



Competition and Litigation in Swedish Public Procurement

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på uppdrag av Konkurrensverket

UPPDRAGSFORSKNINGSRAPPORT 2020:1

Konkurrensverket uppdragsforskningsrapport 2020:1
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ISSN-nr 1652-8069
Foto: Mostphotos

Förord

I Konkurrensverkets uppdrag ingår att främja forskning på konkurrens- och upphandlingsområdet. Konkurrensverket har därför gett docent Janne Tukiainen samt docent Kirsi-Maria Halonen i uppdrag att, inom ramen för Konkurrensverkets uppdragsforskning, undersöka varför antalet anbud minskat inom offentlig upphandling. Författarna har även undersökt överprövningar av genomförda upphandlingar.

Det genomsnittliga antalet anbud per upphandling har sjunkit i stort sett varje år sedan 2012, även om antalet ökade något det senaste året. Om bara ett eller ett fåtal företag lämnar anbud i upphandlingar kan konkurrensen utebli, vilket kan bidra till ökade kostnader och sämre kvalitet i upphandlingen. Rapporten ger därför välkommen kunskap om vilka faktorer som kan leda till färre anbud och hur upphandlande myndigheter kan arbeta för att få fler att lämna anbud. Enligt studien anser många små företag att det är alltför betungande att medverka i offentliga upphandlingar. Det är angeläget att öka incitamenten för att få fler presumtiva leverantörer. Författarna framhåller att upphandlande myndigheter kan skapa bättre förutsättningar för att få fler att medverka genom att till exempel ändra sina upphandlingsprocesser och sättet att kommunicera på och därigenom skapa mer leverantörsanpassade processer. Dessutom pekar denna studie på att upphandlande myndigheter i större utsträckning borde kommunicera resultaten från upphandlingen med övriga anbudsgivare då detta verkar leda till färre överprövningar.

Till projektet har det knutits en referensgrupp bestående av Malin Arve (Norwegian School of Economics), Mats Bergman (Södertörns högskola), Andreas Doherty (Upphandlingsmyndigheten), Jan Jääskeläinen (Aalto University) samt Sofia Lundberg (Umeå universitet). Från Konkurrensverket har Nina Radojkovic, Stefan Jönsson, Karin Morild samt Joakim Wallenklint deltagit.

Författarna ansvarar själva för alla bedömningar och slutsatser i rapporten.

Stockholm, februari 2020

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Sammanfattning

I Sverige sker en stor del av de offentliga inköpen genom offentlig upphandling. Offentlig upphandling är en lagreglerad inköpsprocess som ska säkerställa att offentliga inköp öppnas upp för konkurrens och att offentliga medel används så effektivt som möjligt. Värdet av den offentliga upphandlingen i Sverige motsvarar 17,5 procent av BNP och är en marknad som är värd cirka 700 miljarder kronor.

De uppföljningar som görs av de offentliga inköpen både inom EU och i Sverige pekar dock på att offentlig upphandling inte fungerar som den borde på grund av bristande konkurrens. Det man ser är att det genomsnittliga antalet anbud per upphandling har sjunkit i stort sett varje år sedan 2012, även om antalet ökade något det senaste året. I mer än hälften av alla upphandlingar i Sverige läggs tre eller färre anbud. I var sjunde upphandling läggs bara ett enda bud. Sverige har dessutom en hög andel överprövningar av genomförda upphandlingar. År 2018 annonserades 18 522 upphandlingar, varav 1 135 överprövades.

Syftet med denna studie har varit att bedöma graden av konkurrens i de offentliga upphandlingarna och framför allt undersöka varför antalet anbud minskat inom offentlig upphandling. Denna studie har även undersökt överprövningar av genomförda upphandlingar. I båda fallen har ambitionen varit att försöka förstå de bakomliggande orsakerna till dessa och lämna förslag som ökar antalet anbudsgivare i de offentliga upphandlingarna samt bidrar till minskade överprövningar för upphandlande myndigheter.

Resultaten från denna studie visar att konkurrensen är låg i upphandlingar inom alla regioner, i de flesta branscher och för alla typer av upphandlande myndigheter i Sverige. Dessa resultat överensstämmer med den bild man har på EU-nivå och i studier som tidigare genomförts i Sverige om att offentliga upphandlingar lider brist på konkurrens. Detta är speciellt oroande då själva syftet med en konkurrensutsatt offentlig marknad är att kunna köpa högkvalitativa varor och tjänster till rimliga priser. När företag i allt mindre grad deltar i offentliga upphandlingar finns det således en risk för ökade kostnader och sämre kvalitet i de varor och tjänster som köps. Dessutom är antalet överprövningar hög i Sverige vilket leder till projektförseningar och ökade kostnader för upphandlande myndigheter. Dessa effekter skapar incitament att minska risken för överprövning vilket potentiellt kan leda till ineffektiva upphandlingsprocesser. Bland annat kan det vara så att upphandlande myndigheter medvetet begränsar antalet anbudsgivare i syfte att minska risken för överprövningar. Vilket i sig motverkar syftet med att konkurrensutsätta de offentliga inköpen.

Även om båda dessa fenomen utgör en utmaning för en effektivare offentlig upphandling finns det möjliga åtgärder som kan vidtas för att förbättra läget. Bland annat pekar studien på att det finns ett positivt samband mellan antalet anbudsgivare och till vilken omfattning en upphandling har annonserats. Baserat på detta

resultat bör ett större fokus på att marknadsföra enskilda upphandlingar till en bredare publik bidra till att fler leverantörer lämnar anbud. Dessutom pekar denna studie på att upphandlande myndigheter i större utsträckning borde kommunicera resultaten från upphandlingen med övriga anbudsgivare då detta verkar leda till minskade överprövningar.

Många små företag anser att det är alltför betungande att medverka i offentliga upphandlingar. Det är därför angeläget att öka incitamenten för att få fler presumtiva leverantörer. Här kan upphandlande myndigheter skapa bättre förutsättningar för att få fler att medverka genom att till exempel ändra sina upphandlingsprocesser och sättet att kommunicera på och därigenom skapa mer leverantörsanpassade processer. Resultaten visar även att optimala upphandlingsprocesser kan hjälpa, men att hur de ser ut varierar mellan olika branscher. I synnerhet verkar leverantörer undvika att lämna anbud i upphandlingar som inte är typiska för branschen. Våra kvalitativa intervjuer stödjer slutsatsen att det kan ses som avskräckande för anbudsgivare om en upphandling avviker från hur upphandlingar brukar gå till inom branschen och hur krav och kriterier vanligtvis ser ut.

Enligt denna studie är utvärderingskriteriet "bästa förhållandet mellan pris och kvalitet" i en upphandling förknippat med ett lägre antal anbudsgivare inom byggsektorn. Men i fråga om konsult- och övriga företagstjänster leder i stället utvärderingskriteriet till fler anbudsgivare. Intressant nog var utvärderingskriteriet "bästa förhållande mellan pris och kvalitet" vanligast i upphandlingar av konsult- och övriga företagstjänster och minst vanligt i upphandlingar inom byggsektorn. Den viktigaste lärdomen från detta är att branschanpassade upphandlingar kan öka antalet anbudsgivare. Därför är marknadskunskap, förståelse för de specifika egenskaperna hos dessa och en tidig kommunikation med marknadens aktörer viktiga för att få till stånd en ökad konkurrens.

Resultaten visar även att målet med en ökad konkurrens kan motarbetas av målet av minskat antal överprövningar då det finns en positiv koppling mellan antalet anbudsgivare och antalet överprövningar. I vissa branscher kan dock branschanpassade upphandlingar skapa förutsättningar för att få både ökad konkurrens och färre överprövningar. Exempelvis inom byggsektorn medför användningen av utvärderingskriteriet lägsta pris en lägre risk att få upphandlingar överprövade och en ökad konkurrens. Branschanpassade upphandlingar antyder också att upphandlande myndigheter skulle vinna på att genomföra kontrollerade studier i syfte att lära sig hur man skapar optimala upphandlingar för specifika branscher.

Slutligen behövs en mer centraliserad och detaljerad datainsamling i Sverige för att få en bättre och mer korrekt bild över svensk offentlig upphandling. På så vis kan även goda exempel på bra upphandlingar fångas upp.

Summary

In Sweden and elsewhere, a large share of public sector purchases are implemented with public procurement. In Sweden, public procurement is estimated to account on average for about 17.5% of GDP. Recently policy makers in the EU have been increasingly worried that public procurement does not work as it should due to a severe lack of competition. Moreover, another major concern in EU is that the fear of post-award litigation and risk-avoiding culture are common among contracting authorities and result to ineffective procurement practices. Accordingly, we use quantitative and qualitative analysis to assess the level of competition and litigation in Swedish public procurement and to identify their key determinants. The analysis aims to help in providing some guidelines to support the contracting authorities on how to induce more competition and reduce litigation risks.

We find that the level of competition is low in all regions, most industries and for all types contracting authorities. This echo the EU wide concerns that public procurement suffers from lack of competition and that may present a challenge in getting high-quality public goods and services at reasonable prices. We also report that the level of litigation is high in Sweden creating concerns for project delays and other costs, as well as potentially leading to ineffective procurement practices due to incentives to avoid litigation.

While both of these phenomena present a challenge to efficient public procurement, there are possible remedies. Our quantitative evidence suggests that there is a positive correlation between the number of bidders and to how wide an audience an individual contract has been advertised, and based on our qualitative evidence, active marketing of the contract award is seen as a way to attract more bidders. Moreover, our interviews and according statistics suggest that post-award communication decreases litigation risks. Furthermore, we document both quantitative and qualitative evidence suggesting that especially small firms see public procurement as too burdensome. Therefore, our evidence indicates that contracting authorities can increase the number of bids significantly and reduce litigation risks by changing their procurement procedures and communication practices towards more bidder-friendly approach.

We also show that optimal procurement practices can help, but they vary across industries. In particular, bidders seem to avoid public procurement that uses mechanisms that are not typical for the industry. That is, in construction, the best price-quality award criterion is negatively associated with the number of bidders. On the other hand, in expert services best price-quality ratio criterion is positively associated with the number of bidders. Interestingly, best price-quality ratio criterion was relatively least common in the construction and most common in the expert services. Furthermore, our qualitative interviews support this finding, as deviating from the industry-specific cultures of conducting procurement is seen as discouraging bidding. The lesson here is that appropriate planning of contract

awards can increase competition, but one advice does not fit all cases. Therefore, market knowledge, understanding of the specific sector characteristics and early communication with the market operators are important in increasing competition.

We also document that the goal of achieving more competition can be at odds with the goal of avoiding litigation, as litigation risk is positively associated with the number of bidders. However, in some industries appropriate contract design can alleviate both concerns. For example, in construction, the use of price-only criterion is associated with both lower litigation risks and more competition.

Industry-specific optimal policies also imply that contracting authorities would benefit from randomized controlled trials to learn what the best practices are for them. Many contract and award rule features can easily be randomly alternated across contract awards to learn the causal effects of different policies on procurement outcomes. There is also need for more detailed and comprehensive data collection in Sweden if we are to better understand the best practices.

1 Introduction

In Sweden and elsewhere, a large share of public sector purchases are implemented with public procurement. In the OECD countries, public procurement is estimated to account on average for about 12 % of GDP, and in Sweden the estimate is as high as 17.5 % (KKV and UHM 2018). From a theoretical perspective, adopting public procurement is seen ideally as addressing both issues related to the lack of incentives, inefficiencies and rent-seeking involved in in-house production by the public sector (e.g. Alchian and Demsetz 1972), and various market imperfections arising in private markets producing public goods. Public procurement can potentially achieve the best of both worlds by solving market imperfections with appropriate contract planning, while leveraging on private sector efficiency.

However, recently policy makers in the EU have been increasingly worried that public procurement does not work as it should due to a severe lack of competition. For example, according to the European Commission (2017), "Public procurement relies on open competition to deliver the best value for public money. This competitive process is either not present or it is losing intensity. Between 2006 and 2016, the number of contract awards with only one bid has grown from 17 % to 30 %. The average number of offers per tender fell from five to three in the same period."¹ Also in Finland, a neighbouring country to Sweden with many institutional similarities, the level of competition is overall very low with median number of bidders being only two, and has been decreasing somewhat in the recent years (Jääskeläinen and Tukiainen 2019). Moreover, also for Sweden, quite similar low levels of competition have been documented before (KKV and UHM 2018).

This is particularly interesting as the starting point of EU Public Procurement Directive 2014/24/EU² is that three to five bids is often considered a good amount of competition depending on the procedure type applied. According to art.65 of Directive 2014/24/EU a contracting authority shall invite at least five candidates to bid in a restricted procedure and at least three candidates to participate the negotiations in the competitive procedure with negotiation, competitive dialogue and innovative partnership. In any event, according to the aforementioned legal provision concerned, the number of candidates invited should be sufficient to ensure genuine competition.

1.1 Theory

Attracting enough competition seems to be the central ingredient also from standard auction theoretical perspective in making public procurement auctions

¹ These statistics concern procurement above the EU threshold.

² Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC Text, OJ L 94, 28.3.2014, p. 65–242.

work in getting high-quality goods and services at reasonable prices (Bulow & Klemperer 1996, Klemperer 2000). More competition should induce bidders to bid more aggressively resulting in lower prices (in price only contract awards) or a combination of lower prices and higher quality (in best price-quality ratio contract awards).³

However, auction theory (and evidence) also argues that competition may sometimes have the opposite effect. First, in so called common-value public procurement auctions, the winner is the bidder who has estimated the production costs to be lowest (even if the real costs are the same for all bidders). Thus, the winner may suffer from a winner's curse as the real production costs are higher than the winner thought. This underestimation of costs becomes more severe as the number of bidders increases. Rational bidders account for this, and thus, bid less aggressively as competition increases. This is called the "Common values effect" (Bulow et al. 1999, Hong and Shum 2002, Tukiainen 2008). A similar winner's curse may arise in so called affiliated values auctions where the bidder with the lowest signal on the costs (i.e. the winner) also believes that the other bidders have very low signals, and thus, assumes that a lower bid is needed to win than they would assume without the updating of their beliefs resulting from affiliation. A rational bidder who accounts for this scenario, bids less conservatively the more competition there is. This is called the "Affiliation effect" (Pinkse and Tan 2005, Hubbard et al. 2012). An "Entry effect" (Li and Zheng 2009) means that the higher the number of potential bidders, the less profitable it is to enter due to the more intense competition, and thus, it does not make sense to pay the entry costs. That is, higher number of potential bidders does not necessarily lead to more actual competition. Moreover, with high-levels of competition, an extra bidder is likely to induce more administrative costs than the associated competition benefits (if any) (Kang and Miller 2017). However, if the most efficient bidders select into entering, then actual competition intensity may increase with the increase in the number of potential bidders even if the observed number of actual bidders remains unchanged (Marmer et al. 2013). Similarly, Coviello et al. (2018a) show that buyer discretion on who to invite to bid increases the probability that the same firm wins repeatedly, and it does not deteriorate (and may improve) the procurement outcomes. This result indicates that the type of bidders may be more important than their number. Due to these concerns, the policy maker should rather be concerned with optimizing the number of bidders and their type, rather than maximizing their number. Nonetheless, it is clear that public procurement with especially no bidders or only one bidder, but also quite likely those with two or perhaps even three bidders, are typically unlikely to meet their objectives of getting high quality goods and services with a low burden to tax payers.

³ In best price-quality ratio auctions, winner of the auction is determined by the score that is a combination of price and quality measures, in Swedish "*Ekonomiskt mest fördelaktiga anbud*". For theoretical discussion on the nature of best price-quality ratio auctions, see Asker and Cantillon (2008, 2010) who refer to these as *scoring auctions*.

Based on these theoretical arguments, it is an empirical question whether and when competition has the desired effects on prices and quality. It may also be the case that the effects are non-linear, and the relationship may reverse at some point. For example, Hong and Shum (2002) document that for many construction contracts, the optimal number of bidders is three. Moreover, the effects of competition are likely to vary case-by-case. Previous empirical evidence concerning Swedish public procurement indicates that even a small increase in public procurement entry might result in large costs savings (Hyytinen *et al.* 2018). Similarly, Fazekas and Kocsis (2017) report that the number of bidders, provided that there is no collusion among them, is a significant factor in determining the prices. This is further supported by examples included in a recent report by Svenskt Näringsliv of actual prices received in the event where there is only one bidder (2019, at 34). Similar results that higher competition is reflected as lower prices has been documented also for Finland (Jääskeläinen and Tukiainen 2019). Therefore, the evidence indicates that it is important to document the extent of competition, and if it is found lacking, the reasons and remedies for it.

1.2 Objective and methods

The purpose of this analysis is to assess the level of competition in Swedish public procurement and to identify its key determinants. The analysis aims to help in providing some guidelines to support the contracting authorities on how to induce more competition. We also analyse the determinants of litigation and possible ways to avoid that. Moreover, we study whether the possible ways to attract more competition and reduce litigation risks are complements or whether they present some trade-offs.

We approach these questions with mixed-methods where we combine both quantitative and qualitative analysis. In the quantitative analysis, we use data on 131,601 contract awards collected by Visma Commerce AB (Visma) over years 2012-2018. The first research question asks to what extent the issues related to the lack of competition as measured by the number of bidders concern Sweden. We also study how the number of bidders vary across time, regions, industries and contracting authorities. This part of the analysis complements the previous work by the Swedish Competition Authority and National Agency for Public Procurement (KKV and UHM 2018) as they report similar descriptive statistics. However, we use somewhat different sample selection criteria which means that some new lessons are learned. Furthermore, our second research question and approach deepen our understanding of the determinants of competition by using multivariate regressions analysis. These results are to our knowledge novel in the Swedish context. Similar analysis has been previously conducted for Finland (Jääskeläinen and Tukiainen 2019). As a third and novel contribution, we use multivariate regression analysis to study the determinants of litigation in the Swedish public procurement. Similar analysis has been previously conducted to our knowledge

only for Finland (Hyytinen et al. 2015) and for Sweden (Stake 2015), but for a much smaller data set.

Finally, to understand the public procurement realities and to establish hypotheses to be tested by methods of quantitative research, we conduct interviews with public procurement experts that have extensive experience and knowledge on conducting public procurement in practice. Therefore, in order to elaborate the potential reasons behind low competition in public procurement, we conduct nine interviews. These interviews provide valuable insights on the potential reasons for low competition in public procurement and lead the way for developing hypotheses to be tested with the Visma dataset by quantitative research methods.

1.3 Key results

Our key findings from the quantitative analysis are that the lack of competition is a serious issue also in Sweden and it has stayed at a fairly stable low level over 2012-2018. The level of competition is particularly low in rural regions, but nonetheless a serious issue for all regions, including the most densely populated ones. Aside a few rare exceptions, all industries suffer from the lack of competition as do all types contracting authorities, but in particular, state and municipal corporations.

If a contract is divided into lots, there is unfortunately no information on the number of bids per lot. But based on the information received in the interviews and earlier research conducted both with Swedish and Finnish data (Bergman and Stake 2015, Jääskeläinen and Tukiainen 2019), the lack of actual competition in public procurement is greater than what can be perceived through the current official statistics.

Many interviewees suggested that business cycles have an effect on the number of bidders. According to our quantitative analysis there is however no annual correlation between changes in GDP or sector specific turnover and the number of bidders. Thus, the main reasons for low competition are unlikely to be related only to the business cycles of the economy.

We also present some interesting findings with respect to the contract award design. For example, the number of reported CPV codes (common procurement vocabulary) in the contract award is positively associated with the number of bidders overall and in four out of five of the largest industries. Due to the vast amount of contract notices and the lack of centralised, national contract notice platform in Sweden, most firms are informed on public contracts through different automated, private contract finder services. These search suitable contracts for each of their clients based on the client's selection of CPV- (identification of the type and object of the contract) and NUTS-codes (identification of the location), and key words and expressions. Using multiple CPV codes the audience and the number of potential bidders increases. Thus, our findings suggest that there is a correlation

between the number of bidders and to a how wide audience an individual contract has been advertised. This finding resonates well with our qualitative findings where active marketing of the contract award is seen as a way to attract more bidders. Through our combined qualitative and quantitative analysis, we argue that contracting authorities can in fact increase the number of bids significantly by changing their procurement, and especially, communication practices towards more bidder-friendly approach. Such practices include effective category management, industry specific market analysis and contract planning, contract award calendars, early market dialogues and continued contract follow-ups and open discussions after the award decision has taken place.

The use of best price-quality ratio as a contract award criterion in accordance with art. 67 of the Public Procurement Directive 2014/24/EU is overall not associated in a statistically significant way with the number of bidders although previous report by Swedish Competition Authority and National Agency for Public Procurement (KKV and UHM 2018)⁴, all previous surveys (Företagarna 2016, Svenskt Näringsliv 2019 and Visma Commerce AB 2019) and our qualitative research suggest otherwise. The reason is that while such raw correlation exists, it vanishes after controlling for other relevant factors that correlate with both the number of bidders and the use of best price-quality ratio award criteria. However, there is heterogeneity in this association across industries. In particular, in construction the price-quality award criterion is negatively associated with the number of bidders. On the other hand, in expert services best price-quality ratio criterion is positively associated with the number of bidders. Interestingly, best price-quality ratio criterion was relatively least common in the construction and most common in the expert services. This suggest that bidders seem to avoid procurement that uses mechanisms that are not typical for the industry. Furthermore, our qualitative interviews support this finding as deviating from the industry-specific cultures of conducting procurement is seen as discouraging bidding. For example, a long-term procurement attorney, who has worked for both contracting authorities and bidders in relation to public contract awards for decades, stated in the interview, that within the construction industry, the use of best price-quality criterion is not encouraging firms to bid. This is because the industry is more used to detailed technical blueprints and mandatory minimum requirements attached with strict price comparison. On the other hand, many others stated that when purchasing services, notable weight should be put into other factors than price, e.g. when purchasing expert or health services. This is believed to increase the willingness for most companies to bid and perform well, while discouraging irresponsible companies, i.e., those who pay too low salaries and compromise on working conditions to participate. Consequently, the use of qualitative elements is in accordance with the industry-specific culture in relation to services. The lesson here

⁴ Public procurement statistics report published in 2018 by the Swedish Competition Authority and National Agency for Public Procurement suggests that the use of best price-quality ratio rule increases the number of bidders (KKV and UHM 2018, 80–81) where as our results indicate that the results vary between industries.

is that appropriate planning of contract awards can increase competition, but one advice does not fit all cases.

While we do not directly observe bidder characteristics such as firm size, we can measure bidders' bidding activity in our sample. We classify bidders to three groups based on their activity. We find that medium bidding activity firms win relatively many contracts whereas the most active bidders win the smallest share of the contract awards that they participate in. This result indirectly suggests that perhaps the entry barriers hit in particular small and medium activity firms even if they would be efficient, as they do relatively well when they participate. Moreover, this perhaps suggests that medium bidding activity firms are skilled in picking up the best contracts for them i.e. they may be better in optimizing by giving their best bids to selected contracts.⁵

The fear of post-award litigation and risk-avoiding culture are common among contracting authorities, resulting potentially to ineffective procurement practices and underutilization of, for example, innovative public procurement practises (SOU 2011:73, Finnish Department of Justice 2009, European Commission 2018). The fear of litigation may result in using requirements or criteria that are other than the ones a contracting authority wishes to use (SOU 2011:73). If procurements are designed from the perspective of avoiding possible court proceedings in the future (Indén, Lindström, Lundberg 2014) and if the contract award's success is measured by whether a complaint was lodged, the effectiveness of the whole public procurement market can be compromised. Therefore, we also study how commonly PPs are litigated and which public procurement features affect the likelihood of a public procurement ending up in a litigation. These are novel questions that have been addressed only very little before (Hyytinen *et al.* 2015, Coviello *et al.* 2018b, Stake 2015).

Besides direct litigation costs, which can be significantly larger than previously suggested in official reports (Lundgren & Eklind 2018), litigation matters also in practise as it often leads to project delays (besides direct litigation costs). Court proceedings can at times result even in project cancellations due to lengthy proceedings. Furthermore, the interviews revealed that the uncertainty of when the matter is decided, how long the process lasts, how purchases are secured in non-contract situation and whether the interim contracts will be regarded as illegal direct awards adds up to the risks resulting from litigation. When a complaint above EU thresholds is lodged, the contract in question is automatically suspended. Thus, the contracting authority and winner of the award procedure cannot conclude the contract nor start its execution. For example, in 2017 the first instance proceedings in Swedish administrative courts took in average 3.7 months if the case was examined (2.9 months including cases that are cancelled or rejected).

⁵ According to earlier report of Swedish Competition Authority and National Agency for Public Procurement show that the winning percentage was equal for all different company sizes, in average 46 per cent of all bids were contracted (see KKV and UHM 2018, at 132).

Furthermore, in the second instance at the Kammarrätt the average time for proceedings was 3.3 months (2.0 months including the cancelled and removed cases) and 16.8 months in the Supreme Administrative Court (1.7 months including the cancelled, rejected and those which were not granted leave to appeal). In terms of comparing the times for legal proceedings, the situation in Finland is much worse. In Finnish Market Court, the first instance proceedings in 2018 lasted on average 7.6 months. However, in reality, the time is much longer as this figure includes also those cases that were cancelled or removed. The delays due to a court proceeding result in significant costs for both the contracting authority and the winning bidder whose resources are bound to the contract in question (SOU 2011:73, SOU 2018:44 and Lundgren & Eklind 2018). An appeal may also be presumed as a criticism against the expertise of the responsible public officials (as was clearly stated by different contracting authorities in the interviews), leading to reputational risks. For these reasons, many buyers may concentrate their efforts in avoiding litigation.

We find evidence that more important contracts, measured by contract length and value, are litigated more often. Interestingly, but not unexpectedly, litigation risks increase with the number of bidders. This means that the goal of achieving more competition can be at odds with the goal of avoiding litigation. It also suggests one possible mechanism through which the contracting authorities are not incentivized to attract more competition. Thus, the number of bidders could potentially be increased by reducing the risks of court proceedings to contracting authorities. This can be achieved by increasing effectiveness and shortening of the time of court proceedings, decreasing uncertainty of when the matter will be decided as well as introducing good practices on solutions for interim arrangements meant to secure the continuous deliveries of products and services.

Overall the use of best price-quality ratio award criterion is associated in a statistically significant way with about 0.5 percentage point higher litigation risk (about 7.5% of all contracts are litigated). This can be due to the ambiguity of quality award criteria and their evaluation methods (Bergman and Lundberg 2009, 2013). Again, there is interesting heterogeneity in this association across the industries. In particular, in construction and construction services, the use of best price-quality ratio auctions is positively associated with litigation, whereas in the other industries the association is not statistically significant and sometimes the coefficient is even negative. Therefore, especially in construction the tools to attract competition and avoid litigation are complements as the use of price only criterion seems to be beneficial for both goals.

1.4 Literature and discussion

There is some, but so far quite limited, research on the reasons behind the lack of competition in public procurement. This recent research identifies multiple and diverse factors that can affect competition in public procurement regime. A recent

report to the European Commission on the phenomenon on single bidding and non-competitive contract awarding procedures in EU co-funded projects, suggests that the bidding activity could be increased with robust administrative practices. These include increasing contracting authority's procurement related resources, cutting bid processing times and shifting spending more equally over the year, and demand aggregation, i.e., through larger contract volumes and use of open procurement procedures (Fazekas 2019). Based on this report among others, European Commission website recommends spending equally throughout the year.⁶ Accordingly, in our quantitative analysis, the competition was at its height in January. Moreover, there are correlations between the number of bidders and the length and value of the contract in our Swedish data. However, we observe this only at the rough level below-above EU threshold as the Swedish data does not contain the contract values. On the other hand, the reason for more bidders above EU threshold can solely be the fact that there is a wider audience through TED publication. Furthermore, earlier research on Finnish data indicates that aggregation does not correlate with the number of bidders (Jääskeläinen & Tukiainen 2019). Moreover, according to Swedish company surveys, one of main reasons of not bidding to public contract awards is that the contract is too big. Thus, the recommendation to aggregate larger contract volumes in order to increase competition cannot be made without reservations.

Lundberg et al. (2015) study Swedish cleaning service data and look into the impact of the use of different sustainability requirements to the number of bidders revealing a weak negative correlation between these two. Third research, also conducted with Swedish data, suggests that the low competition in public procurement is connected to a low level of political competition at the local level, indicating towards corruptive practices in certain regions and municipalities (Broms *et al.* 2019). Moreover, Fazekas and Toth (2017) compare the Court of Justice of European Union public procurement related case law data with TED public contract notice data, offering evidence that case law, which required legal actions from the member states was the most efficient one in increasing competition (and achieving lower prices) within public procurement. In addition, there are some earlier empirical surveys on how public procurement is perceived by the private businesses (Företagarna 2016, Svenskt Näringsliv 2019 and Visma Commerce AB 2019). According to these surveys, a large share of firms refrain from bidding even though they would have the possibility to do so. The surveys identify multiple reasons for such behaviour, but the main reasons for this are that the requirements set out in the procurement documents are irrelevant, difficult or too high, the administration of bidding is too difficult and resources consuming, there is too much focus on price and the contracts are too large. It appears that the entry barriers are higher for micro-companies and small businesses, where the

⁶ https://ec.europa.eu/regional_policy/en/information/publications/reports/2019/single-bidding-and-non-competitive-tendering (visited 5 December 2019).

complicated and resource-consuming bidding to public procurement is identified as the most important reason for not submitting a bid.

The qualitative results especially on questions of “why firms are not bidding to public contract awards” and “are certain sectors, contract types or award criteria more problematic in this regard than others” allow us to develop sector specific analyses and heterogenic conclusions. For example, different interviewees give differing answers to questions on whether the use of best price-quality ratio increases bidding activity or not. An interviewee that works mainly with large construction projects suggests that construction firms are not familiar with quality-based award criteria, whereas many interviewees (working mainly with service contracts) conclude that if an award is only based on price or costs, the firms with high quality services are not bidding. These conflicting views on the impact of award criteria lead us to an understanding that there might be a clear difference between different sectors. As argued above, this is further confirmed through our quantitative regression analysis. The use of best price-quality ratio can increase the number of bidders in certain sectors, but decrease competition in others. This discovery, that *there are connections between contract planning and bidding activity, but the same size not fit all*, is significant as it changes the way public procurement statistics should be analysed and how contract award should be planned. Similarly, in a recently published report on single bidding within EU funded projects, it was concluded that the occurrence of low competition varied greatly across different sectors – much more than between different member states. Nonetheless, the problematic sectors also varied across member states (Fazekas 2019). This also suggests that the internal market is not necessary working as planned, as national borders create barriers of competition within the same product market (Fazekas 2019, Herz & Varela-Irimia, 2017). It is also in line with recent report of Svenskt Näringsliv urging contracting authorities to adopt category management into their procurement practices (Svenskt Näringsliv 2019). Specific market knowledge and understanding of the business culture and pricing methods of a certain sector seem to be important in increasing competition.

The interviews provide a lot of information to help in drawing other very interesting conclusions. For example, there is no data on the number of bidders at the level of single lots in the Visma dataset, but based on information gotten from a contracting authority, the number of bidders is significantly lower at the level of individual lots or contracts where the actual competition takes place. This suggests that the lack of competition is worse than what can be observed through the data and yearly statistics. There are multiple reasons for why companies are not interested to bid in public contract awards. Some of the reasons are in the control of contracting authority (dialogue, category management, clearer procurement documents, less irrelevant requirements, active communication towards the market, dividing into lots instead of too big contracts, added transparency on bid evaluation, performing contract follow-ups), some are to be resolved at the national level (one single contract platform for making it easier to find the contract and the right ones, professionalization programs, practical support for SMEs when

submitting their first bids, standardised forms for certain parts of procurement), and some to be resolved by the companies themselves (taking the extra steps to become a contractor instead of subcontractor, contacting contracting authorities within their region, looking for assistance to overcome the bidding difficulties). On the other hand, there is encouraging evidence that the number of bidders can be significantly increased by adopting novel procurement practices, as is the case with one case-study municipality. Similarly, there is evidence that the risk of litigation discussed above can be mitigated by open communication with the bidders in post-award stage.

2 Qualitative results

2.1 Introduction

As research on the reasons for low competition in public procurement has so far been rare, there are also limited existing sources for qualitative analysis concerning Sweden. To understand the public procurement realities and to establish hypotheses to be tested by methods of quantitative research in section 3, we conduct 9 interviews and collect other background information. We interview public procurement experts who have extensive understanding on public procurement in practice or in procurement related analytics.

First, this section gathers together earlier empirical results based on three different studies from 2015 and 2019, including responses from thousands of Swedish companies providing evidence on reasons for not bidding to public procurement. Moreover, these surveys provide interesting findings also regarding how contracting authorities perform contract follow-ups, conduct market dialogue or how the use of employment obligations affects the SMEs participation interest.

Second, this section describes and interprets the interviews conducted for this study. Combined with the earlier surveys described further in this section, these new interviews allow us to deepen the discussion on the potential reasons for non-bidding. The qualitative results especially on questions of “why firms are not bidding to public contract awards” and “are certain sectors, contract types or award criteria more problematic in this regard than others allow us to develop sector specific analyses and insights. Moreover, the answers to the question of “how more companies could be attracted into bidding for public contracts” provide valuable information on business-friendly practices and measures that in part could lower the threshold for participating to public contract awards.

As discussed above, low competition in public procurement is a problem across the EU. Moreover, the occurrence of low competition varies greatly across sectors (Fazekas 2019). The earlier quantitative research suggests that contract and procuring entity type and which award criteria is used (Jääskeläinen & Tukiainen 2019), length of the tendering period, selection of procurement procedure and the fact whether a contract notice is published in the end of the year (holiday season) associate with the number of bidders (Fazekas 2019). The yearly Swedish procurement statistics reports show that the average number of bidders per procurement is descending, but there are significant differences in the bidding activity across industries and CPV-codes (KKV and UHM 2016, 2017 and 2018). Lately the problem of low number of bids has been recognized also among practitioners. In Sweden, recently published reports by the enterprise interest groups Svenskt Näringsliv, and Företagarna as well as Visma Commerce AB address the issues on the basis of empirical evidence gathered from companies. Furthermore, the central purchasing unit for Swedish municipalities and regions,

SKL Kommentus has been collecting information from companies that have viewed the procurement documents in the eTendering system, but decided not to bid for the contract. The main results of all these aforementioned surveys are presented below. While these surveys set the stage for and guide our own interviews, summarizing their results in English here is also valuable as such, as now they will be accessible also to international audience.

2.2 Existing surveys on the number of bidders in Sweden⁷

Företagarna (The Swedish Federation of Business Owners) firm panel

Företagarna, an interest organisation for Swedish business owners, micro-companies and SMEs conducted a survey among its members (Företagarna 2016), where it mapped participation to public contract awards and reasons for refraining of bidding. The questionnaire was sent to 3911 companies of which 1132 replied. Overall, a bit more than a quarter of the respondents (27 %) had participated in public procurement. Firms provided following reasons for not bidding in public contract awards: public procurement is too complicated and takes too much time (24 %), there is too much focus on lowest price (24 %), other (15 %), contracts are too big for us (13 %), I don't know (9 %), requirements are too strict (5 %), we do not ever win (4 %), it is difficult to find contracts (3 %), lack of trust that the procedure and procurement is conducted correctly (3 %).

The results of the firm panel also present other interesting findings. As stated before, 27 % of micro-companies and SMEs participate to public contract awards. Participation level is subject to the size of the company: Only 12 % of the responding entrepreneurs with no employees had participated in public procurement, but 64 % of SMEs with more than 20 employees had. Non-advertised contracts falling under the national thresholds seem to be attractive business opportunities to small businesses (15 % had contracted solely minor contracts allowing direct purchase, 63 % of both advertised and non-advertised contracts). Furthermore, the SMEs found that public procurement has become more complicated (41 %) since 2012. However, the survey was conducted in 2015, prior to the implementation of 2014 Directives.⁸ Also it seems that the use of framework agreements are considered to entail specific problems for SME participation due to the extensive administration required combined with the high unlikelihood of getting any actual contracts (30 % had never or rarely signed a contract based on a framework). Moreover, irrelevant requirements are considered a real challenge for

⁷ The results of the surveys are translated by the author from Swedish into English.

⁸ Thus, this survey does not reveal how the situation might have changed since the adoption of new rules. It can, however, be argued that the situation has not changed significantly even though the 2014 Directives aimed to increase flexibility, and make public procurement more attractive to SMEs (division into lots and less bureaucracy in bidding etc.). The research done by Visma Commerce AB (2019) and Svenskt Näringsliv (2019) and our own interview results suggest that still the public procurement is considered complicated and that bidding administration is consuming a lot of time and money.

SME participation (76 %). For example, a requirement to employ a person outside employment market (e.g. long-term unemployed person) is not considered reasonable (57 %) and decreases SMEs participation to public contract awards (63 %).⁹ Moreover, it is rather alarming that almost one third (29 %) stated that contracting authorities never do contract follow-ups. It seems that there is potential to increase SME participation and consequently increase competition in public procurement as 63 % of those that had no prior experience of public procurement were going to submit a bid to public contract award in future or at least were considering to.

Visma Commerce AB's bidding indicator (anbudsbarometern)

Visma Commerce AB, a private operator for public contract notices and eProcurement business in Sweden, conducted a bidding indicator survey to public sector suppliers in 2019 and received 390 replies. The replies of the Visma (2019) survey are of particular importance to us as the respondents are to our knowledge included in the Visma's public procurement database that we use.

The questions varied from "have you considered to submit a bid to a certain public contract award but in the end decided not to", "if so, then why you did not submit a bid in the end?", "is there some challenges in participating to public contract awards?", "what are those challenges?", "what should be done to make you participate to public contract awards more often?", "are you in contact with the contracting authority before the procurement takes place?", "why you are not in contact?", "do you think the contracting authorities are good at engaging in dialogue with suppliers?" and "are the contracting authorities good at contract follow-ups"?

The results of the survey revealed that 83,2 % have refrained from submitting a bid even though there was initial interest to bid. 91,94 % thought there are challenges embedded in the public procurement system. The reasons for not bidding were the following: requirements were irrelevant or impossible to fulfil (52,26 %), procurement had too much focus on low price (50,65 %), the likelihood of winning was too low (47,42 %), requirements were too high (36,45 %), requirements were too complicated (27,42 %), administration of bidding was too hard and extensive (23,55 %), tendering period was too short (20,32 %), need to prioritise other customers (20,32 %), suspicions that bid evaluation would not be conducted correctly (19,35 %), other reasons (14,19 %), bad experiences or bad reputation of the contracting authority (10,97 %) and contract was too big (7,46 %).

Regarding the biggest challenges within public procurement, the answers were divided in a following way: too much focus on lowest price in comparison to quality (68,71 %), too unclear procurement documents (54,09 %),

⁹ The perceived effect of such requirement is significant but varies a bit depending on the size of the company (67 % 1-4 employees; 70 % 5-9 employees, 55 %; and 10+ employees).

complicated/difficult requirement specifications (43,27 %), wrong requirements (39,18 %), too much administration e.g. requirements for certifications and references etc. (39,18 %), procurement is designed for a certain company (37,13 %), too complicated procurement documents (25,15 %), too long and extensive procurement documents (19,30 %), requirements are too high for us as a company (14,91 %), other (9,36 %), and contracted task was too extensive for us (3,80 %).

To the question of how to increase the number of bids the answers were divided in a following way: more focus to quality (67,12 %), clearer and more relevant requirements (45,92 %), increased transparency of how bids are to be evaluated (37,23%), less certification and reference requirements (24,46 %), longer time for bid submission (24,18 %), to be better informed on contracts within our branch of operation (17,12 %), easier to find out which public contracts would suit our firm (15,76 %), other (13,04 %), smaller sized procurement contracts (11,41 %), none of the above as public procurement works well as it is (2,75 %), don't know (2,45 %).

In addition, Visma's survey included questions relating to communication between contracting authorities and market operators as well as to contracting authorities' abilities to conduct effective contract follow-ups. Based on the answers it seems that some level of dialogue or contact has taken place with approximately half of the suppliers (54,89 %), but still quite many suppliers in public procurement are unaware of the upcoming contracts awards (22,75 %) and of possibility to contact a contracting authority prior to a procurement procedure takes place (24,55 %). It should be noted that challenges are much greater for a company that has no previous experience of public contract awards (as respondents to Visma survey have experience of public procurement). Moreover, it seems that contracting authorities are not very good in conducting dialogue (37,13 % are bad or really bad, 43,56 % not good or bad) or performing contract follow-ups (33,15 % bad or really bad, 39,87 % not good or bad).

Svenskt Näringsliv (Confederation of Swedish Enterprise) report

Svenskt Näringsliv conducts firm survey panels to its member companies. In April 2019, the panel included questions on public procurement and a total of 1681 replies were received. The public procurement related questions and multiple-choice options were almost the same than in Visma bidding indicator discussed above. The results are similar, but unlike in Visma's survey, many of the respondents of Svenskt Näringsliv (2019) panel were firms that were not interested in doing business with public sector in the first place (29 % of the respondents replied that public procurement / public sector market does not interest them). On the other hand, the panel represents views from a large amount of Swedish companies and a vast majority of the respondents were interested or experienced in public procurement.

Svenskt Näringsliv panel also had a question on why firms are not bidding to public contract awards. The answers were divided as follows: administration of

bidding was too hard and extensive (55 %), procurement had too much focus on low price (48 %), requirements were too complicated (40 %), the likelihood of winning was too low (34 %), requirements were irrelevant / impossible to fulfil (34 %), requirements were too high (33 %), suspicions that evaluation of bids would not be conducted correctly (20 %), need to prioritise other customers (18 %), procurement/contract was too large (14 %), bad experiences or bad reputation of the contracting authority (13 %), tendering period was too short (10 %) and other reasons (6 %).

To the question of how to increase the number of bids the answers were divided in the following way: More focus to quality (40 %), clearer and more relevant requirements (30 %), none of the above as the public sector market does not interest us (29 %), easier to find out which public contracts would suit our firm (25 %), increased transparency of how bids are to be evaluated (25 %), smaller size procurement contracts (21 %), less certification and reference requirements (16 %), Other (7 %), longer time for bid submission (5 %) and none of the above public procurement works well as it is (4 %).

SKL Kommentus AB

The central purchasing unit for Swedish municipalities and regions SKL Kommentus AB sends an inquiry to all companies that have viewed their procurement documents for a certain contract award regardless of whether they have submitted a bid in the end or not. In their database, there are 94 companies that have not submitted a bid after reviewing the procurement documents. The reasons for not bidding to SKL Kommentus' contract awards are the following: contract contains objects that our company does not supply (27,7 %), lacked capacity at the time to submit a bid for the contract in question (20,2), requirements were too high (20,2 %) and there was too short time to submit a bid (4,3 %).¹⁰

Survey summary

SMEs and micro-companies were the target group in the survey by Företagarna (2016). The main perceived reasons for not bidding into public contract awards were that the public procurement was considered too complicated and taking too much time, there were too much focus on price and contracts were considered too big. A bit similarly in the Svenskt Näringsliv (2019) survey, the main reasons for not bidding were that the administration of bidding was considered too hard and extensive, too much focus on price, requirements are difficult/irrelevant/too high and there were suspicions that the evaluation of bids would not be conducted correctly. Here, the respondents were companies of all sizes. The results of Visma (2019) survey differed a bit from the results of the two aforementioned surveys. Visma's survey identified as main reasons for not bidding that the requirements were irrelevant, impossible or too high, too much focus on low price and likelihood

¹⁰ The above information is received directly from SKL Kommentus AB and was further translated into English.

of winning is too low. Visma's respondents, unlike in the two other surveys were firms that have experience of bidding in public procurement. Also the SKL Kommentus survey the respondents have certain experience in public procurement.

Generally, it can be concluded on the basis of these surveys that public procurement is challenging to small businesses in particular. Micro-companies participate more rarely to public contract awards than small or medium size companies. Smaller companies are affected by the resources-consuming and complicated bidding administration as well as large contracts and framework agreements. But also certain irrelevant requirements, such as a requirement to employ a long-term unemployed person, often results micro-companies and SMEs to refrain from bidding (Företagarna 2016). This suggests that in case a contracting authority wishes such companies to become bidders, the use of requirements that impose an additional burden to bidders and bidding administration, should be avoided.

There are also other differences in the survey results that highlight the differences between company profiles both relating to size and previous bidding experience. In Visma's survey, complexity of bidding was not among the top reasons for not bidding into public contract award, but it was the main reason both in Företagarna's and Svenskt Näringsliv's surveys. Perhaps the reasons for this can be found from the different company profiles that have replied to surveys. In Företagarna's and Svenskt Näringslivet's surveys only part of the respondents had actual previous experience of public procurement, whereas Visma's survey was only sent to companies with prior experience. This indicates that complexity of contract award procedures, learning how to draft a bid, the use tendering systems and the fact that bidding is time and resources consuming is affecting especially new potential bidders that have not participated to any public contract award procedures before. Those concerns seem to ease a bit after gaining more experience in bidding as in Visma's survey the complexity of bidding was not identified among the main reasons. If these new potential bidders are wanted to become bidders, some guidance, education and technical support should be provided in order to help them climbing over the entry barriers.

The other reasons for not bidding (too much focus on low price, inappropriate requirement setting, too big contracts) are the kind of which contracting authority can impact through better contract and procedural design. This is also supported by earlier research, which analysed the impact of environmental requirements on the number of bidders (Lundberg et al. 2015). Moreover, the lack of trust that the bids are evaluated correctly can be eased through transparent and clear justifications of bid evaluation and dialogue before and after the award.

2.3 Interviews on “what affects the number of bidders”

2.3.1 Background and method

There are many reasons why companies are not motivated to bid in public contracts awards. Some of these reasons are *embedded in the structures and legislative framework of public procurement, but many of them are results of contracting authorities' own practices*. The reasons for not bidding for public procurement contracts has been extensively looked at by Företagarna, Svenskt Näringsliv and Visma Commerce AB in their earlier surveys discussed above. These surveys were in electronic form and did not include any interviews. In order to understand the phenomenon and to develop potential hypotheses for testing via quantitative methods, we conduct interviews with key public procurement stakeholders within this research project.

We conducted nine interviews during September and October 2019. The selection of interviewees was non-random and based on invitation sent via e-mail in September 2019. In the selection, emphasis was given on finding contracting authorities that have a previous track-record of developing their procurement practices and organisations that have an in-depth understanding of public procurement across industries and why companies are not willing to bid to public contracts. The interviewees were representatives of four different contracting authorities (one central purchasing body and three local authorities of different size and geographical location), three representatives of different supplier interest organisations, a senior public procurement specialized attorney and an analyst of public procurement related data. For the purposes of this research, disclosing the identity of the organisations or persons interviewed are not necessary and thus the information gathered through these discussions is presented in anonymous manner.

The interviews were semi-structured and based on a general questionnaire (see Appendix B) leaving room for open discussions on different reasons affecting the number of bidders and other public procurement related concerns. Each interview lasted between 30 to 60 minutes and was conducted via telephone in Swedish. Notes were taken from each interview and each interview was recorded in order to make sure that notes and statements based on the interviews are correct. Even though there were only nine interviews, the information gathered is very extensive as all interviewed persons were public procurement experts and have years of experience in the field. Moreover, the interviewees were selected from organisations that have been actively developing their purchase methods in order to induce fruitful discussion on best practices, and thus, some of the examples described below are not representing practices of an average contracting authority, but rather those of “a procurement model student”. In order to understand the reasons for low bidding activity from a company's perspective across industries, all three interest organisations representing tens of thousands Swedish companies were selected for interview. In addition, interview invitations to randomly selected

individual companies were also sent, but those invitations received no positive responds. However, arguably the interest group organisations interviewed have a very extensive understanding of issues companies are facing when attending in public contract awards and such information covers different industries, regions and company-sizes. Also a procurement analytics specialist and a public procurement specialized attorney were selected to share their observations.

2.3.2 Results

Adequate amount of bids

Most respondents considered 3-5 competing bids as a good amount, but also stressed that the adequate number of bids is subject to the contract type and industry in question. In certain industries such as social services, 50 different contracts can be procured in the same contract award meaning that about 150 bids are then required in order to have adequate competition and enough bids to choose from. On the other hand, many argued that even in an oligopolistic market sector, e.g., in the grocery business, fierce competition can take place only with two big players. Due to the limited amount of market players geographically or in certain sectors, there are necessarily no possibilities to increase the number of bidders in all sectors. To the question of what is perceived as a good number of bidders, a representative of a central purchasing unit noted that “...*the amount of bidders needs to be such that all bidders feel a pressure to give their absolute best bid in order to win the contract.*” [author’s translation into English]. This means that there should be some losers in each contract award. However, the same central purchasing unit stated that the number of competing bids cannot be too high either or otherwise the process costs become too high for bidders, because the likelihood of winning decreases and also for contracting authorities to evaluate. Procurement Directive 2014/24 starts from the assumption that a minimum of 3-5 bids is a good amount to create enough competition. Should there be too many potential bidders for the same contract award, the potential profit margin decreases and the potential bidders lose motivation to bid (e.g., Bergman & Lundberg 2009, Levin and Smith 1994).

All interviewed contracting authorities are following the number of bids they receive for each contract award. This is not surprising as all four contracting authorities were putting in effort in order to increase interest towards public procurement. Although most of them attract more bidders than in Sweden in average, they considered that there is still room for improvement, as each had some procurements where only one or no bids were received. The interviewed central purchasing unit had 24.2 bidders in average, but if social services were removed from the figures, the amount equalled to approximately 6.5 per procurement. One of the interviewed municipalities reported significant increase in number of bidders since 2018. According to information received, the number of bidders is currently

there around 9 per procurement.¹¹ In our sample, we also observe them having one bidder more than on average during the previous years (Table 14).

The contracting authorities interviewed had no statistics on the number of bidders at the level of lots (individual contracts included in the same award), even though contracting authorities had statistics on the overall number of bids per procurement. There is similar lack of information in the Visma's dataset on the number of bidders concerning specific lots. Taking into account that in multiple-lot cases, the actual competition does not take place at the level of the contract award as a whole, but at level of a single lot or an individual contract, the lack of information in this regard is very regrettable. Only the interviewed central purchasing unit was able to give an average number of bidders for separate lots: In their case on average three competing bids per each lot was received. As discussed above, this same central purchasing unit receives in average (24.2) 6.5 bids per procurement, and with these figures and this metric, it is amongst the best performing contracting authorities, when average amount of bidders in Sweden is 4.1 in 2018 (KKV and UHM 2018). If with an average of 6.5 bidders per procurement, only three bidders are actually competing for the same object/lot/contract, it is clear that the *lack of actual competition in public procurement is much greater than what can be perceived through the current official statistics*. In order to build an understanding of the actual amount of competition, systematic large-scale data collection effort should be directed to remedy this. Ideally data collection would be automatically embedded into the procurement platforms.

Reasons for not bidding

There are multiple reasons for not bidding in public contract awards. The different interviewed organisations give a variety of answers including: market boom (especially affecting certain industries); bidding consumes a lot of resources combined with the fact that there is no certainty of winning the contract; administration of bidding is too complicated (complicated rules, no standard forms, each contracting authority asking different things in different manner, requirements to use certain systems and to provide a wide range of documents, there is no time or human resources to draft the bids in SMEs); the use of "wrong" contract award criteria (price only or best price-quality ratio); contract type (procurement contracts are more attractive to companies than framework agreements due to the uncertainty of the actual amount of purchases and suppliers attached to the latter); ill-designed and atypical procurement for the market in question usually due to the lack of market dialogue (too high, difficult or irrelevant requirements); lack of trust towards public sector (suspicions that the contract is designed for a certain company or that the bid evaluation is not done correctly and the lack of contract follow-ups (feeling that bad contractors get away without

¹¹ The number bidders in Nacka (name mentioned with their permission) conditional on receiving any bids about 7 in our data in 2018 – higher than in other municipalities of similar size (Figure 3). However, we only have data from 2018 meaning that it is possible that the average number of bidders in Nacka is in fact higher in late 2019.

consequences); difficulties to find the contracts in general and difficulties to find the right contracts from the mass of contracts (no single national database, no active communication by the contracting authorities at a local level) and bad media image (“only lowest prices win” and “unprofessional procurement” headlines scare potential bidders away). In this section, some of these aforementioned reasons are discussed in more detail.

It is still quite common that there are no bids or just one bid is submitted. In the first situation, the procurement is often cancelled, sometimes also when there is only a single bid. Many interviewees suspect that the lack of bids is often due to the *market boom* when there is enough business opportunities elsewhere. Combined with the fact that bidding consumes resources and the likelihood of getting the contract is uncertain, companies rather choose other business partners if possible. This is seen as affecting especially construction and IT. Moreover, few contracting authorities argued that the companies in these sectors are perfectly aware of the low bidding activity and know their few competitors’ pricing models quite well, resulting in a situation where these companies are not giving their best bids. For example, in the heated IT sector, the bidders know that there are likely no other bids in a specific contract award and thus set their prices on a high level and deny typical discounts. For certain purchases, the prices paid by different contracting authorities vary greatly and this has been confirmed in public procurement network meetings of contracting authorities. Moreover, some argued that the price variations between different bids for the same construction work are often significant.

In addition, the *market can be very limited and oligopolistic* in certain industries and thus the number of potential bidders is low. Nonetheless, the competition can be fierce and award can often result in legal complaints. According to those interviewed, there are very few potential bidders for road works, groceries, medicines (due to patents), office supplies, school books and materials.

Regarding the question of whether or not the number of bidders increases with the *use of best price-quality contract award criteria* instead of price only, the replies were two-fold. Some suggested that the use of best price-quality ratio increases bidding activity, some the opposite. Their examples revealed that the effect varies across industries. Price only criterion is useful for sectors, where the procured product or service is clear and which contracting authority knows well. If contracting authority understands the market in a specific sector well, it can award the contract based on price only, while simultaneously increasing bidding activity. This requires that the authority can set the requirements at the right level, the right time period for the flat rate and drafting the price amending clauses in a way that is typical for the sector in question. Examples of industries where the price only criterion is typical and often expected by the suppliers are construction (here also time can be relevant along with price), transport and groceries. On the other hand, the use of price or cost only criterion can also decrease the interest to bid. This is the case for different service sectors. Here the use of price only criterion is perceived negatively by the

potential suppliers and in a way that the quality of service and personnel's experience would be irrelevant. The use of price only criterion on sectors such as cleaning and transport is considered to attract irresponsible service providers that do not take care of their taxes, social payments or employees. A third opinion presented on the matter was such that it does not make a difference whether a best price-quality ratio or price only criterion is used if procurement is well-designed and based on the continuous dialogue with companies.

It seems that there is a clear *lack of trust towards contracting authorities in relation to their abilities to purchase professionally*. During the interviews, three kind of suspicions were mentioned. First, many submitted that often it feels that a procurement is designed or targeted for a certain company. This can be visible through the requirement setting or the ambiguity of documentation (only the "right bidder" knows what it is all about and can give a competitive price). Second, due to the inadequate transparency of procurement documents (both concerning the call for tenders and justifications of the contract award decisions) firms have suspicions of whether the bids are evaluated correctly. Third, the lack of effective and regular contract follow-ups allows contractors to infringe contracts and to provide bad quality performance. As this behaviour is not often controlled nor consequences imposed, the responsible companies lose motivation as they are annoyed that irresponsible companies are not excluded and they cannot compete in price with those who are not playing by the rules. Interviewees also argued that suppliers are usually happy when their contract performances are monitored. Interestingly, business interest groups, contracting authorities and other specialists seem to share these views.

It is also clear that bidding is perceived expensive and complicated by many companies. Companies find it difficult to find all the contracts available, which is mainly due to the lack of national notice system, but also there are difficulties in finding the suitable contracts (field, region, time period) for them. Moreover, the bidding is seen as rather complicated as it requires a good knowledge of the public procurement rules, gathering a lot of information and documents and ability to use varying eTendering systems for submitting a bid. Furthermore, there are no standard public procurement forms and each contracting authority have different ways of drafting the requirements, contract terms, pricing and product or service descriptions. Thus, it takes a lot of time and effort to go through all procurement documents in detail and this limits the possibility to engage in many public procurement procedures at the same time. This affects especially the smaller companies who don't have extra resources for drafting bids. This finding is also supported by earlier surveys (Företagarna 2016 and Svenskt Näringsliv 2019). As bidding is considered very resource consuming, the fact that there is no certainty of winning the contract and to recover these costs, the private sector purchasers can be perceived as more interesting partners.

How to increase the number of bids

Many contracting authorities have already adopted practices aiming to increase interest towards their public contract awards. These measures can be summarized with dialogue, industry understanding and open communication. In order to submit a bid, first a company needs to be aware that a contract award is taking place and secondly it needs to perceive the contract as an attractive business opportunity for them.

Certain contracting entities are meeting up with interest organisations and trying to develop business friendly procuring practices. Potential bidders are also engaged in planning by inviting them to share their opinions with pre-information request notices and hearing their views on the procurement documents, division into lots, requirements or specific contract clauses by asking them to comment the draft documentation. Category management has also become a part of certain contracting authorities' operations meaning in practice that the procurement is managed from a sector specific perspective: this allows the persons responsible to become experts in the field, understand the market realities, know the supplier characteristics, create long-term plans and prioritise objectives for procurements within the sector and design the content of the contracts in a way that reflects the market conditions of that sector. Category management, drafting of sector specific procurement calendars and continuous dialogue with the market operators ensure that potential bidders are aware of the upcoming procurements well in advance and can assign resources into bidding. Some contracting authorities are also educating companies on how to bid to public contract awards by offering seminars and workshops where companies are told the basics of public procurement and taught to use the eTendering services.

Another way to increase the number of bidders could be to *define procurement's objectives and desirable functions instead of detailed requirements and descriptions*, which can exclude the participation of many bidders or remove them a possibility to include their novel and innovative products from the bids.

Dialogue and contract management are important at post-award phase. Transparent contract award decisions and enforcing contract follow-up practices has received positive feedback from suppliers. According to those that have been involved in these follow-ups, such practices are perceived as a sign of taking the contract seriously and not allowing irresponsible practices or unauthorised amendments go unnoticed. During the contract execution phase some contracting authorities arrange workshops combining the users and suppliers of the contract in order to develop the contract further and to gain knowledge of the performance and quality.

Adoption of similar practices have also been recommended in a recent report Svenskt Näringsliv (2019). The report underlines the importance of category management throughout the contract's life-cycle, effective communication and

understanding of the market realities and models of each industry in order to increase interest towards public contract awards (Svenskt Näringsliv 2019).

There is an example of a municipality where efforts in creating business friendly procurement practices have been effective (see further also 3.3.3).¹² Since mid-2016 Nacka has adopted new purchasing policy (Nacka inköspolicy 2017) and process guidance (Nacka inköpsprocessen 2016) and has set market friendly procurement one of its most important objective of its business strategy (Nacka Näringsliv-strategi 2018). These resulted to new kind of communication with the market and new purchasing practices: all contract awards start with some kind of market dialogue depending on the product / service category and contract type: preparations for a new contract can start months or even years prior to the actual award, contract follow-ups became a part of everyday life, category management and procurement strategies were introduced and implemented¹³, category level procurement calendars and plans are drafted well in advance and the market is informed of upcoming procurements through different communication measures in advance. Nacka has made efforts also in designing the documents so that administration of bidding would be easier. The procurement documents, division into lots or bundling of different contracts are designed so that they reflect the market realities and characteristics. There is a continuous dialogue with the market extending also to post-award phase. According to Nacka, the public procurement rules do not prevent the use of good and business friendly practices. Not only has the new approach increased the number of bidders significantly, it is said to have generated savings, and moreover, there has not been almost any cancellations due to lack of competition.

Concerns relating to public procurement and legal proceedings

Public procurement is facing also a lot of practical challenges beyond the concerns on effective competition and the number of bidders. During the interviews, it became apparent that there are causes for concern in relation to the skills and reputation of public procurement, the procedures and bidding in practice and paying too much attention to law and worrying about possible post-award legal proceedings.

It seems that there is a need to understand public procurement framework and practice better. *The lack of knowledge is affecting the reputation and leading to misunderstandings both in the media, in politics and affecting companies' motivation to bid.* Trying new purchase methods or attracting new bidders is not an easy task if the general atmosphere is negative and full of misconceptions. Contacting authorities were also seen as having a role in this: they should be more approachable, making their procurement plans more transparent, define functions instead of detailed

¹² Nacka agreed using it as an example of how a contracting authority can increase the number of bids through adopting different procurement practices.

¹³ See further on what Nacka is doing in practice, Svenskt Näringsliv 2019 at 72–75.

requirements and descriptions, enforcing the requirements and terms throughout the contract period (effective follow-ups) and improving their dialogue and communication methods towards the market. The need for professionalization of public buying and public buyers is currently a top priority for European Commission as well (European Commission 2017b).

Some interviewees argued that many of the procurement contracts are still too large for SMEs. This finding is in line with the results of earlier survey by Företagarna (2016). One interest organisation for Swedish businesses noted that many contracting authorities do not trust small businesses' capabilities to perform a contract. Contract management is also considered more complicated if there are many suppliers instead of one. Thus, many contracts are not divided into lots. On the other hand, micro-companies and SMEs are partly to blame as well. They often find it easier to become a subcontractor for a larger firm rather than bidding themselves even though the contract award would allow bids into separate lots. There is also a feeling of loyalty towards the bigger players if most of SME's business is coming through these operators.

Most of the persons interviewed identified *the post-award legal proceedings as one of the main concerns regarding public procurement*. Even though the appeals are only in about fourth of cases successful, the contracting authorities and the interest organisations for businesses found it to create problems for effective public procurement. That is, the combination of the uncertainty of court procedure's length and the automatic suspension, i.e., the prohibition to sign and execute the contract prior to court's decision, is very difficult in terms of securing provision of products and services for public authorities. Sometimes an appeal is considered as a personal critique towards the person responsible for the award. *Court proceedings come with a cost*. They generate significant costs for contracting authorities (SOU 2011:73, SOU 2018:44 and Lundgren & Eklind 2018) and to the winning bidder whose resources are bound to the contract in question. Interviewees argued that the financial risks for bidders are not as high as for contracting authorities as in case of unreasonable, cancelled or rejected appeal the appealing bidder very rarely has to pay the authority's costs.

More worrying than the appeals themselves, is the uncertainty of when the matter will be decided. This concern has previously been expressed also at official level (SOU 2018:44, UHM 2017). Due to this uncertainty, the contracting authorities find it very difficult to prepare for the interim period. As it is clear that certain products and services need to be purchased regardless of whether a procurement contract is suspended due to a court procedure, the contracting authorities have developed different methods to mitigate the risk of out-of-contract periods. Most of the interviewed contracting authorities have started to budget the possible appeal and court proceedings into the procurement plan meaning that contract award procedures are initiated 7-9 months earlier than usual. Such practice however can affect bidders' possibilities to give flat rates for the contract period if the award is taking place almost a year prior to the execution date. Moreover, a central

purchasing unit stated that sometimes there are overlapping contracts on same products and services ensuring that there is always a contract in place. On the other hand, sometimes there is a need to resort to a temporary direct award, as was explained by one of the interviewed contracting authorities, in order to secure the provision of products and services. Such temporary direct awards are not as such recognized in EU Public Procurement Directives or in Swedish Procurement Act, but in Finland the possibility to conclude a temporary direct award contract for the length of court proceedings is confirmed both by national legislation and case law.¹⁴ Interim arrangements, whatever sort, are available only for continuous product or services contracts. In case of works contract or other type of investment or project contract which cannot be fulfilled “temporarily”, the appeal causes delays and thereto related costs as work is suspended for the length of the whole proceedings.

Certain solutions to mitigate the risk of court proceedings were also presented during the interviews. First, an interest group for businesses submitted that contracting authorities interpret public procurement rules too strictly, which leads to situations where bids are rejected due to minor faults or shortcomings that could be completed or clarified within the procedure. Here the example of the Netherlands and their official guidance set out by the Dutch Proportionality Guide (2019) were brought up as a potential solution to increase the number of bids and to decrease the number of unhappy bidders (by reducing the number of rejections on the basis of minor issues). Second solution, which is perceived to be very effective in reducing the appeals is a practice, where a contracting authority personally contacts all bidders via telephone after the contract has been awarded and award decision sent. During this phone call, the contracting authority goes through the award procedure, evaluation of bids and explains the grounds for the award and how the bidder and winning bidder were scored. This personal contact and oral explanations along with official written justifications has been appreciated by the bidders and seen to reduce the appeals, especially the legally less strong ones that are often filed due to irritation of losing in the contract award.

¹⁴ According to s. 153 of the Finnish Public Procurement and Concessions Contract Act 1397/2016:

- (1) If a procurement has been appealed to the Market Court, then the contracting entity may arrange the procurement on an interim basis unless the nature of the procurement prevents its deferral for the duration of proceedings at the Market Court;
- (2) The interim arrangement of a procurement may not prevent a decision of the Market Court granting the appellant’s claim for: 1) annulling the decision of the contracting entity in whole or in part; 2) prohibiting the contracting entity from applying an incorrect point in a procurement document or otherwise adhering to an incorrect procedure; or 3) ordering the contracting entity to rectify its incorrect procedure.

3 Quantitative analysis

3.1 Data

According to Swedish Competition Authority (2018), there isn't any Swedish public authority currently collecting public procurement information from the Swedish market and unlike in many other EU member states, there is no national contract notice platform for public procurement. Instead, there are four private market operators providing such solutions. One of the largest operators is Visma Commerce AB (Visma), which provides information on about all public procurement contracts advertised in Sweden both below and above EU thresholds. Besides their own platform, Visma collects data concerning Swedish public procurements through sourcing systems, databases, and the web pages of contracting authorities. Moreover, data is collected from contract documents, contract award documents and court case documents. This report is based on the data provided by Visma, which has generated the data by its own initiative and without any intervention by public authorities or the authors. Thus, the data collection process cannot be checked or evaluated by the authors.

The database contains information on most contract notices advertised in Sweden for the years 2012-2018. We limit our analysis to a subset of the data by including only the normal contract notices that are meant for competitive bidding.¹⁵ With this restriction, we have 131,601 contract awards in the data. Among these data, we keep those 14,022 contract awards that are cancelled (*Avbruten*), because it is likely many of them have been cancelled because of the lack of competition.¹⁶ Unfortunately, there is no data on reasons for cancelling award procedures, and thus, we cannot detail how many of these are cancelled due to lack of competition. As the data covers only advertised contracts, there is no information on directly awarded contracts regardless of whether awarded in accordance with public procurement rules or not. Similarly, the contracts awarded within a framework agreement are not covered in the data.¹⁷

The Visma data contains information on the contracting authority and some details on contract award such as the contract award criteria, that is, whether they use best price-quality ratio rules or price only to decide on the winner. The data also contain information on who are the bidders, but for most of the contract awards it does not unfortunately contain information on the bids, the winning price nor the expected

¹⁵ In the database, these are recorded as "*Meddelande om upphandling*" in Swedish. All other document types are excluded, such as pre-announcements, direct procurement and concessions.

¹⁶ Morawetz (2019) argues that the lack of competition is in fact one of the most common reasons for cancellation. Also our interviews support this view.

¹⁷ The contracts based on a framework agreement are not openly advertised in contract notice platforms, but in case of mini-competition are advertised only among the pre-selected suppliers, see Art. 33 of 2014/24/EU and LOU 7 Kap. 9 §.

value of the contract award, even though the latter is mandatory information to be included in a contract notice according to national and EU rules.¹⁸ We also use the information on whether the contract awards ended up being litigated. One bidder can be registered maximum one time per contract award, even though same bidder can in some rare cases have submitted multiple bids on the same contract award even when the contract award is not divided into many lots. Additionally, there is no information on lots within divided contracts. Hence, it is impossible to analyse of whether a bidder have submitted a bid for a single lot or to several lots within the contract in question. This means that the number of bidders is not always comparable with the number of bids submitted although this ambiguity can be alleviated to some extent by controlling for observing multiple winners. Thus, for the purposes of analysis within this report the term “bid” is used as a synonym for a “bidder”.¹⁹

In many cases, the contract information has certain limitations, for example due to failure of contracting authorities to provide adequate information. For example, among our sample of 131,601 contract awards the contract award criteria is missing for 7.8% of the contract awards and information on the number of bidders is missing for 22.9% of the contract awards.

There could be many reasons for the Visma data not having bidder data for a particular contract award; no bidders, the procurement has been cancelled, or the contracting authorities have used another platform for advertising the contract and have not shared detailed information with Visma. While it seems very plausible that having no bidders contributes substantially to the information missing from the Visma, we do not know the extent of this phenomenon. However, the information is missing more often in early years than later years, and this difference is unlikely to result solely from changes in the number of zero bids procurements and more to do with the data collection procedure. In the next section we make some indirect inference of this issue by comparing Finnish (Jääskeläinen and Tukiainen 2019) and Swedish data. The Finnish data contains detailed information on the number of bidders for all cases in their sample, including the zero bidder contract awards. For details of the Finnish data see Jääskeläinen and Tukiainen (2019).

3.2 Describing the level of competition

In Table 1, we report the share of contract awards with a given number of bidders from zero to eight (or more). All contract awards with more than eight bidders are

¹⁸ Art. 49 of the Public Procurement Directive 2014/24 requires a contracting authority to disclose in advance the estimated value of the contract, when publishing the contract notice and art. 50 sets out a duty to include the value of the winning bid to the award notice (published after the contract has been awarded).

¹⁹ Public procurement directives use the term “tenderer”, but we use economics literature convention of the term “bidder”.

pooled to the group “8+”. We do not distinguish between contract awards that have only one contract and multiple-contract contract awards, where there can be many winners, as the data does not consistently separate between these two.²⁰ We find the similar pathological lack of competition in Sweden as other have documented in EU in general, and in Finland and Sweden specifically (European Commission 2017, Jääskeläinen and Tukiainen 2019, KKV and UHM 2018).

For the Finnish case, we report both bidders from zero to 8+ and bidders from 1 to 8+ conditional on there being at least one bidder. For the Finnish case, there is full information also on the zero bidder cases. For the Swedish case, we report the same set of results but the group of zero bidders consists of contract awards with unknown number of bidders (there are 30204 cases of unknown number of bidders in our sample). Interestingly, the distribution of the number of bidders conditional on receiving at least one bid is almost identical for Finland and Sweden. This is not surprising as these neighbouring countries are in global comparison of roughly similar size and density and they have very similar economic and social institutions.

This similarity between the conditional distributions allows us reasonably to make a following extrapolation: It is likely that Finland and Sweden also have somewhat similar number of contract awards with zero bids. The fact that Finland has 8.5 pct. points larger share of contract awards with zero bids than Sweden has contract awards with unknown bids strongly suggests that a vast majority of the unknown cases are ones with zero bidders! Furthermore, it is also likely that also the selection process of having information on the number of bidders in the Visma data is biased as lacking any bids is at least one even if not the only reason for the missing information. The key lesson here is that analysing only contract awards with known number of bidders, that is, the conditional distribution, would lead to dramatic over-reporting of the extent of competition. Therefore, throughout our analysis we code unknown number of bidders as contract awards with zero bidders. This will certainly lead to some amount of under-reporting the extent of competition, but it is very likely to be dramatically less of an issue than omitting them from the analysis. However, to get bounds of the extent of competition, we also report the conditional distributions and study the robustness of the regression analysis to that sample selection.

With the classification of unknown cases as zero bidders, for Sweden, about 23% of contract awards intended for competition do not have any bidders, about 15% have only one bidder and also about 15% have only two bidders. This means that more than half of the contract awards suffer from a severe lack of competition. Moreover, Table 1 is very likely understating the issue as we cannot split the multiple-contract contract awards for auction level analysis where the real competition takes place. Another reason for understating competition arises, because the data does not

²⁰ We refer to the entire contract award that may contain many contracts and “contract awards”. We refer to the individual contracts within the contracts divided into multiple lots as “auctions”.

contain information on which of the bidders qualified for evaluation. Furthermore, even attracting three or more bidders does not guarantee competition if the bidders are very different from each other in terms of their competitiveness (Cantillon 2008, Jääskeläinen and Tukiainen 2019). On the other hand, in some highly concentrated markets (oligopoly product market or remote region) it may not be possible to get more than two bidders, for example. Moreover, it is possible that in some cases, even two bidders can engage in intense competition.

Table 1. Number of bidders overall in Finland and Sweden

Bidders	Sweden			Finland		
	Contract awards	Share	Share (n>0)	Bidders	Share	Share (n>0)
Unknown/0	30,204	22.95		0	31.48	
1	19,649	14.93	19.38	1	15.53	22.66
2	20,280	15.41	20.00	2	14.16	20.67
3	18,015	13.69	17.77	3	11.28	16.47
4	12,976	9.86	12.80	4	8.03	11.72
5	9,014	6.85	8.89	5	5.08	7.41
6	5,986	4.55	5.90	6	3.64	5.31
7	3,995	3.04	3.94	7	2.36	3.45
8+	11,482	8.72	11.32	8+	8.43	12.31

In Table 2a (imputed zeros included), we document that about the same low level of competition persists throughout the period 2012-2018. In Table 2b (conditional on having at least one bidder), we see hints of a very small decline over the years in the mean number of bidders. It is surprising that competition has not declined substantially over the years, because in EU and Finland it has (European Commission 2017, Jääskeläinen and Tukiainen 2019). On the other hand, Bergman and Stake (2015) document for a (fairly small) sample of Swedish public procurement for years 2007-2008 higher mean and median number of bidders suggesting that decrease in the amount of competition in Sweden may have taken place sometime during 2008-2012. Our results in Table 2b are somewhat in contrast with earlier Swedish results (KKV and UHM 2018) results that the mean (conditional) number of bidders declines somewhat over the same period. The differences arise likely from us limiting the sample to normal contract award notices.

Table 2a. Number of bidders per year 2012-2018, unknown=0

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max	Share of unknown/0
2012-2018	131,601	2	3.31	5.02	0	233	22.95
2012	19,968	2	3.34	5.13	0	139	24.88
2013	19,805	2	3.40	5.01	0	148	23.47
2014	18,401	2	3.39	4.90	0	159	23.14
2015	18366	2	3.28	4.64	0	117	23.66
2016	18,345	2	3.27	4.72	0	102	22.29
2017	18,470	2	3.17	4.83	0	183	21.81
2018	18,246	2	3.35	5.79	0	233	21.18

Table 2b. Number of bidders per year 2012-2018, at least one bidder

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max
2012-2018	101,397	3	4.30	5.33	1	233
2012	15,000	3	4.44	5.49	1	139
2013	15,156	3	4.45	5.31	1	148
2014	14,143	3	4.42	5.17	1	159
2015	14,021	3	4.30	4.88	1	117
2016	14,255	3	4.20	4.97	1	102
2017	14,441	3	4.05	5.13	1	183
2018	14,381	3	4.25	6.22	1	233

Economic rationale, previous literature (e.g., Balat 2017) and our interviews suggest that the amount of competition may depend on the business cycle of the economy. All the interviewees (see Section 2) suggest that during market boom the interest to bid in public contract awards is low as contracts can be concluded easier with private contracting partners. Participating to a public contract award requires money and resources and it entails an uncertainty of to whom the contract will be awarded. Also based on the Finnish evidence, the entry barriers are substantial (Jääskeläinen ja Tukiainen 2019). The business cycle theory assumes that during boom, private market demand is so large that firms do not have the production capacity to bid in public procurement, whereas in bust, the firms have excess capacity, and thus, turn to competing also for public procurement contracts. This theory requires the assumption that private markets are more attractive to producers than the public procurement. This assumption is backed up by our interview results (see Section 2). In particular, during the interviews, the construction and IT services industries were seen specifically to feature this phenomenon. However, based on Tables 3a, 3b, 4a and 4b, no such pattern emerges. For construction, the amount of competition is quite stable over time, with some decrease in the conditional mean competition, whereas for the IT services the

mean number of bidders is decreasing quite a lot over time. In neither of these cases, is there any clear pattern of annual correlation between changes in GDP and the number of bidders. The limitation here is that we do not report sector specific GDP. However, industry specific business cycles are typically more pronounced than that of the overall economy, and thus, cannot explain the stable patterns in both cases (for example, based on our own calculations of Structural Business Statistics, growth rates of real turnover in the construction sector vary between 1-11% during this period and in IT even more). Thus, the reason for low competition cannot be convincingly found from the business cycles of the economy, at least in our very rough aggregate level analysis.

Table 3a. Number of bidders per year for construction (CPV=45), unknown=0

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max	GDP change
2012-2018	42,107	2	2.88	3.55	0	83	
2012	6,196	2	2.93	4.02	0	78	-0.3%
2013	6,388	2	3.11	3.98	0	71	1.2%
2014	6,126	2	2.98	3.54	0	83	2.6%
2015	6,110	2	2.80	3.14	0	47	4.5%
2016	6,110	2	2.80	3.14	0	62	2.7%
2017	5,920	2	2.66	3.11	0	46	2.1%
2018	5,486	2	2.88	3.56	0	83	2.4%

Table 3b. Number of bidders per year for construction (CPV=45), at least one bidder

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max	GDP change
2012-2018	30,280	3	4.00	3.61	1	83	
2012	4,309	3	4.21	4.23	1	78	-0.3%
2013	4,617	3	4.30	4.10	1	71	1.2%
2014	4,431	3	4.12	3.55	1	83	2.6%
2015	4,351	3	3.93	3.06	1	45	4.5%
2016	4,247	3	3.81	3.36	1	62	2.7%
2017	4,257	3	3.71	3.09	1	46	2.1%
2018	4,068	3	3.89	3.63	1	83	2.4%

Table 4a. Number of bidders per year for IT services (CPV=72), unknown=0

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max	GDP change
2012-2018	3,404	2	3.83	7.23	0	111	
2012	506	2	4.63	10.67	0	111	-0.3%
2013	502	2	4.68	8.79	0	77	1.2%
2014	457	2	3.61	7.07	0	88	2.6%
2015	484	2	3.44	4.66	0	40	4.5%
2016	497	2	3.63	6.35	0	69	2.7%
2017	490	2	3.40	4.52	0	44	2.1%
2018	468	2	3.34	6.10	0	59	2.4%

Table 4b. Number of bidders per year for IT services (CPV=72), at least one bidder

Year	Contract awards	Median	Mean	Std. Dev.	Min	Max	GDP change
2012-2018	2,626	3	4.96	7.88	1	111	
2012	401	3	5.84	11.69	1	111	-0.3%
2013	382	3	6.15	9.62	1	77	1.2%
2014	338	3	4.88	7.84	1	88	2.6%
2015	359	3	4.64	4.87	1	40	4.5%
2016	377	3	4.79	6.90	1	69	2.7%
2017	408	3	4.08	4.67	1	44	2.1%
2018	361	3	4.33	6.63	1	59	2.4%

In Tables 5a and 5b, we report descriptive statistics on the number of bidders for each type of contracting authority. Local Regions have on average and in median most competition whereas the state (and municipal) corporations have clearly the least. The difference between state corporations and others is smaller in Table 5b than in 5a suggesting that the very low median for state corporations in Table 5a is at least partly due to them providing less information to Visma than others. Despite these differences, it seems that the lack of competition is an issue for all types contracting authorities.

Table 5a. Number of bidders by contracting authority, unknown=0

Contracting authority	Contract awards	Median	Mean	Std. Dev.	Min	Max
Municipality	61,272	2	3.33	4.61	0	139
Municipal corporation	28,420	2	2.92	3.63	0	100
Regions	13,157	3	4.36	7.59	0	233
State agency	23,516	2	3.44	5.45	0	154
State corporation	2,638	0	1.79	4.43	0	61
Other	2,598	1	2.50	6.24	0	111

Table 5b. Number of bidders by contracting authority, at least one bidder

Contracting authority	Contract awards	Median	Mean	Std. Dev.	Min	Max
Municipality	48,565	3	4.20	4.81	1	139
Municipal corporation	20,456	3	4.05	3.70	1	100
Regions	10,876	3	5.27	8.06	1	233
State agency	18,893	3	4.29	5.77	1	154
State corporation	1,178	2	4.02	5.93	1	61
Other	1,429	3	4.54	7.85	1	111

In Tables 6a and 6b, we describe the number of bidders separately for nine different Swedish regions. All of these regions have contract awards by all the different contracting authority types. The regions are sorted in the Table 6a based on the mean number of bidders and 6b follows that same order. The pattern is as expected as the more densely populated regions such as Greater Stockholm and Skåne have the most competition and regions in Norrland the least. Nonetheless, the lack of competition is an issue across all regions as even in the Greater Stockholm the (unconditional) median number of bidders is only two. Therefore, the lack of potential bidders is unlikely to be the main driver of the lack of actual bidders.

Table 6a. Number of bidders by region, unknown=0

Region	Contract awards	Median	Mean	Std. Dev.	Min	Max
Greater Stockholm	21,432	2	3.72	6.00	0	128
Skåne	11,470	3	3.53	5.46	0	233
South-West	11,001	2	3.43	5.28	0	159
South Central	11,892	2	3.34	4.53	0	86
North Central	14,883	2	3.29	4.39	0	114
South-East	7,238	2	3.27	4.54	0	72
Address missing	29,786	2	3.23	4.88	0	183
East	9,167	2	3.12	4.99	0	148
Southern Norrland	7,953	2	3.03	4.62	0	154
Northern Norrland	6,779	2	2.51	3.69	0	81

Table 6b. Number of bidders by region, at least one bidder

Region	Contract awards	Median	Mean	Std. Dev.	Min	Max
Greater Stockholm	15,813	3	5.04	6.49	1	128
Skåne	9,183	3	4.40	5.78	1	233
South-West	8,544	3	4.41	5.61	1	159
South Central	9,665	3	4.11	4.70	1	86
North Central	12,052	3	4.06	4.54	1	114
South-East	5,718	3	4.14	4.75	1	72
Address missing	22,558	3	4.27	5.20	1	183
East	6,939	3	4.13	5.36	1	148
Southern Norrland	6,077	3	3.97	4.93	1	154
Northern Norrland	4,848	3	3.51	3.94	1	81

In Figures 1 and 2 and Table 7, we analyse the median level of competition across different industries at the 2-digit level CPV code. For brevity, we only report the unconditional results. The comparison across industries are very similar with the conditional measure. One practical challenge for this analysis is that many contract awards report multiple CPV codes. Therefore, we conduct two types of analysis. First in Figure 1, we classify one contract award under many CPV categories if the contract award lists many. This solution has the issue of counting many contract awards multiple times in the analysis. In the second analysis, in Figure 2, we use each contract award only once. This achieved by randomly sampling only one CPV per contract award among the ones reported. This avoids the issue of double counting, but introduces sampling variation to the results. However, based on both types of analysis, aside a few outliers, the pathological lack of competition is present in all industries. In Table 7, we report the industries that were outliers in the amount of competition in the second type of analysis (Figure 2).

Figure 1. Median number of bidders by 2-digit CPV classification. Allowing double counting of contract awards that report multiple different CPV codes

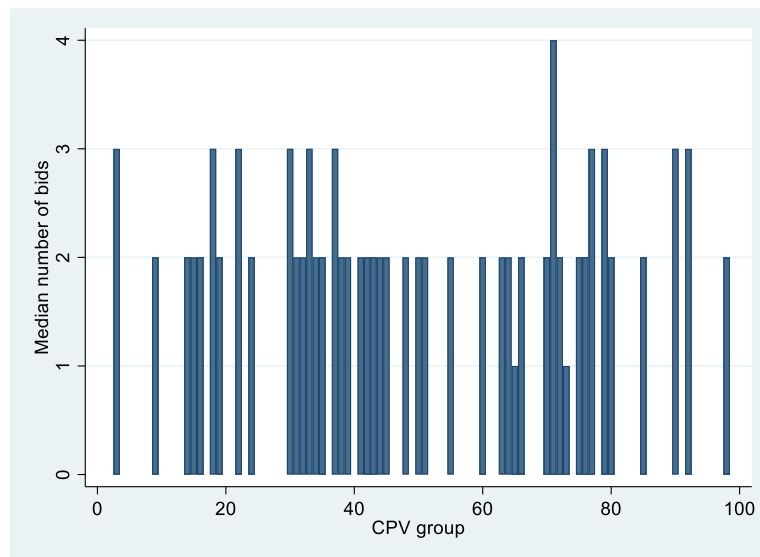


Figure 2. Median number of bidders by 2-digit CPV classification. Random selection of one CPV code for contract awards that report many

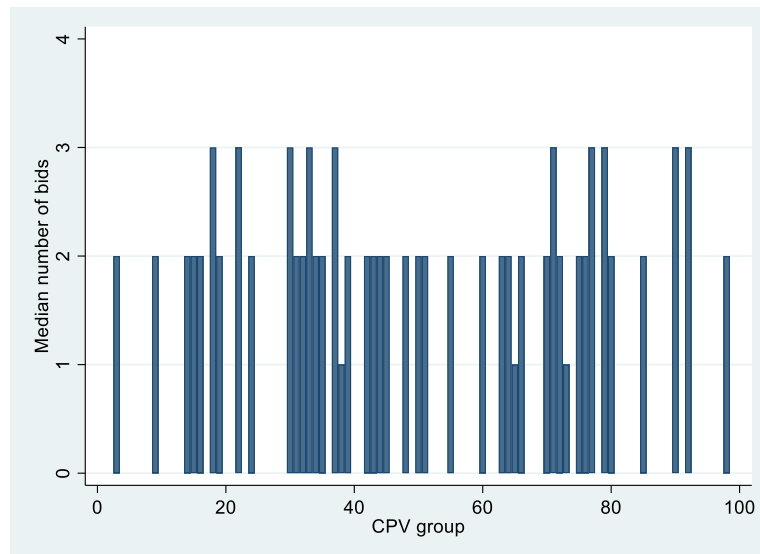


Table 7. Number of bidders in industries with the highest (3) or lowest (0 or 1) median number of bidders. Random selection of one CPV code for contract awards that report many

Industry	CPV	Median	Mean	Contract awards
Recreational, cultural and sporting services	92	3	7.34	927
Architectural, construction, engineering and inspection services	71	3	5.06	10,311
Business services: law, marketing, consulting, recruitment, printing and security	79	3	4.76	8,711
Medical equipments, pharmaceuticals and personal care products	33	3	4.52	5,133
Printed matter and related products	22	3	4.12	437
Sewage-, refuse-, cleaning-, and environmental services	90	3	3.50	7,384
Agricultural, forestry, horticultural, aquacultural and apicultural services	77	3	3.47	1,786
Office and computing machinery, equipment and supplies	30	3	3.15	1,491
Clothing, footwear, luggage articles and accessories	18	3	3.06	978
Musical instruments, sport goods, games, toys, handicraft, art materials	37	3	2.83	650
Research and development services and related consultancy services	73	1	2.39	298
Public utilities	65	1	2.23	357
Laboratory, optical and precision equipments (excl. glasses)	38	1	1.95	2,543
Collected and purified water	41	0	1.25	12

3.3 Determinants of competition

3.3.1 Contract award characteristics

Besides documenting the lack of competition, it is of fundamental importance to explain its determinants, with the goal of informing on the possible policy tools of affecting it. With this goal in mind, our second research question asks more rigorously what explains the number of bidders. We study quantitatively whether some features of the contract award criteria (for example use of best price-quality ratio), contract type (for example contract length and the use of CPV codes), industry, region, time and type of contracting authorities are predictive of the number of bidders. Moreover, we study do the predictions differ across industries. We begin by tabulating in Tables 8a and 8b the number of bidders overall (all industries) and for the 5 most common industries based on the 2-digit CPV codes by whether the auctions use best price-quality ratio or are price only auctions. We omit from this table contract awards that do not report this contract award criteria (i.e. whether contract is awarded with cost only or best price-quality ratio basis) at all.

In total, best price-quality ratio is used in about roughly half of the contract awards and these auctions attract slightly more bidders on average. There are substantial differences across the industries. Especially in construction work (CPV=45) but also in cleaning etc. (CPV=90), price only auctions are much more common, whereas in construction related services (CPV=71) and in business services (CPV=79) best price-quality ratio is much more common. Interestingly, in industries where best price-quality ratio is more common it also tends to correlate with more competition.

Table 8a. Number of bidders by the use of best price-quality ratio for the 5 largest industries, unknown=0

Industry	Best price-quality ratio	Contract awards	Median	Mean	Std. Dev.	Min	Max
All	Yes	57,377	2	3.43	5.16	0	183
All	No	63,972	2	3.20	4.37	0	148
CPV 45	Yes	13,358	2	2.89	4.03	0	83
CPV 45	No	25,644	2	2.94	3.21	0	83
CPV 71	Yes	5,556	3	5.18	6.26	0	63
CPV 71	No	3,895	3	4.68	5.42	0	114
CPV 79	Yes	5,573	3	4.81	6.07	0	114
CPV 79	No	2,490	3	4.57	6.49	0	139
CPV 90	Yes	2,752	3	3.65	3.67	0	31
CPV 90	No	4,173	3	3.48	3.27	0	42
CPV 34	Yes	2,500	2	1.95	1.79	0	19
CPV 34	No	2,505	2	2.06	1.91	0	16

Table 8b. Number of bidders by the use of best price-quality ratio for the 5 largest industries, unknown=0, at least one bidder

Industry	Best price-quality ratio	Contract awards	Median	Mean	Std. Dev.	Min	Max
All	Yes	44,496	3	4.42	5.48	1	183
All	No	50,675	3	4.04	4.55	1	148
CPV 45	Yes	9,359	3	4.13	4.26	1	83
CPV 45	No	19,280	3	3.91	3.15	1	83
CPV 71	Yes	4,626	4	6.22	6.37	1	63
CPV 71	No	3,305	4	5.52	5.48	1	114
CPV 79	Yes	4,616	4	5.81	6.23	1	114
CPV 79	No	2,127	4	5.35	6.71	1	139
CPV 90	Yes	2,232	4	4.50	3.58	1	31
CPV 90	No	3,537	3	4.11	3.16	1	42
CPV 34	Yes	1,993	2	2.44	1.67	1	19
CPV 34	No	2,023	2	2.56	1.80	1	16

Notes: Unit of analysis is contract award. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

In Table 10, we report the results of our key analysis on the determinants of competition. We use standard OLS multivariate regression analysis in order to condition the analysis on *observable* factors that could otherwise possibly confound the analysis. For example, if a particular type of contracting authority uses a lot of best price-quality ratio, we do not know to what extent a possible raw correlation with best price-quality ratio and competition arises from contracting authority types or from the use of best price-quality ratio itself. Regression analysis cleans out the role other factors in the model. Therefore, all the coefficients should be interpreted as conditional, that is, controlling for the other variables included in the model. Obviously, the coefficients nonetheless do not have a causal interpretation as there are likely to be many *unobserved* relevant variables that we cannot control for. Nonetheless, conditioning on the observables is still an improvement over the unconditional (raw) correlations reported in the previous subsection and in previous work (Swedish Competition Authority 2018).

All the regressions in Table 10 include year fixed effects to control for possible differences across the years, and calendar month fixed effects to control for possible within year seasonal effects such as end of a year being different than a beginning of a year or summer differing from winter (Liebman and Mahoney 2017). According to calendar fixed effects there are most bidders in January (not reported). We also include region fixed effects to control for regional differences (reported in Table 6). When using the whole sample, we also control for the 2-digit CPV code fixed effects to control for the different levels of competition across industries (reported in Figure 2). We do not report the coefficients for these fixed effects for brevity (for example, each different CPV code has its own coefficient making full Table 10 extremely long), as we want to focus on the contracting authority types (same types as in Table 5) and contract and mechanisms design. The coefficients are broadly in line with these descriptive tables reported earlier.

Coefficients for contracting authority dummies *Municipal corporation*, *Regions*, *State agency*, *State corporation* and *Other* should be contrasted to the level in the reference group *Municipalities*. *Best price-quality ratio* gets value one if best price-quality ratio criterion is used and zero otherwise. We include in the zero also those contract awards where this contract award criteria is unknown. To control for this, we include another dummy variable *Unknown mechanism*, that get value one if the use of best price-quality ratio versus price only is not reported and zero otherwise. Therefore, the coefficient of *Best price-quality ratio* can be interpreted as in contrast to using price only contract award criteria. *Many winners* is assigned a value one if more than one bidders were noted as the winners and zero otherwise. This is our proxy for contract that are divided in multiple lots. *# of CPV codes* notes the how many different CPV codes the contract award reports. *Contract length* is the total contract length in days, including both the actual contract and the possible options. *"In TED"* is a dummy variable for being included in the TED database, that is, contract is above EU threshold. This dummy is a crude proxy for the size of the contract and the extent of contract notice's transparency, which we have to resort to as most of the contract awards do not include the expected value in our data, which

is in fact surprising when taking into account that there is a duty under Art. 49 of the Public Procurement Directive 2014/24 to disclose in advance the estimated value of the contract, when publishing the contract notice and art. 50 sets out a duty to include the value of the winning bid to the award notice (published after the contract has been awarded). We describe these variables in Table 9. Table 9 does not show the statistics for the various dummy variables that constitute the fixed effects, because the interesting ones are already described in Table 2,5 and 6.

Table 9. Descriptive variables on the main variables used in the regression analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
Number of bidders (8+)	131,601	2.79	2.49	0	8
Number of bidders	131,601	3.31	5.02	0	233
Best price-quality ratio	131,601	0.44	0.50	0	1
Unkown mech	131,601	0.08	0.27	0	1
Many winners	131,601	0.17	0.37	0	1
# of CPV codes	131,601	4.35	3.29	1	99
Contract length (days)	131,601	796	836	0	14603
In TED	131,601	0.32	0.47	0	1

We report in Table 10 the main analysis where unknow number of bidders is coded as zero bidders. In Table A1, we show that the results are robust to including only auction with at least one bidder. We redefine the outcome variable (the number of bidders) such that all values over 8 get a value 8. This is done so that we focus on the region essential for changes in competition intensity. From the point of the view of the contracting authority and the tax payers, the intensity of competition does not essentially change if we have 20 or 10 bidders per auction, but it does increase substantially if we have 3 instead of 2 competitive bidders. The results are mainly robust to not doing this transformation on the outcome variable (Table A2 in the Appendix). The results are also robust to using regression estimation techniques that account for the discrete nature of the outcome variable (see Table A3 for ordered logit and Table A4 for Poisson regression). We prefer to report and discuss the OLS results instead in the main text, because the coefficients have then a clear interpretation of being marginal effects, that is, we can interpret the coefficients such that one unit increase (for the dummies this means having a value one instead of a zero) in the given explanatory variable is associated with a change in the number of bidders equivalent to the reported coefficient. The results are also mainly robust to omitting those contract awards, where there is possibly more uncertainty on the precision of our number of bidders information (Table A5). Such uncertainty may arise in the Visma database when information has been collected from other sources than their own system. We proxy these cases as having two conditions met: First, the number of bidders equals the number of winners, and second, Visma did not record the number of bidders information on their main contract award datasheet.

Based on the results in Table 10, the contracting authorities show exhibit similar conditional correlations as the unconditional correlations in Table 5: State corporations have by far the least bidders, and also municipal corporations have statistically significantly less bidders than municipalities (reference group). *Contract length* is negatively associated with the number of bidders in construction, construction services and transport equipment but not overall or in the other industries. However, the result for construction is not reliable as for that particular industry the data does not contain accurate information. However, it is not large in magnitude. For example, coefficient -0.0003 means that 1000 days longer contracts (mean is 796) are associated with 0.3 less bidders. The number of reported CPV codes (*# of CPV codes*) is positively associated (one more CPV code is associated with 0.026 more bidders) with the number of bidders overall and in all industries expect cleaning services. If this correlation would indicate causal relationship, a potential interpretation could be that reporting many CPV codes attracts the attention of more potential bidders who automatically receive contract notices under pre-specified CPV codes. For obvious reason, the *Many Winners* dummy has a large positive association, because it mechanically captures the contracts that are divided into multiple lots, even though it is not a perfect measure of dividing into lots as other types of contracts can have multiple winners too. That result cannot be interpreted to indicate whether a contract divided into lots is better than an undivided, single contract, because we do not observe the relevant comparison of bidders per lot. Not specifying the contract award criteria (*Unknown mechanism*) is negatively associated with competition suggesting that perhaps revealing as much information as possible is good for attracting competition (Milgrom and Weber 1982) or it may be just an overall measure of unprofessional – and illegal – contract advertisement.

The most interesting results in Table 10 perhaps relate to the using of contract award criteria (whether the contract is awarded on cost-only or best price-quality ratio basis). Previous reports on Swedish procurement data suggest that the use of *best price-quality ratio* attracts more bidders (KKV and UHM 2018). Our findings do not confirm such conclusion. While overall in whole sample the use of best price-quality ratio criterion is not associated in a statistically significant way with the number of bidders, there is interesting heterogeneity in this association across the industries. The heterogeneity was first revealed in the interviews. The expressed views were in part conflicting: some claimed that the use of best price-quality ratio criterion has positive effects and some stated the opposite. Nonetheless, when examples of effects were requested, it became clear that the conflicting views concerned different industries. The hypothesis of differences in business culture across industries was also tested through quantitative analysis, which confirmed the views expressed in the interviews. In particular, in construction, the use of best price-quality ratio auction is negatively associated with the number of bidders to the extent that use of best price-quality ratio predicts 0.3 less bidders. This seems like a large magnitude given the small mean and median number of bidders. On the other hand, in expert services best price-quality ratio criterion is positively associated with the number of bidders. Interestingly, best price-quality ratio was

relatively least common in the construction and most common in the expert services. This suggests that bidders seem to avoid procurement that uses mechanisms that are not typical for the industry. The lesson here is that appropriate planning of contract awards can increase competition, but one advice does not fit all cases. Jääskeläinen and Tukiainen (2019) report similar results for Finland, which both increases the reliability of these results and suggests that they travel to other contexts than Sweden.

The analysis in Table 10 cannot differentiate whether the observed correlations arise due to lack of entry or due to lack of potential bidders, in particular for the full sample. To address this, we check the robustness of the results while including fixed effects for the region times CPV code. That is, we have a separate fixed effect for each regional product market. While this is not a precise market definition, it can to some extent control for variations in the number of potential bidders. The industry specific regressions already address the issue with the regional fixed effects as they already concern only that specific industry. The results concerning the full sample all in practise identical to those in Table 10, and thus, not reported. This indicates that the observed patterns are likely to arise more from entry choices than from variations in the number of potential bidders.

Table 10. Regression analysis (OLS) on predicting the number of bidders per contract award for the 5 largest industries. The outcome variable is limited to a maximum of 8 bidders

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Best price-quality ratio	-0.092 [0.075]	-0.292*** [0.024]	0.056 [0.049]	0.194*** [0.056]	0.042 [0.059]	-0.036 [0.045]
Unknown mechanism	-0.400*** [0.113]	-0.708*** [0.041]	-0.321*** [0.094]	-0.163 [0.107]	-0.536*** [0.119]	-0.12 [0.110]
Many winners	3.149*** [0.104]	3.187*** [0.038]	3.583*** [0.053]	3.434*** [0.056]	2.501*** [0.067]	2.307*** [0.093]
# of CPV codes	0.026*** [0.004]	0.020*** [0.003]	0.033*** [0.008]	0.067*** [0.014]	-0.027* [0.015]	0.073*** [0.013]
Contract length	0 [0.0000]	-0.0001*** [0.0000]	-0.0003*** [0.0000]	0 [0.0000]	0 [0.0000]	0.0003*** [0.0000]
In TED	0.213*** [0.030]	0.252*** [0.032]	0.165*** [0.054]	0.158*** [0.059]	0.495*** [0.062]	0.100** [0.048]
Municipal corporation	-0.205*** [0.049]	-0.286*** [0.025]	-0.266*** [0.064]	-0.230** [0.091]	-0.258*** [0.064]	-0.100* [0.058]
Regions	-0.019 [0.064]	0.028 [0.055]	0.259** [0.109]	-0.196** [0.081]	-0.137 [0.128]	-0.209** [0.103]
State agency	-0.092 [0.086]	-0.023 [0.038]	-0.438*** [0.068]	-0.033 [0.066]	0.787*** [0.087]	-0.073 [0.083]
State corporation	-1.454*** [0.086]	-1.326*** [0.072]	-1.249*** [0.236]	-1.896*** [0.113]	-1.621*** [0.172]	-1.520*** [0.128]
Other	-0.864*** [0.065]	-0.859*** [0.063]	-1.280*** [0.207]	-1.125*** [0.202]	-0.26 [0.365]	0.267 [0.472]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131601	42107	10311	8711	7384	5314
R ²	0.277	0.2	0.354	0.302	0.199	0.205

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

3.3.2 Bidder characteristics

In this subsection, we turn to analysing the role of bidder characteristics in competition. While we cannot analyse the entry decision itself, because we cannot observe the set of potential bidders as these data are not collected, we can analyse the determinants of winning the contract award among the set of bidders. We look at how some bidder and contract award characteristics or their interactions predict the winner of the contract as this may be indirectly indicative of potential entry barriers, such as bid preparation costs that our interviews and previous survey evidence indicated. Our data is very limited in information on the bidders, but in future work it should be possible to add more bidder characteristics to the data if it is linked to for example Statistics Sweden firm register data (see (KKV and UHM 2018 for an example). Due to this limitation, we focus on a proxy measure of bidder size or experience.

In the analysis in Table 11, we classify bidders to three groups: *Low bidding activity* (participate in 1-10 contract awards in our data), *Medium bidding activity* (participate in between 11-500 contract awards in our data) and *High bidding activity* (participated in more than 500 contract awards). We run an OLS regression (linear probability model) on whether a given bidder wins a given contract award using bidder level data. We include all the same variables as in the previous analysis (Table 10) and the bidder group dummies (*Low bidding activity* group is the reference group). We find that the pattern of results is roughly the same across industries. The results are also robust to using logit estimation (Table A6 in the Appendix) and limiting the sample to best price-quality ratio auctions only (Table A7 in the Appendix). We find that *Medium bidding activity* positively predicts winning and *High bidding activity* bidders win relatively less than the *Low bidding activity* bidders. Of course, *High bidding activity* bidders still win a lot of contract awards overall, but only due to the large participation rates, but not due to high winning probabilities. This result indirectly suggests that perhaps the entry barriers hit, in particular, *Low and medium bidding activity* bidders even if they would be efficient, as they do relatively well when they participate. This is consistent with the previous survey evidence. For example, Företagarna (2016) argues that participation level is subject to the size of the company. This result is also surprising as it suggests that companies are not learning to become better bidders and to win more contracts through high bidding activity. The result may also indicate that investing resources rather into drafting good bids, instead of producing high quantity of bids, pays out in higher likelihood of winning. The results may also reflect some small bidders focusing on few specific local contracts, but being unwilling or unable to participate more widely, but that does not explain difference between *Medium and High bidding activity* firms.

Table 11. Regression analysis (LPM) on predicting bidder winning (in) the contract award

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Medium bidding activity	0.011** [0.004]	0.017*** [0.003]	-0.007 [0.005]	0.020*** [0.005]	0.007 [0.006]	0.022** [0.010]
High bidding activity	-0.110*** [0.017]	-0.130*** [0.003]	-0.042*** [0.005]	-0.048*** [0.006]	-0.044*** [0.007]	-0.298*** [0.013]
Contract award type controls	Yes	Yes	Yes	Yes	Yes	Yes
CA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	466436	132987	53983	42951	27175	11759
R ²	0.145	0.119	0.132	0.13	0.138	0.141

Notes: Unit of analysis is bidder. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

3.3.3 Quantitative case study

In our interviews, Nacka municipality is viewed as exemplary case for increasing competition and adopting market friendly procurement practices. Since mid-2016 Nacka has adopted new purchasing policy (Nacka Inköspolicy 2017) and process guidance (Nacka Inköpsprocessen 2016) and has set market friendly procurement one of its most important objective of its business strategy (Nacka Näringslivstrategi 2018). For example, the municipality is to create prerequisites for small-business-friendly procurement and to support innovative and entrepreneur friendly business culture through developing early stage procurement dialogues and follow-ups in order to benefit of the suppliers' innovations, development and market knowledge (Nacka Näringslivstrategi 2018). These new guidelines have led to establishment of novel purchasing procedures. Market friendly approach, dialogue throughout the contract's cycle and SME friendly practices are also underlined at the purchase policy level (Nacka Inköspolicy 2017). First, all contract awards start with some kind of market dialogue depending on the product / service category and contract type well in advance. Second, category management and procurement strategies were introduced and implemented, category level

procurement calendars and plans are drafted well in advance, and the market is informed of upcoming procurements through different communication measures in advance. Third, Nacka has made efforts also in designing the documents so that administration of bidding would be easier. The procurement documents, division into lots or bundling of different contracts are designed so that they reflect the market realities and characteristics. There is a continuous dialogue with the market extending also to post-award phase. Fourth and relatedly, contract follow-ups became a part of routine. Our interview results suggest that these measures were a success.

Here, we analyse whether our quantitative data is consistent with the qualitative results. To understand better whether the increased competition in Nacka can be attributed to the changes in their public procurement practices or some other factors, we conduct difference-in-differences (DID) analysis. Contract awards in Nacka constitute the treatment group. The control group consists of four municipalities that are of similar size and similar contract award activity in our data as Nacka. The idea is to look whether changes in the amount of competition after they changed their procurement practices are specific to Nacka or do they happen also elsewhere in similar municipalities. We define the treatment period as 2017 and 2018, and estimate a separate treatment effects for these two years. In Table 12, we analyse the same two number of bidders measures as before, the one where missing information is coded as zero bidders, and the other where we omit all zero bidder cases. We also analyse contract award cancellations. For all outcomes, we report the standard DID equations, and thus, it includes the year FE, the baseline for Nacka, and the interaction between Nacka Dummy and the two after period dummies. The effects of interest are the coefficients for $Nacka*2017$ and $Nacka*2018$. They tell how much more competition (or propensity to cancel) changed in Nacka in 2017 (or 2018) than it changed in the control group. In the other three columns, we add the same extensive set of controls as in the previous analyses to check that the changes in competition do not result from possible changes in the composition of contract awards.

The cancellation result is not statistically significant. According to the competition results, the procurement practices reform in Nacka managed to increase the number of bidders by about one bidder. This is an important achievement. For example, Jääskeläinen and Tukiainen (2019) estimate for Finland that increasing competition by one bidder is associated with 5-10% decrease in procurement costs.

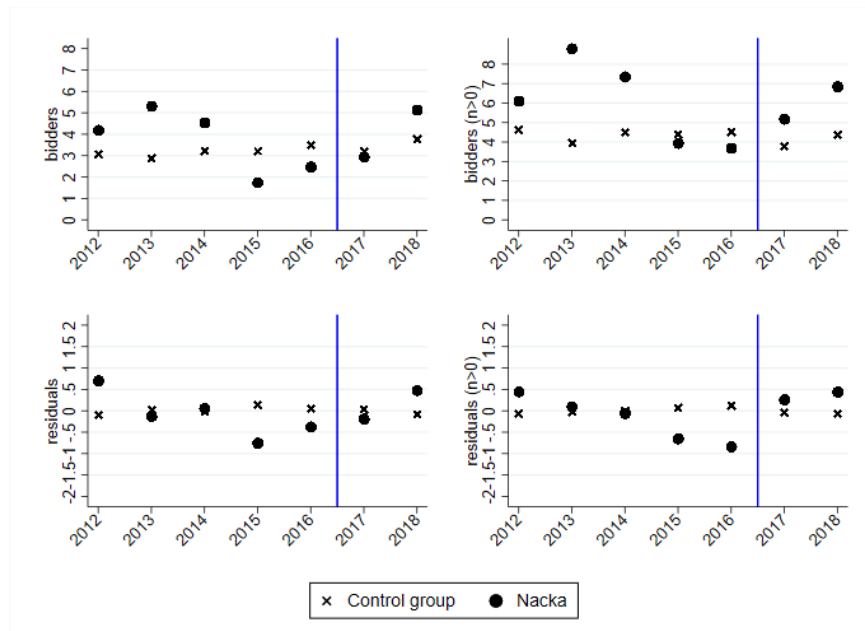
In Figure 3, we evaluate whether the competition result can be plausibly causal. If absent of changes in the procurement practices, Nacka would have followed the same trend as the control group, DID estimates a causal effect. This assumption can be indirectly tested with the common pre-treatment trends test. Based on Figure 3, our control group does not follow the same trend as Nacka in the pre-period. The control group is quite stable in trend, whereas Nacka is more volatile and has roughly a decreasing trend. Therefore, causal interpretation is not warranted, but nonetheless, our evidence is consistent with the efforts in Nacka being successful.

Table 12. Difference-in-differences analysis of Nacka reform

	Bidders	Bidders	Bidders (n>0)	Bidders (n>0)	Cancelled	Cancelled
Nacka (2012-2016)	-0.233 [0.173]	-0.561* [0.283]	0.417* [0.221]	-0.346 [0.247]	0.001 [0.017]	-0.013 [0.029]
Nacka*2017	-0.092 [0.348]	-0.043 [0.244]	0.626 [0.577]	0.556* [0.300]	0.016 [0.033]	0.04 [0.041]
Nacka*2018	0.988* [0.544]	0.761*** [0.261]	1.126** [0.550]	0.774*** [0.259]	-0.034 [0.041]	-0.028 [0.039]
Tender type fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CA fixed effects	No	No	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Standard errors	Clustered (CPV)	Clustered (CPV)	Clustered (CPV)	Clustered (CPV)	Clustered (CPV)	Clustered (CPV)
N	3529	3529	2611	2611	3529	3529
R ²	0.01	0.296	0.02	0.297	0.004	0.056

Notes: Unit of analysis is contract award. Treatment group is Nacka and control group consists of four municipalities of similar population as Nacka. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level.

Figure 3. Difference-in-differences analysis of Nacka



3.4 Determinants of litigation

The analysis in the previous subsections allows us to understand what features at the control of the contracting authorities can influence the extent of competition. In particular, we show that in some industries using price only contract award combined with certain mandatory quality requirements instead of using best price-quality ratio rules may attract more competition, whereas the opposite may be true for some other industries. In this subsection, we analyze whether there are possible side effects of pro-competition contract and auction design. In particular, we study the litigation risks related to observed contract award characteristics.

Because the heterogenous association between the best price-quality ratio rule and the number of bidders is the most interesting results arising in the previous section, we begin by describing the occurrence of litigation when best price-quality ratio is used and when not, overall and for the 5 largest industries in Table 13. Overall, 7.45% of contract awards are litigated in Sweden. In comparison, in 2018 the equivalent percentage in Finland is much lower: approximately 3,12%.²¹ In Sweden the variation across the reported industries (and with or without best price-quality ratio rule) is substantial as the share varies between 4.40% and 9.92%. While the overall between industry differences are larger than the within-industry between-contract award criteria differences, the latter differences are also in some cases non-negligible. For example, in construction, best price-quality ratio is associated with 1.5 percentage points higher propensity to litigation, but in transport equipment with 1.5 percentage points lower propensity.

²¹ This percentage is based on reported amount of contract notices, direct award notices and contract change notices (excluding PIN notices, award notices and seasonal notices). In 2018 there were 13,258 notices (a total of 17,022 notices were reported) of such notices and 413 complaints to the Finnish Market Court. These figures are retrieved from websites of the Finnish contract notice platform HILMA www.hankintailmoitukset.fi and of the Market Court markkinaoikeus.fi

Table 13. Occurrence of litigation by contract award rule for the 5 largest industries

Industry	Best price-quality ratio	Contract awards	% Litigation
All	All	131 601	7,45 %
All	Yes	57 377	8,11 %
All	No	63 972	6,96 %
CPV 45	All	42 107	6,96 %
CPV 45	Yes	13 358	6,31 %
CPV 45	No	25 644	4,81 %
CPV 71	All	10 311	6,11 %
CPV 71	Yes	5 556	6,77 %
CPV 71	No	3 895	5,21 %
CPV 79	All	8 711	9,30 %
CPV 79	Yes	5 573	9,24 %
CPV 79	No	2 490	9,92 %
CPV 90	All	7 384	8,52 %
CPV 90	Yes	2 752	8,54 %
CPV 90	No	4 173	8,41 %
CPV 34	All	5 314	5,25 %
CPV 34	Yes	2 500	4,40 %
CPV 34	No	2 505	5,95 %

Based on the results in Table 14, the contracting authority type is associated to some extent with litigation risk. Overall, state agencies and corporations and municipal corporations have less litigation than municipalities and Regions have more (after controlling for other variables in the model such as the number of bidders that also varies across these types). Moreover, there is some variation across industries in these associations. *Contract length* is systematically positively associated with litigation across all industries such that 1000 days longer contract is associated with 2 percentage points higher litigation risk. If taken literally, it can reflect that more important contracts are litigated more often, for example, because the losing bidders cannot afford to lose them. This argument is supported by also EU contracts being litigated much more often. Similar results were reported also by the National Agency for Public Procurement (2017) after conducting interview-based research: contract of higher value were litigated more often. On the other hand, litigation costs are also less relevant in the case of contracts of high value and thus do not set a barrier for complaint. The number of reported CPV codes (*# of CPV codes*) is positively associated litigation in the full sample and in two specific industries. It is unclear to us why this is the case given that these estimates are conditional on controlling for the number of bidders. A potential explanation is that multiple CPV codes can indicate complexity, and thus, more room for errors or complaints. The *Many Winners* dummy is in most cases not statistically significant nor is specifying the contract award criteria (*Unknown mechanism*).

Interestingly, litigation risks increase with the number of bidders. One more bidder increases litigation risks by about 0.4-1.3 percentage points depending on the industry. This is a very large effect related to the baseline risks reported in Table 13. This means that the goal of achieving more competition can be at odds with the goal of avoiding litigation. It also suggests one possible mechanism through which the contracting authorities are not incentivized to attract more competition. As in particular litigation implies very high administrative costs to contracting authorities (SOU 2011:73, annex 6, SOU 2018:44 and Lundgren & Eklind 2018), and even in general more bidders imply higher administrative costs to the contracting authorities (e.g., Kang and Miller 2017, and Section 2), contracting authorities have reasons to avoid more bidders. This is in contrast with the tax payers' incentives.

We see in Table 14 that overall (in full sample) best price-quality ratio is associated in a statistically significant way with about 0.5 percentage point higher litigation risk. Contracting also loses the court cases more often based on Table 15. On the other hand, the contract awards where best price-quality ratio has been used are also often more vague (Bergman and Lundberg 2009, 2013) and thus leaves more room for litigation. These correlations are similar in Finland (Hyytinen *et al.* 2015). However, there is interesting heterogeneity in this association across the industries. In particular, in construction and construction services, the use of best price-quality ratio auction is positively associated with litigation, whereas in the other industries the association is not statistically significant and sometimes the coefficient is even negative. Therefore, especially in construction the tools to attract competition and avoid litigation are complements as avoiding litigation seems to be beneficial for both goals. The litigation results are robust to using logit specification (Table A7).

Table 14. Regression analysis (LPM) on predicting contract award being litigated

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Number of bidders (censored at 8+)	0.00930*** [0.00194]	0.00425*** [0.00055]	0.00445*** [0.00100]	0.00839*** [0.00131]	0.00976*** [0.00158]	0.01274*** [0.00271]
Best price- quality ratio	0.00561** [0.00268]	0.01053*** [0.00258]	0.01327*** [0.00493]	-0.00945 [0.00719]	0.00062 [0.00698]	-0.00877 [0.00645]
Unknown mechanism	0.00267 [0.00291]	0.00083 [0.00404]	0.01002 [0.00911]	-0.01741 [0.01202]	0.02262 [0.01465]	0.00028 [0.01503]
Many winners	-0.00542 [0.00724]	0.0028 [0.00525]	0.00466 [0.00671]	0.03219*** [0.00924]	-0.01579 [0.00967]	-0.02336 [0.01507]
# of CPV codes	0.00143** [0.00055]	0.00064** [0.00030]	0.00352*** [0.00101]	-0.00092 [0.00162]	0.00027 [0.00173]	0.00259 [0.00163]
Contract length	0.00002*** [0.00000]	0.00003*** [0.00000]	0.00002*** [0.00000]	0.00003*** [0.00000]	0.00002*** [0.00000]	0.00002*** [0.00001]
In TED	0.04317*** [0.00432]	0.03746*** [0.00416]	0.03003*** [0.00552]	0.01948** [0.00759]	0.05718*** [0.00703]	0.03314*** [0.00750]
Municipal corporation	-0.01139*** [0.00265]	-0.01549*** [0.00255]	0.00821 [0.00674]	-0.03236*** [0.00958]	0.00117 [0.00789]	-0.0119 [0.00822]
Regions	0.01913*** [0.00691]	-0.0008 [0.00620]	0.03409** [0.01371]	0.03782*** [0.01213]	0.00955 [0.01991]	-0.00627 [0.01456]
State agency	-0.01459*** [0.00309]	-0.01884*** [0.00382]	-0.00287 [0.00675]	-0.02260*** [0.00778]	-0.01905** [0.00915]	0.00025 [0.01130]
State corporation	-0.03512*** [0.00707]	-0.04459*** [0.00584]	-0.00248 [0.02106]	-0.0125 [0.01544]	-0.01887 [0.02003]	0.04184 [0.03634]
Other	-0.01589* [0.00886]	-0.03379*** [0.00532]	0.00605 [0.02050]	0.02869 [0.02518]	-0.06677*** [0.01940]	0.18516** [0.08762]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131601	42107	10311	8711	7384	5314
R ²	0.036	0.023	0.025	0.033	0.029	0.038

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Based on Table 15 (and similarly for logit specification in Table A8), the contracting authority wins the much more likely court cases with a high number of bidders. This indicates that having many bidders results, in particular, in unnecessary complaints. This suggests that these could be also avoided. Our interviews indicate that litigation risk could be managed by contracting authorities to certain extent through novel and personal communication methods. Similarly, in earlier interview-based research good communication skills and the ability to sincerely discuss bidder's concerns regarding the concluded contract award evaluation has been considered to lower the risk of litigation (National Agency for Public Procurement 2017). For example, a Swedish central purchasing body adopted a technique where companies are – in addition to involving them into the market dialogue stage when planning the procurement by allowing them to comment documents for upcoming public contract awards – after the contract award decision has been made contacted via telephone by the contracting authority. During this call the award decision and evaluation of contract awards is explained even though the relevant information has already been submitted to them in writing. Since engaging in this practise, the amount of complaints towards this contracting authority's decisions has dropped significantly which can further be confirmed through the data as in 2018 only about 4% of their contract awards were litigated whereas during 2012-2017 about third of their contract awards were litigated.

Table 15. Regression analysis (LPM) on predicting contracting authority winning the litigation court case

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Number of bidders (censored at 8+)	0.01859*** [0.00261]	0.01554*** [0.00453]	0.01002 [0.00928]	0.01389* [0.00773]	0.02927*** [0.00825]	-0.01081 [0.01489]
Best price- quality ratio	-0.04744*** [0.01398]	-0.09694*** [0.02369]	-0.02861 [0.04200]	-0.04608 [0.03491]	-0.05419 [0.04470]	-0.16516** [0.07639]
Unkown mechanism	-0.03322** [0.01582]	-0.02264 [0.04821]	-0.01062 [0.07792]	-0.06739 [0.07278]	0.06585 [0.06778]	0.01475 [0.14456]
Many winners	0.04899*** [0.01449]	0.08357*** [0.03164]	0.15277*** [0.05722]	0.03893 [0.04022]	0.00008 [0.04974]	0.10736 [0.09656]
# of CPV codes	-0.00560*** [0.00130]	-0.00463* [0.00260]	-0.00462 [0.00526]	-0.01743** [0.00864]	-0.0062 [0.01013]	-0.03533** [0.01608]
Contract length	-0.00002*** [0.00001]	-0.00002 [0.00002]	-0.00005* [0.00003]	-0.00003 [0.00004]	-0.00002 [0.00003]	0.00004 [0.00004]
In TED	0.00871 [0.01444]	0.03936 [0.02566]	-0.06813 [0.05051]	0.04522 [0.03589]	0.09845* [0.05529]	-0.13081* [0.07317]
Municipal corporation	0.01056 [0.01074]	0.01862 [0.02505]	0.00574 [0.04632]	-0.06257 [0.07539]	0.06122 [0.04461]	-0.02155 [0.11676]
Regions	0.05002*** [0.01446]	0.0031 [0.05835]	0.10755 [0.06788]	0.04264 [0.04739]	-0.04706 [0.10961]	-0.1016 [0.15681]
State agency	0.02479 [0.02120]	0.04108 [0.04067]	-0.0565 [0.05891]	0.05822 [0.03910]	-0.06682 [0.06667]	0.11402 [0.10219]
State corporation	0.0528 [0.05403]	-0.03537 [0.11814]	-0.56690*** [0.11984]	-0.06607 [0.10699]	0.28311** [0.12799]	-0.01012 [0.48317]
Other	0.02457 [0.03556]	-0.01085 [0.14299]	-0.27606 [0.28524]	-0.03388 [0.13160]	0.70839*** [0.14085]	0.24047 [0.16023]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	7171	1621	462	628	490	190
R ²	0.057	0.07	0.153	0.113	0.179	0.252

Notes: Unit of analysis is contract award. Sample consists of litigated contract awards. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

4 Conclusions

It is important to point out that there are some limitations in our quantitative analysis both due to the data limitations and the limitations in the research design. With this kind of procurement data and quantitative methods we cannot assess what kind of impact more detailed contractual terms or requirements set out to bidders in the procurement documents have on the interest in bidding. Furthermore, we do not observe the know-how or practices of the contracting authorities. Moreover, we do not have an as-good-as-random research design to study causal effects. Therefore, the statistical analysis will reveal only associations and conditional correlations rather than effects.

Our first policy conclusion is a call for better data, which has recently progressed as a result of adopting new legislative proposal on procurement data in Sweden (Ds 2017:48 and Prop. 2018/19:142) As to the data, ideally, all contract awards would need to be announced on an online platform and these data would be publicly available in a centralized location (there can one or many of these and they can be private or public, but they should submit information to same central data base). All platforms would be required to collect and share following information, and contracting authorities would have to provide this information: 1. Details of the contract awards, including for example how many lots it consists of and details of each lot, including the expected value. Also details of the contract award criteria are important such as details of the possible best price-quality ratio criterion and sub-criterion related thereto. 2. All the bids and the resulting scores on all the lots and the winner of each lot. 3. Key post-auction outcomes such as litigation and how much the actually billing has been until the end of contract. The last feature is important because sometimes there are large cost overruns. In practise, this is difficult to implement and would likely require new regulation and billing systems. Nonetheless, this is a desirable goal.

Secondly there is a need for better research designs. Contracting authorities should use randomized controlled trials to learn best practices. For example, we find that the length and size of the contract, the extent of audience receiving contract notice (both at the level of amount of CPV codes and whether a TED notice is published) and how much information contract notices contain, has a correlation with the number of bidders. These and also the use of best price-quality ratio versus price only auction (with minimum quality requirements) can be easily randomly alternated across contract awards to learn the causal effects of different rules.

This would be an important avenue as our results suggest that this feature can be an important determinant of competition and its influence varies across industries. Therefore, experimentation is required as one solution does not fit all cases.²²

Despite these limitations in data and research design, we have been able to uncover interesting new patterns in the data. Moreover, our qualitative analysis complements the quantitative one and sheds more light on the detailed practices that may be relevant in attracting competition and mitigating litigation risks. Moreover, we have uncovered several interesting associations that are robust across various specifications and are conditional on fairly large amount of control variables. Furthermore, we have uncovered patterns that are often similar in Finland (Hyytinen *et al.* 2015, Jääskeläinen and Tukiainen 2019) and consistent with our qualitative evidence improving the reliability of the results.

One of the most interesting results relate to the using best price-quality ratio criterion. While overall in the whole sample the use of best price-quality ratio is not associated in a statistically significant way with the number of bidders, there is interesting heterogeneity in this association across the industries. The heterogeneity was first revealed in the interviews. The expressed views were in part conflicting: some claimed that the use of best price-quality ratio rules has positive effects and some stated the opposite. Nonetheless, when examples of effects were requested, it became clear that the conflicting views concerned different industries. Accordingly, we find that in construction, the use of best price-quality ratio auction is negatively associated with the number of bidders to the extent that use of best price-quality ratio predicts 0.3 less bidders. On the other hand, in expert services best price-quality ratio is positively associated with the number of bidders. Interestingly, best price-quality ratio was relatively least common in the construction and most common in the expert services. This suggest that bidders seem to avoid procurement that uses mechanisms that are not typical for the industry. The lesson here is that appropriate planning of contract awards can increase competition, but one advice does not fit all cases. Jääskeläinen and Tukiainen (2019) report similar results for Finland, which both increases the reliability of these results and suggests that they travel to other contexts than Sweden.

We found that *Medium bidding activity* positively predicts winning and *High bidding activity* bidders win relatively less than the *Low bidding activity* bidders. This result indicates that perhaps the entry barriers hit, in particular, *Low and medium bidding activity* bidders even if they would be efficient, as they do relatively well when they participate. This is consistent with our interview results and the previous survey evidence that in particular small firms see public procurement as too burdensome.

²² Similar recommendation of trials with a control group is also done in an earlier research which looked into the methodology of using an obligation to employ a person who is outside of active employment market (such as long-term unemployed person) during the contract term as this is the only way of draw conclusions of effects of new practices (Anxo, Eriksson and Karlsson 2017).

Third policy recommendation would be to increase contracting authority's procurement competence and knowledge. Building public sector purchasing competence is a priority also for European Commission.²³ It seems that the market knowledge, understanding of a particular sector characteristics and early communication with the market operators are important in increasing competition. Our results are encouraging when it comes to mimicking the procurement approach in Nacka. Their comprehensive and careful new approach combined with strategic and political support and decisions to conducting procurement seems to encourage more competition based on both qualitative and quantitative findings. This is encouraging as it means that contracting authorities can create better outcomes with their own effort. We recommend that similar approaches would be adopted elsewhere. Ideally, this could be rolled out to new authorities using randomized controlled trials for example at municipal level to learn its causal effects.

Our litigation analysis reveals that attracting competition and avoiding litigation may be conflicting goals as the number of bidders increases litigation risks. It also suggests one possible mechanism through which the contracting authorities are not incentivized to attract more competition. As in particular litigation implies very high administrative costs to contracting authorities (SOU 2011:73, bilaga 6, SOU 2018:44 and Lundgren & Eklind 2018), and even in general more bidders imply higher administrative costs to the contracting authorities (e.g., Kang and Miller 2017), contracting authorities have reasons to avoid more bidders. This is in contrast with the tax payers' incentives. On the other hand, litigation resulting from high number of bidders are often likely to be unnecessary as contracting authority is more likely to win these court cases. Our interviews suggest that litigation risk could be managed by contracting authorities to certain extent through novel and personal communication methods.

We also find that the use of best price-quality ratio rules is associated with more litigation and also with contracting authority losing the court cases. This implies that avoiding litigation and increasing competition are not always conflicting goals. Especially in construction the tools to attract competition and avoid litigation are complements as avoiding best price-quality ratio rules seems to be beneficial for both goals.

²³ See more on the professionalisation of public buyers initiative at https://ec.europa.eu/info/policies/public-procurement/support-tools-public-buyers/professionalisation-public-buyers_en (visited 10 December 2019).

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Appendix A. Robustness analysis

Table A1. Regression analysis (OLS) on predicting the number of bidders per contract award for the 5 largest industries. Only contract awards with at least one bidder are included

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Scoring	-0.022 [0.0648]	-0.1874*** [0.0254]	0.0976** [0.0486]	0.2712*** [0.0569]	0.1521*** [0.0587]	0.0174 [0.0454]
Unkown mechanism	0.2127** [0.0931]	-0.0641 [0.0524]	0.2953*** [0.0988]	0.4060*** [0.1158]	0.1238 [0.1309]	0.3182** [0.1323]
Many winners	2.3165*** [0.1125]	2.1161*** [0.0385]	2.5502*** [0.0544]	2.6768*** [0.0570]	1.7754*** [0.0670]	1.6984*** [0.0924]
# of CPV codes	0.0415*** [0.0057]	0.0313*** [0.0029]	0.0642*** [0.0078]	0.0885*** [0.0138]	-0.0056 [0.0152]	0.0824*** [0.0140]
Contract length	0 [0.0000]	-0.0001*** [0.0000]	-0.0002*** [0.0000]	0 [0.0000]	0 [0.0000]	0.0003*** [0.0000]
In TED	0.1159*** [0.0352]	0.0443 [0.0329]	0.1865*** [0.0549]	0.0077 [0.0602]	0.4148*** [0.0627]	0.0524 [0.0488]
Municipal corporation	-0.0483 [0.0575]	-0.1459*** [0.0268]	-0.1262* [0.0645]	-0.0454 [0.0934]	0.1702*** [0.0647]	-0.0591 [0.0585]
Regions	-0.0183 [0.0639]	-0.0644 [0.0555]	0.1833* [0.1035]	-0.1425* [0.0818]	-0.2663** [0.1201]	-0.0867 [0.1090]
State agency	-0.1717* [0.0963]	-0.1514*** [0.0394]	-0.5925*** [0.0684]	-0.0639 [0.0659]	0.7132*** [0.0854]	0.1594* [0.0895]
State corporation	-0.9020*** [0.1353]	-0.4212*** [0.1348]	-0.7747** [0.3388]	1.2440*** [0.1766]	0.9422*** [0.2924]	0.9213*** [0.2814]
Other	-0.3596*** [0.0659]	-0.3536*** [0.0833]	-0.6599** [0.2857]	-0.1335 [0.2722]	0.154 [0.4089]	0.4941 [0.4839]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	101397	30280	8518	7193	6052	4212
R ²	0.251	0.158	0.295	0.246	0.174	0.21

Table A2. Regression analysis (OLS) on predicting the number of bidders per contract award for the 5 largest industries. The outcome variable is not limited

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Scoring	-0.107 [0.100]	-0.283*** [0.036]	0.353*** [0.103]	0.272** [0.138]	0.145* [0.080]	-0.016 [0.049]
Unknown mechanism	-0.005 [0.248]	-0.589*** [0.064]	1.236*** [0.305]	0.447 [0.333]	-0.521*** [0.161]	-0.081 [0.128]
Many winners	5.568*** [0.478]	4.865*** [0.090]	6.688*** [0.163]	7.006*** [0.217]	3.284*** [0.122]	2.555*** [0.127]
# of CPV codes	0.100*** [0.019]	0.097*** [0.012]	0.314*** [0.035]	0.304*** [0.045]	-0.032 [0.021]	0.082*** [0.016]
Contract length	0 [0.000]	0 [0.000]	-0.000** [0.000]	0 [0.000]	0 [0.000]	0.000*** [0.000]
In TED	0.361*** [0.057]	0.344*** [0.058]	0.381*** [0.116]	0.457*** [0.145]	0.710*** [0.082]	0.124** [0.051]
Municipal corporation	-0.296*** [0.066]	-0.376*** [0.035]	-0.490*** [0.143]	-0.559*** [0.163]	-0.407*** [0.082]	-0.129** [0.060]
Regions	0.335 [0.205]	0.408*** [0.117]	0.891*** [0.282]	0.211 [0.245]	-0.278 [0.187]	-0.201* [0.121]
State agency	-0.043 [0.156]	0.036 [0.062]	-0.167 [0.161]	-0.111 [0.163]	1.208*** [0.133]	-0.077 [0.092]
State corporation	-1.600*** [0.197]	-1.147*** [0.160]	0.722 [1.045]	-2.443*** [0.226]	-1.785*** [0.224]	-1.594*** [0.133]
Other	-0.697*** [0.197]	-0.785*** [0.095]	-1.720*** [0.370]	-1.154*** [0.407]	-0.118 [0.508]	0.996 [0.904]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131601	42107	10311	8711	7384	5314
R ²	0.218	0.224	0.282	0.244	0.198	0.209

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Table A3. Regression analysis (Ordered logit) on predicting the number of bidders per contract award for the 5 largest industries. The outcome variable is limited to a maximum of 8 bidders

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Scoring	-0.092 [0.059]	-0.244*** [0.020]	0.045 [0.038]	0.086** [0.042]	-0.011 [0.046]	-0.017 [0.052]
Unknown mechanism	-0.512*** [0.086]	-0.740*** [0.039]	-0.361*** [0.082]	-0.264*** [0.090]	-0.562*** [0.108]	-0.367*** [0.134]
Many winners	2.362*** [0.081]	2.357*** [0.032]	2.585*** [0.047]	2.407*** [0.048]	1.786*** [0.051]	2.372*** [0.090]
# of CPV codes	0.021*** [0.003]	0.018*** [0.002]	0.030*** [0.007]	0.046*** [0.011]	-0.025** [0.012]	0.061*** [0.013]
Contract length	0 [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	0 [0.000]	0.000* [0.000]	0.000*** [0.000]
In TED	0.196*** [0.022]	0.247*** [0.026]	0.122*** [0.043]	0.137*** [0.045]	0.362*** [0.049]	0.153*** [0.056]
Municipal corporation	-0.213*** [0.034]	-0.257*** [0.021]	-0.239*** [0.052]	-0.227*** [0.071]	-0.205*** [0.051]	-0.118* [0.069]
Regions	-0.007 [0.054]	0.087* [0.044]	0.235*** [0.089]	-0.144** [0.062]	-0.025 [0.094]	-0.359*** [0.111]
State agency	-0.063 [0.068]	0.013 [0.031]	-0.295*** [0.053]	-0.058 [0.050]	0.592*** [0.069]	-0.177* [0.101]
State corporation	-1.545*** [0.096]	-1.389*** [0.078]	-1.131*** [0.211]	-1.739*** [0.103]	-1.630*** [0.186]	-2.425*** [0.272]
Other	-0.915*** [0.069]	-0.845*** [0.064]	-1.216*** [0.190]	-1.203*** [0.177]	-0.375 [0.310]	0.074 [0.556]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131601	42107	10311	8711	7384	5314
Pseudo R ²	0.069	0.05	0.095	0.082	0.049	0.055

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Table A4. Poisson regression analysis on predicting the number of bidders per contract award for the 5 largest industries. The outcome variable is limited to a maximum of 8 bidders

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Scoring	-0.033 [0.028]	-0.111*** [0.009]	0.012 [0.013]	0.052*** [0.016]	0.011 [0.018]	-0.016 [0.023]
Unknown mechanism	-0.154*** [0.050]	-0.308*** [0.021]	-0.095*** [0.027]	-0.052 [0.032]	-0.196*** [0.046]	-0.072 [0.057]
Many winners	0.854*** [0.026]	0.894*** [0.011]	0.860*** [0.015]	0.800*** [0.014]	0.640*** [0.016]	0.787*** [0.028]
# of CPV codes	0.009*** [0.001]	0.007*** [0.001]	0.008*** [0.002]	0.017*** [0.003]	-0.009* [0.005]	0.026*** [0.005]
Contract length	0 [0.000]	-0.000*** [0.000]	-0.000*** [0.000]	0 [0.000]	0 [0.000]	0.000*** [0.000]
In TED	0.074*** [0.010]	0.085*** [0.011]	0.044*** [0.015]	0.043*** [0.016]	0.154*** [0.020]	0.042* [0.024]
Municipal corporation	-0.075*** [0.018]	-0.109*** [0.010]	-0.065*** [0.016]	-0.065** [0.026]	-0.085*** [0.021]	-0.05 [0.031]
Regions	-0.005 [0.022]	0.008 [0.019]	0.059** [0.026]	-0.053** [0.021]	-0.043 [0.040]	-0.100** [0.046]
State agency	-0.029 [0.029]	-0.011 [0.014]	-0.124*** [0.020]	-0.011 [0.018]	0.224*** [0.024]	-0.033 [0.041]
State corporation	-0.720*** [0.047]	-0.632*** [0.053]	-0.412*** [0.102]	-0.750*** [0.071]	-0.833*** [0.138]	-1.379*** [0.242]
Other	-0.374*** [0.037]	-0.418*** [0.037]	-0.427*** [0.092]	-0.381*** [0.084]	-0.092 [0.132]	0.118 [0.182]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131601	42107	10311	8711	7384	5314
Pseudo R ²	.	0.08	0.134	0.117	0.077	0.069

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Table A5. Regression analysis (OLS) on predicting the number of bidders per contract award for the 5 largest industries. The outcome variable is limited to a maximum of 8 bidders. Omit contract awards with more uncertainty on the number of bidders

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Scoring	-0.0076 [0.0643]	-0.1716*** [0.0257]	0.0868* [0.0486]	0.2767*** [0.0573]	0.1869*** [0.0589]	0.0113 [0.0463]
Unkown mechanism	0.2705*** [0.0907]	-0.001 [0.0534]	0.2825*** [0.1007]	0.4330*** [0.1178]	0.2260* [0.1325]	0.3475** [0.1366]
Many winners	2.3365*** [0.1165]	2.1304*** [0.0388]	2.6102*** [0.0547]	2.6937*** [0.0573]	1.7760*** [0.0670]	1.7602*** [0.0956]
# of CPV codes	0.0400*** [0.0057]	0.0291*** [0.0029]	0.0515*** [0.0082]	0.0855*** [0.0140]	-0.0094 [0.0156]	0.0791*** [0.0141]
Contract length	0 [0.0000]	-0.0001*** [0.0000]	-0.0002*** [0.0000]	-0.0001 [0.0000]	0 [0.0000]	0.0003*** [0.0000]
In TED	0.1542*** [0.0363]	0.0796** [0.0334]	0.2349*** [0.0552]	0.0524 [0.0608]	0.4761*** [0.0633]	0.0529 [0.0498]
Municipal corporation	-0.0023 [0.0641]	-0.1190*** [0.0270]	-0.0376 [0.0646]	-0.0203 [0.0940]	-0.1571** [0.0651]	-0.0047 [0.0603]
Regions	-0.022 [0.0666]	-0.0948* [0.0559]	0.1573 [0.1035]	-0.1557* [0.0823]	-0.2296* [0.1188]	-0.0944 [0.1107]
State agency	-0.1731* [0.0964]	-0.1693*** [0.0397]	-0.5805*** [0.0691]	-0.0408 [0.0663]	0.7168*** [0.0855]	0.1403 [0.0911]
State corporation	-0.5693*** [0.1011]	-0.2341 [0.1458]	-0.207 [0.4149]	-0.6886*** [0.2224]	-0.3502 [0.3178]	-0.8065** [0.3327]
Other	-0.2331*** [0.0747]	-0.2956*** [0.0846]	-0.5797* [0.3076]	0.1576 [0.2787]	0.2667 [0.4311]	0.379 [0.5195]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	97331	29009	8212	6934	5843	4035
Pseudo R ²	0.257	0.163	0.306	0.248	0.185	0.216

Table A6. Regression analysis (Logit) on predicting bidder winning (in) the contract award

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Medium bidding activity	0.060*** [0.023]	0.098*** [0.015]	-0.031 [0.025]	0.105*** [0.024]	0.047 [0.034]	0.101** [0.045]
High bidding activity	-0.581*** [0.097]	-0.717*** [0.017]	-0.207*** [0.023]	-0.260*** [0.033]	-0.242*** [0.037]	-1.551*** [0.075]
Contract type chars	Yes	Yes	Yes	Yes	Yes	Yes
CA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	466436	132987	53983	42951	27175	11759
Pseudo R ²	0.145	0.119	0.132	0.13	0.138	0.141

Notes: Unit of analysis is bidder. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Table A7. Regression analysis (OLS) on predicting bidder winning (in) the contract award in the sample of scoring auctions

		Construction	Construction services	Expert services	Cleaning services	Transport equipment
	All	CPV 45	CPV 71	CPV 79	CPV 90	CPV 34
Medium bidding activity	0.005	0.011**	-0.007	0.014**	0.029***	0.035**
	[0.005]	[0.005]	[0.007]	[0.006]	[0.010]	[0.014]
High bidding activity	-0.105***	-0.138***	-0.032***	-0.044***	-0.023**	-0.310***
	[0.021]	[0.006]	[0.006]	[0.008]	[0.011]	[0.019]
Contract type chars	Yes	Yes	Yes	Yes	Yes	Yes
CA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	209666	42669	29691	27769	10569	5376
R ²	0.176	0.167	0.155	0.143	0.173	0.165

Table A8. Regression analysis (Logit) on predicting contract award being litigated

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Number of bidders	0.1269***	0.0826***	0.0802***	0.1034***	0.1184***	0.2057***
(censored at 8+)	[0.0135]	[0.0102]	[0.0180]	[0.0158]	[0.0185]	[0.0385]
Scoring	0.0864*	0.2056***	0.2347**	-0.1166	-0.0044	-0.1823
	[0.0444]	[0.0491]	[0.0918]	[0.0850]	[0.0925]	[0.1398]
Unkown mechanism	0.0019	-0.0089	0.177	-0.256	0.2611	-0.0198
	[0.0475]	[0.0952]	[0.1693]	[0.1698]	[0.1772]	[0.2650]
Many winners	-0.0887	-0.0135	0.0352	0.3009***	-0.1812	-0.4225*
	[0.0809]	[0.0685]	[0.1059]	[0.0911]	[0.1117]	[0.2244]
# of CPV codes	0.0179***	0.0106**	0.0488***	-0.0118	-0.001	0.0321*
	[0.0061]	[0.0053]	[0.0122]	[0.0194]	[0.0237]	[0.0185]
Contract length	0.0003***	0.0005***	0.0004***	0.0004***	0.0003***	0.0004***
	[0.0000]	[0.0000]	[0.0001]	[0.0001]	[0.0001]	[0.0001]
In TED	0.5761***	0.5570***	0.5308***	0.2211**	0.8029***	0.6249***
	[0.0538]	[0.0570]	[0.1029]	[0.0861]	[0.1074]	[0.1442]
Municipal corporation	-0.1930***	-0.3091***	0.1546	-0.4550***	0.0284	-0.2813
	[0.0513]	[0.0515]	[0.1116]	[0.1496]	[0.1020]	[0.2116]
Regions	0.2056***	-0.011	0.4551***	0.3664***	0.1251	-0.0921
	[0.0717]	[0.1093]	[0.1633]	[0.1127]	[0.2304]	[0.2629]
State agency	-0.2256***	-0.4194***	-0.0838	-0.2744***	-0.2606**	0.0273
	[0.0494]	[0.0876]	[0.1328]	[0.0975]	[0.1289]	[0.1987]
State corporation	-0.7022***	-1.2494***	-0.0742	-0.1579	-0.3715	0.6718
	[0.1839]	[0.2803]	[0.4708]	[0.2288]	[0.4629]	[0.4474]
Other	-0.3415*	-0.8765***	0.0688	0.329	-1.6374	1.6468***
	[0.1892]	[0.2002]	[0.4409]	[0.2521]	[1.0184]	[0.4836]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	131589	42107	10311	8711	7384	5314
Pseudo R ²	0.064	0.05	0.054	0.053	0.05	0.082

Notes: Unit of analysis is contract award. Standard errors are reported in the brackets. *** indicate statistical significance at 1% level, ** at 5% level and * at 10% level. CPV 45 = Construction work; CPV 71 = Architectural, construction, engineering and inspection services; CPV 79 Business services: law, marketing, consulting, recruitment, printing and security; CPV 90 Sewage-, refuse-, cleaning-, and environmental services; CPV 34 Transport equipment and auxiliary products to transportation.

Table A9. Regression analysis (Logit) on predicting contracting authority winning the litigation court case

	All	Construction CPV 45	Construction services CPV 71	Expert services CPV 79	Cleaning services CPV 90	Transport equipment CPV 34
Number of bidders (censored at 8+)	0.1077*** [0.0163]	0.0850*** [0.0256]	0.0659 [0.0567]	0.0970* [0.0541]	0.1931*** [0.0526]	-0.0882 [0.1021]
Scoring	-0.2755*** [0.0762]	-0.5318*** [0.1285]	-0.2277 [0.3108]	-0.3786 [0.2704]	-0.3157 [0.2815]	-1.1280** [0.4660]
Unkown mechanism	-0.1868** [0.0951]	-0.1388 [0.2698]	-0.1351 [0.5299]	-0.4586 [0.4964]	0.3958 [0.5070]	0.208 [1.1051]
Many winners	0.3465*** [0.0940]	0.5246*** [0.1950]	1.2271*** [0.4124]	0.3198 [0.3259]	0.0195 [0.3847]	0.8545 [0.7390]
# of CPV codes	-0.0317*** [0.0074]	-0.0259* [0.0143]	-0.0267 [0.0382]	-0.1219** [0.0541]	-0.0376 [0.0650]	-0.2944*** [0.1105]
Contract length	-0.0001*** [0.0000]	-0.0001 [0.0001]	-0.0004* [0.0002]	-0.0002 [0.0002]	-0.0001 [0.0002]	0.0003 [0.0003]
In TED	0.0555 [0.0828]	0.2405 [0.1497]	-0.4992 [0.3623]	0.2901 [0.2579]	0.5626* [0.3143]	-0.9940* [0.5171]
Municipal corporation	0.069 [0.0633]	0.1343 [0.1411]	0.0437 [0.3594]	-0.3018 [0.4404]	0.4306 [0.2979]	-0.1981 [0.7336]
Regions	0.2971*** [0.0975]	0.0005 [0.3285]	0.9538 [0.7044]	0.342 [0.3310]	-0.402 [0.6410]	-0.4529 [0.9694]
State agency	0.1533 [0.1351]	0.2336 [0.2573]	-0.3896 [0.3944]	0.5013* [0.2959]	-0.5702 [0.4373]	0.9103 [0.7434]
State corporation	0.314 [0.3230]	-0.1823 [0.6597]	0 [.]	-0.346 [0.5952]	0 [.]	0.1731 [1.9172]
Other	0.158 [0.2500]	-0.1165 [0.7393]	-1.4595 [1.2585]	-0.3171 [0.8467]	0 [.]	0 [.]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Month fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
CPV fixed effects	Yes	No	No	No	No	No
Standard errors	Clustered (CPV)	Robust	Robust	Robust	Robust	Robust
N	7170	1621	461	628	485	185
Pseudo R ²	0.053	0.063	0.154	0.118	0.161	0.25



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