

On competition and transparency in public procurement during the COVID-19 pandemic in the European Union

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Abstract: Government expenditures on acquiring services, goods, and work through public procurement represent a substantial proportion of the EU's GDP. Competitive and transparent tendering procedures are generally believed to promote achieving the primary goals of public procurement: maximising value for money and reducing corruption. However, during the crisis, procurement rules allow a temporary departure from transparency standards toward fast and more discretionary procurement procedures justified by force majeure, possibly restricting competitiveness and information availability in the whole procurement process. The presented paper examines emergency response procurement measures by EU countries in the aftermath of the COVID-19 outbreak in the spring of 2020 and their impact on competition. Using an extensive dataset of contracts for medical supplies and PPE obtained from Tenders Electronic Daily, we document the rapid increase of direct and negotiated contracts in the first two months of the pandemic outbreak. We found that firms, in general, were more likely to participate in procurement procedures with a prior call for tenders, such as open procedure and restricted procedure. On the other hand, the significant share of contracts obtained by small and medium enterprises without competition, hence by single bid procurement, suggests that public authorities tend to use their discretion in favour of SMEs. Moreover, overall emergency procurement setting and its effects on competition vary across countries regardless of how intensely the pandemic hit, indicating an institutional context for the increased discretion effects on procurement outcome.

Keywords: COVID-19, public procurement, transparency, SME, competition.

JEL Classification: H57, G18, O38, C30.

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Introduction

The global COVID-19 pandemic, which hit the EU in spring 2020, has stressed all areas of society to an unprecedented extent. The ensuing lack of medical supplies, disinfectants,

ventilators, and personal protective equipment (PPE) revealed real shortcomings in most EU countries' preparedness for the situation. The sudden shortage of life-saving goods inverted the order of public procurement markets,

with suppliers exploiting the situation to take the initiative at the expense of contracting authorities. The loss of government authorities' monopsonist position in the public procurement markets (Folliot Lalliot & Yukins, 2020), together with the inability to deliver in time the necessary goods, often simple medical consumables, called into question the whole area of government purchasing. The traditional legislative framework of EU public procurement has thus proved unable to cope with the rapidly growing demand for medical equipment in the current situation. In addition to shortening procurement deadlines, the European Commission recommended that the Member States consider awarding contracts without prior publication (Public Health Notes, 2020). The Commission's recommendation only sanctioned the already established behaviour of some contracting authorities facing this situation, as they had already been using accelerated public procurement procedures to address acute shortages of medical supplies or even awarding some contracts directly without publication. In this crisis, some Member State governments have often employed exceptions in the form of an "extremely urgent need" to avoid traditional transparent and open procurement procedures. This has resulted in many contracts of enormous financial value going to suppliers who would not otherwise meet the basic criteria for participation in procurement (Sanchez-Graells, 2020a). Such deactivation of public procurement rules (Sanchez-Graells, 2020b) in negotiated contracts without prior publication became a benchmark for public procurement in the early pandemic era. The efforts of contracting authorities to quickly address the acute shortage of medical supplies, by using rapid procurement procedures at the expense of transparency in public procurement, open the door to potential corruption (Kohler & Wright, 2020).

The increased use of direct contracting has been relatively widely discussed during the current pandemic. Such studies, however, mainly focus on understanding the government responses' impact on supply chains using case studies (Atkinson et al., 2020) and discussing the pivotal role of unsolicited proposals in times of crisis (Casady & Baxter, 2021). On the other hand, empirical studies using contract-level data assessing the impact of the COVID-19 pandemic on public procurement, with few exceptions, are still lacking. Studies by Abdou

et al. (2021) and Fazekas et al. (2021), focusing on Romania's procurement, reveal an increased risk of corruption during the pandemic emergency. Therefore, the presented paper aims to add to the current research by assessing the pandemic first wave impact on procurement markets for PPE and medical goods across the EU using contract-level data.

From a theoretical viewpoint, in pandemic times, more attention is paid to the need to respect the basic principles of public procurement, emphasising maintaining an adequate level of transparency and enabling the broadest possible competition (e.g., Folliot Lalliot & Yukins, 2020; Hoekman et al., 2021). On the other hand, ensuring the prompt delivery of required goods and services is usually associated with relatively simple and less demanding procedures. In contrast to traditionally open and protracted procurement procedures, less administratively demanding and transparent procedures provide contracting authorities broad discretionary powers concerning transparency and the range of competitors in such contracts. Therefore, the findings of this study are also of practical importance, since they could help understand governments' tendencies to restrict competition in the process of overcoming supply shortages. Based on the above, we devote our attention to two research questions:

RQ1: What has been EU countries' transparency policy in procurement to address the shortage of medical goods and PPE?

RQ2: How did transparency in procurement procedures affect competition in EU public procurement markets during the first wave of the COVID-19 pandemic?

To answer the above research questions, we use data on contract award notices published in the Tenders Electronic Daily (TED) during the first outbreak of the COVID-19 pandemic (January 2020 to September 2022). We pay particular attention to acute outbreak period which took place on March, April, and May 2020. TED is an online platform dedicated to publishing information on tenders carried under EU law by contracting authorities across the EU (this is also referred to as the new generation of EU public procurement directives, which are: Directive 2014/23/EU of the European Parliament and of the Council on the award of concession contracts, Directive 2014/24/EU of the European Parliament and the Council

on public procurement and repealing Directive 2004/18/EC, and Directive 2014/25/EU of the European Parliament and the Council on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC). The remainder of this paper begins with a literature review and the formulation of hypotheses. The next part is a description of the data and methodology used, followed by presenting and discussing results of the empirical analysis.

1. Theoretical background

1.1 Transparency and competition in public procurement

As one of the key principles established by EU procurement law, transparency is a part of most procurement regulatory systems in EU Member States (Arrowsmith et al., 2010). The importance of transparency is emphasised in previous studies, as the area of public procurement is vulnerable to corruption (e.g., Auriol et al., 2016; Davis, 2004; Nemeč et al., 2020a; Rose-Ackerman et al., 2014), and transparency is therefore considered key to reducing corruption (e.g., Kohler & Wright, 2020; OECD, 2017). Despite its importance concerning public expenditures through public procurement, a straightforward definition of transparency is lacking. A unifying element of the definitions of transparency provided by Grimmelikhuijsen (2012), Meijer (2013), and OECD (2016) is a requirement for the availability of information on the organising and public procurement process, allowing for its external monitoring. A basic level of public procurement transparency is ensured through the publication of notices of announced tenders, contract awards, and, where appropriate, changes to contracts resulting from public procurement. Publicity increases transparency by removing information asymmetries concerning identifying suitable business opportunities in tender notices available without distinction to a wide range of economic operators. Contract notices below certain financial thresholds are published through national publishing offices following the Member States' legislative rules. If procurement notices exceed financial thresholds, such notices are published in TED, which serves as the online platform of the Supplement to the Official Journal of the EU, dedicated to public procurement (European Union, 2020a). Advertising procurement involves more economic operators in public procurement, which

means an increase in competition, thus satisfying a prerequisite for greater efficiency of public spending. The impact of publicity in procurement on final prices or the number of bidders involved in public procurement has been the subject of several empirical studies (e.g., Ochraňa & Pavel, 2013; Pavel & Sičáková-Beblavá, 2012). Coviello and Marinello (2014) examined the impact of increased publicity in Italian auctions on public works between 2000 and 2005 and found that increased publicity reduced procurement costs and rationalised public spending. They also found that increased publicity attracted winners from regions other than the contracting authority and increased the likelihood that a large company would win the auction. Nemeč et al. (2021) found that using open procedures boosts overall competition in the Visegrad Group countries. Several empirical studies have demonstrated the positive effect of a higher number of bids on the final contract price (e.g., Džupka et al., 2020; Grega & Nemeč, 2015; Gupta, 2002; Kuhlman & Johnson, 1983; Nemeč et al., 2020b).

1.2 Public procurement and small and medium enterprises

The importance of small and medium-sized enterprises (SMEs; the definition of SMEs is based on EC Recommendation 2003/361/EC, which includes all companies with less than 250 employees and an annual turnover not exceeding 50 million euros and/or an annual balance sheet not exceeding 43 million euros in total) is constantly growing, given their representation in the EU economy. SMEs accounted for 99.8% of all enterprises in the EU in 2018, generating 56.4% of value-added and 66.6% of employment in the non-financial business sector (European Commission, 2019). SMEs are considered a source of innovation (Jong & Vermeulen, 2014; Spencer et al., 2008). Despite SMEs' significant share in the EU economy, they receive only 45% of the financial value of public contracts above the financial thresholds set by EU procurement law (European Commission, 2017). The underrepresentation of SMEs in public procurement has repeatedly been the subject of several studies aimed at identifying barriers to SMEs' access to public contracts in a fair proportion corresponding to their representation in the economies of most Member States (e.g., Ak-enroye et al., 2020; Loader & Norton, 2015;

MacManus, 1991; Maréchal & Morand, 2012; Perry, 2011). According to the mentioned studies, SMEs must overcome various barriers, including excessive administrative burden, lack of transparency in evaluating processes, high complexity of contracts, poorly written contract specifications, opaque procurement legislation, and overdemanding economic or technical requirements. Other studies have examined the effects of tools to improve SMEs' access to public procurement, such as dividing contracts into smaller lots or awarding contracts based on the most economically advantageous tender (MEAT). Hoekman and Taş (2020) and Nemeč (2020) found that dividing contracts into smaller lots bolsters participation by SMEs.

Awarding contracts using MEAT evaluation, which includes the best price-quality ratio or life-cycle costs, allows contracting authorities to refrain from adhering to precise technical specifications and helps obtain the best value for money. In other words, the MEAT criteria allow consideration of the tender's qualitative, technical, and sustainability aspects along with price criteria when awarding the contract (Nemeč et al., 2021). Abandoning the lowest price as the only award criterion allows SMEs to compete in quality using their specialisation, flexibility, and innovation potential, thus leveling their chances of success with those of large firms. However, recent research results indicate various effects of MEAT on SME bidding. Stake (2017), in his study using data on contracts awarded in 2007–2008 by Swedish contracting authorities, argues that MEAT evaluation has no significant effect on SME participation and even decreases the probability of winning such contracts. On the other hand, Nemeč and Džupka (2021), analysing more than 150,000 contracts awarded by authorities in the Visegrad Group in 2019, found that using MEAT criteria significantly increases SME chances of winning such contracts.

1.3 COVID-19 context and hypotheses development

On March 11, 2020, a rapid increase in the incidence of COVID-19 outside China led the World Health Organisation (WHO) to declare a pandemic. By mid-March 2020, the European Region had become the pandemic's epicentre, with 40% of globally confirmed cases. By the end of April 2020, more than 60% of the total global mortality from new coronavirus disease

was in the European region (World Health Organization, 2020). The following situation of exceptional measures in preventing the further spread of disease, and the increased demand for medical supplies and personal protective equipment, disrupted competition, leading to an inversion in public procurement markets (Folliot Lalliot & Yukins, 2020). In such an emergency, government authorities' role is to secure needed medical supplies and PPE in a time commensurate with the situation's urgency. Awarding speed thus became of utmost importance. Under standard open bidding procedure according to the EU procurement law, the minimum time limit for the tender submission is no less than 35 days from the date the contract notice is sent for publication. In fact, the minimum time limit for submitting tenders may be shortened to 15 days under certain circumstances. However, to these minimum deadlines must be added a 10-day "standstill" period after the winner is announced, during which unsuccessful economic operators may challenge any errors concerning the prior procedure. In emergencies requiring extraordinarily rapid and urgent solutions, contracting authorities can award contracts using negotiated procedures without prior publication. Choosing negotiated contracting without prior publication over traditional open and protracted procedures can help overcome the critical time gap when providing medical goods and PPE. On the other hand, increased discretionary power increases the risk of its abuse, especially considering the absence of a prior call for competition that would allow potential bidders to learn about such contracts. In other words, contracting authorities decide whom to invite to tender. Coviello et al. (2021) documented manipulations in contract values in the aftermath of earthquakes in central Italy to keep procured contracts below the regulatory thresholds, allowing for simpler, faster and more discretionary procurement procedures. The same authors also argue that there are strong incentives to manipulate contracts and increase discretion during emergencies. Decarolis et al. (2021), based on their study on the effects of allowing for the greater use of negotiated and direct awards from February 2020 in Italy, documented a sharp increase in the use of such less transparent and non-competitive procedures. Relaxing the standard procurement rules justified by a need for swift procurement response to save lives and reduce damages,

on the other hand, can lead to deteriorating transparency and accountability. In this context, Coccio et al. (2022) argue that the countries most affected by COVID-19 adopted a large proportion of procurement measures that were risky or even critical to transparency in procurement, such as direct contracting, accelerating bid times, or even increasing thresholds for direct contract awards. However, the same authors' study also revealed that the quality of institutions matters since the deterioration of transparency and accountability standards was more contained in countries with stronger institutions. Drawing on the aforementioned theoretical framework discussing emergency procurement and its effects on transparency led to the formulation of the following hypotheses:

H1: During the first pandemic wave (March, April, and May 2020), less transparent procurement procedures were more widely adopted.

H2: Less transparent procurement procedures prevailed over standard procedures in the countries most affected by the pandemic.

H3: Transparency and the overall setting of procurement response to the first pandemic wave vary across the EU countries.

H4: The adoption of less transparent procedures negatively affected competition.

First three hypotheses are supposed to clarify the first research question:

RQ1: What has been EU countries' transparency policy in procurement to address the shortage of medical goods and PPE?

Fourth hypothesis should respond to second research question:

RQ2: How did transparency in procurement procedures affect competition in EU public procurement markets during the first wave of the COVID-19 pandemic?

2. Data description and methodology

2.1 Description of data

The data used for this research were obtained from a list of contract award notices published on the TED portal referred to as COVID-19 related tenders (a daily updated list of contract award notices is available at: <https://ted.europa.eu/TED/search/searchResult.do>). According to CPV codes relevant for medical supplies and PPE, the basic list of tenders was created using a simple filter in the TED search tool to reflect the needs of medical services and authorities. The data initially available in XML format were converted to CSV format using a simple software tool created by the study's authors. Another issue in processing the database was

Tab. 1: Summary of variables

Variable	Description
Number of bids	The number of all bids received from tenderers in the lot in which the contract was awarded.
SME bids	The number of bids received from SMEs.
Single bidder	Where the contract was awarded in procurement with a single bid submitted.
Won by SME	Where the contract was awarded to an SME.
Award criterion	Whether a contract was awarded based on the lowest price or MEAT evaluation.
Transparency	This variable was constructed by the authors to indicate the level of transparency in respective procurement procedures. Procurement procedures with a prior publication or call for competition, such as open and restricted procedure, are classified as transparent. Less transparent procedures comprised procedures without a prior call for competition or publication, including direct contract awards and negotiated procedures.
Joint procurement	Where the contract was awarded in procurement conducted by two or more contracting authorities.
Framework agreement	This indicates establishment of a framework agreement (FA); the FA's purpose is to establish terms governing contracts to be awarded during a given period concerning the price and quantity envisaged [Art. 33(1) Directive 2014/24/EU].

Source: own

that the original dataset contained all contract award notices (CAN) published in TED from February 1, 2020, regardless of the actual date of their award. Only contract data that met two conditions were included in the database: the contracts had to be awarded in 2020; and the procurement process had to start in 2020 at the latest. The final database used in this research contains data on contracts relating to medical equipment, pharmaceuticals, and personal care products and PPE awarded between January 1 and September 30, 2020. For each contract lot, we observe variables corresponding to elements of the procurement process that occur within each procurement procedure leading to awarding the contract. These elements include the type of procurement procedure, the number of bids, the award criteria, winning firm characteristics, the date of contract award, the location of the contracting authority, and whether the procurement

resulted in the establishment of a framework agreement or involved joint action of several contracting authorities. Tab. 1 presents the list of all variables together with their description.

The dataset initially amounted to 1,499 procurement procedures, with 8,008 contract awards. However, the data in the dataset represent so-called flat data resulting from the conversion of notices published in TED into CSV format. A single notice can lead to several contract lots or contract awards (European Union, 2020). In other words, where a contract in one lot was awarded to more than one tenderer (e.g., framework agreements), duplication in the variables corresponding to such contract lot occurred. Therefore, duplicities concerning such contract lots were excluded to avoid bias in bidding data. These steps reduced the dataset to 7,876 contracts awarded in 1,499 procurement procedures for further estimation

Tab. 2: Characteristics of examined contracts

		Less transparent procedure	Transparent procedure
March–May 2020	Contracts awarded	1,012	2,698
	Won by SME	637	820
	Single bidder	837	1,042
	Won by SME (the single bidder)	520	473
	Lowest price award criterion	661	1,772
	MEAT award criterion	351	926
	Average number of bids	2.23	4.84
	Average number of SME bids	0.91	0.75
	Framework agreement	27	91
	Joint procurement	10	37
Entire period	Contracts awarded	1,280	6,596
	Won by SME	802	2,328
	Single bidder	1,001	2,453
	Won by SME (single bidder)	628	1,234
	Lowest price award criterion	819	3,666
	MEAT award criterion	461	2,930
	Average number of bids	3.50	4.50
	Average number of SME bids	2.10	0.92
	Framework agreement	33	353
	Joint procurement	11	90

Source: own

purposes. Tab. 2 presents the characteristics of the contracts examined for the whole sample and the subsample of contracts awarded in the first wave of the pandemic.

Data on transparency for the period of the pandemic's first wave show that more than one third of all contracts was awarded using a less transparent procedure. Regardless of the period, we can observe that the average number of bids increased with a higher transparency level in the procurement process. Despite the relatively low average number of bids, less transparent procedures seem to be more favourable to SMEs, as they secured more than 60% of contracts awarded through these procedures. The success of SMEs in narrowing competition is even higher: they won over 60% of contracts awarded in the pandemic's first wave and more than 80% of contracts in the whole data set through less transparent procedures where only one bid was submitted. In other words, SMEs won three out of four contracts awarded in less transparent procedures when not competing with any other bidders.

2.2 Methodological framework

This paper seeks answers to two research questions concerning transparency in emergency procurement response and its impact on competition in the pandemic's first wave. The examined contract-level data also contain categorical data such as the specific types of procurement procedures and date of contract award; therefore, the correspondence analysis approach is the first step. Correspondence analysis (Benzécri, 1973) is a multidimensional visual technique that allows the graphic display of rows and columns of a pivot table (Heijden & Leeuw, 1989). It offers similar results to factor analysis effects, and measures the possible relationship between categorical variables. Correspondence analysis results thus allow comparison of the transparency level in procurement in the whole observed period of the pandemic outbreak (March, April, May) and also assesses transparency across EU countries.

In the second phase of analysis, characteristics, structure, and patterns present in emergency procurement responses in the pandemic's first wave are examined using hierarchical cluster analysis. The Wards minimum variance method (Ward, 1963) creates compact, evenly sized clusters that could shed light on the overall procurement setting across

countries. The variables entered for cluster analysis for each country correspond to the average percentage of contracts awarded:

- Using transparent procurement procedures;
- Based on the lowest price criterion;
- Via collaborative joint procurement;
- Using the establishment of the framework agreement.

Afterwards, a simple descriptive statistic of obtained clusters provides a more detailed insight into individual procurement elements, such as average contract value and competition.

Finally, the effect of transparency on competition is estimated. Competition is measured by the number of offers submitted by economic operators for the individual contract. For estimation purposes, the variable denoting the number of offers is grouped into a few categories instead of treating it as a continuous variable. Given the nature of the dependent variable, which takes the form of a categorical variable, the effect of transparency on competition is estimated using a multinomial regression model, where a dependent variable consists of groups comprising the number of submitted bids. The multinomial logit model provides a convenient closed approach for the underlying choice probabilities without the need for multivariate integration (Hausman & McFadden, 1984). Several previous studies have used multinomial logit estimations on contract-level data, such as Stake (2017), Nemeč et al. (2021), and Nemeč and Džupka (2021).

First, we estimate the effect of transparency and other independent variables on competition. Only contracts awarded in the first pandemic wave (March, April, and May) are used for estimation purposes (3,710 observations). The model with the dependent variable *Number of Offers* being a group of one, two, three, four, and five or more offers has the following specification:

$$\begin{aligned} \text{Number of Offers}_i = & \beta_0 + \beta_1 \text{Transparency}_i + \\ & + \beta_2 \text{AwardCriterion}_i + \\ & + \beta_3 \text{JointProcurement}_i + \\ & + \beta_4 \text{FrameworkAgreement}_i + \varepsilon_i \end{aligned} \quad (1)$$

where: *Transparency_i* – the main explanatory variable which is binary and takes a value of 1 if the contract was awarded using a less transparent procurement procedure.

Additionally, several other binary control variables are used, including *AwardCriterion_i*, *JointProcurement_i*, and *FrameworkAgreement_i* (Tab. 1).

In addition to overall competition, the effect of transparency on SME bidding is further estimated. The multinomial logit regression approach allows estimating the effects of procurement variables on SME presence in procurement. The dependent variable in this estimation model is categorised into zero, one, and two or more bids from SMEs. The estimation includes the same independent variables as the previous estimation. For this estimation, as for the estimation before, contract-level data are used, and the model is defined as:

$$\begin{aligned} \text{Offers by SMEs}_i = & \beta_0 + \beta_1 \text{Transparency}_i + \\ & + \beta_2 \text{AwardCriterion}_i + \\ & + \beta_3 \text{JointProcurement}_i + \\ & + \beta_4 \text{FrameworkAgreement}_i + \varepsilon_i \end{aligned} \quad (2)$$

In the multinomial logit model, one outcome has to be set as default. Setting zero bids as the default outcome allows a simple comparison between no bids from SMEs and their presence in procurement by submitting one or more offers. Optimally, the whole subsample of contracts awarded during March, April, and May would be analysed; however, the analysed subset was reduced to 3,067 observations due to missing data on SME offers.

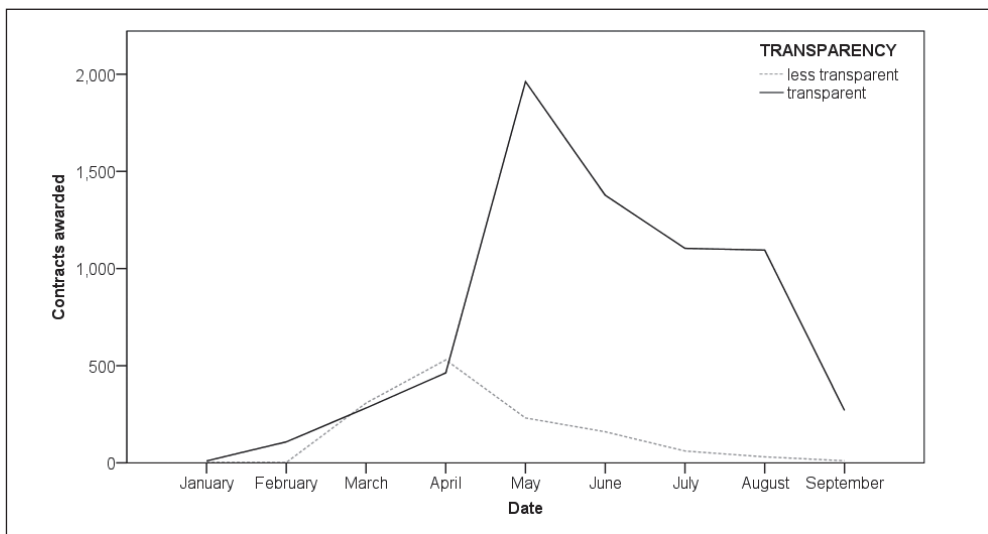
The multinomial logit model has often been discussed because of its drawbacks, as this model is based on assumptions of the independence of irrelevant alternatives (McFadden, 1974; Verbeek, 2008). However, in the case of overall competition and even SME bids, the independence of irrelevant alternatives is fulfilled, as the number of offers submitted in procurement does not change when another offer is submitted, since the economic operators compete for a contract without information about any currently submitted bids.

3. Results and discussion

3.1 Procurement in the pandemic's first wave

Fig. 1 displays the number of contracts awarded in procurement procedures by EU contracting authorities for the first three quarters of 2020. As assumed in first hypothesis, the contracts awarded through less transparent procedures grew steeply starting from February, following the first disease cases reported in the EU at the end of January. Contract awarded through less transparent procedures reached a peak in April, suggesting justification by contracting authorities for direct awards because of saving lives or delivering scarce medical supplies and PPE.

Fig. 1: Trends in contract awards by transparency



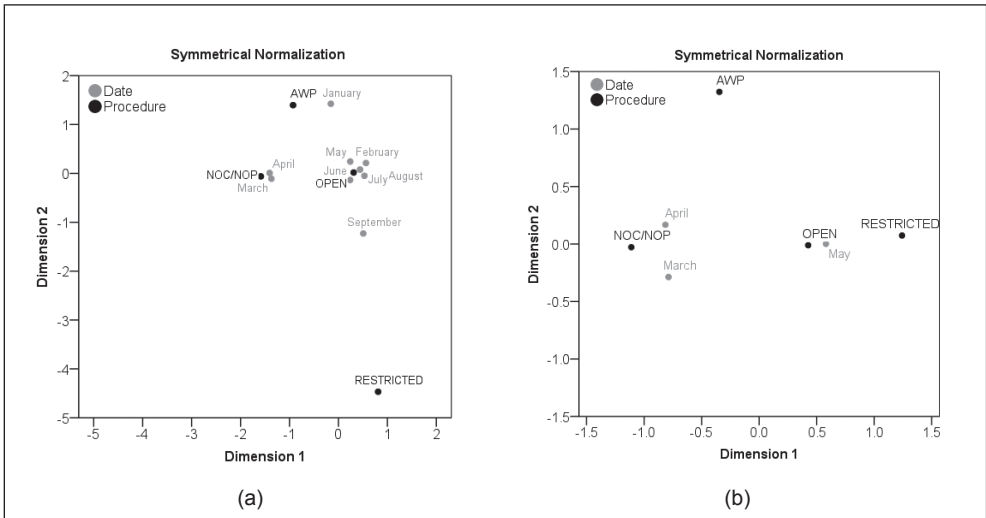
Source: own

Starting in April, the decline in contracts awarded through less transparent procedures suggests a gradual return to normal. However, relaxing from standard procurement procedures by focusing on fast, flexible, and less transparent procedures entails an increase in corruption risk. By analysing the Romanian procurement market in the pandemic's first wave, Fazekas et al. (2021) found that the increased incidence of corruption risk factors had not reversed even a full year after the state of emergency. For transparent procedures, it might be mentioned that distribution of public procurement has reverse U-curve character for the first three quarters of 2020. Drawing on such findings, we performed two correspondence analyses to compare the specific type of procurement procedures adopted during the pandemic outbreak period and the whole observed period. A prerequisite for correspondence analysis use is the existence of dependence between variables. Pearson's chi-square test of independence verified the relationship between the nominal variables (date of contract award and type of procurement). In both cases, we obtained a p -value < 0.01 and a chi-square value of 1998.15, and a p -value < 0.01 (for the whole period) and a chi-square value of 828.21, respectively (March,

April, and May 2020). Fig. 2a shows results for the whole observed period, while Fig. 2b describes the pandemic outbreak (AWP – contract award without prior publication; NOC/NOP – negotiated procedure without a prior call for competition; OPEN – open procedure; RESTRICTED – restricted procedure).

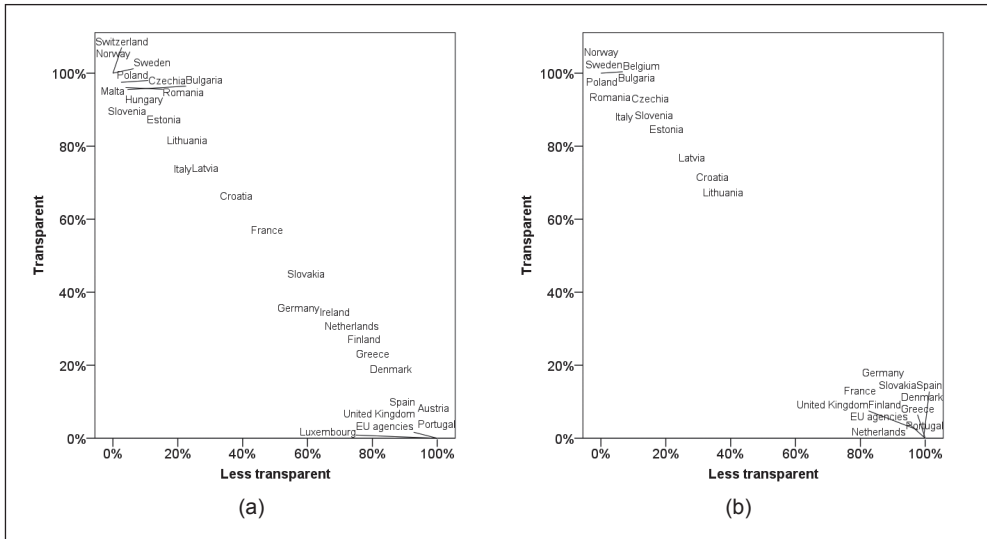
From Fig. 2a it is clear that awarding contracts by negotiated procedure without prior publication or call for competition was primarily used in March and April. From May to September, a change is indicated in the governments' procurement behaviour towards transparent ways of procuring medical equipment, hence using open procedure. A closer look at the pandemic outbreak (Fig. 2b) confirms the overuse of negotiated contracting justified by emergency only in March and April. Such findings are in line with previous findings by Decarolis et al. (2021), revealing the same approach by Italian contracting authorities in emergency procurement practices. However, by contrast a gradual departure from more straightforward, faster, and less transparent procedures after the initial pandemic shock does not suggest efforts by procuring entities to manipulate procuring entities to avoid open and transparent procedures, as found by Coviello et al. (2021).

Fig. 2: Correspondence analysis (Fig. 2a – for the whole period; Fig. 2b – for the acute outbreak)



Source: own

Fig. 3: Transparency in procurement (Fig. 3a – during the whole period; Fig. 3b – in March, April, and May)



Source: own

To test the second hypothesis, i.e., whether less transparent procedures prevailed in countries hardest hit by the pandemic, the following figures provide insight into the respective procedures' proportions for the entire period (Fig. 3a) and the first months of the pandemic (Fig. 3b).

Regardless of how severe the pandemic hit a respective country, some interesting shifts in transparency procurement can be observed. Comparing the proportion of contracts awarded through transparent procedures over the whole period with the first months of the pandemic indicates differences among the countries' approaches to emergency procurement response. While some countries, such as Hungary or France, show a relatively high proportion of transparent procedures during the whole period, deterioration in transparency in the pandemic's first months is significant. On the other hand, Italy and Belgium, which were among the countries most affected by COVID-19, show a lower proportion of contracts awarded through less transparent procurement procedures. This might seem contrary to the findings on the increase in direct awards and negotiated procedures in Italy (Decarolis et al., 2021) or even suggest that the countries most affected by the pandemic adopted less transparent procedures

(Cocciolo et al., 2021). One explanation for that may be that not all data on awarded contracts were reported in TED, as some contracts could have been awarded directly and remained hidden due to the situation on the market for medical goods and personal protective equipment. The above is most likely the reason why Ireland, Malta and Switzerland are not present in the results on the Fig. 3b. In addition to procurement by individual countries, supply of commodities such as ventilators or PPE was also carried out within the Joint Procurement Agreement for medical countermeasures (JPA) coordinated by EU agencies. The JPA provides a voluntary mechanism that allows participating EU countries and EU institutions to jointly purchase medical supplies such as vaccines, antivirals, and other treatments to prevent cross-border health threats (European Commission, 2020).

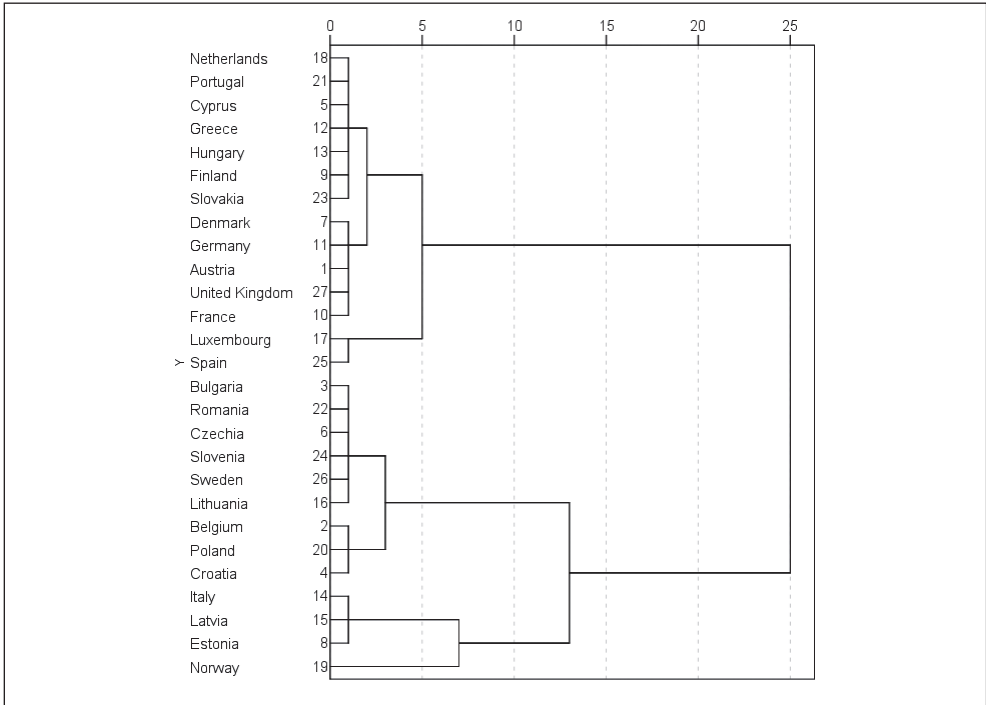
Moreover, the United Kingdom, which did not participate in the JPA, shows a high proportion of contracts awarded through less transparent procedures (the British government missed participating in the first four tenders announced under the JPA). For more information see: <https://ukandeu.ac.uk/eu-joint-procurement-uks-delayed-participation-undermines-the-nhs-and-risks-lives/>.

3.2 Uncovering emergency procurement patterns

With findings suggesting a rather different approach among EU countries to emergency procurement in terms of transparency, we now try to resolve third hypothesis to reveal the countries' overall procurement setting, considering

elements other than just the type of procurement procedure. In fact, accounting for the consequent effect of the chosen procurement procedure, contract award criteria on competition, and final contract prices helps shed light on the emergency procurement patterns in the pandemic's first months (Fig. 4).

Fig. 4: Cluster analysis



Source: own

Hierarchical clustering (Fig. 4) shows an emergence of two main clusters, comprising several sub-groups of countries with similar procurement settings in addressing the shortage of medical goods and PPE in spring 2020. In this part of analysis, acute outbreak of the COVID-19 pandemic is concerned, and thus March, April, and May 2020. The reason why countries such as Ireland, Malta and Switzerland are not present in this part of analysis is most likely caused by fact that not all data on awarded contracts were reported in TED, as some contracts could have been awarded directly and remained concealed

due to the situation on the market for medical supplies and personal protective equipment. The first cluster on the upper dendrogram branch includes a relatively large group of countries comprising the Netherlands, Portugal, Cyprus, Hungary, Finland, Greece, Slovakia, Denmark, Austria, Germany, the United Kingdom, France, Luxembourg, and Spain. On the other hand, we can distinguish two other sub-clusters emerging from the second cluster on the lower branch, starting with Bulgaria and ending with Croatia in the first sub-cluster, while Italy, Latvia, Estonia, and Norway form the second sub-group.

Tab. 3: Characteristics among sub-clusters

Variable	First sub-cluster	Second sub-cluster	Third sub-cluster
Transparent procedures (%)	4.0	90.0	87.0
Lowest price award criterion (%)	79.0	78.0	72.0
Framework agreement (%)	5.3	0.5	75.8
Joint procurement (%)	0.8	0.5	30.0
Average number of offers	4.0	3.0	10.0
Average SME bids	1.0	1.1	1.3
Average contract value (euro)	11,501,242	445,586	1,156,349

Source: own

Tab. 3 provides a more detailed look into the characteristics of the respective sub-clusters regarding the proportion of transparent procedures, use of other procurement tools to achieve value for money such as framework agreements, cooperative purchasing, or award criteria, and their effect on competition.

Besides the transparent procedures, the most notable differences drawn from the data on sub-cluster characteristics (Tab. 3) point to the relatively frequent use of framework agreements and the adoption of cooperative purchasing in countries such as Italy, Latvia, Estonia, and Norway, which comprise the third sub-cluster. Allowing public authorities to buy directly from pre-selected economic operators within a contracted framework seems to be how only a small group of countries managed pandemic procurement response, even though framework agreements are recognised as an effective emergency procurement tool (e.g., Albano & Nicholas, 2016). However, it should be noted that addressing the shortage of medical goods and PPE using contract bundling tools such as FAs might have been of utmost difficulty, especially in the early spring of 2020, when the analysed data suggest over 40 contract awards daily on average.

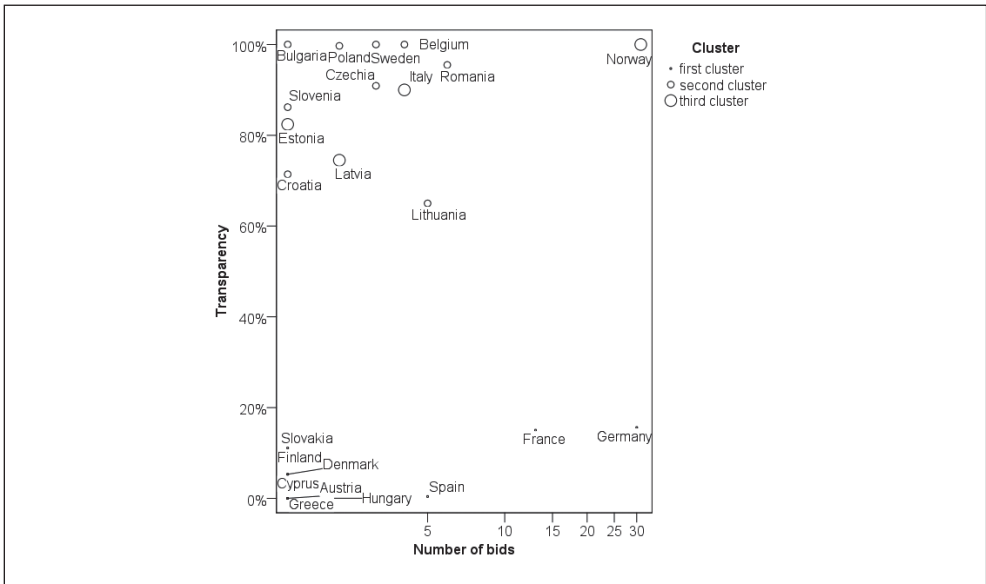
We observe no differences concerning contract award criteria among all three sub-clusters, where a wide spread of the lowest price was used to award three out of four contracts on average. Indeed, emergency response measures require fast and straightforward procurement procedures, thus sidelining other tools otherwise considered important in obtaining value for money, such as quality evaluation award criteria. This finding

suggests the widespread application of the lowest price criterion, previously reported in the case of Italy by Decarolis et al. (2021), thus became a common approach adopted by EU countries in awarding contracts in spring 2020.

Tab. 3 shows the overuse of less transparent procurement procedures in countries emerging as the first and biggest sub-cluster, amounting to 96% of contracts awarded in the first pandemic months. On the one hand, fast track and simple procedures justified by an emergency allow public authorities to deliver needed medical goods or PPE within much shorter time limits than procedures with a prior call for competition. On the other hand, direct awards or negotiated procedures can restrict competition because they give contracting authorities power to decide whom to invite or not invite to tender. However, Tab. 3 suggests almost no or little difference in competition, considering the average number of bids, between groups of countries with a larger percentage of transparent procurement procedures (second sub-cluster) and those with the overuse of less transparent procedures (first sub-cluster). To help understand the differences among sub-clusters, Fig. 5 displays the average number of offers recorded in each country while outlining the proportion of transparent procedures in their procurement in spring 2020.

The data above indicate that countries with a higher proportion of transparent procedures grouped within the second and third sub-clusters show more average offers than those with widespread less transparent procurement procedures. However, the position of countries in the left upper quadrant, i.e., Croatia,

Fig. 5: Competition in March, April, and May 2020



Source: own

Estonia, Slovenia, and Bulgaria, suggests that even some countries with a high proportion of transparent procurement procedures could not achieve greater competition, so there might also be other factors attracting more bidding by economic operators. Indeed, as previously noted the overall procurement setting, consisting of proper selection criteria, dividing contracts into smaller lots, award criteria, and even special contract clauses, can affect the number of bids (e.g., Gavurova & Kubak, 2021; Nemeč et al., 2020b; Nemeč et al., 2021).

Moreover, the institutional context should also be taken into account. Plaček et al. (2019), analysing the procurement in countries “underperforming” in terms of governance quality, suggest the importance of an institutional environment on procurement outcomes. Drawing from the position of Germany and France, countries with strong institutions and with at least some proportion of transparent procedures could maintain a high competition environment in their procurement. Institutional quality becomes even more important in cases where public authorities choose less transparent procedures over transparent ones, because

stronger institutions guarantee the exercising of discretionary powers related to such procedures according to the proportionality principle.

3.3 Estimating transparency effects on competition

The cluster analysis findings outlined in the previous section indicate that a higher proportion of transparent procedures is associated in some cases with a higher number of offers received in such procurement. To verify the fourth hypothesis about negative effect of less transparent procedures on competition, measured by the number of offers, Tab. 4 presents the estimated results of the multinomial logit model.

Estimates delivered no surprises concerning the effects of a less transparent procedure on competition, confirming the original assumptions as to its negative impact on the number of offers. Choosing procedures without a prior call for competition, hence contracting authorities approaching potential bidders directly, significantly reduces the odds of more offers being submitted. On the other hand, approaching potential bidders directly by contracting authorities does not necessarily mean that such

Tab. 4: Regression estimation results for the overall competition

Variable	Two offers	Three offers	Four offers	Five and more offers	Single offer (default)
Less transparent procedure	0.071*** (0.191)	0.042*** (0.276)	0.104*** (0.222)	0.314*** (0.120)	–
Framework agreement	2.578*** (0.289)	2.280** (2.280)	0.301 (0.508)	1.456 (0.316)	–
Joint procurement	1.682 (0.652)	1.718 (0.754)	2.407 (0.878)	18.381*** (0.498)	–
Lowest price award criterion	1.034 (0.106)	1.404*** (0.123)	1.122 (0.136)	1.298** (0.111)	–
Pseudo <i>R</i>	0.208				
– 2 Log Likelihood	607.519				
Observations	3,710				

Source: own

Note: Results are in the odds ratio; dependent variable as the group of 1, 2, 3, 4, 5 and more offers; standard errors in parentheses; *** $p < 0.01$; ** $p < 0.05$.

procedures lack a previous call for tenders. Contracting authorities still can advertise previous calls using methods other than sending notices to TED, such as advertising upcoming tenders on their websites or national gazettes. Therefore, in light of the above estimates, publicity of tenders remains an essential tool in enhancing competition in public procurement, thus confirming the findings of previous studies (e.g., Coviello & Mariniello, 2014; Nemeč et al., 2020a). Although greater competition generally leads to lower procurement costs, the question remains whether rigid bidding processes that limit buyers' discretion can reasonably deliver value for money considering the associated costs, i.e., ex-post contract renegotiations (Decarolis, 2014).

Adopting the demand aggregate and centralising purchasing techniques in framework agreements and even joint procurement indicates a positive effect on enhancing competition (although only in the group of five and more offers). A significant increase in the odds of two and three offers being submitted is logical, considering the nature of FAs as multi-supplier agreements and the overall low competition in medical goods and PPE during spring 2020. The positive effect of FAs on competition is indeed a positive sign, taking into account the perceived benefits of FAs, such as price savings from pooling (Karjalainen, 2011). Nonetheless, the analysed data provide only information related to establishing a FA, but no information

on second-round auctions that might lead to a contract award to one of the suppliers with whom a FA has been established. Such data could help examine emergency framework contracts in more detail, focusing on the efficiency and competition that otherwise, in times of crisis, becomes less important than in normal circumstances (Estache & Foucart, 2021).

In multinomial logit regression Pseudo *R*-squared is used to evaluate a goodness-of-fit of the model but cannot be seen as an equivalent to *R*-squared in OLS regression model. Therefore, interpretation of Pseudo *R*-squared statistic should be done with great caution, and it is not appropriate to reckon of Pseudo *R*-squared as a proportionate reduction in error in multinomial logit regression. However, value 0.208 indicates a good fit of our model. Another measure of the goodness of fit is the 2 Log Likelihood. Here again, there is no common rule for what the 2 Log Likelihood value should equal, as the number is sample size dependent. Generally applies that the higher the value of the 2 Log Likelihood, better is the fit of the model. As we compared 2 Log Likelihood values between multiple models we have estimated, the model presented above is the most suitable one.

Indeed, direct and negotiated contracts using procedures that lack previous publication on the EU level theoretically open the door to potential buyer collusion, corruption, or abuse.

Tab. 5: Regression estimation results for SME bidding

Variable	One offer by SMEs	Two and more offers by SMEs	No offer by SMEs (default)
Less transparent procedure	13.328*** (0.123)	0.507** (0.340)	–
Framework agreement	9.011*** (0.490)	32.380*** (0.488)	
Joint procurement	0.771 (0.820)	0.196 (1.060)	–
Lowest price award criterion	0.274*** (0.098)	0.282*** (0.136)	–
Pseudo <i>R</i>	0.330		
– 2 Log Likelihood	232.340		
Observations	3,067		

Source: own

Note: Dependent variable by a group of no offer (default outcome), one offer, and two and more offers by SMEs; standard errors in parentheses; *** $p < 0.01$; ** $p < 0.05$.

On the other hand, such simple and fast-track procedures that relax technically or financially demanding selection criteria could be a relief to SMEs in terms of reducing the administrative burden associated with traditional protracted procedures. In Tab. 5, we present estimated results examining the effect of such simple but less transparent procedures on SMEs' presence and their further bidding.

As noted above, a trade-off between fast-track procedures and transparency by publicity constraints on bidding opportunities unnecessarily restricts the procurement process' overall competitiveness, which may result in higher final prices. Although the simple and administratively demanding procedures can undoubtedly help remove perceived barriers to SMEs' access to public procurement, it should be noted that SMEs won over 70% of all contracts awarded in less transparent procedures without competition – meaning with a single bid submitted. Furthermore, considering the contracting authority's discretion as to whom to invite to submit an offer, the direct effects on SME bidding rather suggest procurers' tendencies in approach to bidders. Indeed, estimates for further bidding suggest that some barriers to the SMEs' participation in public tenders, related to lack of information about contract opportunities (e.g., Akenroye et al., 2020), might still persist.

A significant positive effect of framework agreements, traditionally considered a tool for achieving economies of scale, highlights their emergency response potential involving small and medium suppliers too. As in the case of overall competition, we cannot analyse the specific contracts awarded under the framework agreement due to data limitations. However, in this context, previous research by Nemeč & Džupka (2021) suggests the important role of framework agreements in increasing SMEs' chance of winning them.

Awarding contracts based on the lowest price rather than the best price-quality ratio lowers the odds of SMEs' presence in such contracts. Rewarding the additional quality of products enables competition in quality, where SMEs can shine due to their specialisation, and helps promote secondary procurement objectives (Schoenmaekers, 2015). On the other hand, comparing the effects of the lowest price award criteria on overall competition (Tab. 4) suggests the opposite effect. Indeed, emergency procurement relies on fast track procedures and timeliness, where the prolonged evaluation of submitted offers could jeopardise the main goals of protecting the lives and health of citizens. Pseudo *R*-squared as the measure of goodness-of-fit of the model is 0.330 and it indicates a good fit of our model. Comparison of the 2 Log Likelihood values between multiple

models we have estimated for this second regression indicates confirmed that model presented in the Tab. 5 is the most suitable one.

4. Discussion

The COVID-19 outbreak in the spring of 2020 called for emergency response procurement measures, temporarily deactivating the traditional transparent and competition promoting procurement tools provided by EU procurement law. This paper adds to the current research in evolutionary economics by evaluating the COVID-19 pandemic first wave impact on procurement markets for PPE and medical goods across the EU using an extensive dataset on contract-level. Paper response on two baseline questions: (i) What has been EU countries' transparency policy in procurement to address the shortage of medical goods and PPE?; and (ii) How did transparency in procurement procedures affect competition in EU public procurement markets during the first wave of the COVID-19 pandemic? To do so, we develop four hypotheses. As assumed in *H1: During the first pandemic wave (March, April, and May 2020), less transparent procurement procedures were more widely adopted*, the contracts awarded using less transparent procedures increased steeply from February, following the first disease incidences in the EU, and reached a peak in April 2022. Second hypothesis, *H2: Less transparent procurement procedures prevailed over standard procedures in the countries most affected by the pandemic*, has not been confirmed, because countries most affected by COVID-19 (Italy and Belgium), show a lower proportion of contracts awarded through less transparent procurement procedures. Third hypothesis *H3: Transparency and the overall setting of procurement response to the first pandemic wave vary across the EU countries*, was confirmed. The most substantial differences point to the relatively frequent use of framework agreements and the adoption of cooperative purchasing in countries such as Italy, Latvia, Estonia, and Norway. Countries with a higher proportion of transparent procedures show on average more offers than those with prevalent less transparent procurement procedures. Finally, fourth hypothesis *H4: The adoption of less transparent procedures negatively affected competition*, was confirmed and we empirically prove that use of procedures without a prior call for competition, resp. approaching potential

bidders directly, significantly reduces the odds of more offers being submitted, therefore competition. Overleaf, approaching potential bidders directly by contracting authorities does not automatically mean that such procedures lack a previous call for tenders. Our findings also suggests that the significant portion of contracts obtained by SMEs without competition, resp. by single bid procurement, are assigned by public authorities in favour of SMEs. Besides, overall emergency procurement setting and its effects on competition differ across countries no matter how intensely the pandemic hit, what indicate institutional context for the increased discretion effects on procurement outcome.

Emergency procurement's fundamental dilemma lies in the trade-off between transparency in information on tender opportunities and protecting lives and health, often favouring the fast provision of needed goods. This paper documented that the emergency procurement response measures adopted by EU countries in spring 2020 relied mainly on fast track and discretionary procedures without prior publication. Although the overall pandemic procurement setting varied across EU countries regardless of the pandemic's impact on them, sacrificing transparency in information naturally restricted overall competition. Moreover, direct and negotiated contracts in the spring months seem to favour SMEs, which theoretically could be a good sign, taking into account their representation in the EU economy and perceived benefits. On the other hand, a lack of public oversight in such emergency-induced discretionary procedures can lead to increased corruption risk (e.g., Fazekas et al., 2021), especially in direct contracts to ad hoc firms from tax havens that abuse informal connections to buyers.

The limitations of this research are linked to the nature of the analysed data and their source. While TED provides a valuable source of procurement data across EU countries and allows observation of procurement-related factors at the contract lot level, it has some flaws that must be considered when interpreting TED data. First, the quality and completeness of TED data depend on whether contracting authorities' personnel enter these data into tender notice forms further published in TED in a precise and timely manner. Missing and unpublished information on contracts due to protection of public interests, fair competition, or commercial interests may be another issue,

leaving this method's potential substantial proportion of contracts unobservable.

Conclusions

Despite limitations, several implications of both practical and theoretical importance can be drawn from the results provided by this research. Transparency of information seems to remain a cornerstone for inducing competition in procurement. On the one hand, in an emergency, discretionary procedures without a public call for tenders that slow down the whole procurement process are more valuable than ever. However, on the other hand, procurement practitioners should bear in mind that such procedures significantly reduce the competitiveness of the whole procurement process and increase its costs. The utilisation of framework agreements showed that it might be possible both to induce competition and to fulfil emergency purposes requirements, and this may even increase SMEs' access to public procurement.

From a theoretical point of view, the variance between countries' overall emergency procurement settings and related outcomes seems to have a broader context than just the choice of proper tools, such as type of procedure, award criteria, or utilisation of framework agreements. Bosio et al. (2022) argue that the effects of discretion depend on the institutional framework. Indeed, institutions matter, especially in times of crisis, when the linkage between emergency procurement and corruption is even stronger as long as institutions are weaker (Barone & Mocetti, 2014).

The outlined findings provide a basis for further research toward expanding the observed period that would cover at least the first year of the pandemic, which would capture lags concerning contract award reporting. Moreover, further research, building on the institutional framework, may help understand the multi-layered nexus of institutions and specific procurement related factors in setting emergency procurement outcomes. Understanding such mechanisms may bring a shift in adopting specific emergency procurement policies aimed at the timely provision of goods, services, and work while obtaining the best possible value for money in such challenging circumstances.

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