

# Innovations

## An Analysis of Factors Affecting Public Tender Competition in Latvia from 2020 to 2023

**Mr. Georgs Vardanians (MBA)**

Chief Executive Officer, Sorsera

**Mr. Rudolfs Kreicbergs (MSc)**

Chief Technology Officer, Sorsera

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### **Abstract:**

**Background:** Public procurement in Latvia plays a significant role in the economy, with competition in public tenders being essential for ensuring transparency and efficiency. Recent data suggests challenges in attracting sufficient bidders, particularly in relation to tender value, buyer size, industry characteristics, and regulatory frameworks.

**Objective:** The aim of this study is to analyze the key factors influencing public tender competition in Latvia between 2020 and 2023, measured by the number of bids received per tender. **Methods:** A dataset of 137,000 public tenders was analyzed using multiple linear regression to explore how tender, industry and buyer factors influence competition. **Results:** The analysis shows that higher tender values lead to fewer bids due to increased complexity and stringent requirements, while larger buyers and industries attract more bidders. Legal frameworks with stricter regulations and less transparent procurement procedures are associated with reduced competition.

**Conclusions:** The findings suggest that simplifying tender requirements and improving transparency could increase competition. Policymakers should consider reforms that make public procurement more accessible, particularly for small and medium-sized enterprises (SMEs), to promote a more competitive bidding environment.

**Keywords:** Public procurement, Latvia, Competition, Tendering, Economics

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## **1. Introduction**

### **1.1 Background Information**

Public procurement represents a large part of the EU's GDP, with tenders worth 14% of GDP being issued each year. Given its importance, public procurement in the European Union, incl. Latvia has been affected by a number of EU-wide regulatory

changes. The 2014 EU public procurement reforms aimed to simplify procedures and boost competition.

Recent studies, including reports from the European Court of Auditors, shed light on the challenges that the public procurement system faces. The SME Needs Analysis in Public Procurement reveals specific barriers that small and medium-sized enterprises (SMEs) face when trying to access public procurement opportunities, such as high administrative burdens, complex documentation and cross-border barriers (Celotti et al., 2021).

### **1.2 Problem statement**

Despite the EU's efforts to create a fair, competitive procurement environment, we continue to see a decline in tender competition. Polls show widespread public distrust regarding the fairness of procurement processes, with the public opinion that tenders are swayed by private interests, leading to inflated prices and subpar quality.

As outlined in the Open Government Partnership's action plan, Latvia is focusing on structured publication of procurement data (which are also used by the authors of this article), digital tools for assessing risks, and engaging the public in monitoring procurement practices. This study digs deeper into the complex factors shaping the revealed competition levels in public tenders as measured by the number of bids received per tender.

### **1.3 Research objectives**

This paper attempts to provide an analysis of the factors influencing bidder participation in public tenders across various industries in Latvia. We leverage a robust dataset of 137,000 tenders, spanning years 2020 to 2023, to identify key determinants such as tender value, buyer size, industry traits, and legal frameworks that could boost competition.

We aim to contribute insights to the growing literature on tender dynamics in the EU, in the hopes to better inform policymakers and procurement authorities on creating a more inclusive procurement environment.

## **2. Literature Review**

### **2.1 Theoretical framework**

Public procurement plays a large role in the EU's economic landscape. It affects all parts of the economy - market efficiency, innovation, and allocation of public resources, which are often scarce. Various economic theories—like market structure theory, auction theory, and transaction cost economics—help us understand the competition in tender processes. At the center of optimal outcomes are well-

designed, competitive bidding environments. More bidders typically lead to better pricing and higher quality services, which benefits taxpayers and public authorities. Research by Hanák and Muchová (2015) shows that a greater number of bidders (positive competition) leads to better procurement outcomes, such as lower prices and improved service quality. Their work emphasizes that a well-structured tendering process encourages qualified bidders to participate in published tenders. The European Court of Auditors (2023) also discussed a troubling trend -a rise in tenders with a single bid and direct awards that directly inhibits tender competition.

## **2.2 Previous research**

Despite the EU's legislative efforts, such as the 2014 procurement directives meant to simplify processes, challenges, such as increased complexity and lack of transparency, continue to deter tender bidders (European Court of Auditors, 2023). The auditors note that the goal of simplifying procurement procedures has not successfully addressed the administrative burdens faced by tender bidders, incl. Small and medium companies with lacking resources to overcome such barriers.

Procurement data quality also plays a substantial part. As outlined by the University of Oxford's Centre for Competition Law and Policy, data quality is a strong proxy for transparency. Meanwhile, poorly labeled and non-standardized tender data is expected to create confusion for bidders, hindering effective competition (Tátrai et al., 2024). The analysis shows that critical aspects of contract notices (duration, award criteria, lot division) can significantly affect competitive participation. For example, longer contract durations and criteria allowing negotiations tend to attract more bidders, as they have more time to prepare bids or adjust to buyer requirements.

The literature also emphasizes the role of SMEs in public procurement. These smaller enterprises often face unique challenges that, due to complex documentation and administrative burdens, act as barriers to successful tender participation.

Furthermore, studies show that data accessibility can complicate the bidding environment for all, especially those with fewer resources (Celotti et al., 2021). The findings from Tátrai et al. (2024) support this, indicating that competition requires not just clearer data, but also key, structural changes to the procurement process (incl. breaking tenders into lots).

Likewise, the Common Procurement Vocabulary (CPV) plays a critical role for the transparency and competition in public procurement across the EU. However, recent reports have shown that the CPV's current structure and application present barriers to competition. Kuljanin and Klipstein (2017) point out that inaccuracies in CPV code usage affect up to 16.5% of tenders published in Tenders Electronic Daily (TED). These inaccuracies often result in potential bidders missing relevant tenders,

which can reduce competition by limiting the number of bids submitted for a particular contract. This misalignment in CPV classification can especially impact smaller bidders (or those new to public procurement), who may find it more challenging to navigate complex coding structures, thus further hindering their participation in tenders (Kuljanin & Klipstein, 2017).

Moreover, the CPV's hierarchical structure has been criticized for being overly rigid, making it difficult to adapt to new procurement needs or technological advancements. Kuljanin and Klipstein (2017) propose extensive adjustments to the CPV, including better integration with other international classification systems to make the vocabulary more flexible and relevant to both contracting authorities and economic operators. They also recommend developing more advanced search tools to help users find the most accurate CPV codes for their needs, thereby reducing administrative burdens and increasing transparency in tender processes. These adjustments could, in turn, result in greater participation in public tenders by ensuring potential bidders can more easily identify relevant opportunities.

Similarly, cross-border procurement has been a key area of interest in understanding the dynamics of public procurement competition within the EU. According to a study by Prometeia et al. (2021), around 77% of public procurement contracts within the EU27 between 2016 and 2019 were awarded domestically, with only a fraction going to foreign bidders. This highlights a persistent challenge in enhancing competition and accessibility for cross-border participants. The study identifies that contract value plays a significant role in cross-border procurement activity, as larger contracts tend to attract more direct foreign bidders. However, smaller contracts are typically awarded domestically, reducing the potential for broader competition (Prometeia et al., 2021). The authors suggest that simplifying procedures and reducing barriers for foreign companies could help increase cross-border tender participation, potentially leading to higher competition and better procurement outcomes.

The study also emphasizes the importance of indirect cross-border procurement, where firms win contracts through subsidiaries or affiliates in the awarding country. Prometeia et al. (2021) found that indirect cross-border procurement accounts for around 20% of public procurement in the EU27. This method is especially prevalent for high-value contracts and select sectors (e.g. healthcare and medical equipment), where foreign firms often establish local subsidiaries to overcome regulatory or language barriers.

### **2.3 Literature gap**

Despite abundant documentation on legislative and procedural aspects of public procurement, empirical studies that focus on the direct impact of tender participation rates—especially in Latvia—are lacking. Studies show problems with

data standardization and transparency, and few systematically analyze the resulting negative effect on tender participation. The complexity of procurement documentation, paired with non-standardized and mislabeled data, creates challenges for comprehensive analysis, leading to gaps in understanding how these factors affect competition (Tátrai et al., 2024).

Previous research shows that SMEs face considerable obstacles, including excessive administrative burdens and unclear procurement processes, which deter them from participating in public tenders (Celotti et al., 2021), but literature has scarcely used new open data on tenders to evaluate tender competition.

Our research aims to bridge these gaps, using a novel dataset, which also includes data on tender bids. Open tender data typically includes information on tender conditions and the award notice, however, new data on bids can be used as proxy to competition.

Despite the valuable insights provided by Kuljanin and Klipstein (2017) on the challenges associated with the Common Procurement Vocabulary (CPV), their analysis lacks empirical data on the real-world consequences of CPV inaccuracies on bidder behavior. While the authors suggest that misclassification limits competition by preventing potential bidders from identifying relevant tenders, they do not provide concrete data on the extent to which these inaccuracies reduce the number of bids or influence tender outcomes. Moreover, the study does not explore how improvements in CPV systems might impact competition levels across different industries and regions. This leaves a gap in understanding how systematic CPV revisions might practically enhance procurement competition, particularly in smaller markets like Latvia.

Similarly, while the study by Prometeia et al. (2021) offers an in-depth examination of cross-border procurement within the EU, it does not sufficiently explore the factors that might incentivize more direct participation by foreign firms in smaller-value contracts. The study focuses predominantly on high-value contracts, where indirect cross-border procurement dominates. It leaves unanswered questions about how to make smaller contracts more attractive to foreign bidders, particularly in countries with smaller economies or more stringent procurement regulations, like Latvia. Additionally, while the study highlights barriers such as language and procedural complexity, it does not delve into specific reforms that could lower these barriers for small and medium-sized enterprises (SMEs) from other EU countries looking to enter foreign markets through public procurement.

This work contributes to the academic conversation about public procurement and can provide insights for policymakers and procurement authorities striving to create a more transparent and efficient public procurement environment.

### 3. Methodology

#### 3.1 Description of the Dataset

Our dataset uses public tender data, as well as company participation data. We sourced this data from the open data portal of the Republic of Latvia and national electronic procurement system.

Data cleaning and processing was performed, using the data processing engine of Sorsera (app.sorsera.com). This resulted in combined yearly data on 137,000 tenders or tender parts across various industries. This dataset was rich in detail, allowing us to analyze multiple dimensions of interest, incl. tender, industry and organization data. Processing included handling data quality issues, such as different names used for organizations and data input errors (e.g. for registration numbers).

We also categorized tenders into industries based on the Common Procurement Vocabulary (CPV) codes. Given the limitations of the CPV system, incl. the fact that over 9,000 CPV codes are listed, we utilized a large language model (GPT-4 by OpenAI) to classify these codes into 52 industries and 12 industry groups, which made it possible to analyze industry effects on competition.

The resulting dataset showed a mean tender value of €155,346 and a median tender value of €20,000. Overall, the tenders range from several hundred euros to tens of millions of Euros, with substantial heterogeneity in the value, industry and other factors.

#### 3.2 Statistical methods

We applied multiple linear regression analysis using R statistical software. This method allowed us to explore the relationships between the different variables of interest.

In our model, the dependent variable is the logarithm of the number of bids received for each tender, denoted `log_Bid_count`. This transformation was required to address right-skewness, due to some tenders having dozens of bids, but with the majority of tenders having 1-4 bids.

The following independent variables were included in our model:

- **log\_Tender\_value:** A logarithmic transformation of tender value accounts for the wide variance in tender amounts. It helps us understand how the scale of a tender impacts bidder participation.
- **Buyer\_size:** A logarithmic measure of the buyer's size, derived as the sum of logs from the total count and value of tenders they've issued. The hypothesis is that it can influence tender attractiveness to potential bidders.
- **Industry\_size:** A normalized measure that captures the size of the industry in Latvia, related to the tender.

- **Industry\_group:** A categorical variable with 12 overarching industry groups (based on CPV codes)
- **Tender\_category:** This categorizes tenders into supply, service, or works.
- **Procedure:** This reflects the procurement procedure used by the buyer for the tender, and includes open, closed and negotiated procedures.
- **Award\_criteria:** This variable captures the method for selecting the winning bid - price vs economic advantage.
- **Law:** This variable represents the legal framework under which the tender is issued, imposing varying levels of regulatory burden on bidders. Alongside the General law (public procurement law of Latvia), Security and Utility sectors have specific laws.

To address potential concerns regarding the selection of independent variables in the regression model, each variable was chosen based on its theoretical relevance and empirical evidence linking it to public procurement competition. The variables `log_Tender_value`, `Buyer_size`, and `Industry_size` were selected to capture key aspects of the procurement process, such as the financial scope, the capacity of the buyer, and the overall competitiveness of the industry. Additionally, previous research suggests that higher tender values tend to discourage participation due to increased requirements, while larger buyers and industries attract more bidders due to perceived stability and market size (Hanák & Muchová, 2015; Celotti et al., 2021). Variables such as bidder-specific characteristics (e.g., nationality, previous bidding success) were not included due to data limitations but may be explored in future studies.

#### 4. Results & Discussion

##### 4.1 Presentation of regression analysis results

We created a correlation matrix to explore the relationships among continuous variables in our dataset. We found low correlations among `log_Tender_value`, `Buyer_size`, and `Industry_size`. This indicates these variables are not highly collinear.

Table 1: Correlation Matrix

Variable	<code>log_Tender_value</code>	<code>Buyer_size</code>	<code>Industry_size</code>
<code>log_Tender_value</code>	1	0.2177756	-0.1364072
<code>Buyer_size</code>	0.2177756	1	0.05743078
<code>Industry_size</code>	-0.136407	0.0574308	1



Multicollinearity analysis (VIF) was performed, resulting in acceptable values for all variables.

Afterwards, we conducted multiple linear regression analysis. The model assessed the relationship between the logarithm of the number of bids received (log\_Bid\_count) and various independent variables, including log\_Tender\_value, Buyer\_size, Industry\_size, legal frameworks, procurement procedures, award criteria, industry group, and tender category. The analysis revealed significant relationships among these variables, see Table 2A and 2B.

Table 2A: Regression Results

Variable	Estimate	Std. Error	t value	Pr(>  t )
(Intercept)	0.0790	0.2294	0.3443	0.7306
log_Tender_value	-0.0096	0.0013	-7.3773	<0.001 ***
Buyer_size	0.0058	0.0012	5.0026	<0.001 ***
Industry_size	0.8491	0.0702	12.0986	<0.001 ***
LawGeneral	-0.2635	0.1094	-2.4085	<0.05 *
LawSecurity	-0.4708	0.1369	-3.4398	<0.001 ***
LawUtility	0.0488	0.1086	0.4490	0.6535
ProcedureNegotiated procedure	-0.3077	0.0506	-6.0757	<0.001 ***
ProcedureOpen tender	0.0365	0.0461	0.7909	0.4290
ProcedureOther	-0.4908	0.0494	-9.9265	<0.001 ***
ProcedureSmall purchase	-0.2075	0.0463	-4.4804	<0.001 ***
ProcedureStandardized	-0.1016	0.0483	-2.1057	<0.05 *
Award_criteriaLowest price	-0.2938	0.1276	-2.3024	<0.05 *
Award_criteriaMost economic	-0.3736	0.1277	-2.9262	<0.01 **
Industry_groupBusiness Services	0.1238	0.0222	5.5705	<0.001 ***
Industry_groupConstruction& Engineering	0.1294	0.0157	8.2540	<0.001 ***
Industry_groupDigital& Software Services	0.0170	0.0208	0.8161	0.4145
Industry_groupEducation, Research, & Training	0.0513	0.0225	2.2794	<0.05 *
Industry_groupEnergy& Utilities	0.0585	0.0220	2.6546	<0.01 **
Industry_groupHealthcare& Life Sciences	-0.0226	0.0099	-2.2953	<0.05 *
Industry_groupManufacturing& Industrial	0.0817	0.0307	2.6638	<0.01 **
Industry_groupOther	0.1708	0.0158	10.7836	<0.001 ***
Industry_groupReal Estate & Construction Materials	0.0846	0.0225	3.7510	<0.001 ***
Industry_groupRetail& Wholesale Trade	0.1227	0.0322	3.8103	<0.001 ***
Industry_groupTransportation& Logistics	-0.0533	0.0191	-2.7873	<0.01 **
Tender_categoryBūvdarbi	0.7104	0.1395	5.0928	<0.001 ***
Tender_categoryPakalpojums	0.6534	0.1388	4.7062	<0.001 ***
Tender_categoryPiegāde	0.6960	0.1388	5.0129	<0.001 ***

Table 2B: Model summary



<b>Residual standard error</b>	<b>Multiple R-squared</b>	<b>Adjusted R-squared</b>	<b>F-statistic</b>	<b>p-value</b>
0.584 on 47004 degrees of freedom	0.077894	0.077365	147.1 on 47004 and NA DF	< 2.2e-16

### 4.2 Discussion of findings

The regression analysis outlines several key factors that affect the number of bids received (and tender competition) for public tenders in Latvia.

- **Tender Value (log\_Tender\_value):** As tender value increases, the number of bids tends to decrease slightly. Possible explanations are that higher-value tenders can have higher bidder requirements, incl. Technical and financial.
- **Buyer Size:** Larger buyers attract more bids, possibly due to their outreach, visibility and willingness of suppliers to engage in long-term relationships with these buyers..
- **Industry Size:** We found that tenders in larger industries tend to receive more bids. We presume that larger industries have more firms capable of fulfilling tender requirements.
- **Legal Framework:** Certain legal frameworks negatively affect bid counts. For example, tenders governed by specific laws, like the security law, see fewer bids, possibly due to stricter regulations (or lower transparency)
- **Procurement Procedure:** Negotiated procedures, small purchases, and other less transparent processes tend to limit competition.
- **Award Criteria:** Tenders with most economic award criteria seem to have lower competition than tenders with lowest price criteria.
- **Industry Dynamics:** Certain sectors, especially Construction & Engineering and Business Services, see higher bid counts, while industries like Healthcare & Life Sciences experience fewer bids. We assume this is related to level of specialty required from companies to operate in said industries.

Overall, results show the importance of tender, industry and buyer factors in the resulting tender competition..

### 4.3 Interpretation of results

Our analysis reveals some compelling insights into the factors influencing competition in public tenders in Latvia. A notable finding is that higher tender values

tend to correlate with fewer bids. As a possibility, this suggests that as “the stakes rise”, potential bidders perceive larger risks and challenges associated with a tender. Larger contracts (and tender terms) often come with stricter technical and financial requirements, which can deter smaller firms lacking the necessary resources. However, suppliers are generally more inclined to engage with established buyers, e.g. in the wishes to establish fruitful & long-term relationships. Industry size also plays a substantial role. Our findings suggest that tenders in larger industries see more bids (likely due to the greater number of qualified firms available to fulfill requirements). A larger pool of potential bidders can drive competition.

Finally, legal frameworks and procurement procedures impact bid counts. Tenders governed by specific laws, such as those pertaining to security, often experience lower participation levels. It can be seen that stricter regulations inhibit competition by also creating barriers for potential bidders. Less transparent procedures, such as negotiated tenders, tend to limit engagement.. Overall, these insights provide a clearer understanding of how various factors, from tender values to buyer dynamics, affect the competitive landscape of public procurement in Latvia.

#### **4.4 Study limitations**

While this study leverages a robust dataset of 137,000 tenders, there are potential limitations and biases that should be acknowledged. Firstly, the data sourced from public tender portals may contain gaps, such as missing bids or incomplete information about tender outcomes. Tenders that did not receive any bids or were withdrawn may not be fully represented in the data, potentially leading to selection bias in the analysis.

Also, the focus on Latvian tenders might limit the generalizability of findings to other EU countries, particularly in regions with different procurement regulations or market dynamics. These limitations highlight the need for future research to explore more comprehensive datasets, including information on rejected bids or bidder characteristics, which could provide a more detailed understanding of tender competition.

### **5. Conclusions**

#### **5.1 Summary of findings**

In this study, we explored various factors influencing public tender competition in Latvia between 2020 and 2023, with a dataset of 137,000 tenders and tender parts providing valuable insights. Our results show that several factors, such as tender value, buyer size, industry size, legal frameworks, and procurement procedures, significantly impact competition as measured by the number of bids per tender. Higher tender values were generally associated with fewer bids, a phenomenon that

can be attributed to the complexity and resources required for larger contracts. Stricter technical and financial requirements in high-value tenders may discourage smaller firms from participating, highlighting the challenge of balancing accessibility with the demands of large-scale procurement.

Our findings suggest that industries with more firms capable of fulfilling tender requirements are likely to experience more competitive bidding processes.

In addition, legal frameworks and procurement procedures have a notable effect on competition. Tenders governed by more restrictive legal frameworks, such as those pertaining to the security sector, tend to receive fewer bids. This result suggests that regulatory barriers can limit competition by creating entry obstacles for potential bidders. Less transparent procedures, such as negotiated tenders, also tend to reduce bidder participation, likely due to the perception of a less open or fair process.

## **5.2 Practical implications**

The findings of this study provide valuable insights for policymakers and procurement authorities aiming to enhance competition in public tenders. Simplifying tender requirements, particularly for larger contracts, could help increase participation. Streamlined documentation and less burdensome technical specifications might encourage smaller firms to bid, especially in high-value tenders where they might otherwise be deterred by stringent requirements. Additionally, targeted measures to reduce administrative burdens, especially for small and medium-sized enterprises (SMEs), could further promote competition by enabling a wider range of firms to engage in the public procurement process.

Large buyers, with their inherent advantages of scale and reputation, play a significant role in fostering competition. As such, strategies like joint procurement by several institutions or the centralization of procurement activities could help replicate the competitive advantages enjoyed by larger buyers. By pooling resources and offering larger, more attractive contracts, smaller buyers can potentially attract more bidders and foster greater competition.

Procurement processes that rely on negotiated procedures or other non-transparent methods tend to limit competition, as evidenced by our findings. Policymakers should prioritize open tendering procedures, which encourage participation and enhance fairness in the procurement process, unless specific circumstances call for limiting competition, e.g. for security reasons.

Improvements to the Common Procurement Vocabulary (CPV), as suggested by Kuljanin and Klipstein (2017), are also crucial for ensuring that tenders are correctly classified and easily accessible to potential bidders. Addressing CPV inaccuracies and simplifying classification systems would likely enhance competition by ensuring that potential bidders can accurately identify relevant opportunities.

### 5.3 Suggestions for future research

Future research could build on these findings by incorporating additional variables, such as economic conditions, bidder characteristics, and the impact of specific policy reforms, to further enhance our understanding of tender dynamics. For instance, exploring the effects of local and global economic fluctuations on tender participation could provide deeper insights into how economic cycles influence public procurement markets. Moreover, analyzing bidder characteristics, such as past performance, company size, and financial health, could help identify patterns in bidder behavior and their impact on competition.

Comparative studies with other EU countries could also shed light on best practices that Latvia might adopt to improve its public procurement landscape. The study by Prometeia et al. (2021) suggests that cross-border procurement remains limited in the EU, and further research could explore the factors that encourage or inhibit foreign bidders' participation in smaller markets like Latvia. Understanding how other countries handle cross-border procurement and mitigate challenges related to language, regulation, and administrative complexity could offer actionable insights for policymakers looking to enhance competition.

Finally, longitudinal analyses examining trends over time would provide valuable information about the effects of policy changes on tender participation. Such studies could track the long-term impact of reforms aimed at reducing barriers for SMEs or increasing transparency in procurement procedures

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