently				-
Contract modification				++
Contract lengthening				- -

Source: own calculation

Note: - - means strong negative effect on EU funds corruption risks; - means weak negative effect on EU funds corruption risks; + means weak positive effect on EU funds corruption risks; ++ means strong positive effect on EU funds corruption risks; 0 means insignificant or negligible effect on EU funds corruption risks; representing two signs in the same cell indicates a diverse effect of corruption risk categories within the same variable.

If further research confirms the higher corruption risks associated with EU funds, the EU will have to consider implementing more effective policies for protecting its financial interests and promoting good government; in particular:

- **Introducing an EU-wide, real-time monitoring mechanism of EU funds spending designed to detect systematic fraud and corruption in public procurement using data mining techniques, elements of which can be derived from ANTICORRP research** (see for example: Mungiu-Pippidi, 2013);
- **Refocusing the monitoring and control mechanisms from procedural adequacy to effective competition and subtle bid rigging; and**
- **Considering the reallocation of EU funding going into discretionary investment projects, which typically constitute high corruption risks, towards non-discretionary spending such as education.**

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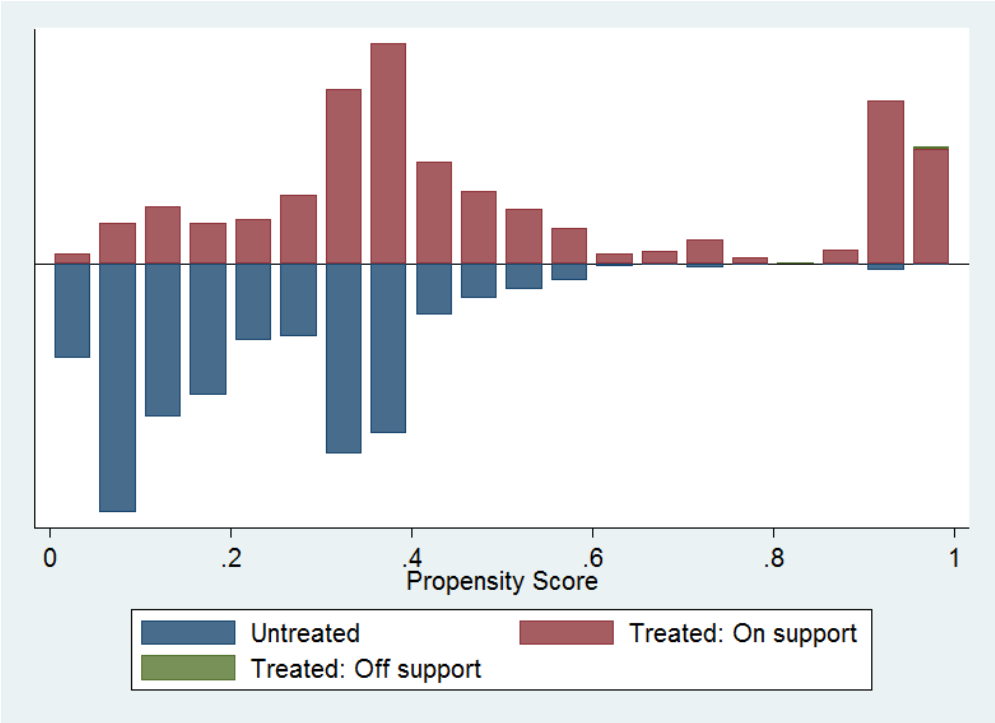
7. Appendices

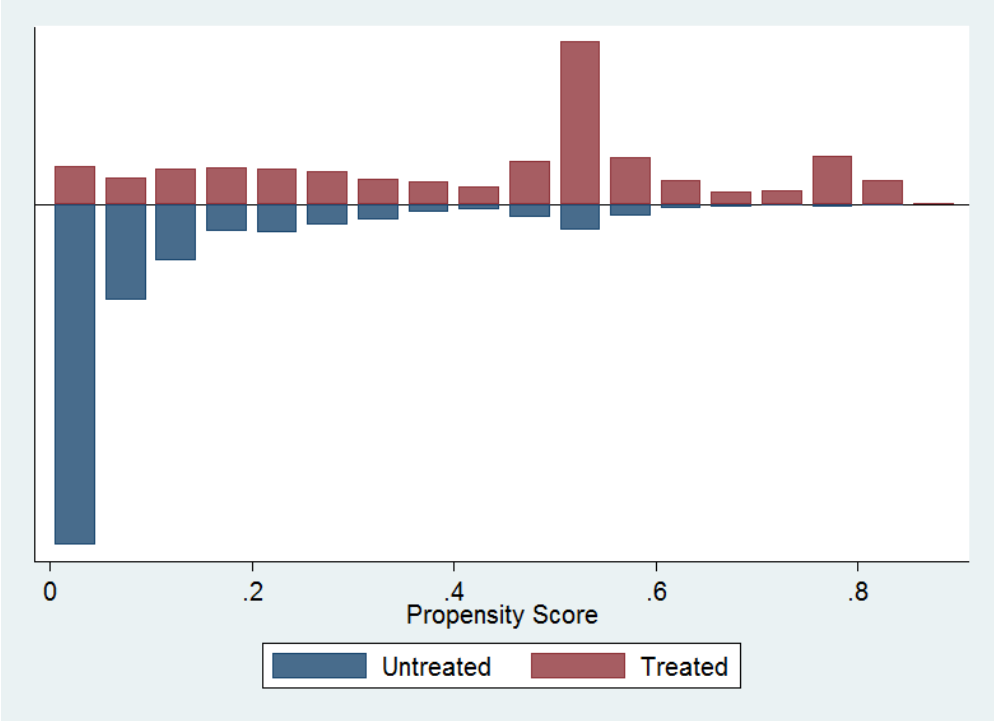
7.1. Appendix A-Goodness of propensity score matching

Figure 7. Common support in Czech Republic, psgraph in psmatch2 package of stata 12.0



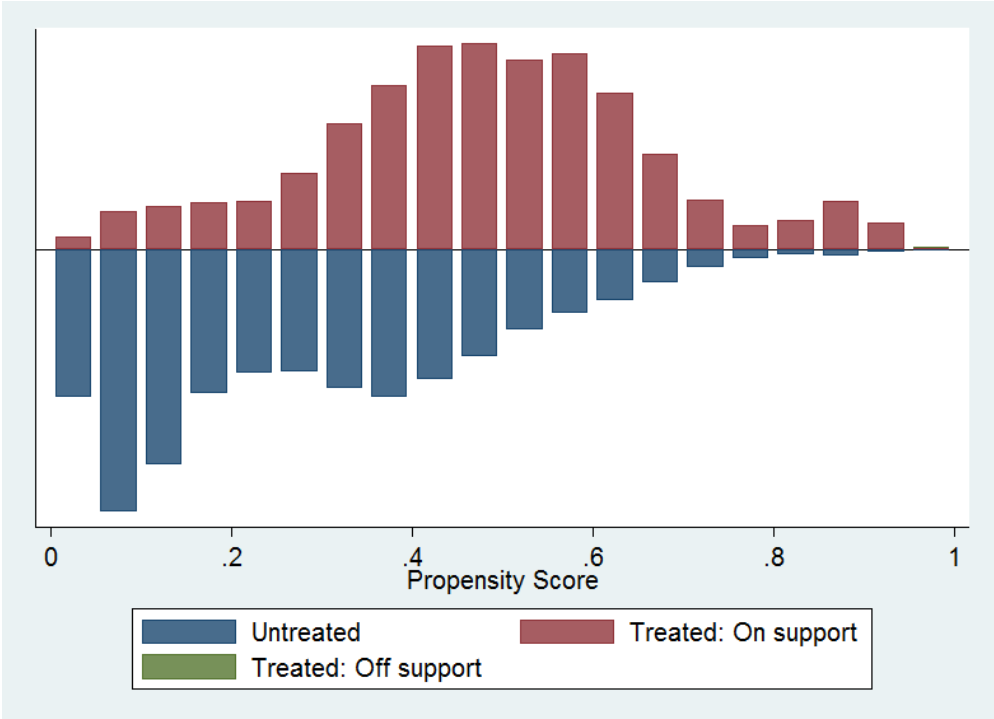
Source: PPC

Figure 8. Common support in Slovakia, psgraph in psmatch2 package of stata 12.0



Source: PPC

Figure 9. Common support in Slovakia, psgraph in psmatch2 package of stata 12.0



Source: PPC