European Commission

Single bidding and **non-competitive tendering** procedures in EU Co-funded Projects

Report by Mihály Fazekas,
Central European University and
the Government Transparency Institute

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Single bidding and non-competitive tendering procedures in EU Co-funded Projects.

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[1] Data preparation and cleaning has been completed by the DIGIWHIST team. For more details see: digiwhist.eu

Table of Contents

1. EXECUTIVE SUMMARY

1.1. Background, aims and scope

With a budget of EUR 454 billion for 2014-2020, the European Structural and Investment Funds (ESIF) are the EU's main investment policy tool. National co-financing is expected to amount to at least EUR 183 billion, with total investment reaching EUR 637 billion. It is increasingly recognised that one of the key success factors for ESIF is efficient public administration as highlighted in the last *Report on Economic, Social and Territorial Cohesion*[1] which concludes that without good governance, high growth rates and regional economic convergence cannot be achieved. Given that around 48% of ESIF financing is spent through public procurement and that public authorities in the EU spend roughly 19% of GDP every year on the purchase of services, works and goods, efficient and clean public procurement is paramount for the territorial cohesion of the EU. However, experience with the implementation of ESIF in Member States shows that contracting authorities face challenges in applying public procurement rules, with mistakes and inefficiencies leading to the lack of competition and single bidding in particular (single bidding is understood as one bid submitted in a public tender leading to contract award). Among others, single bidding tends to lower value for money by increasing prices, for example by 9.6% in a 2009-2014 EU-wide dataset of contracts (Fazekas & Kocsis, 2017).

Hence, this report and the corresponding online dashboards set out to **provide a detailed overview of and explanation for single bidding in selected Member States.** First, in the descriptive part (section 5), it describes the prevalence of single bidding and a related tendering characteristic, the use of non-open procedures, in great detail for 10 Member States: Croatia, Cyprus, Czech Republic, Hungary, Italy, Latvia, Poland, Romania, Slovakia, and Slovenia. These countries have been selected because they have the highest single bidding rate in the EU-wide public procurement portal, Tenders Electronic Daily (TED), for the 2008-2017 period. Second, in the explanatory part (section 6), the report develops quantitative explanatory models for single bidding in 4 countries (Czech Republic, Hungary, Latvia, and Poland) where public procurement data is of sufficiently high quality. These models account for single bidding on the contract level using three groups of explanatory factors, most of which are amenable to policy intervention: economic fundamentals, administrative capacity and integrity. Based on the explanatory models, specific, data-driven policy recommendations are put forward.

The analysis uses **data** collected by the Horizont-2020 funded research project DIGIWHIST and made publicly available at opentender.eu/download. The project collected data from 33 European jurisdictions and it contains both below and above EU-threshold public procurement contracts where the national system was of sufficient scope. Among the ten countries selected for this analysis, there are only four with sufficient quality and scope of data for a full explanatory analysis (Czech Republic, Hungary, Latvia, and Poland); while the other countries either had too small scale datasets (Croatia and Cyprus) or their below threshold data was of insufficient scope and quality (Italy, Romania, Slovakia, and Slovenia) for complex statistical modelling.

Unfortunately, data quality in many of the studied countries, both for above and below EU threshold data, has turned out to be problematic, limiting the analytical value of the analysis. In many countries, EU Funds' status (due to data availability, every tender marked as EU funded in procurement notices is considered as EU Funds

[1] The European Commission. 7th Report on Economic, Social and Territorial Cohesion, 2017. See: http://ec.europa.eu/regional_policy/en/information/cohesion-report/

irrespective of the specific instrument in question), , name of the winning firm, or the number of bidders were missing for third to half of the tenders. While many of the tenders without such information are likely to be terminated or unsuccessful tenders, there is certainly a non-negligible portion of the Member States' public procurement activities which remains unaccounted for. It is suggested that missing information is associated with administrative capacity, potentially with organisational integrity, and it ultimately influences tendering outcomes (Bauhr, Czibik, Fazekas, & Licht, 2017; Cingolani & Fazekas, 2017). Given that missing information is more likely to mask low administrative quality and wrongdoing than represent high quality administrative performance, the analysis and its conclusions merely provide a lower bound estimate of single bidding and non-open tendering problems.

1.2. Findings and policy recommendations

The descriptive analysis of the scale and scope of single bidding and non-open procedures in EU funded public contracts revealed a vast diversity of performance, not only across countries but very much within countries according to economic sector, NUTS region, and time period concerned. Within country differences surpass cross-country differences frequently, in other words, the differences within countries (e.g. by sector) tend to be a lot greater than differences across countries. For example, in the Czech Republic the sector with the highest prevalence of single bidding (postal and telecommunications services) purports a 60% rate, while the sectors with the lowest rates (e.g. architectural services) achieve only about 20% single bidding. Crucially, the ranking of sectors in terms of single bidding rates varies greatly across countries. For example, the transport equipment sector displays the highest single bidding rate among all analysed sectors in Hungary, but it is the lowest among the Czech sectors analysed. Or take the IT services sector which scores the highest on single bidding in Slovakia with close to 50% single bidding rate, while being situated towards the middle of the sectoral ranking in most other countries such as Romania (about 30% single bidding rate). This suggests that in spite of the expectations of a level playing field across Member States in the EU, national borders create pronounced barriers to competition within the same product market (Herz & Varela-Irimia, 2017). In addition, the popular perception that some sectors are inherently less competitive or carry higher risk regardless of the Member State seems to be, at least partially, contradicted by the evidence gathered here.

Data-driven policy recommendations are based on quantitative **explanatory models of single bidding[2].** While the models fall short of establishing causal relationships with experimental methods, such as randomized controlled trials, they can point at the most relevant factors accounting for single bidding in public procurement, especially as all factors considered are supported by the academic literature. The models paint a diverse picture paralleling the complexities highlighted above and calling for an approach sensitive to country and region-specificities[3] (for country-specific findings and recommendations see the country sections in chapter 6). Nevertheless, the analysis still offers a number of shared lessons across all analysed countries. The quantitative models taking into account economic fundamentals, administrative capacity and integrity are generally of high quality explaining 20% - 50% of variance in single bidding on the contract level. While the models consider a great number of predictors which are not directly or easily amenable to policy intervention such as sector or year of spending, a considerable portion of the models directly leads to policy conclusions implementable on the short term without lengthy legislative changes.

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[2] Binary logistic regression models were built on the contract-level in each country separately.

[3] On related EC policy directions see: https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-tailored-approach-regional-needs_en.pdf

Leveraging economic opportunities holds the potential to improve single bidding rates considerably. Demand aggregation, that is larger contract (lot) values have a considerable effect on single bidding, but the direction of impact depends on market conditions, in some cases increasing, in others decreasing single bidding probability (Oliveira, Grandio, Sanchez, & Fazekas, 2019). Contrary to perceptions of the influence of EU Funds' spending cycles, annual swings in the total value of EU funded contracts has no effect on single bidding. However, seasonality, that is the month of contract award, is a strong predictor of single bidding in our statistical models with especially year end (December) purporting high single bidding rates. Hence, shifting some spending to more competitive months could lower overall single bidding throughout the year.

Investing into administrative capacities of procuring entities is likely to pay off in terms of lowering single bidding rates.[4] For example, improving organisational capacity such as the average decision making speed (the number of days on average an organisation takes to decide on one bid) can send a positive signal to the market increasing bidder participation and lowering single bidding. Quick and on schedule public sector decisions lower uncertainty for bidding firms hence lower the costs of doing business with the government which attracts bidders and likely lowers prices. The likely effect sizes in our models fall in the range of 5-30% point decrease in single bidding when organisations score close to the national average compared to those which tend to be very slow in decision making. These results underline the need for investing in administrative capacity in terms of competence and resources to make speedy and timely decisions.

Strengthening public sector integrity promises to further lower single bidding and the associated risks. For example, pursuing open tendering procedures with adequate advertisement rather than direct contracting or negotiated procedures without prior publication holds the promise of lowering single bidding percentages. While different procedure types are required for different purposes, non-open procedures are more likely to be misused for particularistic ends. Increasing the prevalence of open procedure types can lower single bidding percentages in the studied countries by 20-30% points. Moreover, short advertisement periods can deter bidders from entering the market hence increase single bidding. Discouraging very short advertisement periods of 2-4 weeks could potentially decrease single bidding by 10-25% points.

This study is merely the first attempt to systematically map and account for single bidding in selected EU Member States opening up the avenues for a range of improvements in the near future and supporting policy reform. **Further work** could include:

1. Given the high political salience and economic costs of single bidding across Europe, a regular monitoring mechanism of single bidding, for example every 3-6 months, can be set up following the methodology and dashboards created here.
2. If some of the policy recommendations suggested by the statistical modelling are implemented, the data and analytical framework would be well suited to assess effectiveness of policy interventions and recalibrate them if needed.
3. The identified sectors and regions with exceptionally high single bidding rates and some of the notable empirical relationships between single bidding and main explanatory factors could be further investigated using a case study

[4] This finding is very much in line with recent policy directions of the new regional funding framework. See Annex III: https://eur-lex.europa.eu/resource.html?uri=cellar:26b02a36-6376-11e8-ab9c-01aa75ed71a1.0003.02/DOC_3&format=PDF

methodology better fitted to uncover the local dynamics of administrative behaviour and market competition.

4. The explanatory models could only consider policy-relevant factors for which there is sufficient data collected by DIGIWHIST; hence, policy recommendations remain focused on the measured variables. Further factors, currently omitted, could be systematically investigated if additional data was collected and linked to public procurement data (e.g. remedies bodies' decisions).

2. CONTEXT AND BACKGROUND

With a budget of EUR 454 billion for 2014-2020, the European Structural and Investment Funds (ESIF) are the EU's main investment policy tool. National co-financing is expected to amount to at least EUR 183 billion, with total investment reaching EUR 637 billion. Many different factors influence the extent to which these cohesion policy investments are effective. It is increasingly recognised that one of the key success factors is the efficient public administration. As highlighted in the last *Report on Economic, Social and Territorial Cohesion*[5], without good governance, high growth rates and regional economic convergence cannot be achieved.

One of the indicators of the quality of public administrations is their performance in public procurement. This performance reflects the wider administrative capacity of public sector institutions in the country. Procurement capacity is all the more important given that a large share of public expenditure is channelled via procurement procedures. For ESIF, the European Commission estimates that around 48% of the financing is spent through public procurement. Overall, public authorities in the EU spend roughly 19% of GDP every year on the purchase of services, works and goods.

Experience with the implementation of ESIF in Member States shows that contracting authorities face challenges in applying public procurement rules. Procurement procedures often account for delays in kick-starting investment on the ground and also contribute to the largest share of errors detected in the EU co-funded projects. Moreover, irregular or inefficient public procurement procedures are costly in terms of losing market participants' and the wider publics' trust. All this has negative consequences for the level of competition and the quality and impact of public expenditure.

In most cases, mistakes and inefficiencies in procurement procedures are a result of lack of experience and weaknesses in the administrative capacity of the contracting authorities. The Commission has launched a series of actions aimed at strengthening the capacity of bodies involved in the implementation of EU co-funded investments in the Member States to apply public procurement rules in a legal and efficient manner.[6]

In the last years the issue of single bidding, understood as one bid submitted in a public tender leading to contract award, has received a lot of interest from different stakeholders. This, at least partially, reflects the accumulating evidence on its negative consequences; for example that it tends to lower value for money by increasing prices: in a 2009-2014 EU-wide dataset of contracts single bidder contracts were 9.6% more expensive than multiple-bidder contracts (Fazekas & Kocsis, 2017). Single bidding has also been shown to be linked to weaker political accountability from Sweden to Romania (Broms, Dahlström, & Fazekas, 2017; Klasnja, 2016). Recognising this interest, DG REGIO has started to analyse this problem, for example in a study assessing the quality of government at the regional level using public procurement data (Fazekas, 2017) with some relevant results included also in the last Cohesion report (European Commision, 2017).

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5 The European Commission. 7th Report on Economic, Social and Territorial Cohesion, 2018. See: http://ec.europa.eu/regional_policy/en/information/cohesion-report/

6 These initiatives are set out in the European Commission's Action Plan on Public Procurement. http://ec.europa.eu/regional_policy/en/policy/how/improving-investment/public-procurement/

3. GOALS AND OBJECTIVES

As the interest regarding single bidding in some Member States has increased and a range of questions from different stakeholders has been raised, a detailed analysis in selected countries is put forward in order to explore the extent of single bidding and its main explanations such as the use of non-competitive procedure types. In order to provide a comprehensive description and balanced assessment of reasons for single bidding, a wide range of factors must be taken into account such as economic conditions (e.g. the number of capable companies in a region), administrative capacities, and integrity risks, some of which are directly amenable to EU or Member State policy interventions.

Against this background, the purpose of this report is to provide a detailed overview of and explanation for single bidding in selected Member States, hence it has two main sections, a descriptive and an explanatory. The descriptive analysis of single bidding in EU co-funded public procurement looks at a broad country sample encompassing 10 Member States across the EU with the highest average single bidding rates in the 2008-2017 period according to TED data (according to recent DG GROW figures): Croatia, Cyprus, Czech Republic, Hungary, Italy, Latvia, Poland, Romania, Slovakia, and Slovenia. The explanatory analysis develops quantitative explanatory models for single bidding in 4 Member States where public procurement data is of sufficiently high quality: Czech Republic, Hungary, Latvia, and Poland.

Both analyses are based on EU co-funded projects (ERDF/Cohesion Fund) in each Member State, for the 10 biggest sectors (construction which is typically the largest sector is further decomposed into its 5 biggest sub-sectors) according to spending value both above and below EU-thresholds. The exact details of the analysis in each Member State reflects data quality considerations as the publicly available data varies greatly (see DIGIWHIST collection and assessment of the available data). The analytical approach is explicitly non-comparative, looking at each country on its own without benchmarking or ranking.

In order to assess the extent of and reasons for single bidding and to describe the scope of a related tendering characteristic, the use of non-open procedures, the analysis proceeds in the following steps:

1) Providing a factual overview of the share of single bidder contracts as well as non-competitive procedure types (e.g. award without publication) by Member State, region, sector and year.
2) Providing a list of companies according to the share of single bidder contracts and non-competitive procedures per Member State and sector,
3) Identifying the main reasons behind single bidding within Member States using quantitative explanatory models which account for a comprehensive set of factors broadly falling into economic, administrative, and integrity-related groups. Making sure that only those quantitative models are put forward which are reliable, both from data quality and statistical perspectives.
4) Setting out data-driven, specific policy recommendations building on the lessons of data collection and the final explanatory models.
5) Making the results accessible to interested parties by putting them on an easy to use dashboard; while also explaining how to use and interpret visualisations.

4. DATA

This section describes in detail the data used in the subsequent analysis. In particular it outlines:

1. The precise data sources taken as a starting point for database building
2. The main steps taken the clean source datasets, in particular removing duplicate tenders (i.e. those present in national and TED publication portals), identifying unique organisations, and removing the most apparent contract value errors.
3. The rules followed for excluding records (i.e. contracts or lots) without sufficiently reliable and complete information such as missing supplier name.
4. The final set of choices for selecting contracts to analyse, each of which is funded by the EU and falls in major economic sectors.

This section is meant to provide a high-level overview of data preparation while excluding the full technical details of coding. The analysis uses DIGIWHIST data encompassing both above and below EU-threshold datasets, by implication key data pre-processing codes can be found on Github: https://github.com/digiwhist/backend

4.1. Data sources

The analysis is based on data collected by the Horizont-2020 funded research project DIGIWHIST[7] which are made publicly available at opentender.eu/download. The project collected data from 33 European jurisdictions and it contains both below and above EU-threshold public procurement contracts where the national system was of sufficient scope.[8] Among the ten countries selected for descriptive analysis, there are only four with sufficient data quality and scope for a more comprehensive explanatory analysis: Czech Republic, Hungary, Latvia, and Poland (Table 1). The other six could not be fully analysed for various reasons. Two countries, Croatia and Cyprus, had such a small scale database that applying any disaggregation by year, region, or sector resulted in too small datasets for meaningful descriptive analysis. Furthermore, four countries, Italy, Romania, Slovakia, and Slovenia either had no below threshold data collected by DIGIWHIST (Italy), or below threshold data missed some of the key variables relevant for the analysis (e.g. the Romanian national source does not contain information on EU funding).

[7] digiwhist.eu

[8] For a detailed technical overview of data collection and cleaning, see http://digiwhist.eu/wp-content/uploads/2018/03/D2.8-revised-version-FINAL.pdf

Table 1: Data sources per country in addition to TED[9]

Country	Below EU-threshold included?	Scope of analysis (based on data quality)	Link to below threshold data source
Croatia	no	descriptive	https://eojn.nn.hr/Oglasnik/
Cyprus	no	descriptive	https://www.eprocurement.gov.cy/epps/prepareAdvancedSearch.do
Czech Republic	yes	descriptive & explanatory	https://www.vestnikverejnychzakazek.cz/
Hungary	yes	descriptive & explanatory	http://www.kozbeszerzes.hu/
Italy	no	descriptive	http://portaletrasparenza.avcp.it/microstrategy/html/index.htm
Latvia	yes	descriptive & explanatory	ftp://open.iub.gov.lv/
Poland	yes	descriptive & explanatory	ftp://ftp.uzp.gov.pl/
Romania	no	descriptive	http://data.gov.ro/
Slovakia	no	descriptive	https://www.uvo.gov.sk/
Slovenia	no	descriptive	http://www.enarocanje.si/

Although all countries use the same standard forms for above EU-threshold contracts and these are published in a machine-readable XML format, the quality of data differs greatly from country to country. DIGIWHIST assessment has shown that the missing rate of core fields in these publications – such as the winner's name or the contract's final value – can be as high as 25% . Furthermore, data errors are also prevalent. For example, publishing unit prices instead of the final values or entering nonsensical values (e.g. 0 as a final contract price etc.) are also frequently found in official publications.

Gathering data on below threshold contracts is significantly more complicated than above EU-threshold contracts (Table 2). First, publishers rarely publish well-structured XML documents and use more complicated HTML publication formats instead. Second, they often use very many different standard forms at the same time. This makes finding and extracting the same information from them significantly harder – for example, the information on procedure type might be stored under different sections with different wording, which makes automatized parsing algorithms harder to use. Similarly to TED, as there is no mechanism incentivising public authorities for filling in forms correctly, missing and error rates can be quite high.

[9] All information on above EU-threshold tenders come from the official TED XML publication (ftp://ted.europa.eu/).

Table 2: Yearly data coverage per country (only EU-funded)

Years	Countries
2006-2017	TED
2006-2017	Czech Republic
2007-2017	Slovenia
2010-2017	Slovakia
2011-2017	Hungary, Latvia, Italy, Romania, Cyprus, Poland
2013-2017	Croatia

4.2. Data cleaning

Data cleaning algorithms applied aimed at improving key dimensions of the datasets necessary for reliable and valid analysis. In particular, it identified likely duplicate announcements in the datasets, that is announcements which simultaneously appeared on TED and a national publication portal. In addition, it also improved on the unique organisation IDs assigned by the DIGIWHIST project using more recent machine learning algorithms. Finally, some key contract value cleaning rules are outlined.

4.2.1. Deduplication of tenders

A key challenge of merging above EU threshold tenders (official TED publications) and the national sources: tenders following the national legislation can be published on the TED portal[10], while national procurement portals also often publish the above EU-threshold contracts.[11] In order to minimize double counting tenders, duplicate tenders had to be filtered out from the combined dataset.

As highly complex algorithms fully following rules in the EU Directive return unreliable results (a problem already identified by Mihály Fazekas: Assessing the quality of government at the regional level using public procurement data[12]), a simplified rule was implemented that largely follows the data cleaning practices used by the EC[13]. This approach only keeps tenders below the value thresholds in Table 3 from the national portals and the tenders above these values from TED. Value thresholds were applied to the estimated value of the tender, or if this value was missing, the final tender value in the contract award announcement. Tender deduplication was not carried out for those countries where only TED data was used in the analysis. For the full list revert back to Table 1.

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[10] Note, that some of the below EU-threshold tenders also need to be published in case of significant EU-funding. Furthermore, threshold change according to buyer type. However, there is no unambiguous source in the tender publications that would allow for applying an entirely accurate

[11] Note that TED publication requirements differ by the contracting authority type, product code etc. Therefore, it is not possible to define a unambiguous rule that would filter out double publications entirely.

[12] http://ec.europa.eu/regional_policy/en/information/publications/working-papers/2017/assessing-the-quality-of-government-at-the-regional-level-using-public-procurement-data

[13] http://data.europa.eu/euodp/repository/ec/dg-grow/mapps/TED_advanced_notes.pdf

Table 3: Thresholds applied in the deduplication of tenders[14]

Contract type	Applied threshold for below/above EU threshold tenders
Supplies and services	EUR 134,000
Works (or if the contract type is missing but the 2-digit CPV code is 45)	EUR 5,186,000

An important distinction has to be made between tenders and contracts. Whereas the above discussed threshold rules are defined at the tender level, an individual procurement tender can have multiple lots that lead to multiple contracts within the same procedure.[15] Hence, there are significantly more contracts than tenders in the dataset. While the data section always refers to tenders (e.g. displaying number of tenders included) – as the tender value determines the regulation to be followed – all the indicator-based analysis uses contract level data.

4.2.2. Assigning unique organisation IDs

The TED and national sources used in the analysis do not reliably identify legal entities either on the buyer or supplier sides, with the exception of Czech Republic. By implication, variants of the same organisation name and address had to be identified and linked to each other using a unique ID. For example, supplier name variants such as University of Bologna, Bologna Uni, or Univ. of Bologna were combined under a single entity ID.

While there are a number of alternative approaches to doing this ranging from fully manual to fully machine learning-based approaches we opted for using a recent innovation in entity name deduplication using the Python software package dedupe[16]. This package works by first engaging the analyst in labelling a training sample which feeds into a machine learning algorithm to predict matching records. The records similarity is defined by string similarity of their attributes measured by affine gap distance, which is a modification of Hamming distance that also makes consecutive inserting, deleting, or substituting of symbols, but applies slightly different penalties. In addition to that, the manual labelling of the training sample also allows the model to develop the weights for all the available attributes that are applied to predict the probability that each pair of two records represents the same entity.

Such an approach builds on prior experience with organisation name standardization in the DIGIWHIST project while it significantly deviates from the more conservative approach adopted on the opentender.eu portal. Use of the "dedupe" package was also applied with great success, for example, by the European Research Council funded research project: CORPNET[17] and it is currently considered state of the art by the

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14 While the thresholds have changed during the analysed time period, these changes were not that significant. The current publication thresholds are 144,000 EUR for supplies and services and 5,548,000 EUR for public works. For more detailed thresholds, see: https://ec.europa.eu/growth/single-market/public-procurement/rules-implementation/thresholds_en

15 Note that tenders with one lot can also lead to multiple awarded contracts.

16 https://github.com/dedupeio/dedupe

17 http://corpnet.uva.nl/

recently started public procurement focused research project funded by Horizon 2020 called They buy for you[18].

4.2.3. Contract value cleaning

Contract values are extracted from source publications as found on the source, then transformed in a number of steps. First, they are standardized by adhering to a number of grammatical rules (e.g. whether the decimal sign is a point or a comma etc.). Second, net contract values in EUR are calculated based on the information given in the announcement (e.g. % VAT applied to the price, currency of the price). In the absence of reliable information on VAT and currency, the typical values of the country were assumed. Third, a range of 'nonsensical' values were set to missing as they are likely to represent a publication error. For example, we removed prices falling in the 0.01% of the sample that is higher than 1.2 billion EUR. Prices below 300 EUR including negative values were also removed.

4.3. Selecting reliable and complete records

The deduplicated dataset[19] (see *deduplication of tenders* section) had to be further filtered to reflect the correct availability of key variables used in the analysis. In particular, we identified reliable and complete records if: i) the supplier name and bidder number information were available, and ii) EU Funding status was given (due to data availability, every tender marked as EU funded in procurement notices is considered as EU Funds irrespective of the specific instrument in question).[20]

Tenders without winner name or bidder number information cannot be used for analysis looking at single bidding or aiming to create company-level indices. First, the winner's name is necessary to group contracts awarded to the same supplier and a tender's single bidder status is defined based on the number of received bids. Second, most procurement publications do not contain information on whether the tendering procedure was successful or not. In practice, a significant share of tenders are cancelled, hence filtering out contracts without winner's name or received number of bids indirectly excludes cancelled tenders.

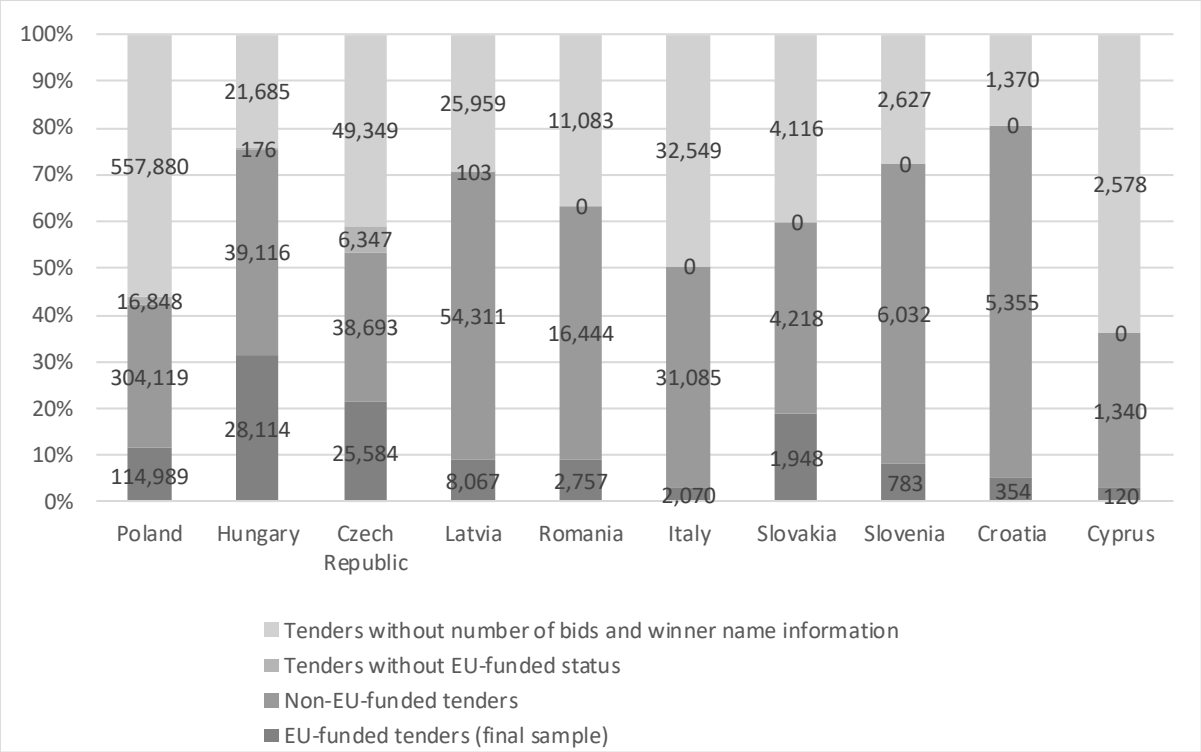
As the goal of this assessment is to explore EU-funded public procurement (including Structural and Cohesion Funds as well as the European Social Fund), tenders without known EU-funded status had to be excluded, too. The share of EU-funded awarded tenders is between 2-10% in the whole sample. Figure 1 shows in more detail the share of tenders excluded from the analysed sample.

[18] http://theybuyforyou.eu/

[19] Please note that the dataset also includes framework agreements.

[20] Please note that no record was excluded due to missing contract value or missing procedure type information.

Figure 1: Number of tenders excluded and included in the final analysis, by reason for exclusion/inclusion



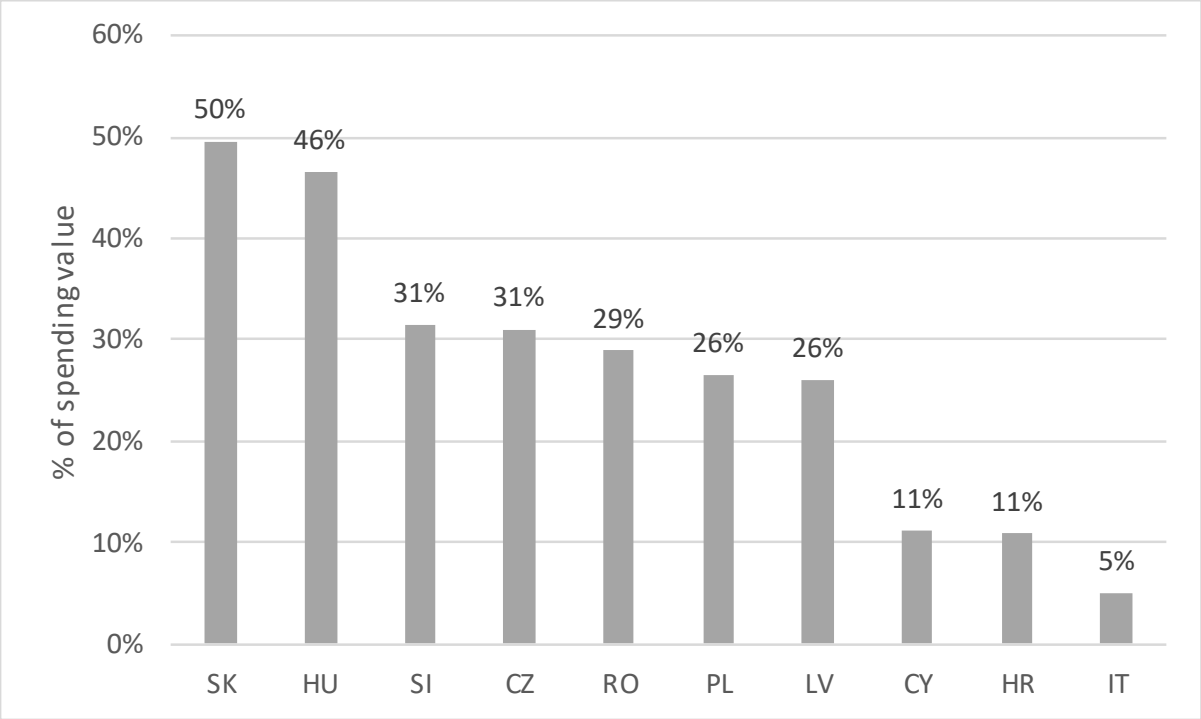
4.4. Selecting largest sectors of EU funded contracts

Once the dataset was cleaned and unreliable, incomplete records were removed, EU-funded tenders were selected and largest economic sectors identified for detailed analysis. Small sectors were removed from the analysis in order to compare companies within sectors only if there is a sufficient number of tenders, that is information to characterise company performance (e.g. when looking at companies in a sector which only has 2 companies in it, company performance is most likely to reflect sectoral specificities rather than company behaviour).

As expected, countries differ significantly in the share of EU-funded procurement spending[21] (Figure 2). As public procurement announcements only record whether EU Funds co-financed a contract but not the EU-funding value, observed differences in EU Funds' share in public procurement can be partly explained by the different country strategies regarding how widely they distribute EU Funds across contracts (i.e. low EU Funds share in many contracts or high EU Funds share in fewer contracts). For example, it might be the case that the average EU funding per contract is 40% higher in Romania than in Slovakia; hence, a higher share of total procurement contract value in Slovakia does not necessarily imply a higher overall EU-funding value in Slovakia than Romania.

[21] Note that tender-level estimation on the total committed spending is used which is the basis for all spending-related figures in this section. Theoretically, buyers have to publish four types of price items: tender level final price, lot level final price(s), tender level estimated price, lot level estimated price(s). Tender level prices refer to the whole tender, while there can be multiple lot (or contract) level prices published – depending on how many lots (or contracts) are related to the same tendering procedure. While in an optimal scenario, the tender level final price would show the total committed spending as a result of award to a supplier, this information is sometimes missing. Therefore, a variable had to be constructed that contains the best estimate of contract value. It has the value of the tender level final price if it was published. If it is missing the lot level final values of the tender are summed up. If all lot level final values are missing the tender level estimated price is used, and so on.

Figure 2: Share of EU-funded procurement spending (both below and above EU-threshold)

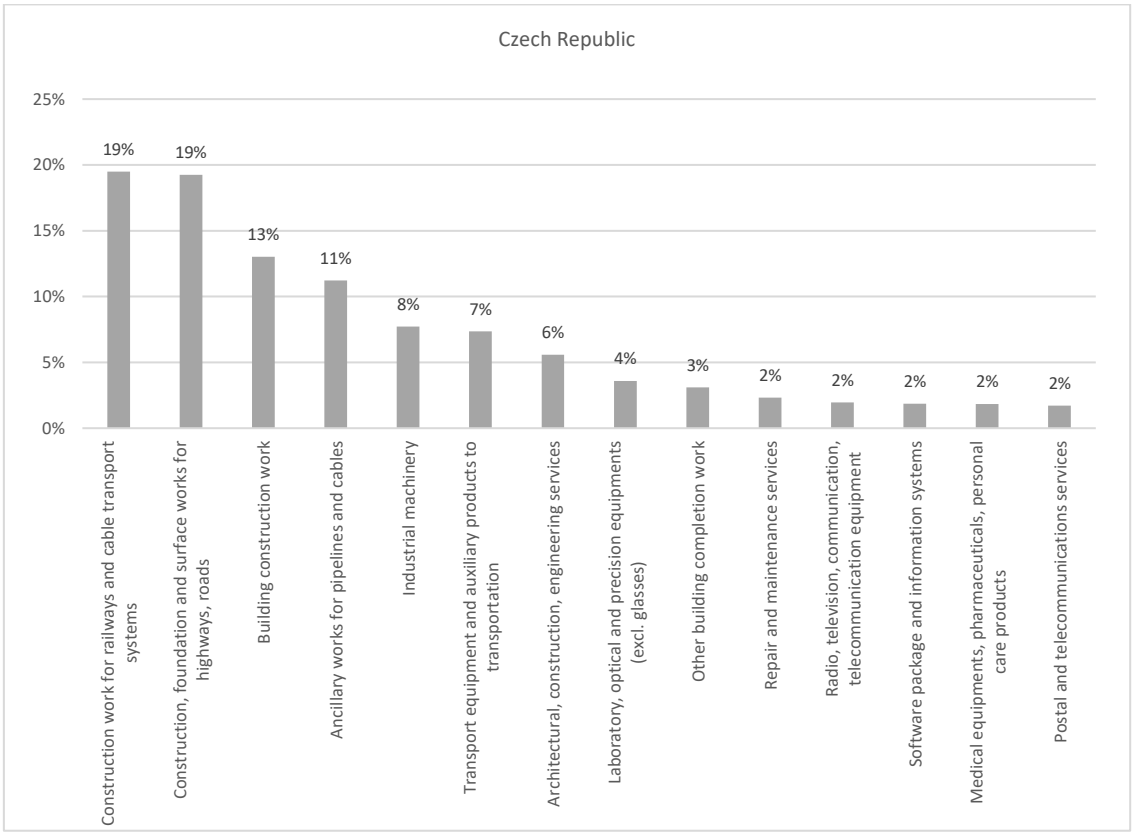


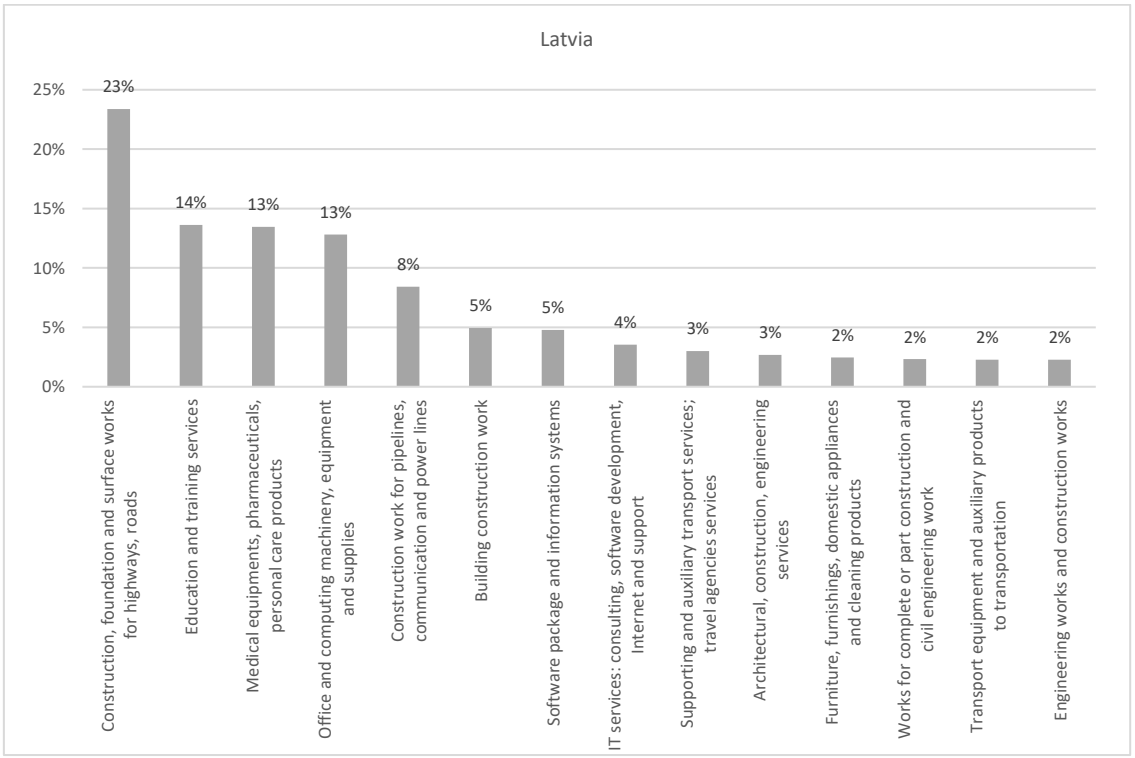
Next, the economically and financially most relevant sectors were identified in order to focus the subsequent analysis on contracts most relevant from the EU's perspective. To this end, a simple rule was applied to identify the ten largest sectors in each country: the total amount spent in each 2-digit CPV code category was summed up (i.e. CPV divisions)[22] – see Figure 3. These are wide categories such as software and information systems or financial and insurance services. While this helps to find the biggest sectors in terms of the amount of spending, one can also dig deeper to the level of economic markets in the subsequent explanatory analysis. For example, it is possible to distinguish between expensive medical equipment such as CT machines and regular medical supplies such as syringes that obviously constitute different markets. Note that a sectoral split for Croatia and Cyprus given the low number of EU-funded tenders is not included as there are not enough observations.

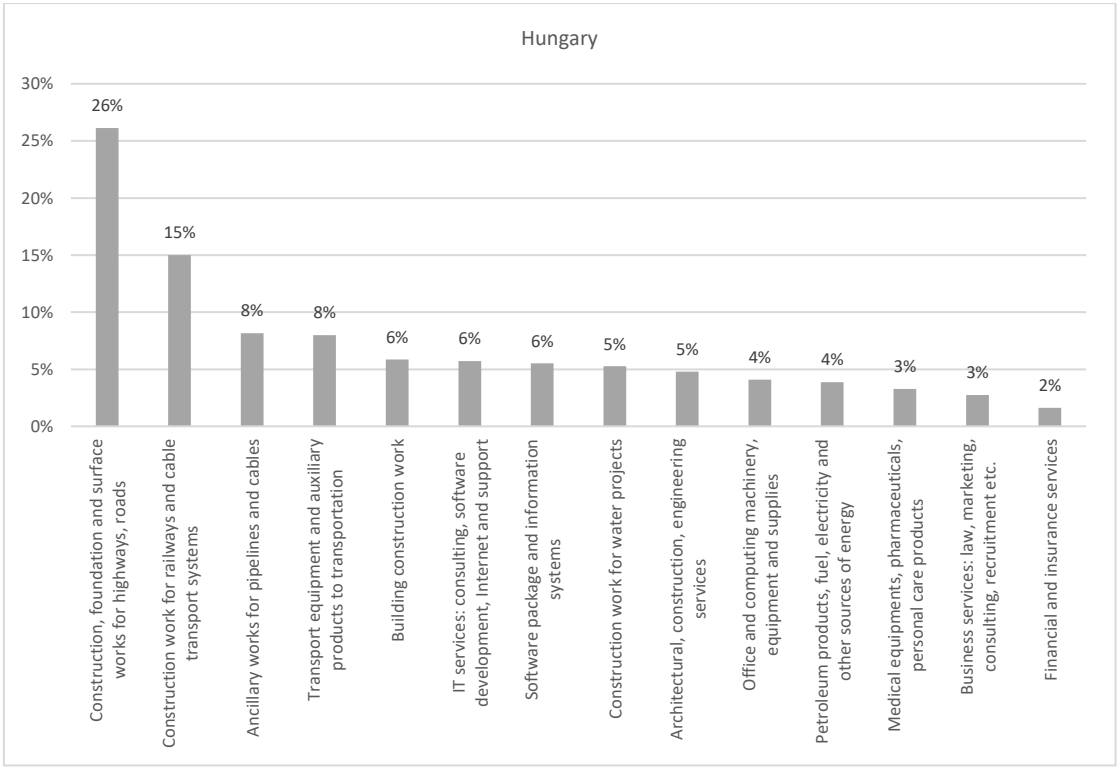
Moreover, this sectoral overview suggests that one needs to split the construction sector into smaller sub-markets – such as road, rail or sewage construction works. Construction entails at least half of the total spending in almost all countries in terms of spending value hence further refinement is warranted. For the sake of simplicity, 5 construction sub-sectors were added to the other 9 main sectors in the analysis. Overall, these 5 plus 9 sectors and sub-sectors capture the bulk of EU Funds spending for the selected periods in each of the countries, keeping the analysis broadly speaking representative of total EU Funds spending. Interestingly, the ten biggest sectors are only partially similar in each country: there are 24 different sectors in the top ten markets. Some of the most prominent are transport equipment, medical equipment, and architectural, business and IT services.

[22] For more detail, see: https://ec.europa.eu/growth/single-market/public-procurement/rules-implementation/common-vocabulary_en

Figure 3: Ten biggest sectors in terms of total spending per country, only EU-funded contracts (percentages represent each sector's share in the total EU-funded public procurement spending in the dataset)



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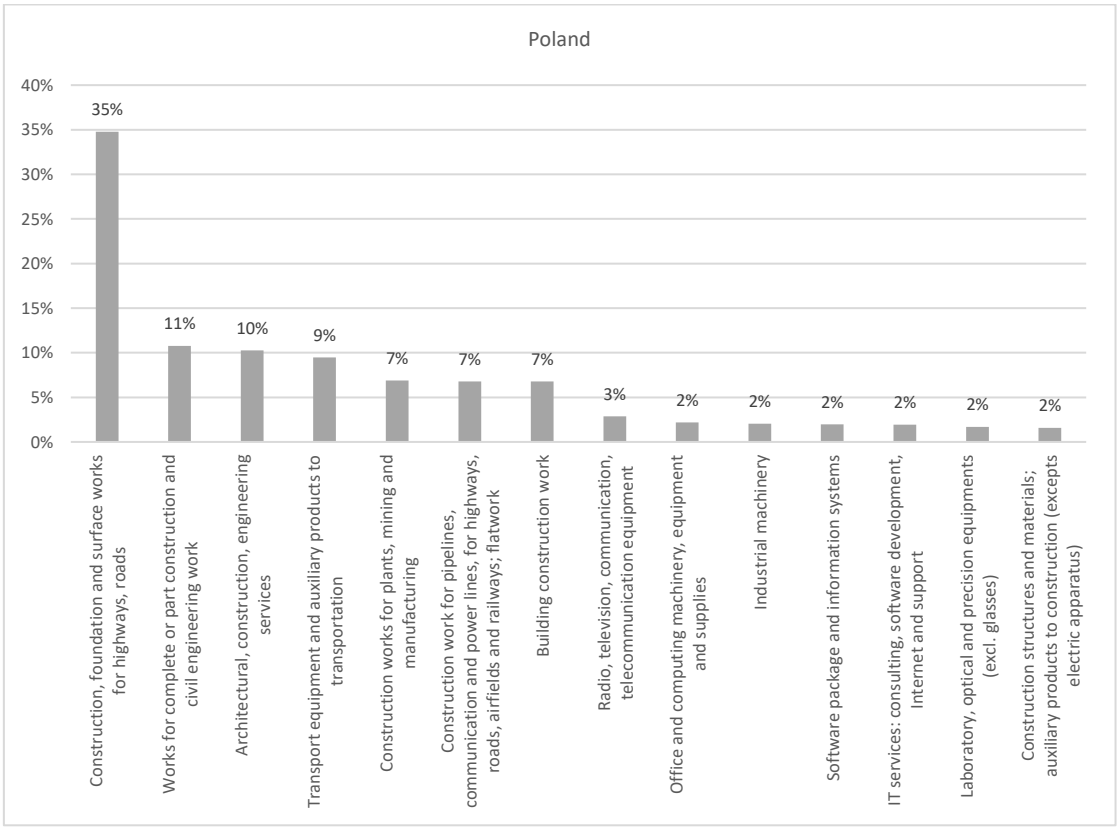
Construction, foundation and surface works for highways, roads
Construction work for railways and cable transport systems
Ancillary works for pipelines and cables
Transport equipment and auxiliary products to transportation
Building construction work
IT services: consulting, software development, Internet and support
Software package and information systems
Construction work for water projects
Architectural, construction, engineering services
Office and computing machinery, equipment and supplies
Petroleum products, fuel, electricity and other sources of energy
Medical equipments, pharmaceuticals, personal care products
Business services: law, marketing, consulting, recruitment etc.
Financial and insurance services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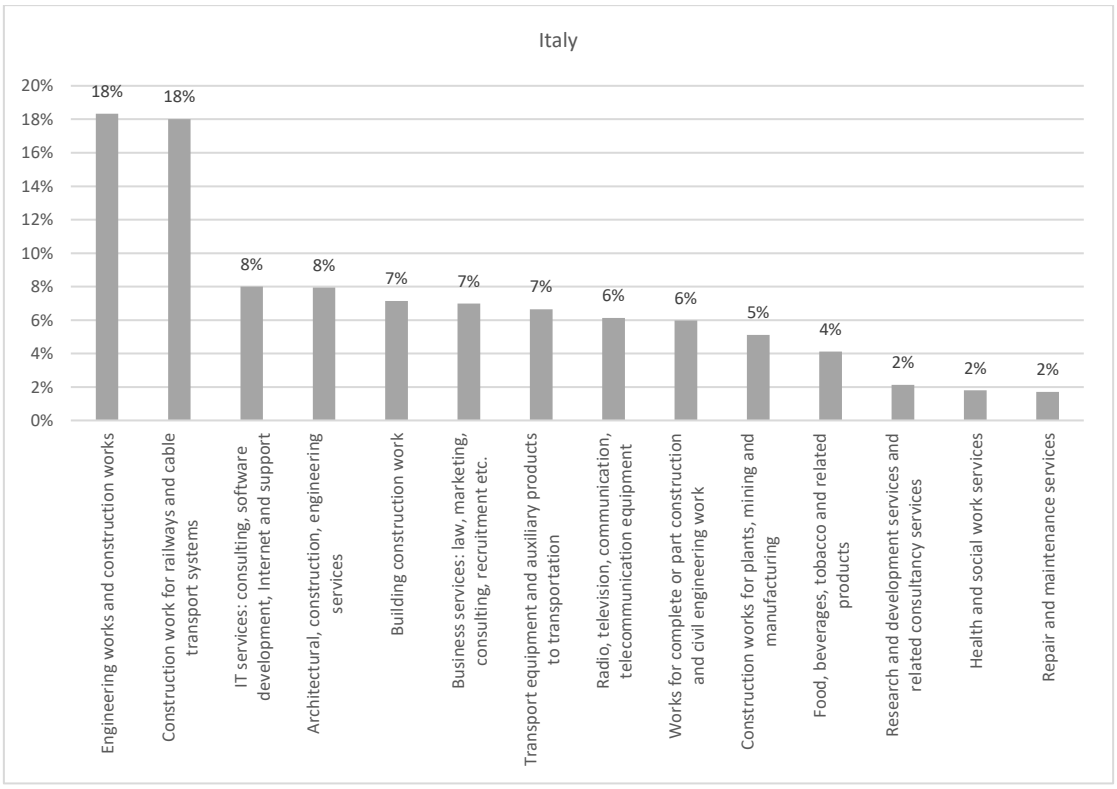
Architectural, construction, engineering services
Transport equipment and auxiliary products to transportation
Construction works for plants, mining and manufacturing
Construction work for pipelines, communication and power lines; for highways, roads, airfields and railways; flatwork
Building construction work
Radio, television, communication, telecommunication equipment
Office and computing machinery, equipment and supplies
Industrial machinery
Software package and information systems
IT services: consulting, software development, Internet and support
Laboratory, optical and precision equipments (excl. glasses)
Construction structures and materials; auxiliary products to construction (excepts electric apparatus)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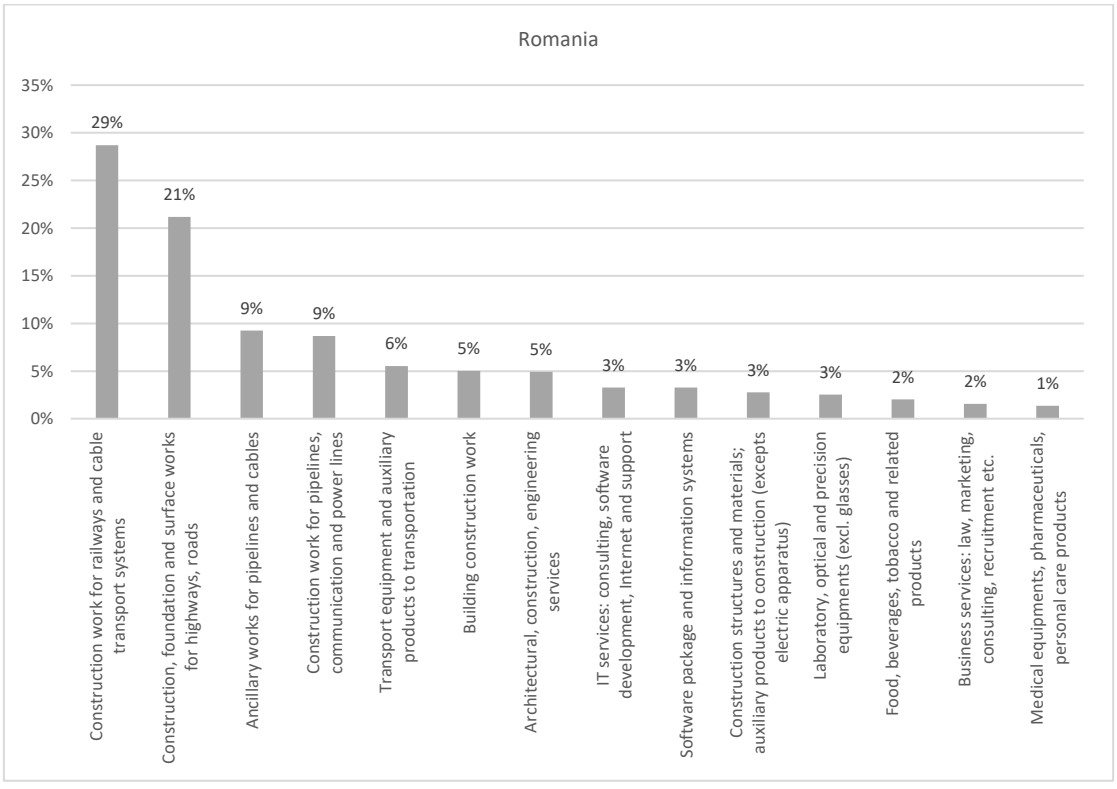
IT services: consulting, software development, Internet and support
Architectural, construction, engineering services
Building construction work
Business services: law, marketing, consulting, recruitment etc.
Transport equipment and auxiliary products to transportation
Radio, television, communication, telecommunication equipment
Works for complete or part construction and civil engineering work
Construction works for plants, mining and manufacturing
Food, beverages, tobacco and related products
Research and development services and related consultancy services
Health and social work services
Repair and maintenance services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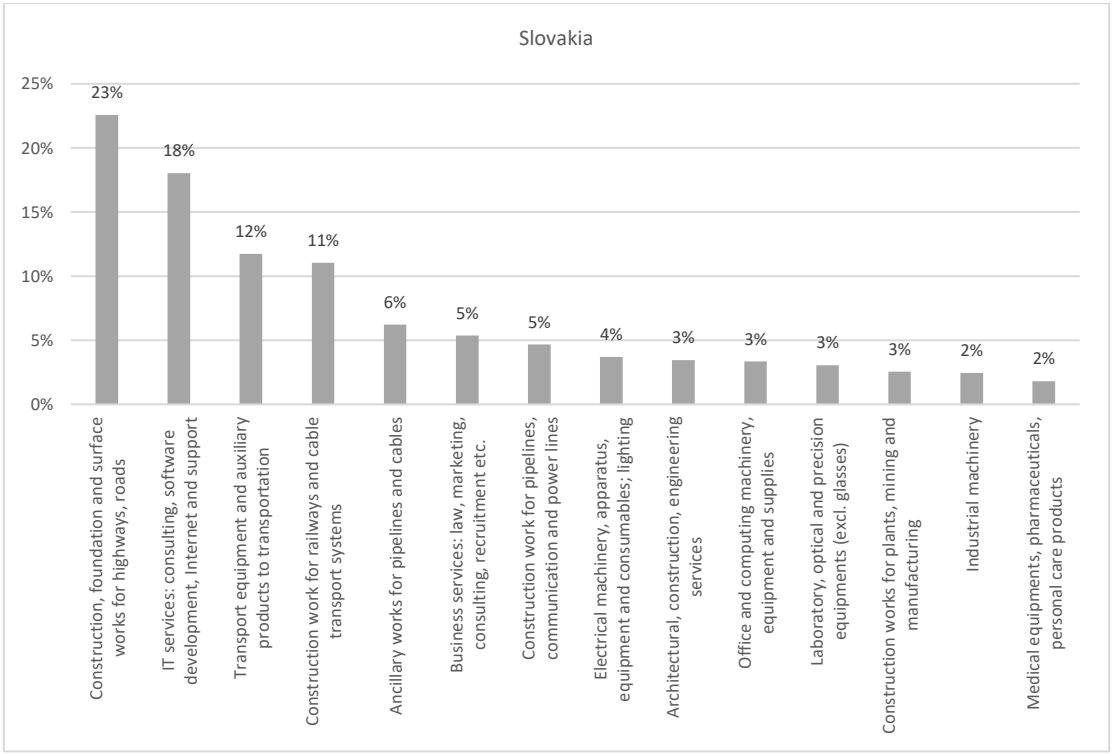
Ancillary works for pipelines and cables
Construction work for pipelines, communication and power lines
Transport equipment and auxiliary products to transportation
Building construction work
Architectural, construction, engineering services
IT services: consulting, software development, Internet and support
Software package and information systems
Construction structures and materials; auxiliary products to construction (excepts electric apparatus)
Laboratory, optical and precision equipments (excl. glasses)
Food, beverages, tobacco and related products
Business services: law, marketing, consulting, recruitment etc.
Medical equipments, pharmaceuticals, personal care products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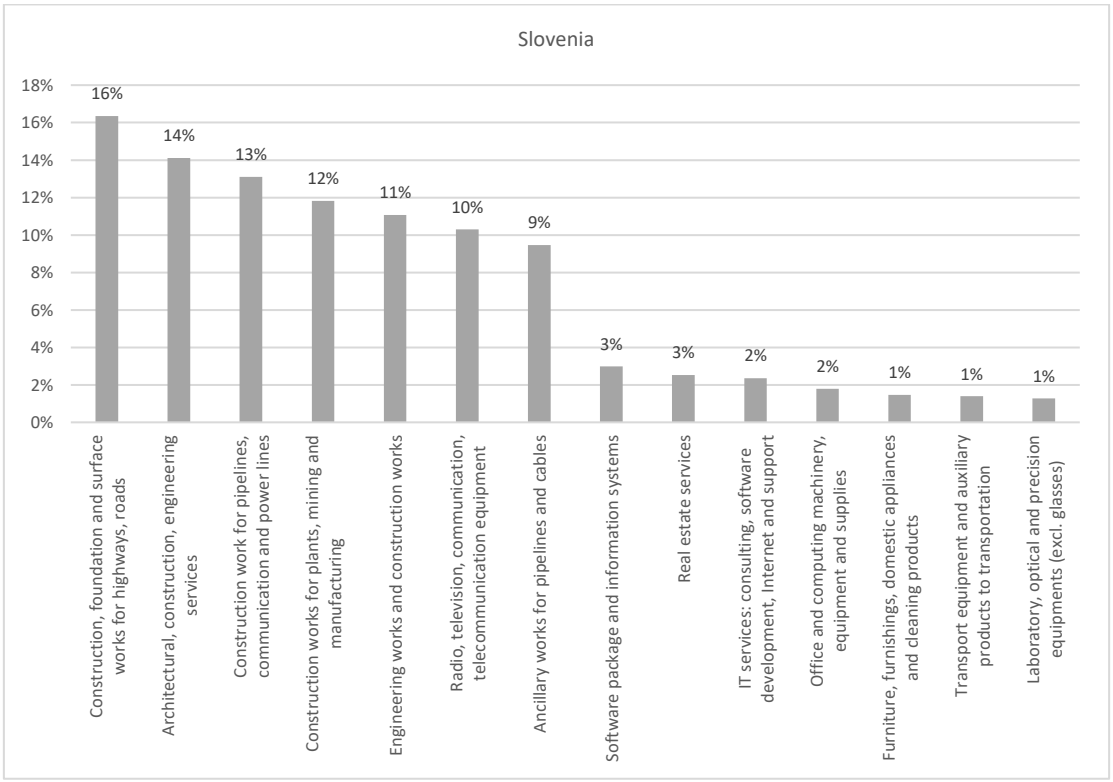
Construction, foundation and surface works for highways, roads
IT services: consulting, software development, Internet and support
Transport equipment and auxiliary products to transportation
Construction work for railways and cable transport systems
Ancillary works for pipelines and cables
Business services: law, marketing, consulting, recruitment etc.
Construction work for pipelines, communication and power lines
Electrical machinery, apparatus, equipment and consumables; lighting
Architectural, construction, engineering services
Office and computing machinery, equipment and supplies
Laboratory, optical and precision equipments (excl. glasses)
Construction works for plants, mining and manufacturing
Industrial machinery
Medical equipments, pharmaceuticals, personal care products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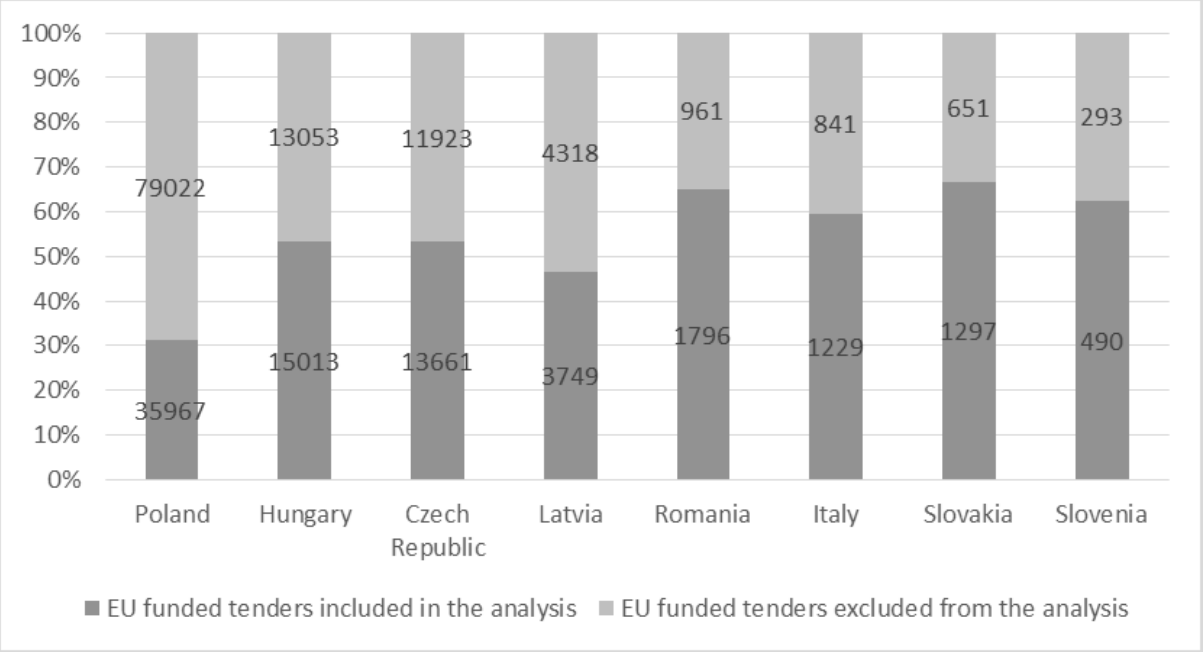
Construction, foundation and surface works for highways, roads
Architectural, construction, engineering services
Construction work for pipelines, communication and power lines
Construction works for plants, mining and manufacturing
Engineering works and construction works
Radio, television, communication, telecommunication equipment
Ancillary works for pipelines and cables
Software package and information systems
Real estate services
IT services: consulting, software development, Internet and support
Office and computing machinery, equipment and supplies
Furniture, furnishings, domestic appliances and cleaning products
Transport equipment and auxiliary products to transportation
Laboratory, optical and precision equipments (excl. glasses)

As the analysis only focuses on the top 5 construction and top 9 non-construction sectors, the analysed sample is a subsample of all EU-funded markets. The eventually selected tenders cover 30-65% of the total number of EU-funded tenders (Figure 4). This variation is most likely due to the different spending structure by country.

Figure 4: Share of tenders included in the final analysis (top5 construction+ top9 non-construction sectors)



5. DESCRIBING THE PREVALENCE OF SINGLE BIDDING AND NON-OPEN PROCEDURES

As highlighted in sections 2 and 3 on the background and goals of the study, single bidding is of central importance to public procurement performance and the use of non-open procedure types is one of the key policy choices explaining it. Hence, two indicators were used in the descriptive analysis: (a) the share of non-open procedures and (b) the share of single bidder contracts. As both of these indicators are originally defined on the contract level, they were aggregated to higher levels of observation of policy relevance: sectors, regions, periods, and companies. Sectors are defined as above, using 2-digit CPV categories for non-construction sectors and more detailed CPV codes for construction works. Regional markets are defined on the NUTS-1 level[23] in order to retain a sufficient number of observations within even the smallest regions. For the sake of simplicity, temporal comparisons are made on an annual basis. Finally, company tables show company average scores within each main sector, i.e. the same company can have different values in different sectors. All of these indicators and aggregations are discussed in the following sections with examples and a thorough explanation of indicator interpretation, including pros and cons of the indicator.

5.1. Indicator interpretation and the use of dashboards

5.1.1. Sectoral, regional, and annual descriptive statistics

This section discusses the share of single bidder contracts and the use of non-open procedures from an aggregate perspective. Each of these indicators are calculated for the biggest EU-funded sectors as defined in the data section above, and for regions as well as changes over time.

The first indicator captures **single bidding**. Single bidder contracts are those tenders that received only one bid. As the dataset contains primarily high value tenders, the occurrence of single bidder contracts certainly flags a market anomaly that can lead to higher prices and/or lower quality (Fazekas & Kocsis, 2017). There are several factors behind single bidding. Certain regions might simply lack good enough companies that could participate effectively on public markets. Problems might occur on the public buyer's side: managing large and often very complex contracts is not an easy task and contracting authorities might lack the expertise needed to attract enough bids. Public procurement markets also face a structural risk of collusion: companies might agree on not competing against each other (Fazekas & Tóth, 2016). Furthermore, single bidding is also associated with corrupt practices – favoured companies usually win in tailored tenders where competitors often cannot even place a bid (OECD, 2007). Therefore, single bidding is used widely as a performance indicator – for example, in the European Commission's Public procurement scoreboard.[24]

Public procurement rules allow buyers to decide on the **procedure type** they use to choose their suppliers. There are several procedure types both below and above EU-threshold. For example, any company can participate freely in an open procedure; but

[23] There are two ways to follow for regional categorization of the tenders based on the information published in procurement notices: the region of implementation or the region of the contracting authority. From the market definition perspective using information on the implementation location is preferable as companies' bidding behaviour is primarily affected by the place of actual contract implementation. For example, a central ministry managing all road construction tenders across a country is expected to receive bids from different sets of companies that operate on local submarkets far from each other. However, implementation location is often not published in the official announcements. Therefore, the regional categorization is based on the implementation location if available and on the region of the contracting authority if the information on the former is missing. While this method introduces some ambiguity into market definition, this is still the best possible way of categorizing tenders by geographical markets. All indicators are calculated using NUTS-1 level regional codes.

[24] http://ec.europa.eu/internal_market/scoreboard/performance_per_policy_area/public_procurement/

only invited companies can bid in a negotiated procedure. There are legitimate reasons for using non-open procedures. First, special circumstances may make it necessary to find a supplier as fast as possible when an open competition can be too time-consuming (for example, in case of a natural disaster). Second, the costs of evaluating bids after an open call can also be significantly burdensome for public buyers, which makes inviting only high-quality companies to bid a sensible choice from the buyer's perspective. Third, sometimes it is impossible to define a product or a service precisely in advance, incentivizing buyers to use a more flexible, negotiated procedure type that gives more room for specifying the needs jointly with the suppliers.

In addition to the justifiable uses of non-open procedures, buyers can also misuse them to unnecessarily restrict competition. Therefore, the overuse of non-open procedures can become problematic (Chong, Klien, & Saussier, 2015). For example, the use of negotiated procedure without a call for bids is part of the EU's procurement scoreboard – more than 10% of all tenders using such procedures per country are considered to be a bad practice[25]. *This analysis marks all tenders not following either an open or a restricted procedure as being non-open – including those with missing procedure type information*.[26]

5.1.2. Company-level descriptive statistics

There are two company performance indicators used in the analysis. The first indicator of company performance is the share of single bidder contracts won. Only suppliers winning at least ten contracts in the analysed period are considered and the reported tables only contain the top ten companies with the highest single bidder share per sector.[27] Companies with an extremely high share of single bidder contracts won are winning tenders recurrently without effective competitive pressures. Although a high-share of single bidder contracts can be considered unusual in a competitive market, certain special market conditions can explain the lack of competition – for example, a sub-market for a specific IT service or product that can be only purchased from a particular supplier. Nevertheless, a high share of single bidder contracts is considered as a possible risk factor.

The second indicator by which companies are assessed is the share of contracts won in a non-open procedure. Again, only suppliers winning at least ten contracts in the analysed period are considered in the analysis, in order to remove the highly volatile performance of smaller companies from the analysis. The reported tables only contain the top ten companies with the highest share of non-open procedures among all contracts won. Companies winning most of their contracts through non-open procedures suggests that they are less exposed to competition and may receive special treatment. However, there might be certain special markets (e.g. for specialised medical equipment) or circumstances (e.g. emergencies following natural disasters) where companies would win non-open tenders repeatedly and legitimately.

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25 http://ec.europa.eu/internal_market/scoreboard/performance_per_policy_area/public_procurement/

26 As any company can participate in the first round of a restricted procedure, while only the ones shortlisted by the buyers can place a bid in the second round, these can be regarded as open procedures as well.

27 When there are more than 10 companies winning only single bidder contracts per market (or there are more than ten companies winning single bidder contracts with equal probability), the top ten are filtered based on the sum of contract value won.

5.1.3. How to use and interpret the dashboards: descriptive statistics

The descriptive evidence gathered in this section, in particular those reported in the country profiles below are complemented by a more detailed dashboard which also allows users to filter parts of the data most relevant to them. The starting page of the dashboards can be found here:

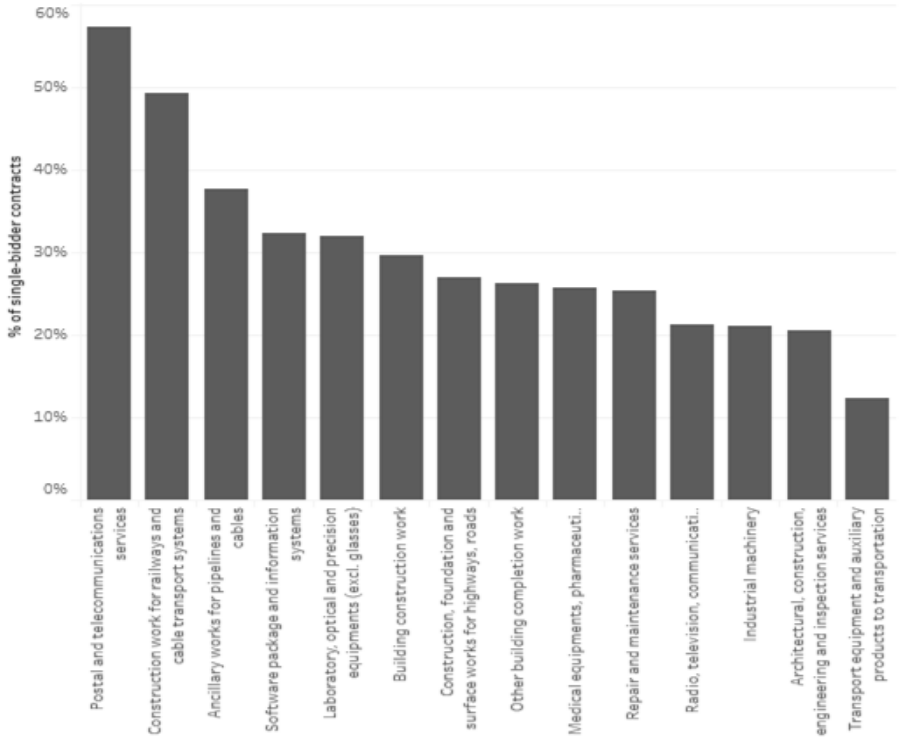
https://public.tableau.com/profile/directorate.general.for.regional.and.urban.policy#!/vizhome/Singlebidnon-open_proc/Singlebiddingoverview

For each country, there is one dashboard providing a macro-level overview both of single bidding and the use of non-open procedures by sector, region and year. Using the dashboard for the Czech Republic as an example, uses of the dashboard are briefly demonstrated.

First, looking at sectoral variation, Panel A of Figure 5 shows that the share of single bidder contracts varies a lot among sectors within the Czech Republic. Whereas close to 60% of all EU-funded contracts received only one bid between 2012 and 2017 in the postal and telecommunication sector, this share is only 12% among transport equipment contracts. Similarly, Panel B of Figure 5 highlights that there are considerable differences between sectors in the use of non-open procedures. While it is close to 60% in postal and telecommunication services and building construction, it is only around 10% for medical equipment. In both cases, clicking on one of the bars in the sectoral figure (top left, online) allows the user to filter that sector for the whole dashboard, hence changing the regional and temporal figures correspondingly.

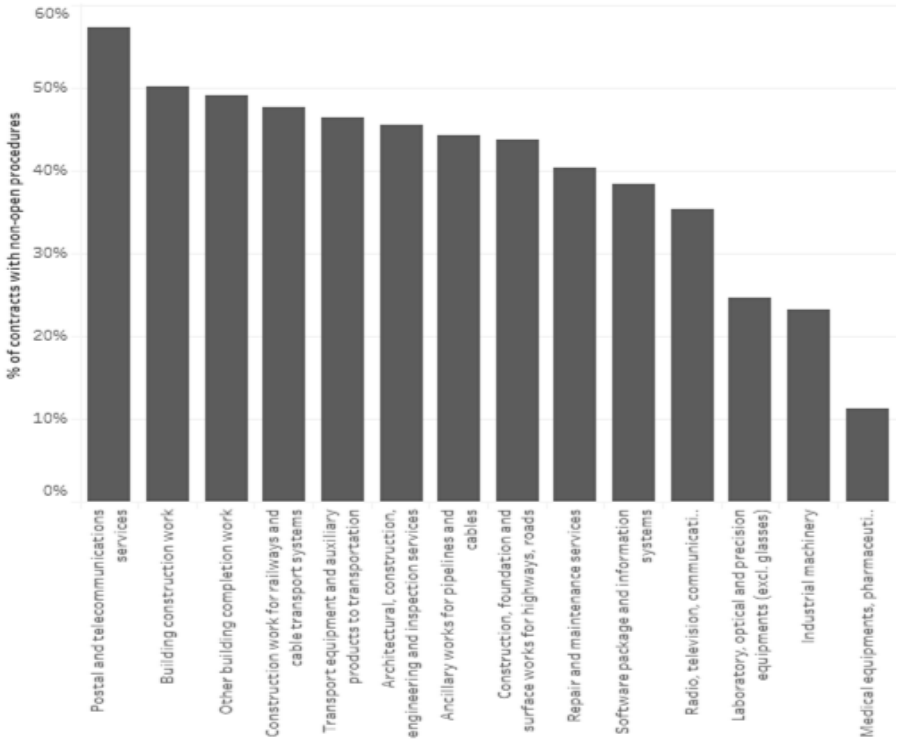
Figure 5: Share of non-open procedures and single bidding per the largest sectors in the Czech Republic, EU funded contracts, TED and national public procurement data[28]

Panel A – single bidding



[28] Based on tenders between 2012-2017 that received EU funding.

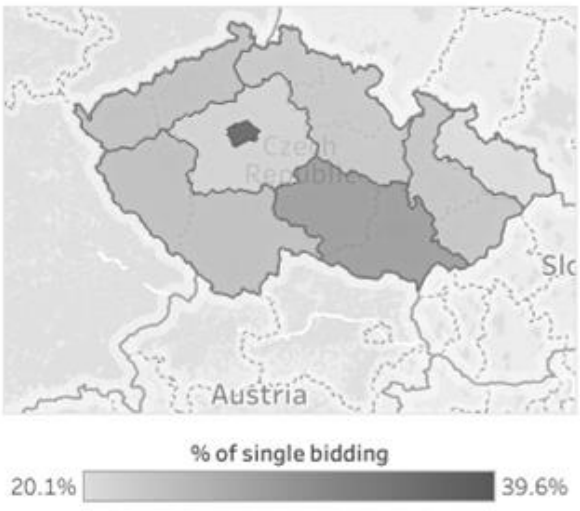
Panel B – non-open procedures



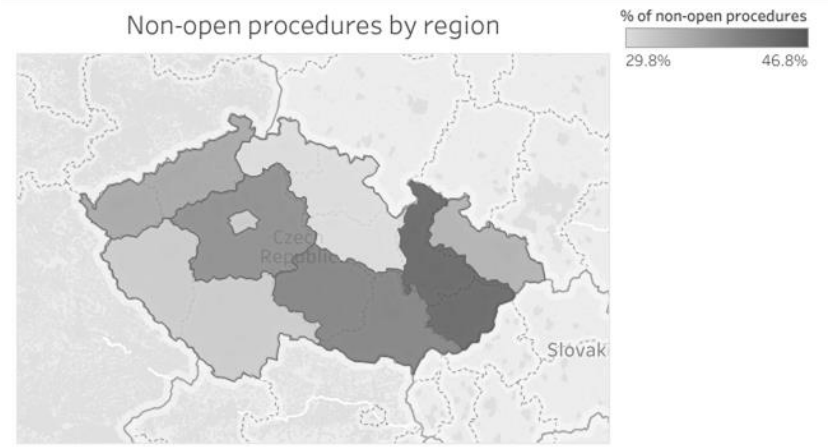
Second, looking at regional variation, the share of single bidder contracts are shown on Panel A in Figure 6. There are significant differences between regions: the share of single bidder contracts is more than 40% in Prague, while only around 20% in the Moravian-Silesian region. Similarly, the share of non-open procedures can also be seen in Panel B of Figure 6, which shows significant cross-regional differences in the Czech Republic. The share of non-open procedures is 32% in Prague, while around 47% in Central Moravia.

Figure 6: Share of non-open procedures and single bidder contracts per region in the Czech Republic

Panel A – single bidding



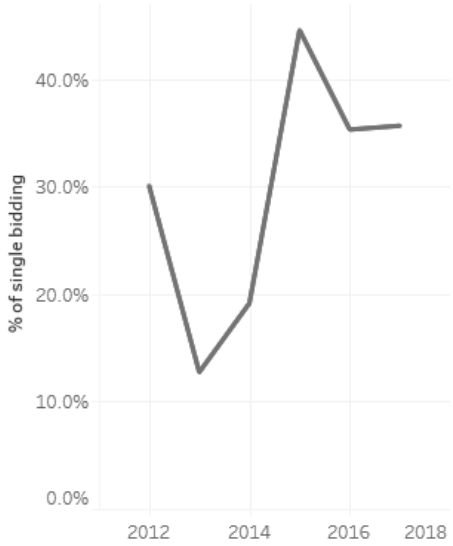
Panel B – non-open procedures



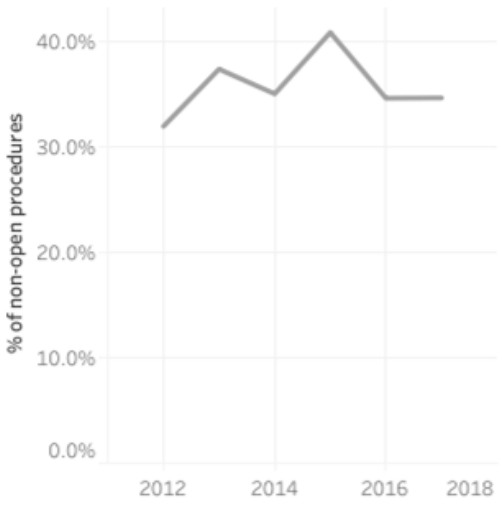
Third, looking at annual changes, Panel A of Figure 7 shows the average single bidding rate by year in the Czech Republic. Interestingly, the share of single bidder contracts increased from the 20-30% range between 2010-2014 to the 35-45% range between 2015-2017. Yearly averages are also calculated for the share of non-open procedures, see panel B in Figure 7. The share of non-open procedures slightly increased over the years in parallel to single bidding (for a systematic analysis of the relationship between these two variables see the explanatory models in section 6).

Figure 7: Share of non-open procedures and single bidder contracts across years in the Czech Republic

Panel A – single bidding



Panel B – non-open procedures



In addition to a macro-overview of single bidding and non-open procedures, the dashboards also allow for identifying companies with the highest single bidding and non-open procedure rates. Examples are shown from the Czech Republic again to demonstrate how the dashboards work and support analysis. Table 4 shows that there are several companies winning single bidder contracts, often in the Czech rail construction sector, however, their significance in terms of contracts won differ significantly. For example, OHL ŽS, a.s. wins 87% of their contracts without competition, it won almost three times the amount compared to Viamont DSP a.s. which has a comparable share of single bidder contracts.

Furthermore, as Table 5 shows, there are many companies with extremely high shares of contracts won in non-open procedures reaching as high as 80-90%. While some companies won a lower total contract volume, some are large companies such as GEMO OLOMOUC, spol. s r.o. which won over 10 million EUR worth of contracts with an average 83% of non-open procedure rate.

If the user clicks on a country in the map or on a sector in the sectoral bar chart, the list of companies changes to reflect the selected country and sector.

Table 4: Companies with the highest share of single bidder contracts won (according to the number of contracts) in the Czech Republic – railway construction sector, 2012-2017

Company name	Single bidding share	Total contract value won (EUR)
STRABAG Rail a.s.	88%	17,013,323.00
OHL ŽS, a.s.	87%	43,971,749.00
Subterra a.s.	83%	28,923,197.00
EUROVIA CS, a.s.	79%	23,562,099.00
Viamont DSP a.s.	79%	15,868,274.00
Skanska a.s.	78%	24,003,741.00
Metrostav a.s.	68%	25,435,175.00
Chládek A Tintěra, Pardubice, A.S.	67%	4,916,683.00
AZŽD Praha s.r.o.	58%	25,525,721.00

Table 5: Companies with the highest share of non-open contracts won (according to the number of contracts) in the Czech Republic – building construction works, companies winning at least 10 contracts, 2012-2017

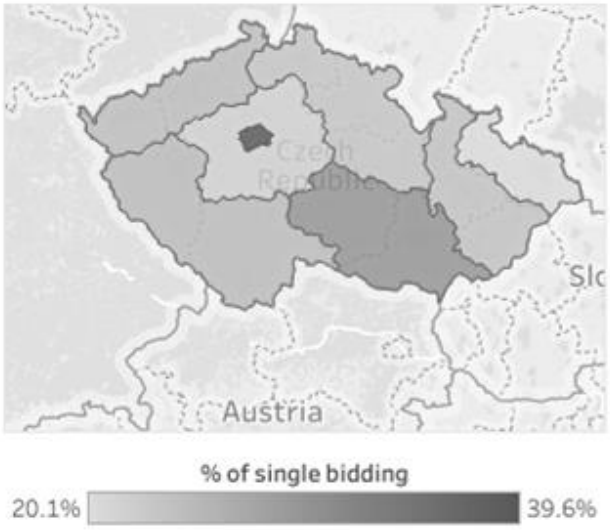
Company name	Non-open procedure share	Total contract value won (EUR)
TIMA spol. s r.o. - obchodne výrobní slu□by	91%	1,628,019
PSG-International a.s.	90%	2,006,414
Subterra a.s.	87%	3,034,164
GEMO OLOMOUC, spol. s r.o.	83%	10,600,000
MORAVOSTAV Brno, a.s. stavební spolecnost	82%	6,151,427
Zlínstav a.s.	82%	5,612,258
STARKON JIHLAVA CZ a.s.	80%	2,239,788
MATEX HK s.r.o.	75%	1,546,844
EUROMONT GROUP a.s.	73%	2,274,830
Podzimek a synové s.r.o.	72%	5,137,543

5.2. Country profiles

5.2.1. Czech Republic

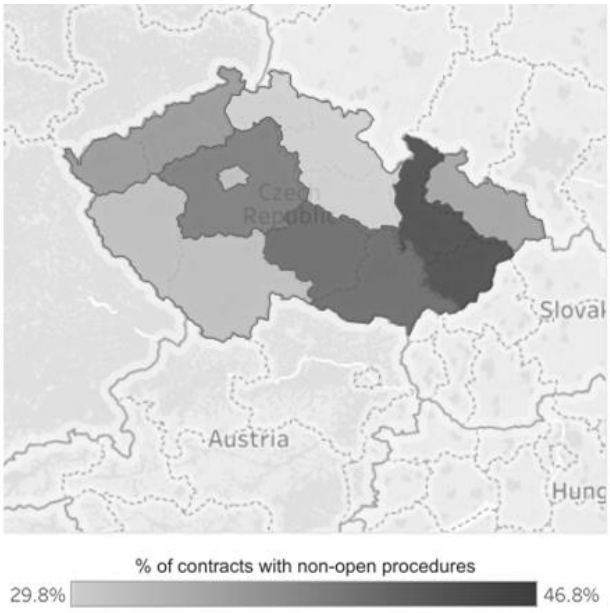
In the Czech Republic, single bidding varies considerably by region (Figure 8). The share of single bidder contracts is close to 40% in Prague, while only around 20% in the Moravian-Silesian region. On the one hand, given the supposedly most developed supplier markets in the capital region, it is surprising to find the highest single bidding share in there. On the other hand, capital regions might procure more unique products where supplier markets are more sparse, making single bidding more likely even when tendering practices follow best international standards.

Figure 8: The share of single bidder contracts per region in the Czech Republic



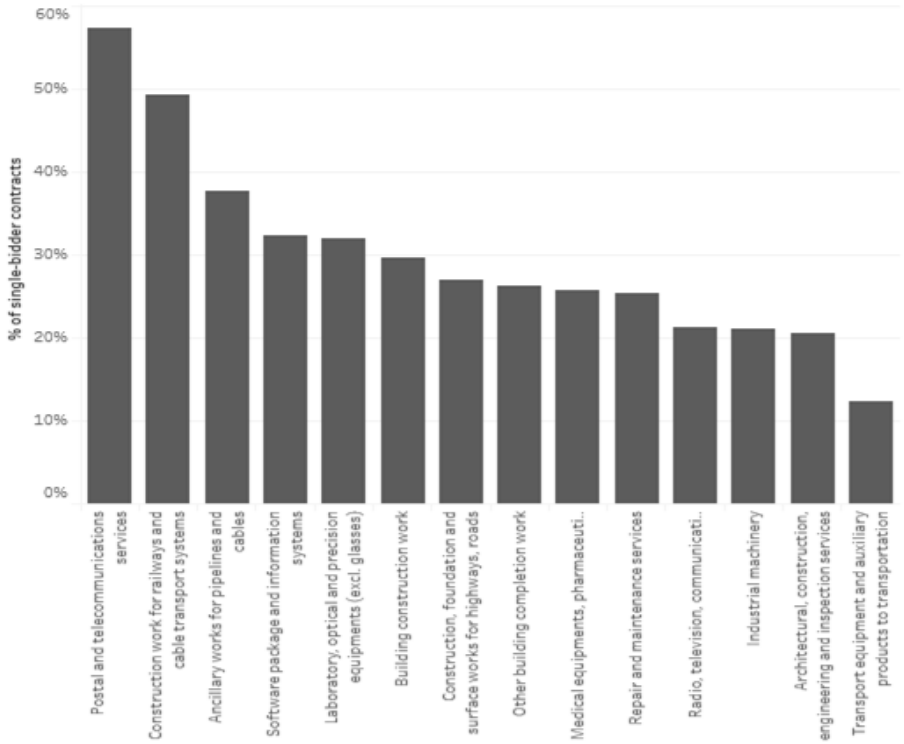
In the Czech Republic, the use of non-open procedure types varies a lot by region (Figure 9). The share of non-open procedures is 32% in Prague, while around 47% in Central Moravia. Public buyers in the capital area most likely have comparatively higher capacity than in many peripheral or rural regions, making the use of procedure types less open to competition surprising.

Figure 9: The share of non-open contracts per region in the Czech Republic



Interestingly, sectoral variation in single bidder shares is even higher than regional variation (Figure 10). The postal and telecommunications services sector purports the highest single bidder share with over 60% value which is probably due to the former state monopoly's dominant position in postal services and the oligopolistic market structure in many telecommunications sub-markets such as mobile telephony. Moreover, most construction sub-markets such as architectural services (only 20% of single bidding) are among the moderate or lowest single bidding share sectors which may contradict many perceptions of the sector.

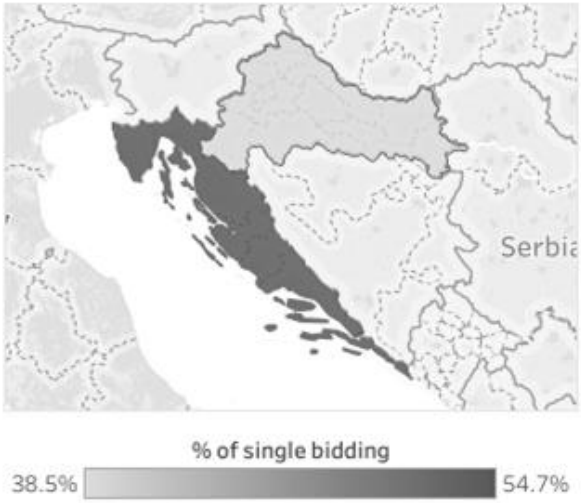
Figure 10: The share of single bidding per largest sectors in the Czech Republic, 2012-2017, EU funded contracts



5.2.2. Croatia

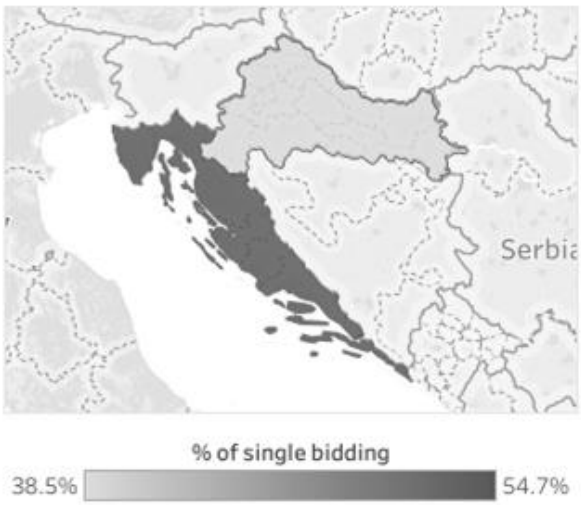
The share of single bidder contracts varies significantly between the continental and Adriatic regions of Croatia with a difference of more than 15 percentage points (Figure 11). This is in line with expectations: in capital regions, where more companies are available to participate in public tenders, the level of competition is expected to be higher as well.

Figure 11: The share of single bidder contracts per region in Croatia



Similarly to many other countries discussed below – such as Romania or Poland – the share of non-open procedures is negligible, less than 5% in both regions (Figure 12).

Figure 12: The share of non-open contracts per region in Croatia

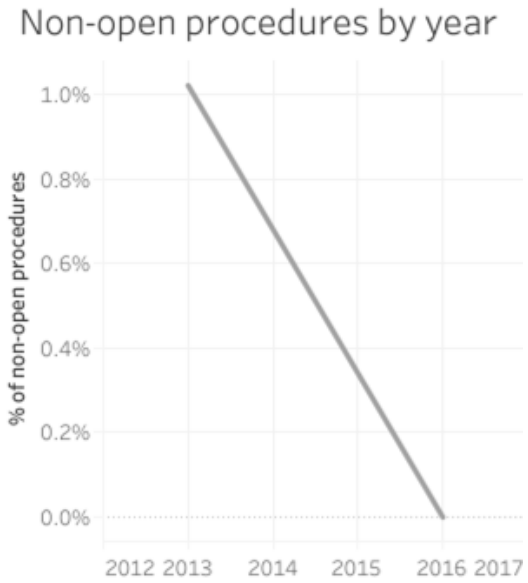


5.2.3. Cyprus

The share of single bidder contracts varies significantly across years in Cyprus (Figure 13). However, this significant variation is also affected by the small number of EU-funded contracts in the analysed period. The share of non-open procedure is negligible (Figure 14) – similarly to other countries like Poland.

Figure 13: The share of single bidder contracts across time in Cyprus

Figure 14: The share of non-open contracts across time in Cyprus



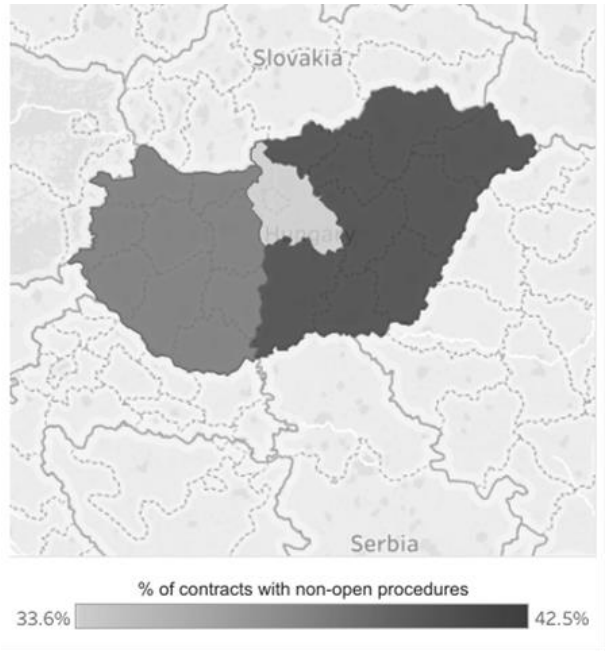
5.2.4. Hungary

Single bidding varies considerably by region in Hungary (Figure 15). The share of single bidder contracts is somewhat above 20% in Central-Hungary (including Budapest), while the highest single bidding share is still around 25% outside of it. Having the lowest single bidding share in the capital region is not surprizing as capital regions' higher procurement spending tends to be accompanied by more mature supplier markets. However, the single bidder share is at comparable levels both in Western and Eastern parts of Hungary, which is unexpected given that West Hungary is more economically developed compared to the East.

Figure 15: The share of single bidder contracts per region in Hungary

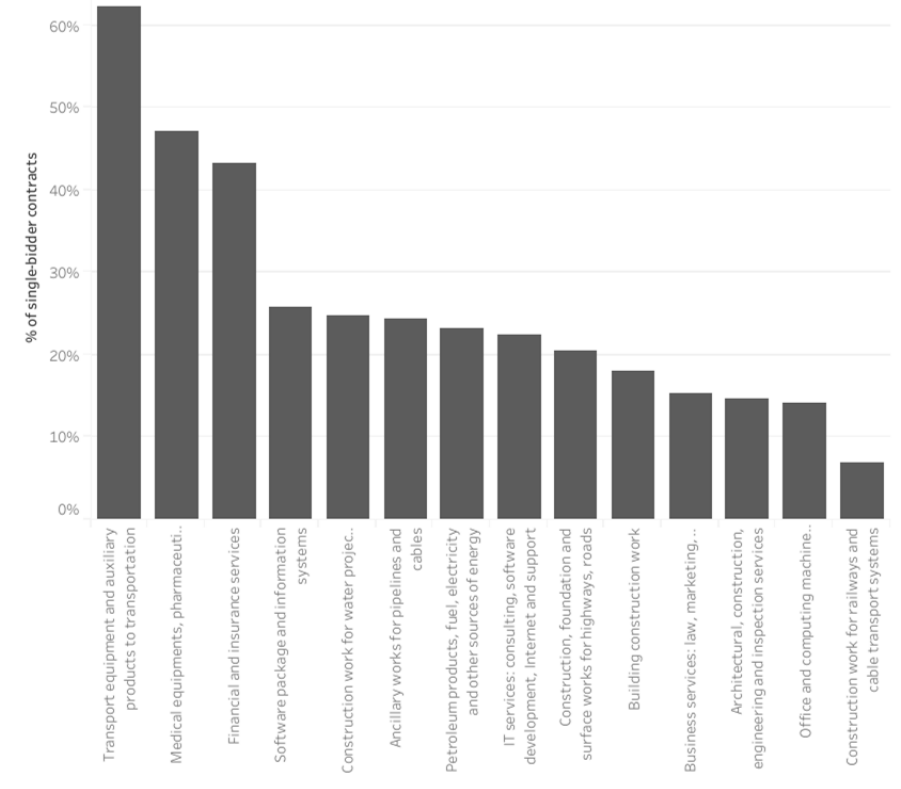
There is a clear divide between regions in using non-open procedure types in Hungary (Figure 16). The share of non-open procedures is 33% in the capital region, while it is around 40% outside of it. Public buyers in the capital region typically have a higher capacity than in many peripheral or rural regions, which can partly explain the wider use of open tendering. The significant divide can be also explained by the different spending structure of the capital versus less urbanized areas. There might be markets that are overrepresented in the capital, where the use of open procedures is easier due to many high-quality suppliers.

Figure 16: The share of non-open contracts per region in Hungary



Sectoral variation in single bidder shares is significantly larger than regional differences in Hungary (Figure 17). Transport and medical equipment purchases as well as financial services all have more than 40% of single bidder shares. As in the Czech Republic, construction markets such as architectural services or railway related construction works (with less than 10% of single bidding in the latter sub-sector) are among the moderate or lowest single bidding share sectors which may be contrary to common perceptions of the sector.

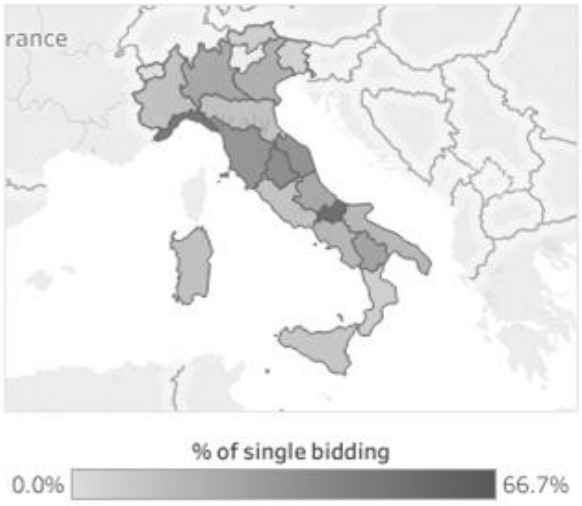
Figure 17: The share of single bidding per the biggest sectors in Hungary, 2012-2017, EU funded contracts



5.2.5. Italy

The share of single bidding differs significantly across Italian regions (Figure 18). However, the extremely high shares are coming from regions with only a few EU-funded tenders – such as North-East or Central Italy. North-West Italy has a higher share of single bidder contracts than South Italy, which rather unexpected given the large economic and administrative differences between these regions. However, this might be explained by differences in spending structure. Given that the North-West region is more economically advanced, they might use EU-funded procurement to purchase more special supplies or works with a smaller number of potential suppliers.

Figure 18: The share of single bidder contracts per region in Italy

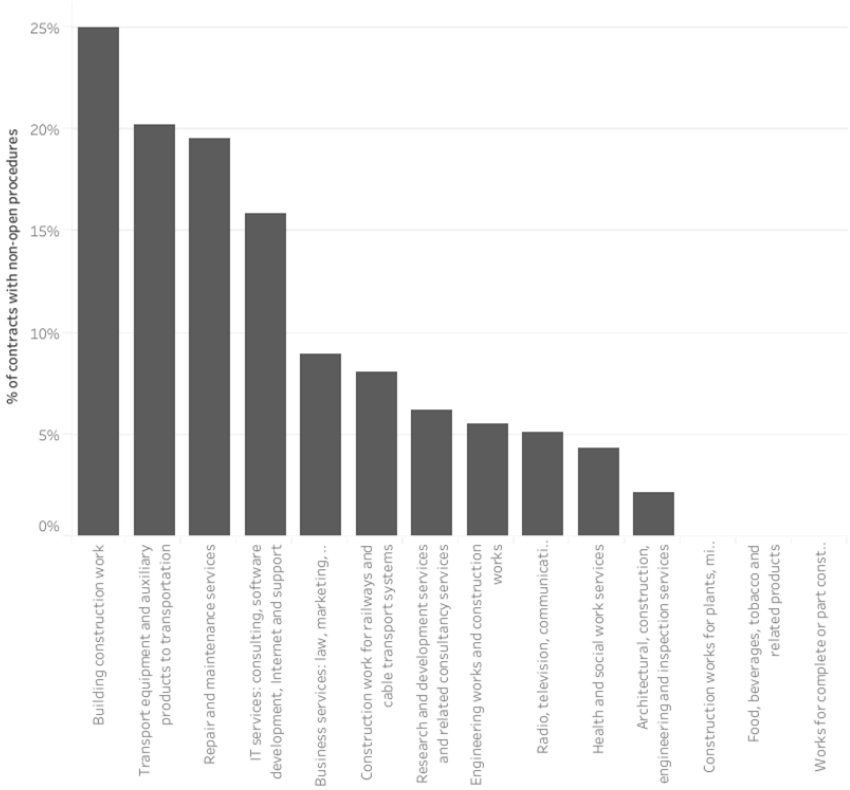


Similarly to the share of single bidder contracts, there appear to be vast differences in the share of non-open contracts (Figure 19). However, North-East Italy only accounts for a couple of EU-funded procurement contracts. Overall, the share of non-open procedures hovers around or below 10%, which is significantly lower than most other countries. Interestingly, neither single bidding, nor non-open procedure shares reflect the widely held perceptions of the north-south divide in Italy.

Figure 19: The share of non-open contracts per region in Italy

The share of non-open procedures differs a lot across sectors in Italy. While it is relatively often used in building construction work (25%), it is not that prevalent in other construction sectors such as general engineering and construction, construction of plants, or mining and manufacturing etc. (less than 5%).

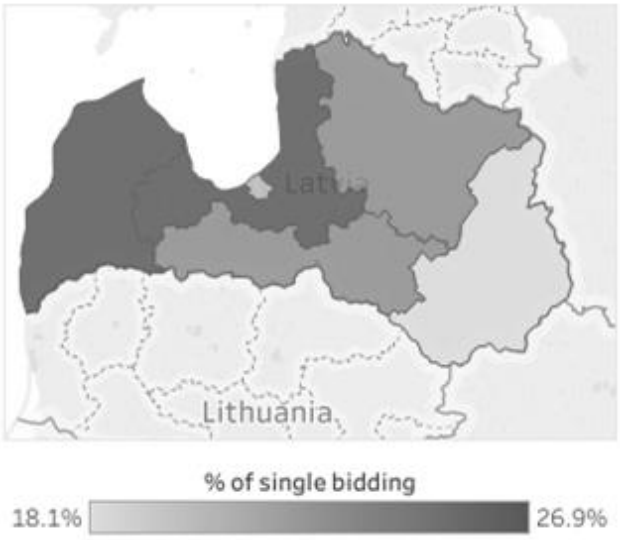
Figure 20: The share of non-open contracts per largest sectors in the Italy, 2012-2017, EU funded contracts



5.2.6. Latvia

The share of single bidder contracts is between 18-26% in Latvia (Figure 21). The highest single bidding share is in Pierīga region (surrounding Riga). Given that supplier markets are supposedly most developed in the capital region, it is surprising to find the highest single bidding share there.

Figure 21: The share of single bidder contracts per region in Latvia



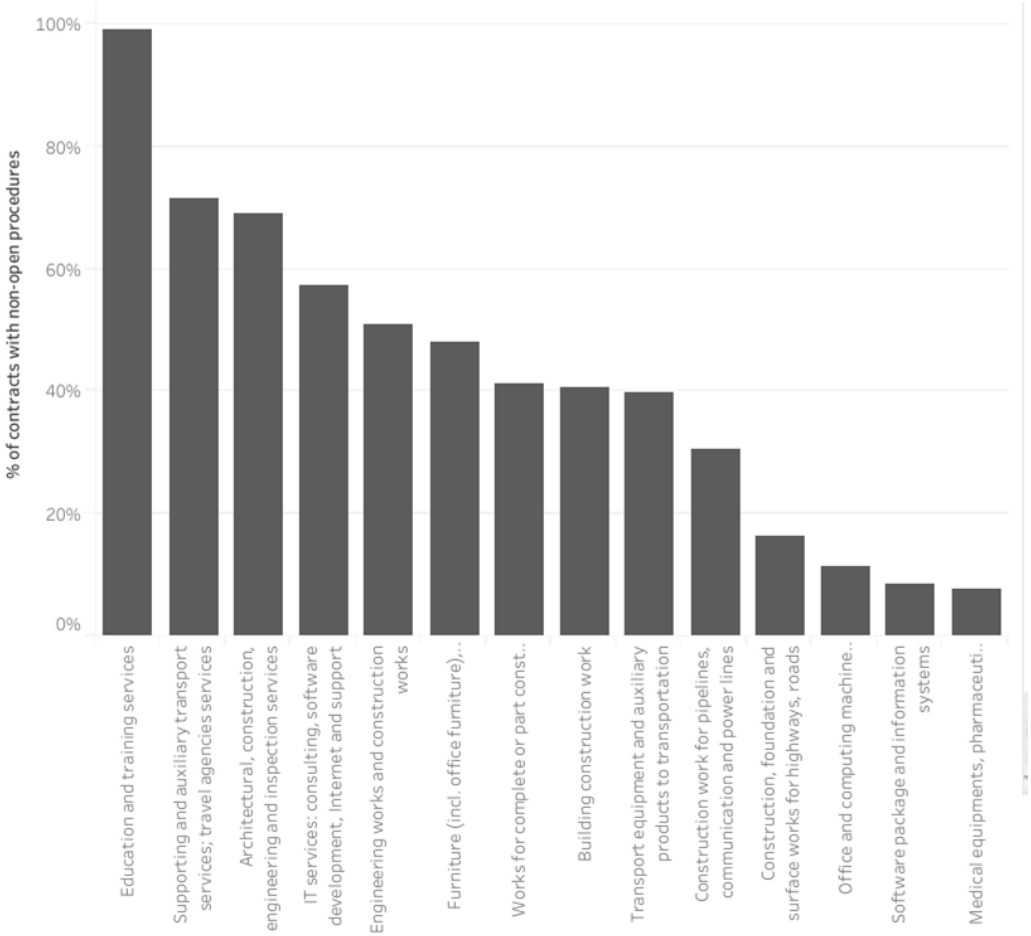
Non-open tenders are allocated evenly across regions in Latvia (Figure 22). However, the average share of non-open procedures is significantly higher than in most other countries which is partially due to counting missing procedure types as non-open procedure type. While it is around 60% in Latvia, it is only around 40% in Hungary and 30-40% in the Czech Republic. Interestingly, applying non-open procedures does not lead to an equally high share of single bidder contracts, suggesting that procedures with more discretion are not misused for favouring particular suppliers.

Figure 22: The share of non-open contracts per region in Latvia

Non-open contracts are especially prevalent in education and training services – almost none of the contracts follow an open procedure. Architectural services and

auxiliary transport services are also among the least open EU-funded procurement markets, both having more than a 60% share of non-open procedures. Medical equipment and software purchases apply open procedures the most – non-open procedures are 5-times less prevalent in these markets compared to the top 3 sectors in this regard.

Figure 23: The share of non-open contracts per largest sectors in Latvia, 2012-2017, EU funded contracts



5.2.7. Poland

In Poland, the share of single bidding is high and varies considerably by region (Figure 24). It is close to 41% in the Central, while more than 58% in the Western regions. On the one hand, given the supposedly most developed supplier markets in the capital region, it is expected to find the lowest single bidding share there. On the other hand, it is surprising to find such a high share of contracts without competition in the economically more advanced Western regions.

Figure 24: The share of single bidder contracts per region in Poland

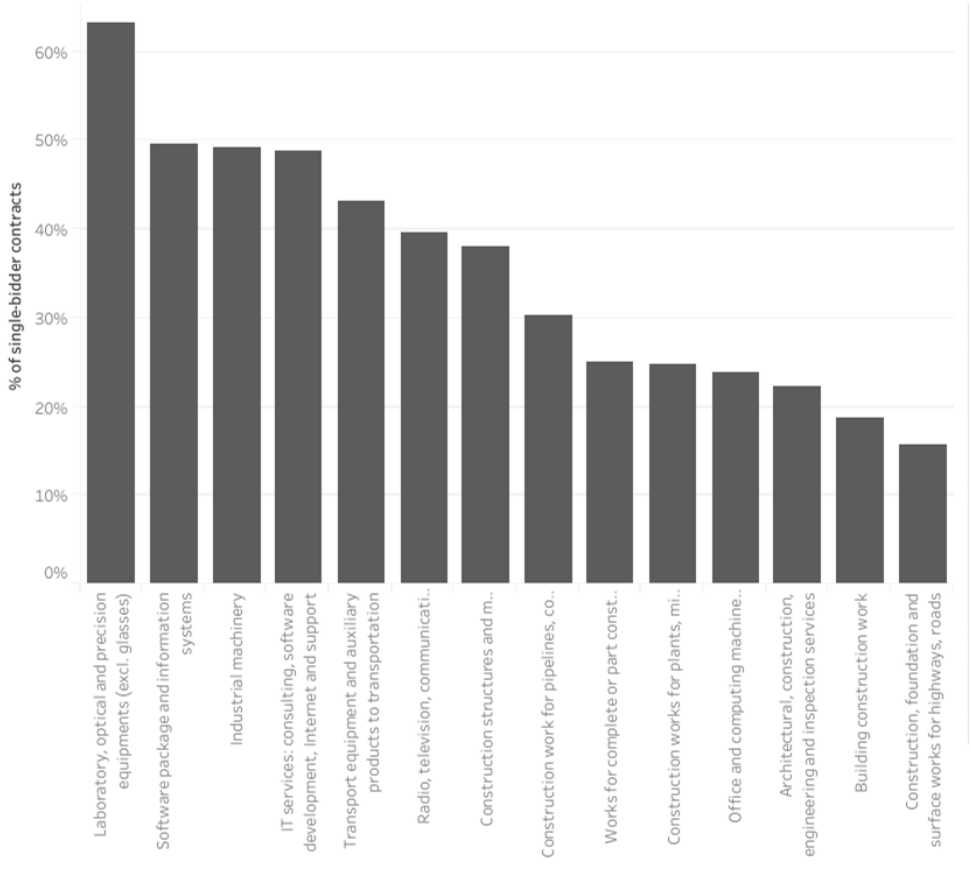
The share of non-open contracts is negligible in Poland (Figure 25). Although regions seemingly differ a lot in this respect, the highest share of non-open contracts is less than 3% even in the Central region. This might be due to country specific practices – for example, below the EU-threshold tenders are mostly open procedures in Poland.

Figure 25: The share of non-open contracts per region in Poland

Sectoral variation in single bidder shares is significant in Poland: while it is more than 60% for laboratory, optical and precision equipment, it is less than 20% for building and road construction works (Figure 26). This suggests that competition is low in

markets where purchases can be very specific. However, most construction related purchases have significantly higher levels of competition.

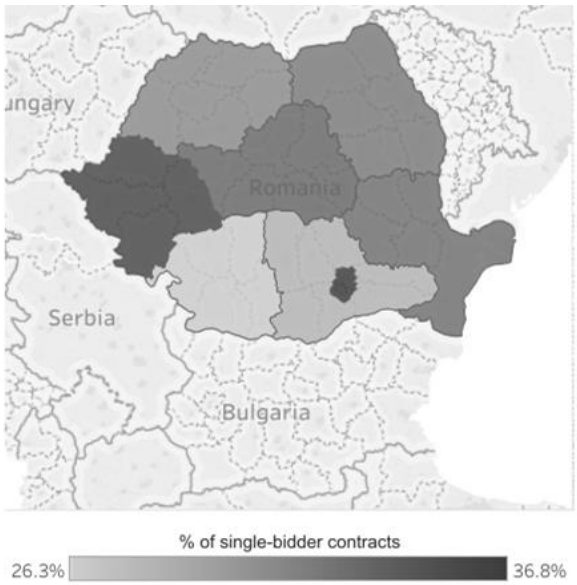
Figure 26: The share of single bidding per the biggest sectors in Poland, 2012-2017, EU funded contracts



5.2.8. Romania

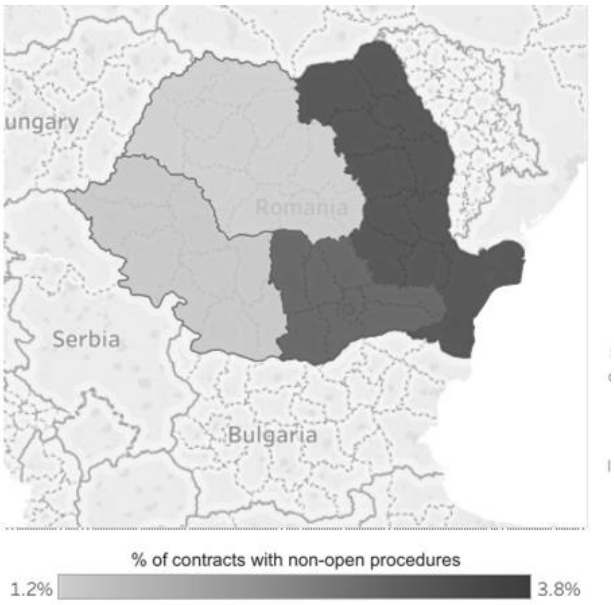
There is roughly a 10 percentage point difference between the regions with the highest and lowest single bidding shares in Romania (Figure 27). Similarly to the Czech Republic, the highest single bidding share is found in the capital region, București-Ilfov. First, this may be explained by the unique products purchased in the capital region. Second, public contracts are often managed by central authorities with implementation in remote areas. For example, an authority responsible for transport infrastructure purchases may award road maintenance contracts all over the country – including regions with very limited competition.

Figure 27: The share of single bidder contracts per region in Romania



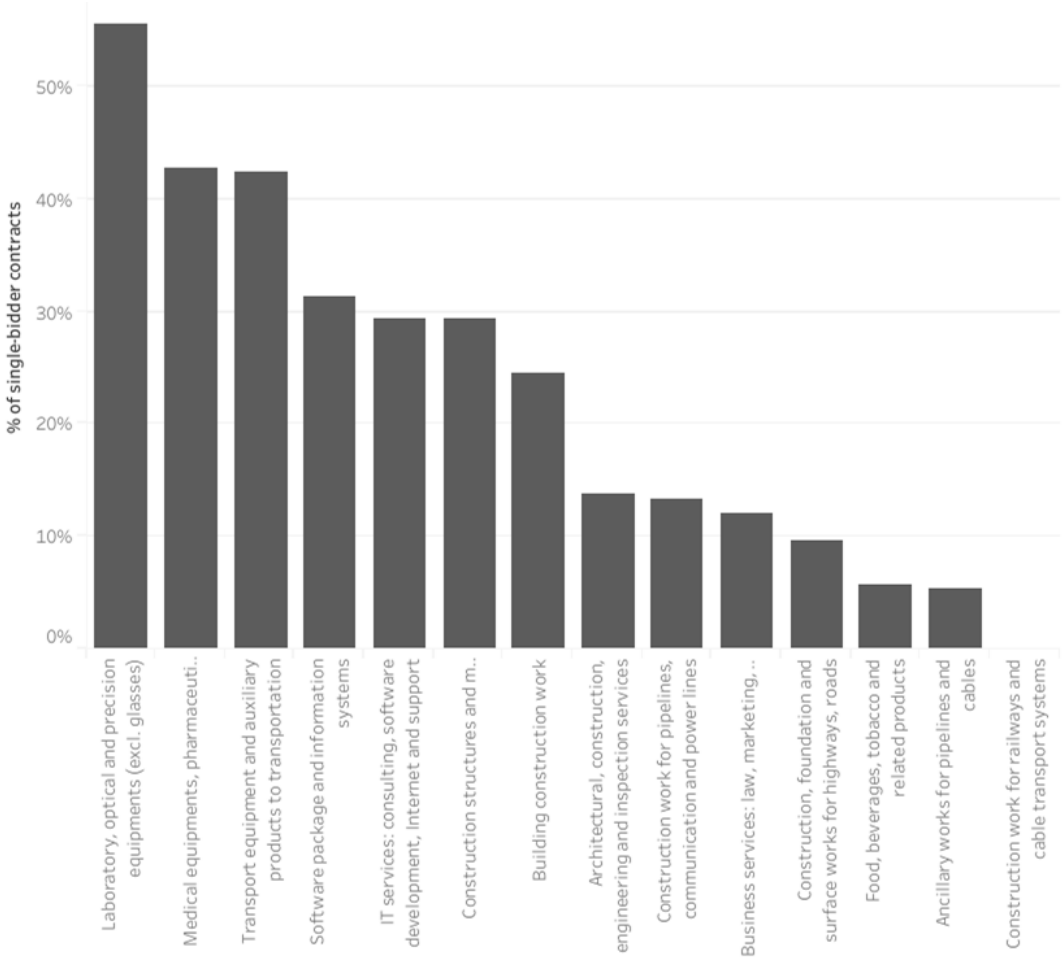
The share of non-open contracts appears to vary significantly by region (Figure 28). However, given that the share of non-open contracts is always less than 5%, it only signifies a few dozens of non-open contracts in the whole country. This suggests that non-open procedures are not overused in Romania.

Figure 28: The share of non-open contracts per region in Romania



Sectoral variation in the share of single bidder contracts is significant in Romania. It is more than 55% for laboratory, optical and precision equipment, and more than 40% both for medical and transport equipment (Figure 29) – similarly to Poland or Hungary. This suggests that competition is low in markets where products are very specific. On the other hand, most construction related tenders have a 2-3 times lower share of single bidding.

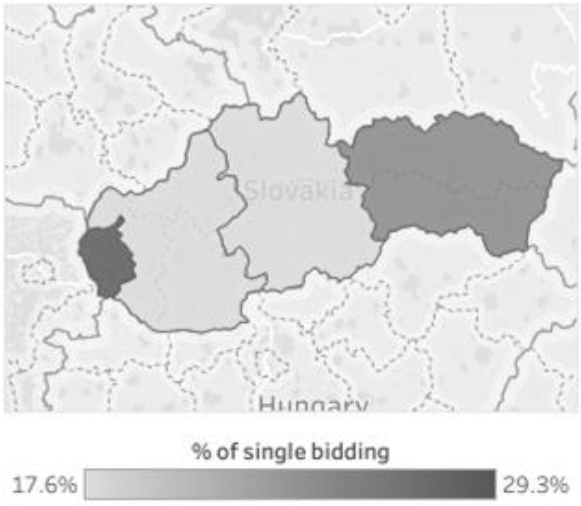
Figure 29: The share of single bidding per the biggest sectors in Romania, 2012-2017, EU funded contracts



5.2.9. Slovakia

The share of single bidder contracts ranges from around 18% in Central Slovakia to 29% in Bratislava. Similarly to the Czech Republic or Romania, the capital city presents the lowest level of competition. However, as highlighted before, special purchases that are more likely to be located in capitals and the central authorities managing contracts for remote locations can possibly explain the relatively higher share of single bidder contracts.

Figure 30: The share of single bidder contracts per region in Slovakia



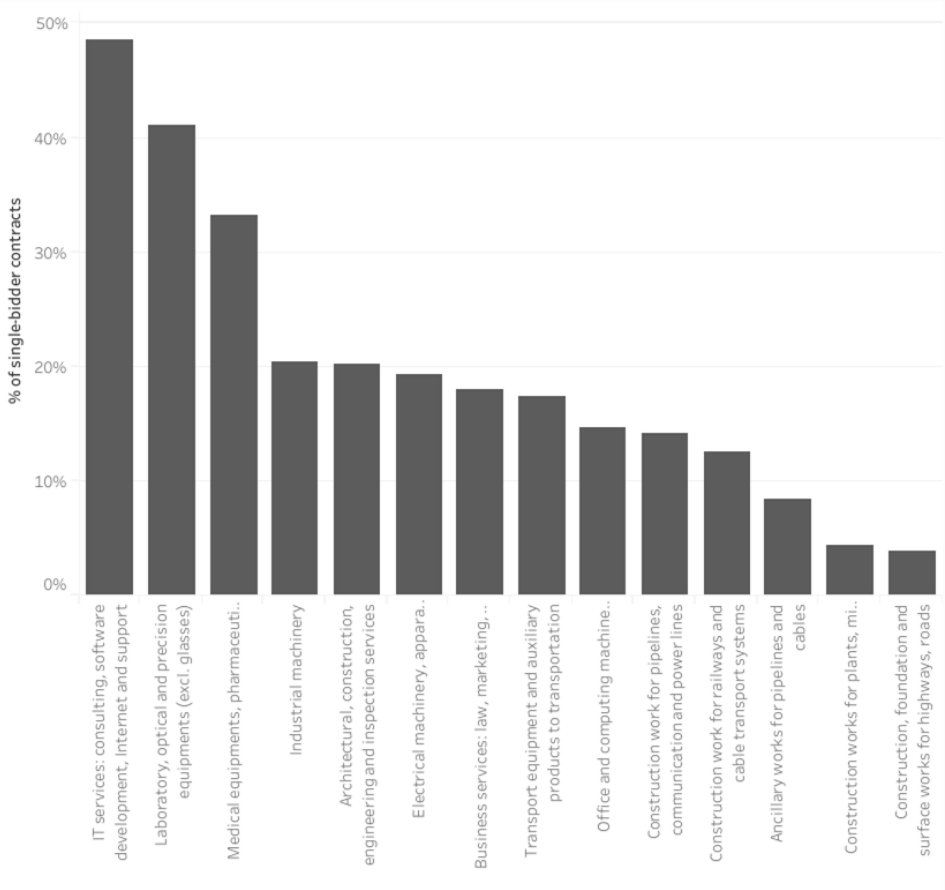
The share of non-open procedures varies across regions in Slovakia (Figure 31). It is used most widely in the capital region which might be explained by special needs or urgency - e.g. equipment purchases for natural disasters are more likely to be purchased by a central authority located in the capital. However, the share of non-open procedures is less than 5% in the whole country, suggesting that they are not overused in EU-funded procurement tenders.

Figure 31: The share of non-open contracts per region in Slovakia

Differences across sectors in the share of single bidder contracts are significant in Slovakia (Figure 32). While the share of single bidding in IT services, laboratory, optical and medical equipment is between 30-50%, it is significantly lower in most

construction sectors (less than 15%). This resembles the sectoral differences in the level of competition that are found in Romania, Hungary or the Czech Republic.

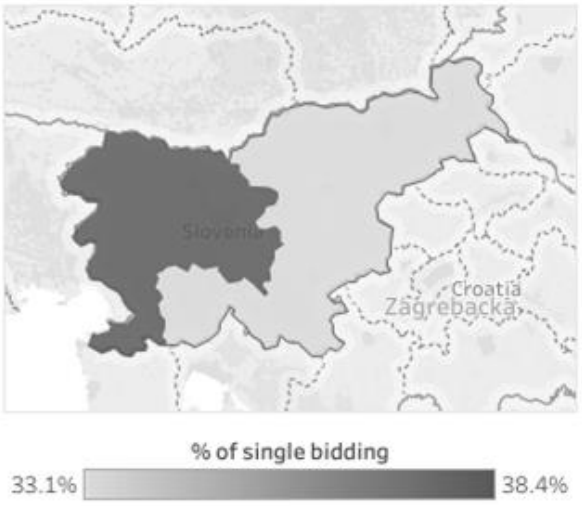
Figure 32: The share of single bidding per the biggest sectors in Slovakia, 2012-2017, EU funded contracts



5.2.10. Slovenia

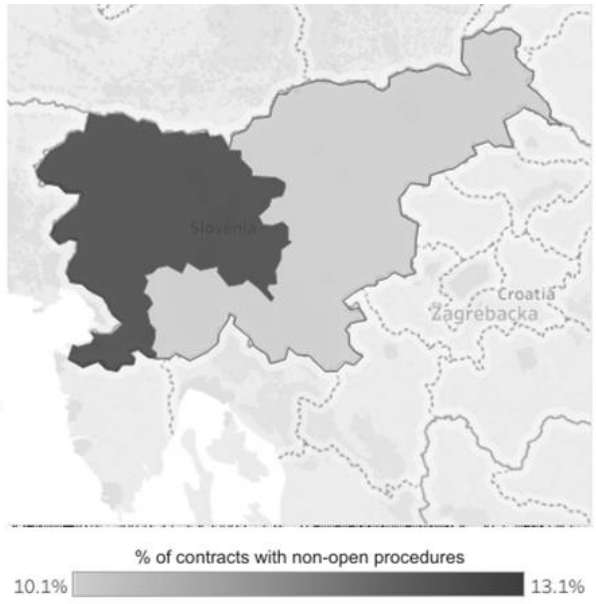
The share of single bidder contracts only differ by a couple of percentage points between the two big regions in Slovenia. The overall share is relatively high compared to other East European countries. For example, while the single bidder share among EU-funded tenders is lower than 30% in all Hungarian regions in the sectors analysed, it is always between 30-40% in Slovenia.

Figure 33: The share of single bidder contracts per region in Slovenia



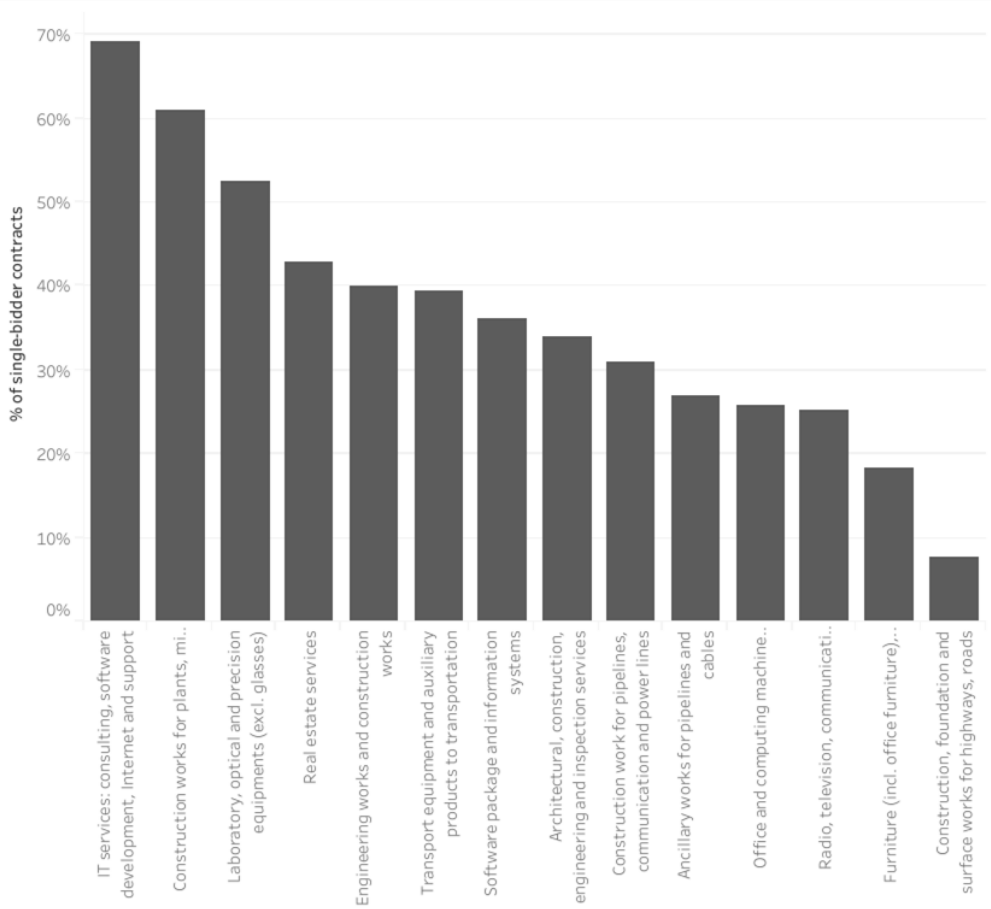
The share of non-open procedures only differs by 2-3 percentage points between the two regions (Figure 34). As their average share is more than 10% on average, it suggests that they are slightly overused in Slovenian EU-funded public tenders. Note that the EC scoreboard threshold for overusing negotiated procedures without call for bids is 10%.

Figure 34: The share of non-open contracts per region in Slovenia



Unlike most other countries, some of the construction tenders show a relatively high share of single bidding (e.g. construction work for plants) – see Figure 35. However, laboratory supplies and IT services are also among the highest single bidder share markets in other countries such as in Poland or Slovakia.

Figure 35: The share of single bidding per the biggest sectors in Slovenia, 2012-2017, EU funded contracts



6. EXPLAINING SINGLE BIDDING IN SELECTED COUNTRIES

The preceding data exploration and descriptive analysis confirmed that there are 4 countries with sufficient data quality and scope for in-depth explanatory analysis:

- the Czech Republic,
- Hungary,
- Latvia, and
- Poland.

Below, the methodology of the analysis is briefly described, followed by the analytical results and policy conclusions.

6.1. Methodology

The goal of the explanatory statistical analysis is to identify those factors which are the most powerful predictors of single bidding in EU-funded public contracts in the selected countries. Three main groups of explanatory factors are considered based on prior academic and policy research pointing at their importance for single bidding (Charron, Dahlström, Fazekas, & Lapuente, 2017; Cingolani & Fazekas, 2017; Coviello, Guglielmo, & Spagnolo, 2015; Decarolis, 2014; Fazekas, 2017; Fazekas & Kocsis, 2017; Klasnja, 2016):

- economic fundamentals,
- administrative capacity, and
- integrity.

Each of these groups include a wide range of variables where prior research has delivered clear expectations regarding the direction and size of impact. As the four countries are somewhat different from each other, not all of the explanatory variables are statistically significant and substantially important in the models. Below, only those results are reported which are deemed to be robust enough to support policy lessons.

The statistical models include all significant[29] and large predictors from the 3 groups, even though not all of them are directly amenable to policy intervention. In other words, the models consider structural givens, at least on the short term, such as the maturity and size of procurement markets as well as variables which can be modified on the short term, even without regulatory change, such as longer advertisement of tenders. This approach allows for setting the boundaries of impact for any policy intervention on the short to medium terms.

It is important to note that the explanatory models – binary logistic regressions – presented below, while being based on sound theory and prior research and explaining a considerable portion of single bidding, can only uncover patterns and associations in the observed data. We lack solid experimental evidence which could reliably identify causal relationships. Hence, modelling results and the corresponding policy lessons can be considered as a useful starting point for designing policy interventions which are effective in diminishing single bidding in the selected countries.

Below, each explanatory variable is briefly discussed along with the theoretical expectations regarding its impact on single bidding (Table 6).

[29] Please note that most figures also report confidence intervals around point estimates representing the uncertainty of modelling results.

Economic fundamentals encompass the following variables: year, month, sector, region, contract size, aggregated demand and number of potential suppliers, and new suppliers (Decarolis, 2014; Kovacic, Marshall, Marx, & Raiff, 2006; Spagnolo, 2012). First, year controls account for any time-varying external shock in the data such as the global economic crisis, while month controls for within year differences or seasonality. The month of contract award may influence single bidding due to the availability of suitable suppliers or the behaviour of buyers. According to the former argument, months late in the year are busier for all suppliers, or the holiday season in August can lower competition as most companies are understaffed. While according to the latter argument, spending tends to be more hasty and tender preparation less thorough at the end of the year when the pressures of spending all the financial year's budget are high.

Second, regional institutional and economic differences are captured by a regional variable which is based on the buyer's address (NUTS region) and the contract implementation region if the buyer's region is missing.[30] Third, sectoral variables capture overall market-specific factors explaining the extent of single bidding. In all countries, these are the top-14 markets in terms of the total amount spent including the top-9 non-construction sectors and the top-5 construction markets. Fourth, contract size compared to market average and its squared term are included in order to capture the potentially non-linear impact on single bidding. While larger contracts (lots) should attract more bidders, which should lower single bidder rates, there might be only a handful of companies capable of fulfilling the requirements of exceptionally huge projects, suggesting an inverted U-shaped relationship.

Fifth, aggregate demand captures any fluctuation in the level of competition due to the year-to-year changes in spending per market which may be driven by EU Funds spending cycles. More spending might attract more bidders in theory. However, if all potential bidders are already active on these public markets, there should be no relationship between the two. In addition, rapidly increasing aggregate demand might result in capacity constraints on the market hence low bidding activity among companies on the market. Aggregate demand is defined as the total amount of tenders per year per sector. Sixth, the number of companies participating in a given market is expected to lower the share of single bidder contracts. The indicator is defined as the total number of distinct companies which have won at least one contract on that market.[31] New suppliers are measured simply by looking at whether the given company has won any contracts in the year preceding the given tender, aiming to capture whether new companies can enter the market or barriers to entry are high.

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30 In Poland, only buyer postcodes are published in the official announcements, therefore the 10 main postcode regions are applied in the final model. These can be potentially further improved by matching postcodes to NUTS codes in the future.

31 Note that the number of unique companies comes from announcement texts as none of the analysed countries publish unique company identifiers with the exception of the Czech Republic (see Methodology Report).

Table 6. Summary of variables used in the explanatory analysis

Variables	Definition
Economic fundamentals	
Year	Year of contract award
Month	Month of contract award
Region	Region of the buyer (NUTS) or contract implementation if the buyer's address is missing.
Sector	Main sector of the tender (top-9 non-construction and top-5 construction sector)
Contract (lot) size	Natural base logarithm of contract award value's deviation from the market average (EUR, net)
Number of companies on the market	Number of companies that won a contract in the analysed time period (2012-2017) per sector
Aggregate demand	Total contract value per sector and year
New company	Whether it is the first year the company wins a public procurement tender
Administrative capacity	
Most economically advantageous tender (MEAT) as an award criterion	Whether the award criteria is MEAT (1) or price only (0)
Buyer's average decision period length per bid	Deciles of buyer's average decision period length per bid that is defined as the difference between contract award publication date and bidding deadline date divided by the number of bids.
Buyer's average relative price	Deciles of buyer's average decision period length per bid that is defined as the ratio of final and estimated contract price.
Buyer type	Administrative categorization of the public buyer such as national authority, national agency, regional authority, utilities etc.
Integrity	
Procedure type	Type of procedure followed for choosing a supplier, e.g. open, negotiated, restricted etc.
Call for tender publication	Whether a call for tender publication is available for the tender.
Advertisement period length	Deciles of the advertisement period length that is defined as the difference between call for tender publication date and bidding deadline date.
Decision period length	Deciles of the decision period length that is defined as the difference between contract award publication date and bidding deadline date.
Average single bidding share per supplier	Single bidding ratio per company per year (only companies winning at least 3 contracts)

Administrative capacity indicators include the following: use of most economically advantageous tender as an awarding criteria, buyer's average decision period length per bid, buyer's average relative price, and buyer type (Cingolani & Fazekas, 2017; Fazekas, 2017). First, the use of most economically advantageous tender (MEAT) as

an award criterion is considered to be a good practice as it allows buyers to consider quality aspects explicitly. MEAT is regarded as a contract level factor rather than measured on the level of procuring entity (Fazekas, 2017). Second, the buyer's average decision period length per bidder captures how efficient a given buyer is in assessing submitted bids. This can be used as a proxy for the level of bureaucratic competence. In the models, the average decision length per bidder is calculated, then the buyers are categorized into 10 groups from the shortest to the longest decision period length. Third, the average price discount or relative price (that is the ratio between the final price and the initially estimated price) is another indicator capturing buyer's efficiency. High-quality buyers can specify and organize their tenders in a way that achieves the maximum price discount possible through higher levels of competition. Similarly to the previous indicator, the buyers are categorized into 10 groups based on the average relative prices of their contracts. Contracts that are managed by buyers that achieve lower relative prices on average (i.e. higher discounts) are expected to have a lower probability of single bidding indicating that they can effectively leverage the market achieving value for money. Fourth, buyer type captures structural factors that are related to the buyer's capacities and resources. For example, a large ministry has more procurement experts, lawyers, and resources to hire external staff that supports high-quality public contracting, while a small municipal government can only afford to maintain a smaller (often non-expert) staff managing all kinds of purchases. However, ministries or other centralized agencies also tend to purchase goods that are significantly different from those of small municipalities (e.g. buying a unique IT system etc.).

Integrity indicators include the followings variables: procedure type, publication of a call for tenders, submission period length, decision period length, and average single bidding share per supplier (Fazekas, Cingolani, & Tóth, 2018). First, procedure type is an important determinant of the level of competition. Buyers can misuse certain procedure types in order to favour specific companies. For example non-open procedures, such as the various negotiated procedures, have a higher risk of single bidding compared to an open call. Second, the publication of a call for tender document is crucial for potential bidders to find out about a contract opportunity. Although publication is legally prescribed – with only a few types of procedures not requiring the publication of a contract notice announcement – many contract awards do not have a matching contract notice. Third, extremely short submission period length makes it harder for potential bidders to submit a bid. Submission period length is measured as the difference (in days) between the submission deadline and the call for tenders publication. Similarly to the buyer-level decision period length and relative price, the submission period lengths are also sliced into 10 categories from shortest to the longest for empirical modelling. This allows for following the potential non-linear relationship between the length of advertisement period and the likelihood of single bidding. Fourth, an extremely short decision period length suggests that the received bids are not considered seriously, i.e. there is a chance that the provisional winner company has been agreed beforehand. Decision period length is also categorized into 10 equal groups from the shortest to the longest. Average single bidding share per supplier is defined for those companies winning at least 3 contracts. These are further split into two groups: companies with low and high shares of single bidding (50%-50%). This indicator captures whether a supplier is primarily involved in contracts with low competition.[32]

Some of the administrative capacity and integrity indicators have high missing rates in certain countries. Therefore, countries differ in terms of which of these variables are included in the final explanatory models (see Appendix). For certain indicators, missing data comes only from below EU-threshold contracts. Those cases are highlighted in the text.

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[32] This predictor was excluded from Latvia.

Once the full explanatory models are built, they can be used to derive quantitative policy relevant insights. Six realistic policy changes are selected targeting six policy influenceable variables in the models in order to show the likely improvements in single bidding rates if realistic policy changes are implemented (Table 7). The likely changes in single bidding percent are discussed at the end of each country chapter, based on extrapolations using the final regression estimations.

Interventions are aimed at decreasing the prevalence of high risk categories for extremely short advertisement periods, high-risk procedure types, and the lack of publication of a call for tenders. Influencing the timing of the tendering process (i.e. the month of purchase) is also directly amenable to policy interventions: moving tenders from the busier autumn period or August, when holiday season affects companies' responsiveness, only requires some extra planning on behalf of public buyers. Decision making speed is a broader proxy for the public authority's capacity to manage public contracts hence the predicted change in single bidding by making average decision period shorter may also require a broader investment in organisational capacity.

All policy interventions assume a 50% decrease in the number of tenders falling in the worst performing category (i.e. highest single bidding estimation) with a simultaneous increase in the number of tenders in the best performing category (i.e. the lowest single bidding estimation). For example, if 20% of contracts follow a negotiated procedure that is high risk, then the policy intervention assumes a 10 percentage point decrease in the share of those and an equal increase in the share of open procedures. High single bidding share (or high-risk) categories per predictors vary across countries. They are reported separately in each chapter in the policy intervention discussion.

Table 7: Intervention scenarios used for policy change assessment

Predictor	Potential intervention
1 Advertisement period length	Decreasing short advertisement period by 50%
2 Procedure type	Decreasing the use of high risk procedure type by 50%
3 Buyer's average decision period length	Decreasing the share of tenders awarded by buyers with a slow average decision period by 50%
4 Call for tenders publication	Decreasing the share of tenders without a call for tender by 50%
5 Month of the tender	Decreasing the share of tenders in high single bidding share months by 50%

6.1.1. Representing explanatory modelling results on dashboards

Analogous to the descriptive part of this report, dashboards accompany the explanatory analysis. Now, each of the 4 analysed countries has its own dashboard highlighting the 4 most relevant predictors and the corresponding predicted single bidding rates with confidence intervals. These country-specific dashboards allows the users to get a more detailed understanding of the effect of policy choices in terms of changing single bidding, according to the statistical models.

6.2. Czech Republic

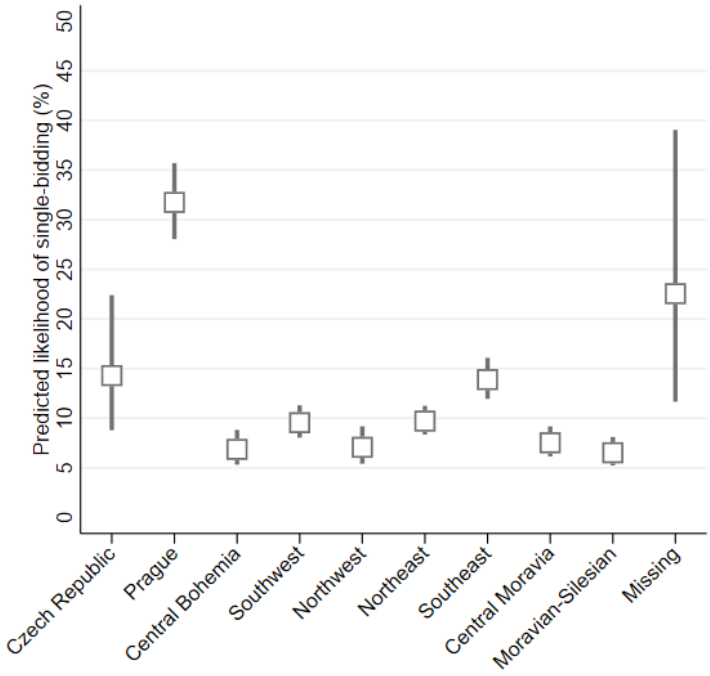
In the Czech Republic, the explanatory model including economic and administrative capacity-related as well as integrity-related factors can account for 49% of variation in single bidding across contracts. Hence, it is considered to be a very high quality statistical model. Crucially for delivering robust policy advice, most of the variables considered in the analysis turned out to be statistically significant and in line with theoretical expectations.

6.2.1. Economic fundamentals

Fundamental economic characteristics of markets and contracts exert a strong influence on single bidding probability (see Table A1.1 in the Appendix). The contract regions reveal large differences in single bidding. For example, Central Bohemia and Moravian-Silesian regions are associated with only about 6-7% predicted single bidding in stark contrast with Prague or the Southeast purporting 32% and 14% respectively (Figure 36). Among markets of contracting, the highest share of single bidding is predicted for 'Postal and telecommunications services' and 'Construction work for railways and cable transport systems' with 74% and 54% respectively; while the lowest rate is found for 'Transport equipment and auxiliary products to transportation' and 'Other building completion work' with 3% and 7% respectively. Over time, the model reveals a declining single bidding probability between 2012 and 2014, however followed by a strong upward trend in 2015-2017.

Among the more directly policy influenceable factors, contract value negatively influences single bidding probability albeit at a diminishing rate, that is, higher than market average value contracts are less likely to be single bidder contracts as opposed to smaller ones, but among the highest value contracts this relationship becomes weaker. Surprisingly, the number of companies on the market has no statistically significant effect on single bidding in the model which may suggest that in all major markets there is a sufficient number of companies present already (recall that small markets were removed from the sample early on) or that our focus on EU Funds only misses out on the wider market dynamics. Moreover, the total value of annual aggregate demand on a market has a negative effect on single bidding. The share of single bidding varies a lot between months: it is significantly higher in the autumn and winter months than in spring, which suggests that tender scheduling can influence suppliers' bidding behaviour. Awarding a new company is positively related to single bidding.

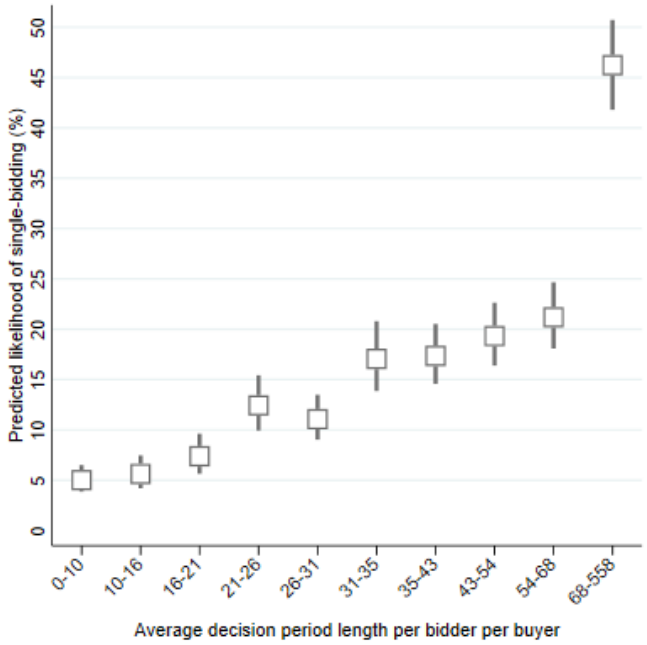
Figure 36. Predicted share of single bidding by regions



6.2.2. Administrative capacity

Administrative capacity of buyers has also turned out to be a strong predictor of single bidding probability in the final, most comprehensive statistical model (see Table A1.2 in the Appendix). Structural factors which are largely given on the short term explain a small portion of single bidding with central government entities only marginally differing in single bidder probability from local or regional entities. However, directly policy amenable organisational capacities have a strong predictive power. Higher capacity buyers that are quicker on average in making decisions on the received bids, tend to have a considerably lower predicted single bidder share with the quickest buyers having only slightly higher than 5% single bidding while the slowest buyers having a spectacular, more than 45% single bidding percent (Figure 37). Moreover, buyers which manage to achieve large price savings (i.e. lower relative prices) generally tend to have a considerably lower incidence of single bidding. However, the use of most economically advantageous (MEAT) criteria appears to have no significant impact on single bidding compared to price only criteria.

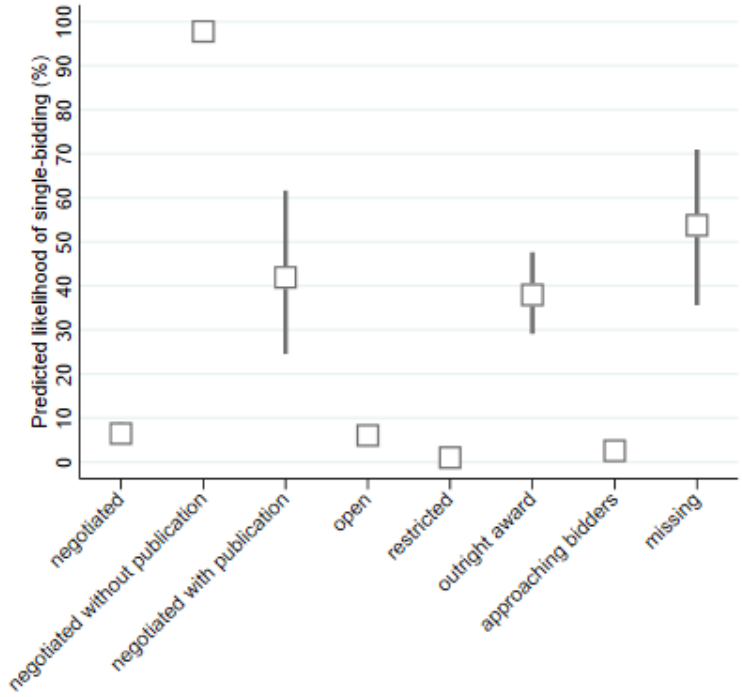
Figure 37: Predicted single bidding share by the deciles of the buyer's average decision period length per bidder



6.2.3. Integrity

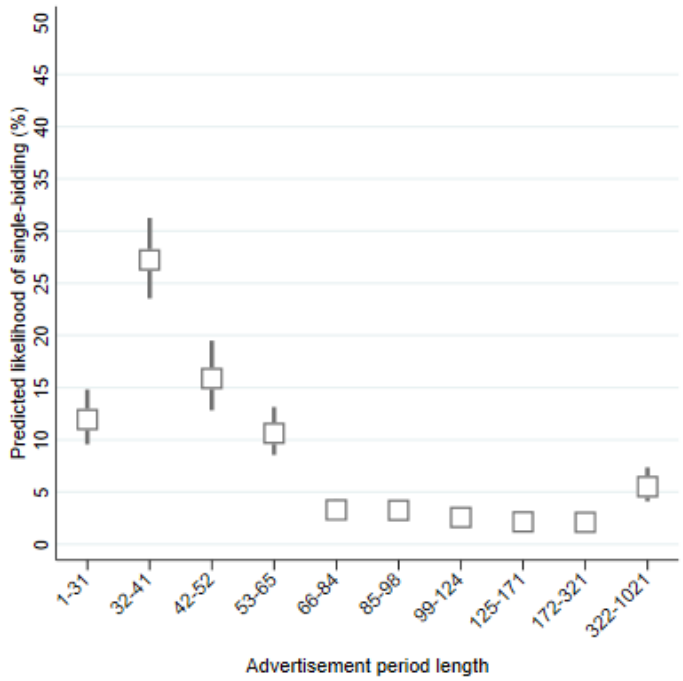
Integrity-related indicators have proven to be strong predictors of single bidding probability in the final, most comprehensive statistical model (see Table A1.3 in the Appendix). The type of procedure used is one of the most important policy variables: using open, restricted, or negotiated procedure types carries a very small, below 10% predicted single bidding percentage; however negotiated procedures without publication or outright awards both predict a very high single bidding probability of 35-97% (Figure 38). Potentially linked to procedure type choice, the lack of tender advertisement predicts a significantly and considerably higher single bidding probability, an increase of 3.6 percentage points compared to advertisement.

Figure 38: Predicted share of single bidding by procedure type



The length of the advertisement period is a similarly powerful predictor of single bidding. The particularly short periods of 1-31 days or 32-41 days predict single bidding of about 12% and 27% respectively (Figure 39). Similarly, the length of decision period on the contract level (this is different from the average organisational decision making speed) is significantly negatively associated with single bidding with particularly short periods – snap decisions – going hand in hand with high single bidding probabilities. Suppliers' past single bidding share is closely related to the likelihood of single bidding: companies in the group with the 50% highest past share of single bidding are 9% more likely to be awarded a single bidder contract compared to the ones who won less than 3 single bidder contracts. Conversely, companies with the 50% lowest past share of single bidding are 13% less likely to be awarded without competition compared to the same group.

Figure 39: Predicted share of single bidding by deciles of advertisement period length in the Czech Republic



6.2.4. Policy lessons

In the Czech Republic, policy influenceable factors which hold the promise of impacting single bidding prevalence generally fall in the categories of administrative capacity and integrity. Economic structure certainly plays a major role in determining single bidding, but most significant predictors are hardly amenable to policy intervention or not desirable to change such as the region of contract performance where shifting spending across regions would have a strong influence on the prevalence of single bidding but might be politically infeasible.

Improving administrative capacity could exercise a positive effect of decreasing single bidding according the modelling results. For example, specifically investing into those organisations which tend to decide on bids very slowly, for example 54 or more days per bid on average, and moving them closer to the national average organisational performance has the capacity to decrease single bidding by 5-30% points.

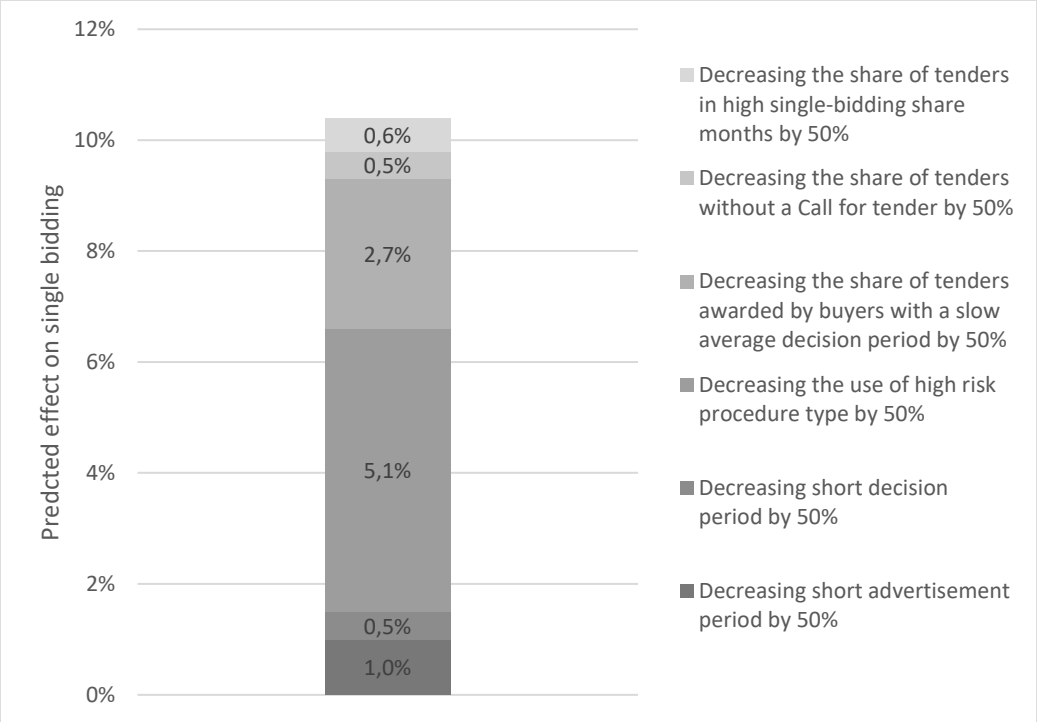
Lowering integrity risks could further decrease the probability of single bidding. Facilitating the use of open procedure types involving the publication of a call for tenders rather than using outright award and negotiated procedures without publication could move the national average single bidding rate close to 10%. Moreover, discouraging rushed tenders characterised by short advertisement periods could similarly lower single bidding probability from the region of 15-30% towards 5-10%.

6.2.5. The impact of policy interventions

Hypothetical policy interventions result in a predicted 10-11% decrease in the share of single bidder contracts (Figure 40). Decreasing the share of tenders with extremely short advertisement period, high-risk procedure type and lack of call for tenders publication by 50% can decrease the share of single bidding by a combined 6.6%. Rescheduling 50% of the purchases from the busy autumn and winter months into the spring can lower the share of single bidding by an additional 0.6% point.

A significant change is related to the decrease in the buyer's average decision period length per bid: if 50% of the contracts were moved from the slowest 40% of buyers to the quickest 10%, single bidding would decrease by 2.7%. This suggests that buyers' capacities to manage public contracts is an important determinant of the level of competition. A possible implication is that procurement spending should be moved to buyers with adequate capacities or buyers should be trained and allocated extra funds to organize tenders better to attract more bids.

Figure 40: Policy intervention effects on single bidding in the Czech Republic



Notes:
Short advertisement period is defined as the shortest 2 deciles (20%) of all contracts with decision period length that is less than 41 days.
The high risk procedures are negotiated procedures with and without publication, and direct awards. It is related to significantly higher shares of single bidding.
Buyers' average decision period length per bidder is considered to be slow if it is among the slowest 40% of all contracts, i.e. more than 35 days on average.
The highest risk months are September, October, November, December, all having close to 30% single bidding. They are regrouped to April which has only around 20% single bidding.

6.3. Hungary

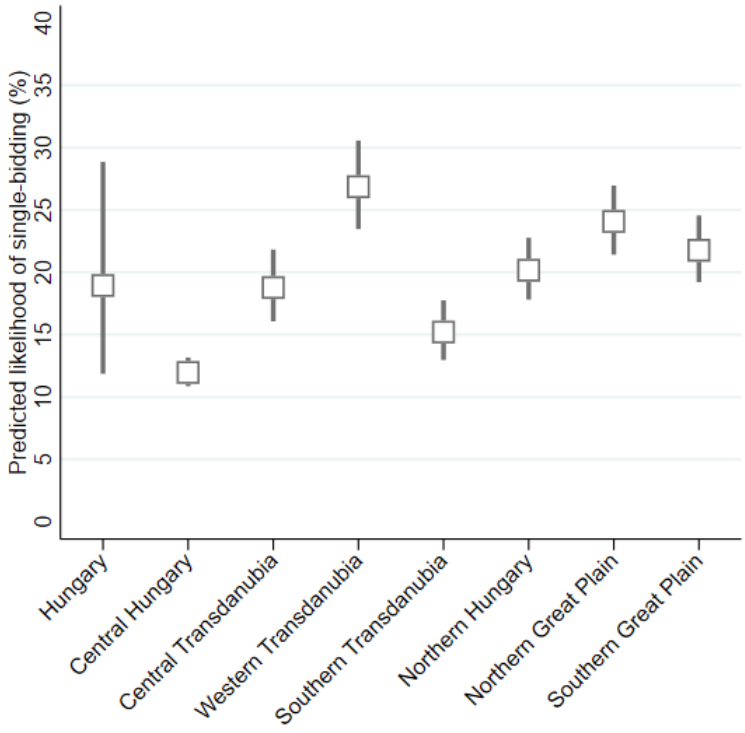
In Hungary, the explanatory model including economic, administrative capacity-related, and integrity-related factors can account for 19% of variation in single bidding across contracts. Hence, the statistical model is considered to be of moderate quality. Crucially for delivering robust policy advice, most of the variables considered in the analysis appear to be statistically significant and in line with theoretical expectations.

6.3.1. Economic fundamentals

Fundamental economic characteristics of markets and contracts exert a strong influence on the single bidding probability in Hungary (see Table A1.1 in the Appendix). Structural factors, which are not easily influenced by policy intervention, predict the single bidding probability considerably. Buyer's location correlates significantly with the likelihood of single bidding. Whereas predicted single bidding is only 11% in central Hungary, it is between 15-26% outside of the capital region (Figure 41). As for economic sectors, the highest single bidding percentage is predicted for 'Transport equipment and auxiliary products to transportation' and 'Medical equipment, pharmaceuticals and personal care products' with 65% and 44% respectively. The lowest rate is found for 'Construction work for railways and cable transport systems' and 'Office and computing machinery, equipment and supplies except furniture and software packages' with 4% and 5% respectively. The model reveals no clear trend over time.

Among the more directly policy influenceable factors, contract value does not have a significant influence on single bidding probability. Surprisingly, the number of companies on the market has a positive relationship with single bidding (recall that small markets were removed from the sample early on). The total value of annual aggregate demand on a market has a no significant relationship with single bidding. The share of single bidding varies a lot across months: it is significantly higher in the autumn and winter months than in spring, which suggests that tender scheduling can influence suppliers' bidding behaviour. Awarding a new company is related to a 2.6 percentage points higher single bidding share.

Figure 41. Predicted share of single bidding by regions in Hungary

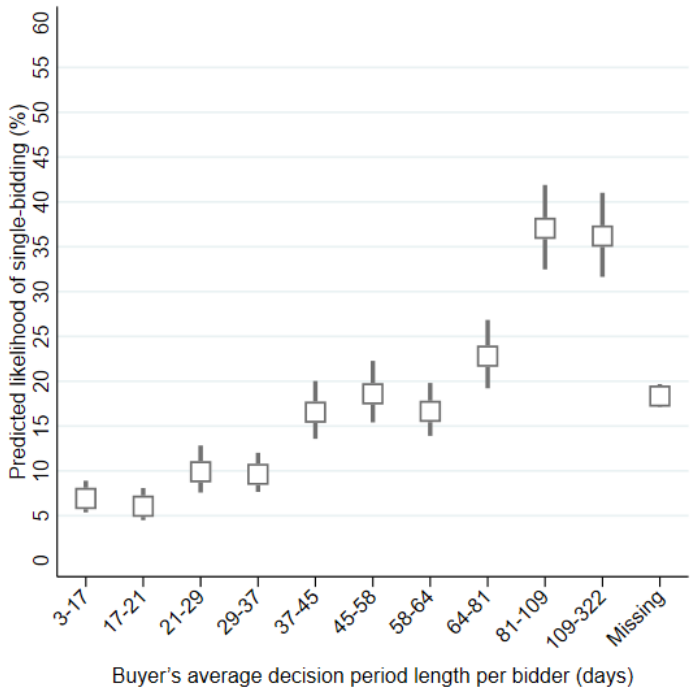


6.3.2. Administrative capacity

Administrative capacity of buyers also predicts single bidding probability (see Table A1.2 in the Appendix). Although central government bodies are expected to have a low likelihood of single bidder contracts, regional authorities have a 5.7% and 'other' buyer types have 5% lower share of single bidding. Directly policy amenable organisational capacities have a strong predictive power. Buyers making award decisions quicker tend to have a considerably lower predicted single bidder percentage with the quickest buyers having around 6% single bidding while the slowest buyers having above 36% single bidder contracts (Figure 42).[33] Moreover, buyers which manage to achieve large price savings (i.e. lower relative prices) generally tend to have a lower incidence of single bidding.

[33] Note that the buyer's average decision period per bid is missing for around 50% of the contracts. Those are labelled as 'missing'.

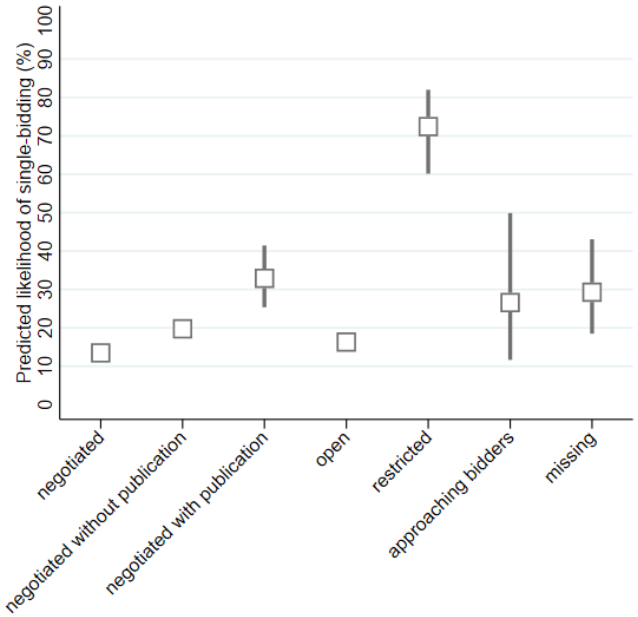
Figure 42: Predicted single bidding share by the deciles of the buyer's average decision period length per bidder



6.3.3. Integrity

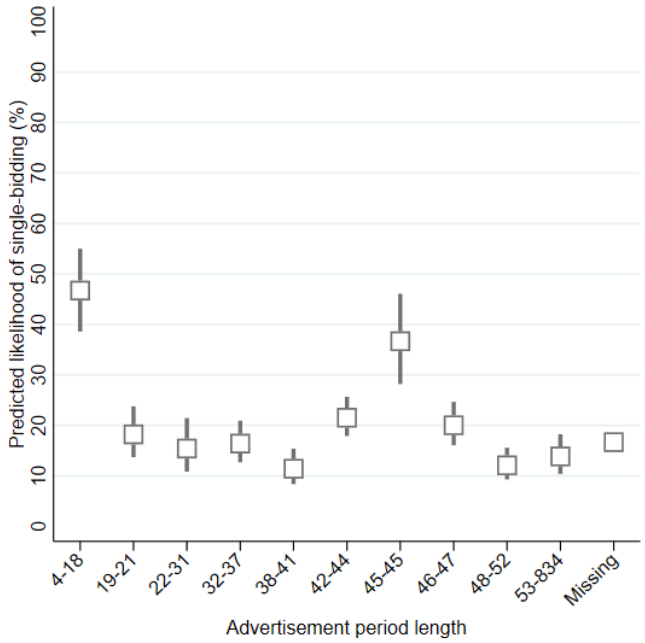
Integrity-related indicators have proven to be strong predictors of single bidding probability (see Table A1.3 in the Appendix). Procedure type and single bidding shows an interesting relationship: Using open, negotiated or negotiated without publication procedures have a predicted 13-20% likelihood of single bidding. These procedure types are by far the most widely used ones. Restricted or negotiated with publication procedures have predicted single bidding shares of 72% and 33% respectively. However, only around 500 contracts use these procedures among the analysed tenders.

Figure 43: Predicted share of single bidding by procedure type in Hungary



Moreover, the length of the advertisement period is a similarly powerful predictor of single bidding. The predicted probability of single bidding is 47% for contracts having an advertisement period of less than 18 days (Figure 44).[34] Similarly, the length of decision period on the contract level (this is different from the average organisational decision making speed) is significantly negatively associated with single bidding, with particularly short periods – snap decisions – going hand in hand with high single bidding probabilities. Suppliers' single bidding share is closely related to the likelihood of single bidding: the companies with the 50% highest share of single bidding are 23% more likely to be awarded a single bidder contract compared to the ones without winning at least 3 contracts. However, companies with the 50% lowest share of single bidding are almost 23% less likely to be awarded without competition compared to the same group.

Figure 44: Predicted share of single bidding by deciles of advertisement period length in Hungary



6.3.4. Policy lessons

In Hungary, policy influenceable factors which hold the promise of impacting single bidding prevalence generally fall in the administrative capacity and integrity categories. Economic structure certainly plays a major role in determining single bidding, but most of the significant predictors are hardly amenable to policy intervention or politically difficult to change such as the region of contract performance where shifting spending across regions would have a strong influence on the prevalence of single bidding but might be politically infeasible.

Improving administrative capacity could exercise a positive effect of decreasing single bidding according the modelling results. For example, specifically investing into those organisations which tend to decide on bids very slowly, for example taking 81 or more days per bid on average, and moving them closer to the national average

[34] Note that both the advertisement period length and the decision period length are missing for around 77% of contracts. This is partly due to the fact that some procedure types do not require the publication of a call for tender document with a bidding deadline, but missing data on the source or other data errors can also influence the availability of advertisement period length.

organisational performance has the capacity to decrease single bidding by about 20% points.

Lowering integrity risks could further decrease the probability of single bidding. Facilitating the use of open procedure types involving the publication of a call for tenders rather than using outright award and negotiated procedures without publication could move the national average single bidding rate close to 20%. Moreover, discouraging rushed tenders characterised by short advertisement periods could similarly lower the single bidding probability from the region of 50% towards 20%.

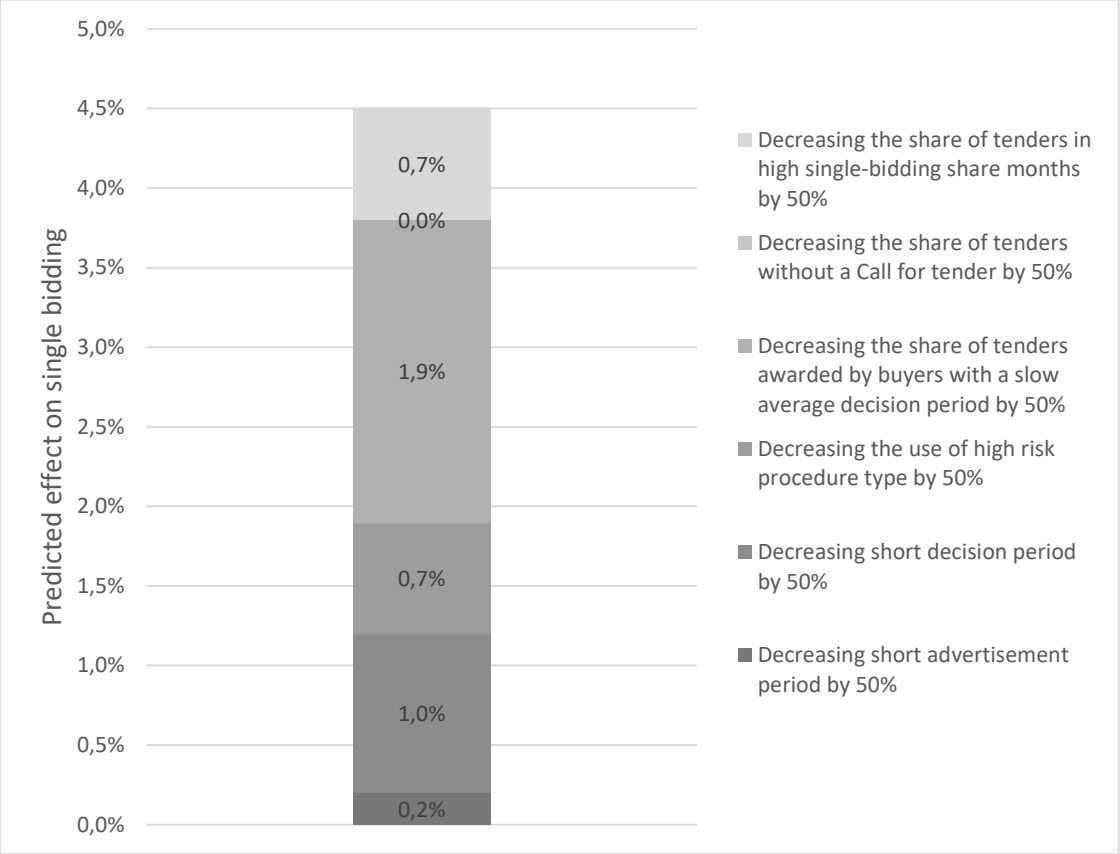
6.3.5. The impact of policy interventions

Hypothetical policy interventions result in a predicted 4.5% decrease in the share of single bidder contracts (Figure 45). Decreasing the share of tenders with extremely short advertisement period and decision period, high-risk procedure type by 50% can decrease the share of single bidding by 1.9%.[35] Rescheduling 50% of the purchases from the busy autumn and winter months into the spring can lower the share of single bidding by 0.7%.

The biggest change is due to the decrease in the buyer's average decision period per bid: 1.9% decrease in single bidding if 50% of the contracts would be moved from the slowest 40% of buyers to the quickest 10%. This suggests that buyers' capacities to manage public contracts is an important determinant of the level of competition. A possible implication is that procurement spending should be moved to buyers with adequate capacities or buyers should be trained and allocated extra funds to organize tenders better to attract more bids.

[35] Note that no publication of a call for tenders has no significant effect on single bidding based on the final regression estimation.

Figure 45: Policy intervention effects on single bidding in Hungary



Notes:
Short advertisement period is defined as the shortest 2 deciles (20%) of all contracts with decision period length that is less than 21 days.
The high risk procedures are negotiated procedures with and without publication. It is related to significantly higher share of single bidding.
Buyers' average decision period length per bidder is considered to be slow if it is among the slowest 40% of all contracts that is more than 58 days on average.
The highest risk months are August, September, October, November, December and January, all having higher than 23% single bidding. They are regrouped to March which has less than 20% single bidding share.

6.4. Latvia

6.4.1. Economic fundamentals

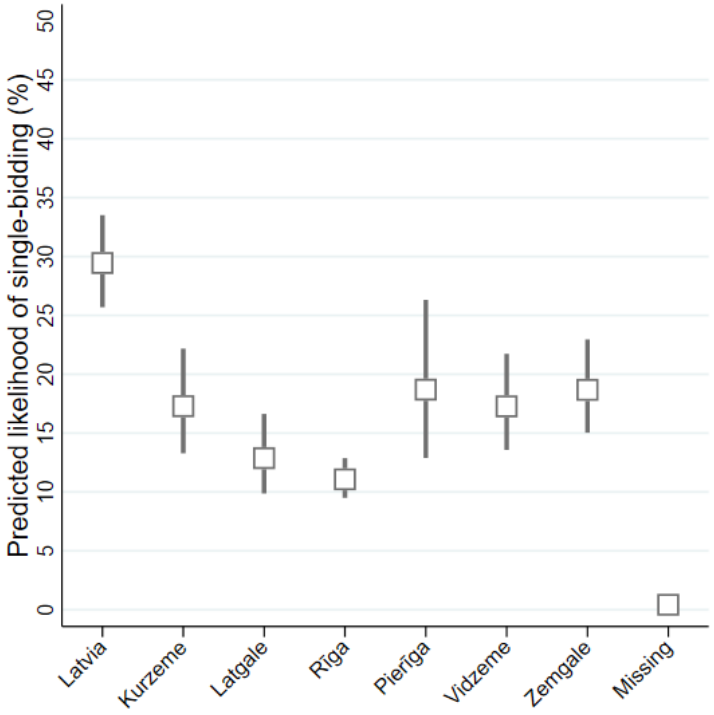
Fundamental economic characteristics of markets and contracts exert a strong influence on single bidding probability (see Table A1.1 in the Appendix). Structural factors, which are not easily influenced by policy intervention, predict single bidding probability considerably. Buyer's location correlates significantly with the likelihood of single bidding. Single bidding is only slightly above 10% in Riga and is around 15-20% in most other regions (Figure 46)[36].

When it comes to economic sectors, the highest single bidding percentage is predicted for 'IT services: consulting, software development, Internet and support' and 'Transport equipment and auxiliary products to transportation' with 40% and 39% respectively. The lowest rate is for 'Office and computing machinery, equipment and supplies except furniture and software packages' and 'Medical equipment, pharmaceuticals and personal care products' with 1% and 3% respectively. There is no clear time trend in the share of single bidder contracts, however, the share was significantly lower in 2015 and 2016.

Among the more directly policy influenceable factors, contract value positively influences single bidding probability albeit at a diminishing rate, that is, higher than market average value contracts are more likely to be single bidder contracts as opposed to small ones, but among the highest value contracts this relationship becomes weaker. The number of companies on the market has a negative relationship with single bidding (recall that small markets were removed from the sample early on). The total value of annual aggregate demand on a market has a no effect on single bidding. The share of single bidding varies a lot between months – e.g. the difference is around 16% between September and December. Awarding a new company is unrelated to single bidding.

[36] Buyers with missing regional information tend to be national agencies, while buyers having a country-wide regional code tend to miss buyer type.

Figure 46. Predicted share of single bidding by regions in Latvia



6.4.2. Administrative capacity

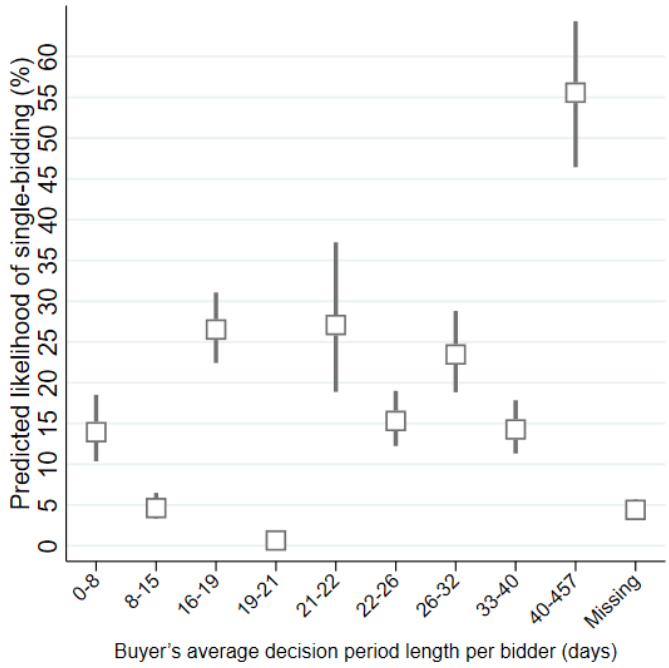
Administrative capacity of buyers also predicts the single bidding probability (see Table A1.2 in the Appendix). Structural factors that are largely given on the short term do not have a strong relationship with single bidding. National agencies and public bodies have the lowest predicted single bidder shares – both below 5% – that is lower than our reference category, the 11% of national authorities. Regional authorities, utilities and other buyer types seem to have significantly higher predicted single bidding shares between 18-41%.[37]

Directly policy amenable organisational capacities have a strong predictive power. Buyers having less than 21 days-long decision periods per bidder often show a low likelihood (<15%) of single bidder contracts. However, buyers with longer decision periods usually have more than 15% predicted singe bidding (Figure 47).[38]

37 Unfortunately, these predictions are only based on above EU-threshold contracts as our dataset does not contain information buyer type for below EU-threshold contracts.

38 Note that the buyer's average decision period per bid is missing for around 13% of the contracts. Those are labelled as 'missing'.

Figure 47: Predicted single bidding share by the deciles of the buyer's average decision period length per bidder in Latvia

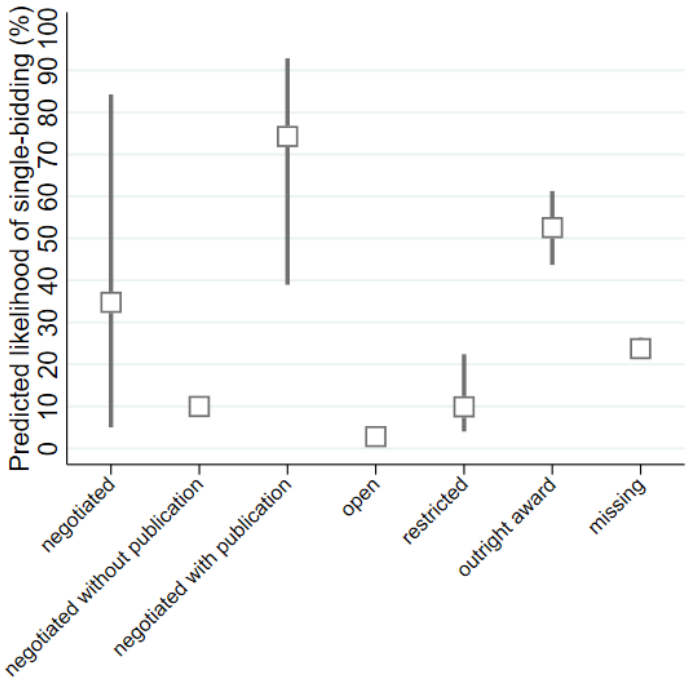


6.4.3. Integrity

Integrity-related indicators have proven to be strong predictors of single bidding probability (see Table A1.3 in the Appendix). The most widely used procedure types have reasonably low levels of single bidding: open and negotiated procedure without publication have 3-10% of single bidder contracts. Missing procedure type or outright award, however, has 23% and 53% of single bidding respectively.[39]

[39] Note that there are only a few dozen contracts having a restricted or negotiated procedure with publication.

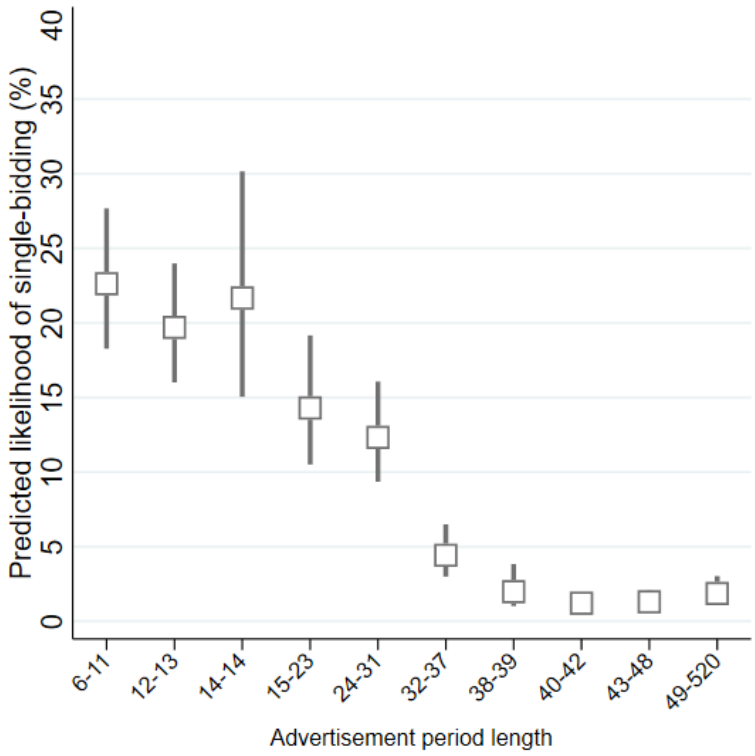
Figure 48: Predicted share of single bidding by procedure type in Latvia



The length of the advertisement period is also a powerful predictor of single bidding. Single bidding is around 19-22% for contracts with an advertisement period of under 14 days, while being close to zero for those contracts advertised for more than 38 days (Figure 49).[40] Similarly, the length of the decision period on the contract level (this is different from the average organisational decision making speed) is significantly negatively associated with single bidding, with particularly short periods – snap decisions – going hand in hand with high single bidding probabilities.

[40] Note that both the advertisement period length and the decision period length are missing for around 30% of contracts. This is partly due to the fact that some procedure types do not require the publication of a call for tender document with a bidding deadline, but missing data on the source or other data errors can also influence the availability of advertisement period length.

Figure 49: Predicted share of single bidding by deciles of advertisement period length in Latvia



6.4.4. Policy lessons

In Latvia, policy influenceable factors which hold the promise of impacting single bidding prevalence fall mostly in the administrative capacity and integrity categories. Economic structure certainly plays a major role in determining single bidding, but the most significant predictors are hardly amenable to policy intervention or not desirable to change such as the region of contract performance where shifting spending across regions would have a strong influence on the prevalence of single bidding but might be politically infeasible. The only actionable economic factor having a negative relationship with the likelihood of single bidding is the number of companies in a given market. Therefore, policies lowering market entry (e.g. non-restrictive bidding requirements) can potentially increase the level of competition, hence lower single bidding. However, the exact barriers to entry have to be understood clearly for each market in order to address this problem correctly.

Improving administrative capacity could exercise a positive effect of decreasing single bidding according the modelling results. For example, specifically investing into those organisations which tend to decide on bids very slowly, for example taking 40 or more days per a bid on average, and moving them closer to the national average organisational performance has the capacity to decrease single bidding by 30% points. Furthermore, improving the procurement practices of regional authorities, utilities and other buyers can also have a significant impact on the probability of single bidding as these potentially less well-prepared buyers have a particularly high share of single bidder contracts.

Lowering integrity risks could further decrease the probability of single bidding. Facilitating the use of open procedure types involving the publication of a call for tenders rather than using outright award could move the national average single bidding rate close to or even below 10% from around 50% in certain tenders. Moreover, incentivizing longer advertisement periods – e.g. 40+ days instead of less

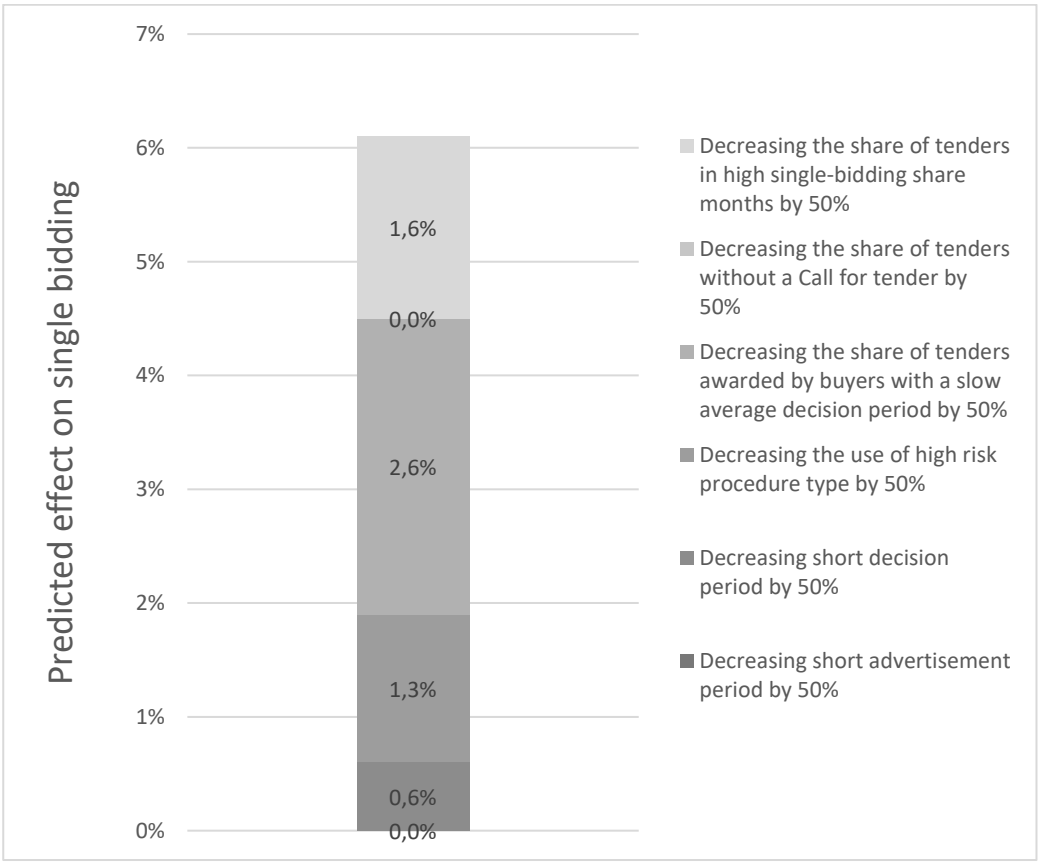
than 14 days – could potentially lower single bidding shares from 20-25% to below 5%.

6.4.5. The impact of policy interventions

Hypothetical policy interventions result in a predicted 6.1% decrease in the share of single bidder contracts (Figure 50). Decreasing the share of tenders with high-risk procedure type by 50% can decrease the share of single bidding by 1.3%.[41] Rescheduling 50% of the purchases from April, August and December, when single bidding is the highest, to a month with higher levels of competition (e.g. September) can lower the share of single bidding by 1.6%.

A significant change is related to the decrease in the buyer's average decision period per bid: 2.6% decrease in single bidding if 50% of the contracts would be moved from the slowest 30% of buyers to the quickest 10%. This suggests that buyers' capacities to manage public contracts is an important determinant of the level of competition. A possible implication is that procurement spending should be moved to buyers with adequate capacities or buyers should be trained and allocated extra funds to organize tenders better to attract more bids.

Figure 50: Policy intervention effects on single bidding in Latvia



Notes:
The high risk procedures are negotiated procedures with and without publication, and direct awards. They are related to significantly higher share of single bidding than open procedures.

[41] Note that no publication of a call for tenders and extremely short advertisement period has no significant effect on single bidding based on the final regression estimation.

Buyers' average decision period length per bidder is considered to be slow if it is among the slowest 30% of all contract that is more than 26 days on average. They are re-categorized into the quickest group (0-8 days).
The highest risk months are April, August and December, all having higher than 20% single bidding. They are regrouped to September which has less than 10% single bidding share.

6.5. Poland

6.5.1. Economic fundamentals

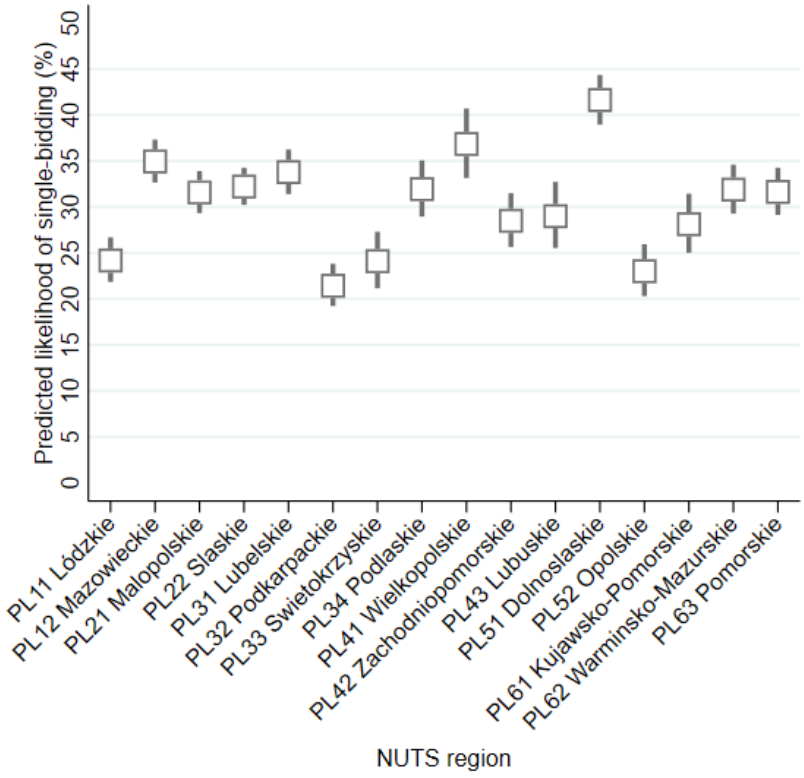
Fundamental economic characteristics of markets and contracts exert a strong influence on single bidding probability (see Table A1.1 in the Appendix). Structural factors, which are not easily influenced by policy intervention, predict single bidding probability considerably. Contract location correlates significantly with the likelihood of single bidding: in some regions the predicted single bidding share is around 40%, while being only between 20-25% in others (Figure 51). [42]

The highest single bidding percentage is predicted for 'Laboratory, optical and precision equipment (excl. glasses)' and 'Software package and information systems' with 66% and 55% respectively. The lowest rate is for 'Construction, foundation and surface works for highways, roads' and 'Building construction work' with 11% and 15% respectively. The share of single bidder contracts is higher in the later years.

Among the more directly policy influenceable factors, the contract value is positively correlated with single bidding, while the quadratic term is insignificant. This implies that contract values higher than the market average are more likely to be single bidder contracts. Neither the number of companies on the market, nor the total annual aggregate demand have a significant relationship with single bidding (recall that small markets were removed from the sample early on). The share of single bidding varies a lot between months: it is significantly higher (sometimes more than 10%) in the autumn and winter months than in the spring, which suggests that tender scheduling can influence suppliers' bidding behaviour. Interestingly, awarding a new company is predicted to lead to a 1.7% higher probability of single bidding.

[42] Note that only buyer postcodes are available widely in the dataset. These can be connected to NUTS codes later.

Figure 51. Predicted share of single bidding by regions in Poland



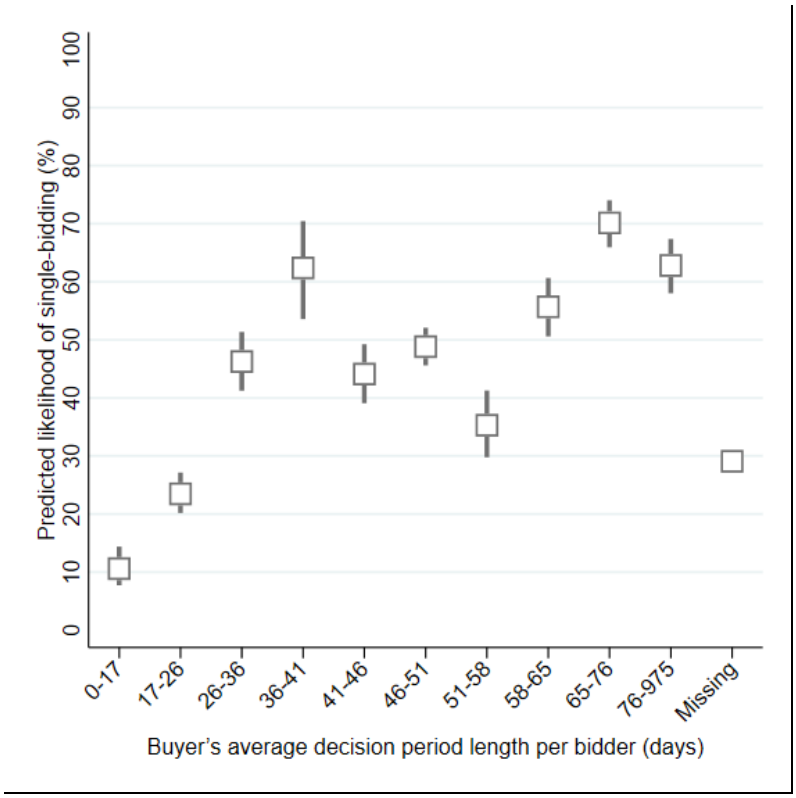
6.5.2. Administrative capacity

Administrative capacity of buyers also predicts single bidding probability (see Table A1.2 in the Appendix). Structural factors that are largely given on the short term do not have a very strong relationship with single bidding. Compared to national (central) authorities (22%), the predicted share of single bidder contracts are higher for public bodies (50%), national agencies (29%) and other authorities (42%). The buyers of these high single bidding categories are managing around 50% of the analysed contracts.

Directly policy amenable organisational capacities have a strong predictive power. Buyers with a less than 26 days-long decision period per bidder have a relatively low likelihood (<24%) of single bidder contracts. However, buyers with longer decision periods often have more than 50% predicted single bidding (Figure 52).[43] Moreover, buyers which manage to achieve large price savings (i.e. lower relative prices) generally tend to have a considerably lower incidence of single bidding.

[43] Unfortunately, the buyer's average decision period per bid is missing for around 80% of the contracts. Those are labelled as 'missing'.

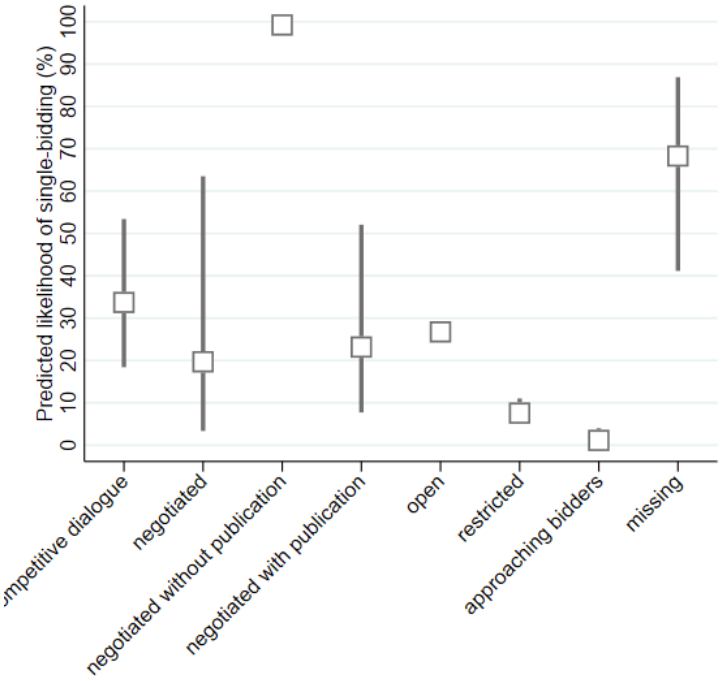
Figure 52: Predicted single bidding share by the deciles of the buyer's average decision period length per bidder in Poland



6.5.3. Integrity

Integrity-related indicators have proven to be strong predictors of the single bidding probability (see Table A1.3 in the Appendix). Open procedures have a 27% predicted single bidding share (Figure 53). While all other procedure types are only used sparsely, there is one interesting exception: negotiated procedures without publication (~3k contracts) have an extremely high share of single bidding (close to 100%). Potentially linked to procedure type choice, the predicted single bidding is more than 6% higher for tenders without an advertisement.

Figure 53: Predicted share of single bidding by procedure type in Poland

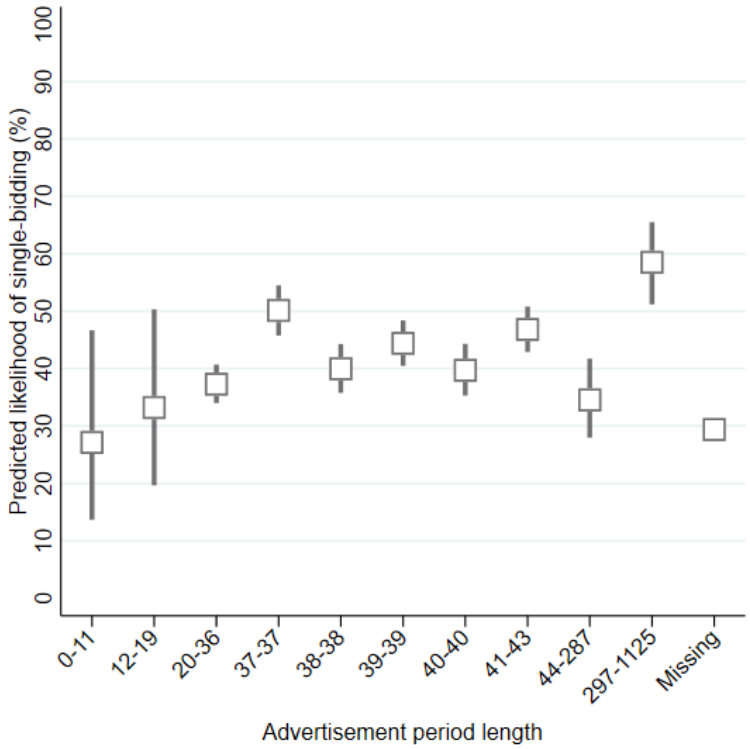


Interestingly, the relationship between the length of the advertisement period and single bidding is counterintuitive. Contracts with extremely short advertisement period tend to have relatively low single bidder shares, while for 'normal' contracts' the single bidding share is roughly between 40-50% (Figure 54).[44] [45] The length of the decision period on the contract level (this is different from the average organisational decision making speed) is significantly negatively associated with single bidding with particularly short periods – snap decisions – going hand in hand with high single bidding probabilities.

[44] Note that both the advertisement period length and the decision period length are missing for around 80% of contracts. They are entirely missing for below EU-threshold contracts. This is partly due to the fact that some procedure types do not require the publication of a call for tender document with a bidding deadline, but missing data on the source or other data errors can also influence the availability of advertisement period length.

[45] There are only ca. 200 contracts with less than 19-day long advertisement period.

Figure 54: Predicted share of single bidding by deciles of advertisement period length



6.5.4. Policy lessons

In Poland, policy influenceable factors which hold the promise of impacting the single bidding prevalence fall mostly in the administrative capacity and integrity categories. Economic structure certainly plays a major role in determining single bidding, but most significant predictors are hardly amenable to policy intervention or not desirable to change such as the region of contract performance where shifting spending across regions would have a strong influence on the prevalence of single bidding but might be politically infeasible.

Improving administrative capacity could have a positive effect of decreasing single bidding according to the modelling results. For example, specifically investing into those organisations which tend to decide on bids very slowly, for example 50 or more days per a bid on average, and moving them closer to the national average organisational performance has the capacity to decrease single bidding by around 30 percentage points. Furthermore, improving the procurement practices of public bodies, regional and other authorities could have a significant impact on the occurrence of single bidding, potentially lowering single bidding by 20-30 percentage points (when the reference is central authorities).

Lowering integrity risks could further decrease the probability of single bidding. Facilitating the use of open procedure types involving the publication of a call for tenders rather than using negotiated procedures without publication could mitigate at least the extremely high single bidder shares for a sub-group of tenders.

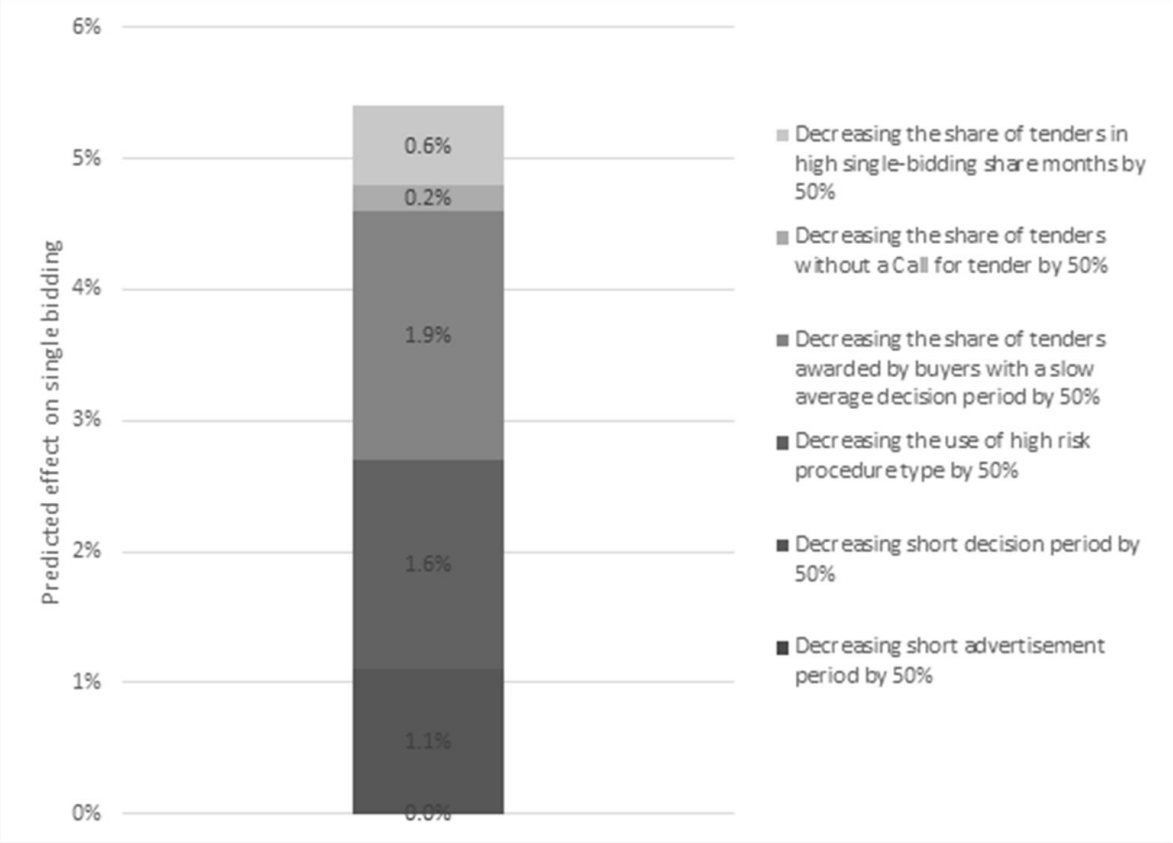
6.5.5. The impact of policy interventions

Hypothetical policy interventions result in a predicted 5.4% decrease in the share of single bidder contracts (Figure 55Figure 40). Decreasing the share of tenders with

high-risk procedure type by 50% can decrease the share of single bidding by 1.6%.[46] Rescheduling 50% of the purchases from the autumn and winter months, when single bidding is the highest, to a month with higher levels of competition (e.g. May) can lower the share of single bidding by 0.6%.

A significant change is related to the decrease in the buyer's average decision period per bid: if 50% of the contracts were to be moved from the slowest 50% of buyers to the quickest 10%, this would decrease single bidding by 1.9%. This suggests that buyers' capacities to manage public contracts is an important determinant of the level of competition. A possible implication is that procurement spending should be moved to buyers with adequate capacities or buyers should be trained and allocated extra funds to organize tenders better to attract more bids.

Figure 55: Policy intervention effects on single bidding in Poland



Notes:
The high risk procedures is the negotiated without publication. It is related to significantly higher share of single bidding.
Buyers' average decision period length per bidder is considered to be slow if it is among the slowest 50% of all contract that is more than 46 days on average.
The highest risk months are September, October, November, December and January, all having higher than 35% single bidding. They are regrouped to May that has a 29% single bidding share.

[46] Note that no publication of a call for tenders and an extremely short advertisement period has no significant effect on single bidding based on the final regression estimation.

7. CONCLUSIONS AND RECOMMENDATIONS

This report and the corresponding online dashboards set out (1) to provide a detailed overview of single bidding and the use of non-open procedures in 10 selected countries and (2) to build a comprehensive explanatory model for single bidding in 4 countries where public procurement data is of sufficiently high quality.

Unfortunately, **data quality** in many of the studied countries, both for above and below EU-threshold tenders, has turned out to be problematic, limiting the analytical value of the analysis. In many countries, EU Funds status, name of the winning firm, or the number of bidders were missing for a third to half of the tenders. For example, in over half of the tenders in Poland the information on bidder number or winner name was missing; while, on the other end of the spectrum, Hungarian and Croatian data had a missing rate of 'only' around 20% for bidder number and winner name variables (Figure 1). While many of the tenders without such information are likely to be terminated or unsuccessful tenders, there is certainly a non-negligible portion of Member States' public contracting which remains unaccounted for. Academic research suggests that missing information is associated with administrative capacity, potentially with organisational integrity, and it ultimately influences tendering outcomes (Bauhr et al., 2017; Cingolani & Fazekas, 2017). Given that missing information is more likely to mask low administrative quality and wrongdoing than represent high quality administrative performance, the analysis so far and the ensuing conclusions merely provide a lower bound estimate of single bidding and non-open tendering problems.

With regards to the **descriptive analysis of the scale and scope of single bidding and non-open procedures** in EU Funded public contracts, the analysis revealed a vast diversity of performance not only across countries but very much within countries according to economic sector, NUTS region, and time period concerned. Within country differences surpass cross-country differences frequently, i.e. the differences within countries (e.g. by sector) tend to be a lot greater than differences across countries. For example, in the Czech Republic the sector with the highest prevalence of single bidding (postal and telecommunications services) purports a 60% rate while the sectors with the lowest rates (e.g. architectural services) achieve only about 20% single bidding. In Italy, the sector with the highest single bidder share is repair and maintenance services (50%) while the lowest rate is in the food, beverages, tobacco and related products market (2%). Crucially, the ranking of sectors in terms of single bidding rates varies greatly across countries. For example, the transport equipment sector displays the highest single bidding rate among all analysed sectors in Hungary, but it is the lowest among the Czech sectors analysed. Similarly, the IT services sector scores the highest on single bidding in Slovakia with close to 50% single bidding rate, while being situated towards the middle of the sectoral ranking in most other countries such as Romania (about 30% single bidding rate). This suggests that in spite of the expectations of a level playing field across Member States in the EU, national borders create pronounced barriers to competition within the same product market (Herz & Varela-Irimia, 2017). In addition, the popular perception that some sectors are inherently less competitive or carry higher risk regardless of the Member State seem to be, at least partially, contradicted by the evidence gathered.

7.1. Policy recommendations

Data-driven, specific policy recommendations are based on quantitative **explanatory models of single bidding.** While the models fall short of establishing causal relationships with experimental methods, such as randomized controlled trials, they can point at the most relevant factors accounting for single bidding in public procurement, especially as the relationships identified are supported by the academic literature. The models paint a diverse picture paralleling the complexities highlighted

above and calling for an approach sensitive to country and region-specificities.[47] Nevertheless the analysis still offers a number of shared lessons across all analysed countries (for country-specific findings and recommendations see the country sections in chapter 6). The quantitative models taking into account economic fundamentals, administrative capacity and integrity are of generally high quality explaining 20% - 50% of variance in single bidding on the contract level. While the models consider a great number of predictors which are not directly or easily amenable to policy intervention such as sector or year of spending, a considerable portion of the models directly leads to policy conclusions feasible on the short term, without lengthy legislative changes.

Leveraging economic opportunities holds the potential to improve single bidding rates considerably. Reflecting the conditional conclusions of both economic theory and strategic sourcing practitioners (Oliveira et al., 2019), demand aggregation is expected to lead to stronger competition, that is larger contract values attracting significantly more bidders hence lower single bidding rates if some further conditions are met (e.g. sufficient capacity to manage large contracts) (Czech Republic). However, larger contracts (lots) can also weaken competition, i.e. increase single bidding, typically reflecting market capacity constraints (Latvia and Poland). Surprisingly, annual aggregate demand on the market, which accounts for large annual swings in total EU Funds spending (i.e. EU Funds spending cycles driven by the 7 year programming periods), has no effect on single bidding. However, seasonality, that is the month of contract award, is a strong predictor of single bidding in our statistical models with especially year end (December) purporting high single bidding rates. Hence, shifting spending from months of higher single bidding rates can lower the overall incidence of single bidding throughout the year. This is because the availability of suitable suppliers is more constrained during the holiday season when companies' order books tend to be full and staff goes on vacation. Moreover, it may also be due to the end of financial year tenders being more hastily launched (i.e. quickly run to avoid ending the year with unspent budget).

Investing into administrative capacities of procuring entities is likely to reap benefits in terms of lowering single bidding rates and ultimately lowering prices.[48] Improving organisational capacity in the form of average decision making speed (the number of days on average an organisation takes to decide on one bid) can send a positive signal to the market increasing bidder participation and lowering single bidding. Quick and on schedule public sector decisions lower uncertainty for bidding firms hence lower the costs of doing business with the government which can attract more bidders as well as likely lowering prices (regression models cannot account for product quality unfortunately). The likely effect sizes in our models fall in the range of 5-30% point decrease in single bidding when organisations score close to the national average compared to those which tend to be very slow in decision making. These results underline the need for investing in administrative capacity in terms of competence and resources to make speedy and timely decisions.

Strengthening public sector integrity promises to further lower single bidding and associated risks. For example, pursuing open tendering procedures with adequate advertisement rather than direct contracting or negotiated procedures without prior publication holds the promise of lowering single bidding percentages. While different procedure types are required for different purposes, non-open procedures are more

[47] On related EC policy directions see: https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-tailored-approach-regional-needs_en.pdf

[48] This finding is very much in line with recent policy directions of the new regional funding framework. See Annex III: https://eur-lex.europa.eu/resource.html?uri=cellar:26b02a36-6376-11e8-ab9c-01aa75ed71a1.0003.02/DOC_3&format=PDF

likely to be misused for particularistic ends. Increasing the prevalence of open procedure types can lower single bidding percentages in the studied countries by 20-30% points. This is a result in line with prior academic research on a much broader set of countries (Fazekas & Kocsis, 2017). Moreover, short advertisement periods can deter bidders from entering the market hence increase single bidding. Discouraging very short advertisement periods of 2-4 weeks could potentially decrease single bidding by 10-25% points.

This study is merely the first attempt to systematically map and account for single bidding in EU funded public procurement in selected Member States opening up the avenues for a range of improvements in the near future and supporting policy reform and better enforcement. **Further work** could encompass:

1. Given the high political salience and economic costs of single bidding across Europe, a regular monitoring mechanism of single bidding could be set up following the methodology and dashboards created here. Updating the data at regular intervals, for example every 3-6 months, would allow policy makers to track reform effectiveness and changes on time.
2. If some of the policy lessons suggested by the statistical modelling prove to be worthy of being put into practice, the data and analytical framework would be well suited to track progress and assess effectiveness of policy interventions. Based on lessons learnt from implemented reforms the explanatory models could be further refined, too.
3. The identified sectors and regions with exceptionally high single bidding rate and some of the notable empirical relationships between single bidding and main explanatory factors could be further investigated using a case study methodology better fitted to uncover the local dynamics of administrative behaviour and market competition.
4. The explanatory models could only consider policy-relevant factors for which there is sufficient data collected by DIGIWHIST, hence policy recommendations remained narrow and targeted to the measured variables. Naturally, an array of relevant factors have remained unaccounted for such as the role of remedies bodies or competition policy more broadly. The role of many such omitted factors could be systematically investigated if additional data is collected and linked to the public procurement dataset used in this study (e.g. remedies bodies decisions can be collected in many Member States and potentially linked to tendering records).

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Appendix

Table A1.1: Full results of binary logistic regressions (log-odds coefficients reported): Economic fundamentals

Country	Czech Republic	Hungary	Latvia	Poland
Dependent variable	Single bid submitted=1, otherwise=0			
Contract value deviation from market average	-0.0111***	-0.0117	0.122***	0.0146***
	(0.000)	(0.294)	(0.000)	(0.000)
Contract value deviation from market average, squared	0.00231***	-0.000757	-0.00682***	-0.000817
	(0.000)	(0.066)	(0.000)	(0.100)
Number of companies per (region-market)	0.000105	0.0000846**	-0.000141**	-0.0000282
	(0.087)	(0.003)	(0.002)	(0.505)
Aggregate demand (region-market-year)	-0.0000878*	-0.00000482	-0.00000826	-0.00000593
	(0.037)	(0.196)	(0.966)	(0.598)
Month				
Ref. Cat. December				
January	-0.00234	0.00739	-0.0861***	-0.0331**
	(0.856)	(0.706)	(0.000)	(0.002)
February	-0.0140	-0.0271	-0.0919***	-0.0600***
	(0.267)	(0.184)	(0.001)	(0.000)
March	-0.00599	-0.0311	-0.127***	-0.0818***
	(0.627)	(0.136)	(0.000)	(0.000)
April	0.00214	-0.0582**	-0.0764**	-0.0883***
	(0.849)	(0.003)	(0.003)	(0.000)
May	-0.0143	-0.0521*	-0.0824***	-0.0550***
	(0.226)	(0.010)	(0.000)	(0.000)
June	0.00391	-0.0443*	-0.0695***	-0.0593***
	(0.745)	(0.019)	(0.001)	(0.000)
July	0.0283*	-0.0333	-0.0717**	-0.0420***
	(0.010)	(0.088)	(0.001)	(0.000)
August	0.0362**	0.0155	-0.0409	-0.0429***
	(0.001)	(0.416)	(0.067)	(0.000)
September	0.0546***	-0.00642	-0.175***	-0.0281*
	(0.000)	(0.754)	(0.000)	(0.012)
October	0.0454***	-0.0124	-0.0549*	-0.0316**
	(0.000)	(0.511)	(0.031)	(0.007)
November	0.0347***	-0.00970	-0.0816***	-0.0205
	(0.001)	(0.599)	(0.000)	(0.070)
New company	0.0151*	0.0267**	-	0.0169**
	(0.034)	(0.007)	-	(0.006)
Region	included	included	included	included
Sectors	included	included	included	included
Years	included	included	included	included

Table A1.2: Full results of binary logistic regressions (log-odds coefficients reported): Administrative capacity indicators (continued from previous page)

	Czech Republic	Hungary	Latvia	Poland
Dependent variable	Single bidding			
Distance from average MEAT	-0.00666	-	-0.00126	-
	(0.451)	-	(0.941)	-
Decision period length per buyer				
Ref. Cat: top 10%				
0-10%	-0.166***	-0.272***	-0.231***	-0.567***
	(0.000)	(0.000)	(0.000)	(0.000)
10-20%	-0.172***	-0.222***	-0.202***	-0.468***
	(0.000)	(0.000)	(0.000)	(0.000)
20-30%	-0.130***	-0.229***	-0.132***	-0.294***
	(0.000)	(0.000)	(0.000)	(0.000)
30-40%	-0.134***	-0.225***	-0.108***	-0.260***
	(0.000)	(0.000)	(0.000)	(0.000)
40-50%	-0.0915***	-0.202***	-	-0.279***
	(0.000)	(0.000)	-	(0.000)
50-60%	-0.0996***	-0.196***	-0.117**	-0.230***
	(0.000)	(0.000)	(0.002)	(0.000)
60-70%	-0.0788***	-0.174***	-0.176***	-0.156***
	(0.000)	(0.000)	(0.000)	(0.000)
70-80%	-0.0623***	-0.140***	-0.129***	-0.112***
	(0.000)	(0.000)	(0.000)	(0.000)
80-90%	-0.0393**	-0.0768**	-0.130***	-0.0724**
	(0.005)	(0.005)	(0.000)	(0.003)
Missing decision period length	-0.158***	-0.194***	-0.126*	-0.392***
	(0.000)	(0.000)	(0.014)	(0.000)
Buyer type				
Ref. Cat.: national authority				
European agency	0.0136	-	-	-
	(0.889)	-	-	-
National agency	0.0209	-0.0283	-0.164***	-0.0200
	(0.137)	(0.400)	(0.000)	(0.700)
Public body	0.00704	-0.0259	-0.0249	0.114***
	(0.538)	(0.189)	(0.606)	(0.000)
Regional agency	-0.00633	-0.0424	-	0.0456
	(0.659)	(0.180)	-	(0.404)
Regional authority	-0.0120	-0.0570***	0.169*	0.0524**
	(0.312)	(0.000)	(0.028)	(0.006)
Utilities	-0.0121	0.00559	0.210	-0.0363
	(0.526)	(0.900)	(0.064)	(0.114)
Other	0.00284	-0.0500***	0.0815	0.0894***
	(0.826)	(0.000)	(0.075)	(0.000)
Missing	-0.00843	-0.200	0.00946	-
	(0.753)	(0.090)	(0.812)	-
Average relative price (categorized)	included	included	-	included

Table A1.3: Full results of binary logistic regr.(log-odds coeff. reported): Integrity indicators (continued from previous page)

	Czech Republic	Hungary	Latvia	Poland
Dependent variable	Single bidding			
Procedure type				
Ref. Cat: open				
Competitive dialogue	-	-	-	-0.0161
	-	-	-	(0.817)
Negotiated	0.0752**	-0.000279	0.464**	-0.0684
	(0.001)	(0.986)	(0.004)	(0.647)
Negotiated without publication	0.693***	0.0610***	0.220***	0.678***
	(0.000)	(0.000)	(0.000)	(0.000)
Negotiated with publication	0.181**	0.220***	0.253*	-0.0801
	(0.001)	(0.000)	(0.026)	(0.391)
Restricted	-0.0659***	0.0208	-0.0191	-0.0528
	(0.000)	(0.600)	(0.616)	(0.120)
Design contest	-	-	-	-
Direct award	0.299***	-	0.113**	-
	(0.000)	-	(0.004)	-
Approaching bidders	-0.0295*	0.0746	-	-0.291***
	(0.014)	(0.337)	-	(0.000)
Missing	0.214***	0.187***	0.104***	0.240*
	(0.000)	(0.000)	(0.000)	(0.035)
No CFT	0.0361*	-0.0498	-0.0467	0.0675***
	(0.022)	(0.770)	(0.319)	(0.000)
Submission period length				
Ref. Cat. Middle (40-50%)				
0-10%	0.101***	0.0656*	-0.0491**	-0.0681
	(0.000)	(0.044)	(0.008)	(0.313)
10-20%	0.0568***	0.0688*	-0.0584**	0.137
	(0.001)	(0.049)	(0.001)	(0.052)
20-30%	0.0608***	0.0240	-0.0468*	0.0130
	(0.000)	(0.246)	(0.032)	(0.479)
30-40%	0.0800***	0.00151	-0.0433*	0.0771***
	(0.000)	(0.925)	(0.015)	(0.001)
50-60%	-0.0179	-0.0221	0.00142	0.0304
	(0.225)	(0.159)	(0.940)	(0.141)
60-70%	-0.0253	0.0221	0.0957***	0.0169
	(0.087)	(0.284)	(0.001)	(0.445)
70-80%	-0.0192	0.00922	0.00617	0.0566**
	(0.206)	(0.576)	(0.767)	(0.007)
80-90%	-0.0414**	-0.00967	-0.00653	-0.00937
	(0.009)	(0.533)	(0.746)	(0.752)
90-100%	-0.0527*	0.0171	0.0169	0.176***
	(0.024)	(0.335)	(0.411)	(0.000)
Missing	-0.0857*	0.210*	0.674***	-0.0312
	(0.014)	(0.027)	(0.000)	(0.717)
Single bidding rate per winner				
Ref. Cat: few (<3) tenders won				
Low single bidding rate	-0.126***	-0.232***	-	-
	(0.000)	(0.000)	-	-
High single bidding rate	0.0935***	0.235***	-	-
	(0.000)	(0.000)	-	-
Decision period length (categorized)	included	included	included	included
Constant	included	included	included	included
Pseudo R-squared	0.56	0.28	0.33	0.24
Number of observations	17828	14487	9632	54429

Note: p values in parentheses

Table A2.1: Variable category definitions by country: advertisement period length

Advertisement period length	Czech Republic		Hungary		Latvia		Poland	
values by deciles	minimum	maximum	minimum	maximum	minimum	maximum	minimum	maximum
0-10%	1	31	5	18	6	11	0	11
10-20%	32	41	19	21	12	13	12	19
20-30%	42	52	22	31	14	14	20	36
30-40%	53	65	32	37	15	23	37	37
40-50%	66	84	38	41	24	31	38	38
50-60%	85	98	42	44	32	37	39	39
60-70%	99	124	45	45	38	39	40	40
70-80%	125	171	46	47	40	42	41	43
80-90%	172	321	48	52	43	48	44	287
90-100%	322	1021	53	834	49	520	297	1125

Table A2.2: Variable category definitions by country: decision period length per buyer

Decision period length per buyer	Czech Republic		Hungary		Latvia		Poland	
values by deciles	minimum	maximum	minimum	maximum	minimum	maximum	minimum	maximum
0-10%	0,44	10,08	3,42	16,86	0,10	8,55	1,00	21,13
10-20%	10,11	15,88	17,00	21,67	8,67	15,95	21,15	29,88
20-30%	15,95	20,88	21,86	29,41	16,00	19,28	29,97	38,45
30-40%	20,94	26,11	29,50	37,50	19,40	21,30	38,48	41,76
40-50%	26,13	31,25	37,82	45,36			42,00	47,27
50-60%	31,31	34,95	45,38	58,57	21,37	22,31	47,32	51,84
60-70%	35,00	43,04	58,67	64,64	22,48	26,56	51,89	58,23
70-80%	43,33	54,32	64,75	81,00	26,63	32,77	58,26	65,72
80-90%	54,44	68,15	81,50	109,02	33,00	40,23	65,79	79,02
90-100%	68,33	558,00	109,50	322,60	40,32	457,00	79,05	975,00

Table A3: Variable-level missing statistics, final dataset used in the analysis

# of missing by variable	Czech Republic		Hungary		Latvia		Poland	
	national	TED	national	TED	national	TED	national	TED
Single bidding	0	0	0	0	0	0	0	0
Winner's single bidding rate	6708	2713	12172	2202	2770	2133	34450	5166
New company	0	0	0	0	0	0	0	0
Contract value	353	111	3420	56	102	731	1273	974
Month	0	0	3018	0	0	0	0	0
Procedure type	17	15	130	17	3395	7	13	16
No CFT	0	5498	0	0	0	5391	0	12954
Submission period length	8078	893	13601	357	1746	1756	49690	994
Decision period length	8086	1543	13531	395	1748	1757	49690	1321
MEAT	45	7	13876	0	740	0	49690	12
Average relative price	1031	321	1127	373	35	182	1226	1495
Buyer type	112	0	17	0	5927	0	0	0
Decision period length per buyer	3280	351	9382	144	205	1314	49690	335
Region	119	45	1546	1	96	2346	4269	1957
Year	0	0	0	0	0	0	0	0
Sector	0	0	0	0	0	0	0	0
Number of companies per region-market	119	0	0	0	0	0	18	8
Aggregate demand	0	0	0	0	6	114	0	0
Total	12961	5498	14309	3705	5927	5391	49690	12954

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