Il sistema anti turbativa negli appalti pubblici: analisi critica e metodologica

The anti-disturbance system in public tenders: a critical and methodological analysis

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Abstract

The market of public contracts feeds most of the national construction market, with important repercussions on the country's professional and production associations, which have been suffering for a crisis that has now lasted for over 10 years. When the competition level rises, businesses increase rebates, with important repercussions for Public Administration on the stability of the subject matter of the contract, be it work, services or supply. After the new Code of Public Contracts was issued in 2016, and after the subsequent corrective measures of 2017 and the numerous ANAC Guidelines, the public consultation on the Code that recently came to an end demonstrated Italy's interest in unlocking this situation and understanding the issues of the stakeholders that operate in this sector.
Within this general framework, the aim of this article is to address in depth one of the more debated topics – the anomaly of the supply – and to highlight the impacts that the relevant regulations have on the way calls for tenders are carried out. The phenomenon will be presented and described both in terms of national legislation and in terms of the state of the art, at the international level as well; later we will apply the methods for determining the anomaly threshold provided for by the current legislation to some case studies, with the double aim to highlight their critical issues and orient future research in this field.

1 INTRODUCTION

The trends that have marked law making in the field of tenders and public contracts since 1994 – year of the promulgation of the so-called 'Merloni' Act (Act No 109/1994) – essentially derive from two great driving forces that have pushed law makers: the will to limit Administrations' discretion and the comparison with a European legislation that is increasingly aimed at Community harmonisation. In the past 24 years additional complications have emerged (the sector's crisis started in 2008, the gradual disappearance of small and medium-sized enterprises, the growth of public debt, etc.) that have influenced lasting corrupt behaviours and have exasperated the system of public contracts and their relevant regulation. The sort of legislation 'bulimia' (Polito Lectures, 2017) that derived from this – which is indicating of the crisis – presents contrasting principles, such as the conflicting objectives that inspired it to begin with.

The main problem of the current Code of Public Contracts (Legislative Decree No 50/2016) is the fact that it isn't possible to bring together some of its essential prerequisites: there is a soft law approach (Prizzon & Rebaudengo, 2017) but at the same time there is also rigidity, hyper-regulation, and a strong anti-trust component, while Public Administrations (PAs) are held back in a process – which is only temporary in the best case scenario – that is due to the brief duration of the transition period.

Notoriously, Public Administration invests public funds by 'acquiring' goods, services or by carrying out works through a call for tenders – a procedure that, by inverting the traditional roles of buyer and seller, aims to find the best market price for the goods in question. In this particular process, the meeting between supply and demand happens exactly when the bids received by the PAs are selected: this phase, which is emblematic for the efficient way it actualises the public interest, is aimed at achieving the best combination between high quality and low price level (Bergman & Lundberg, 20).

The goal of this article is to shed some light on the regulation regarding bids selection during calls for tenders, and in particular the way the anomaly threshold is determined. The analysis of the bids is a very good parameter to investigate market trends and the sector's crisis: as a matter of fact, in the past 5 years, the number of calls and the relevant sums have decreased, while what increased were the prerequisites demanded to participate to the calls, the businesses' territorial differentiation, the number of cases of appeal (article 89) and, most of all, the average awarding rebate (Studies Service of the Chamber, ANAC & CRESME, 2017).

This analysis will focus mainly on article 97, 'Abnormally low bids", which is one of the 29 topics of the Code that were submitted to public consultation by the Ministry of Infrastructures and Transport last summer, in view of a future proposal for reform that should this way welcome the opinions of multiple stakeholders. The participants' interest on the topic of anomaly, having totalised almost 7.1% of total contributions, resulted high, and mostly regarded requests for modification/integration (Ministry of Infrastructures and Transport, 2018).

After presenting the topic and setting it in a historical-regulatory framework, we will present two case studies, in which we will use all the methods described by the legislation for calculating the anomaly threshold and compare the results. Lastly, we will try to bring some clarity on this debated article of the Code, by analysing in depth the operational

consequences of the contractor's choice, in order to identify any possible issues that might orient future developments of the regulations.

2 ABNORMAL BIDS AND PUBLIC CONTRACTS MARKET

The contraction of the market, which is the result of the economic crisis begun in 2008, made competition even harsher; businesses have increased territorial mobility (the biggest ones have also tried to create new branches outside of their region of origin) and this triggered a phenomenon in which enterprises have rushed to rebate – which, in some cases, lead to low-cost bids, formulated with the sole purpose to keep the business going. The fact that margins are reduced to a minimum inevitably ends in a fragmentation of the activity needed to carry out the work: the number of subcontracts actually increases, even irregular ones that exceed the limit provided for by the regulation, with the result that the last link of the chain becomes weaker, often in a permanent way – small businesses, mostly artisans with a small number of workers, are crushed by the contract with the successful tenderer or the official sub-contractor, since this is often stipulated with very low or even no profit margins.

In these general conditions (less money available, decreasing number of calls for tenders, higher competition, increase of the complexity of regulations, etc.), the Code reformed the bids selection phase in two main ways:

- Optimising the selection method: limiting, at least at the level of principles, the use of the *best value* (now *lowest price*) method, in favour of a wider use of the *economically most advantageous tender criterion* (EMAT);
- Introducing another anti-disturbance setting in determining the anomaly threshold for the lowest price criterion: the rule for determining this limit value can no longer be found *a priori* in the tender notice, but it is set in a totally random way, by randomly drawing between the methods provided for by the legislation.

With regards to the selection through the method of the EMAT, article 83 of the Code states that, when the contract is awarded this way, '*the tender notice establishes the criteria to evaluate the offer, which pertain to the nature, the subject matter and the characteristics of the contract, such as, for example, price, quality and technical merit*', according to which the individual bids will be qualitatively evaluated.

Ideally, using a system that takes into account both the factors linked to price, as well as the ones linked to quality, should lead to formulating the best solution; however this theoretical vision clashes with problems in applying it that cannot be overlooked. In particular, at the national level, it appears that this system is in contrast with article 59, comma 1 of the Code, which prohibits to resort to an integrated call for tenders (joint awarding the executive planning and the execution of the works): if, in a works contract, there is an existing executive plan at the basis of the call for tenders – that is to say, a highly detailed plan ready for construction – how can the offers suggest consistent and significant design improvements? According to the Vice-Chairman of the Italian National Builders Association (in Italian: ANCE)[1], Mr Edoardo Bianchi, there has been no case (at least not until 9 October 2017) when the EMAT was used in which it was possible to

1 Italian National Builders Association

appreciate such improvements, while in most cases the contracting authorities ended up basing their evaluation on prerequisites that were completely irrelevant (Bianchi, 2017b). Not only that, but Mr Bianchi himself in another article (Bianchi, 2017a) talks about a '*real risk*', due to using the EMAT, that determines 'a maximum level of discretion, in terms of how the Contracting Authorities (CAs) select the successful tenderer.

At the international level, scientific research has found another big obstacle: the difficulty in building an *evaluative design* (Ballesteros-Pérez, Skitmore, Pellicer, González-Cruz, 2015) applicable to all situations, which constitute a heterogeneous range of types (services, supplying, works), of amount classes, of PAs (small and big, more and less qualified). In accordance with the recent measures of the European Council, and in light of the analysis of the state of the art, it can be said that, in general, the scientific community gives more space to studies on the EMAT, at the expense of the lowest price, which is seen as a non-transparent method that opens the door for operators and administrators to strategically manipulate the calls for tenders (Bergman & Lundberg, 2013). However, there are some exceptions to this line of thought: Ballesteros-Pérez, Skitmore, Pellicer & González-Cruz, 2015, for example, consider best value to be the best method from the point of view of transparency and efficiency, despite also defining it as a receptacle for problems of more procedural nature (more space to variants, with an increase in costs; high rate of controversies; lack of control on variables of time and quality) (Ballesteros-Pérez *et al.*, 2015). Another negative opinion on the EMAT comes from an analysis of Swedish public contract (Stake, 2017), according to which – and in contraposition to the more widespread belief in the European Community – the use of this method further pushes small and medium-sized businesses to exit the market, thus favouring major economic operators.

To then introduce the anti-disturbance method, some definitions are necessary. The expression *abnormally low bid* indicates an offer that is abnormally low compared to the extent of the services required by the tender notice, and one that, at the same time, raises suspicions that the bid itself might lack accuracy and that the agreed upon service might not be carried out correctly, because the bid doesn't guarantee the economic operator an adequate profit; evaluating the offer's anomaly falls under the scope of responsibility of the contracting authority, which must give its technical opinion on the bid's congruity, accuracy, sustainability and feasibility (ANAC – Italian National Anti-Corruption Authority).

The Code establishes that, after the anomaly threshold has been determined, the economic operators, upon request by the contracting authority, must offer explanations on the price or on the individual costs budgeted for in the bids if they appear to be abnormally low – that is to say, if they exceed in terms of numbers the "limit" value represented by the anomaly threshold. The methods for calculating this threshold differ based on the awarding criterion – be it lowest price or economically most advantageous tender.

The anti-disturbance method introduced by the new Code provides that, in calls for tenders of less than 2 million euros awarded to the *lowest pric*e, offers can be automatically excluded if they present rebate percentages that equal or surpass the anomaly threshold, drawing the mathematical criterion to identify the latter only during the call; 'with this expedient one should be able to avoid the risk of trusts being formed, greatly accelerating the procedures to award the contracts" (Latour & Salerno, 2017). It was indeed proved that, before the anti-disturbance method was introduced – so without automatic exclusion and a randomly drawn method – it was possible to predetermine the anomaly threshold,

and subsequently the best economic bid, by presenting some agreed upon similar offers (Bosetti Gatti & Partners).

The most recent articles in the literature tackle the topic of the bid's anomaly from three main fronts:

- Describing and analysing the phenomenon (Gunduz & Karacan, 2008; Hanák, 2016; Gunduz & Karacan, 2017);
- Investigating the predictability of the threshold (Ballesteros-Pérez *et al.*, 2015), and the businesses' behaviour (Ballesteros-Pérez & Skitmore, 2016; Ballesteros-Pérez, Skitmore, Pellicer & Zhang, 2016);
- Conducting probability studies to assess the risk of corruption (Conti & Naldi, 2008; Conti, De Giovanni & Naldi, 2012; Ballesteros-Pérez, González-Cruz, Cañavate-Grimal & Pellicer, 2013), also by developing *red flags* (Fazekas, Tóth & King, 2016).

The analysis of the state of the art showed that it is commonly believed that anomalous bids represent one of the biggest problems for PAs in managing expenditures. As a matter of fact, an anomalous bid could mean that the business is in a state of insolvency, and it unrealistically reduces the price 'betting' on its own survival (Calveras, Ganuza & Hauk, 2004): this scenario is based on the business probably minimizing its profits, safety obligations and cost of labour; alternatively, this situation – if it isn't promptly recognised – can lead to the price growing significantly during the works, through unexpected variants. Other cases cited by the abovementioned authors, though quite less frequent, are the so-called *predatory bidding* (abnormally low bids, made with the sole purpose to hinder another bidder) and *courtesy bidding* (when the business – just to make sure not to be forgotten by the PA – makes an increased offer, even though it isn't interested in winning the contract for which it is bidding).

Among the abovementioned lines of research, one is particularly interesting: the one regarding the development of an 'integrated system of indicators (*red flags*), which is susceptible to precisely identify the situations at risk of corruption, and thus orient the supervisory activity in a more focused way' (ANAC, 2018) – a line of thought shared by the Italian National Anti-Corruption Authority. The *red flags* system, applied to research on anomalous bids, is based on an alleged correlation between the presence of anomalous offers in a call for tenders and collusion phenomena that involves public officials. In this perspective, the anomalous bid is the one that hides collusive agreements between one or more operators and one or more Public Administration officials – this situation would represent the gravest scenario, because it includes all of the problems related to anomalous bids at the same time.

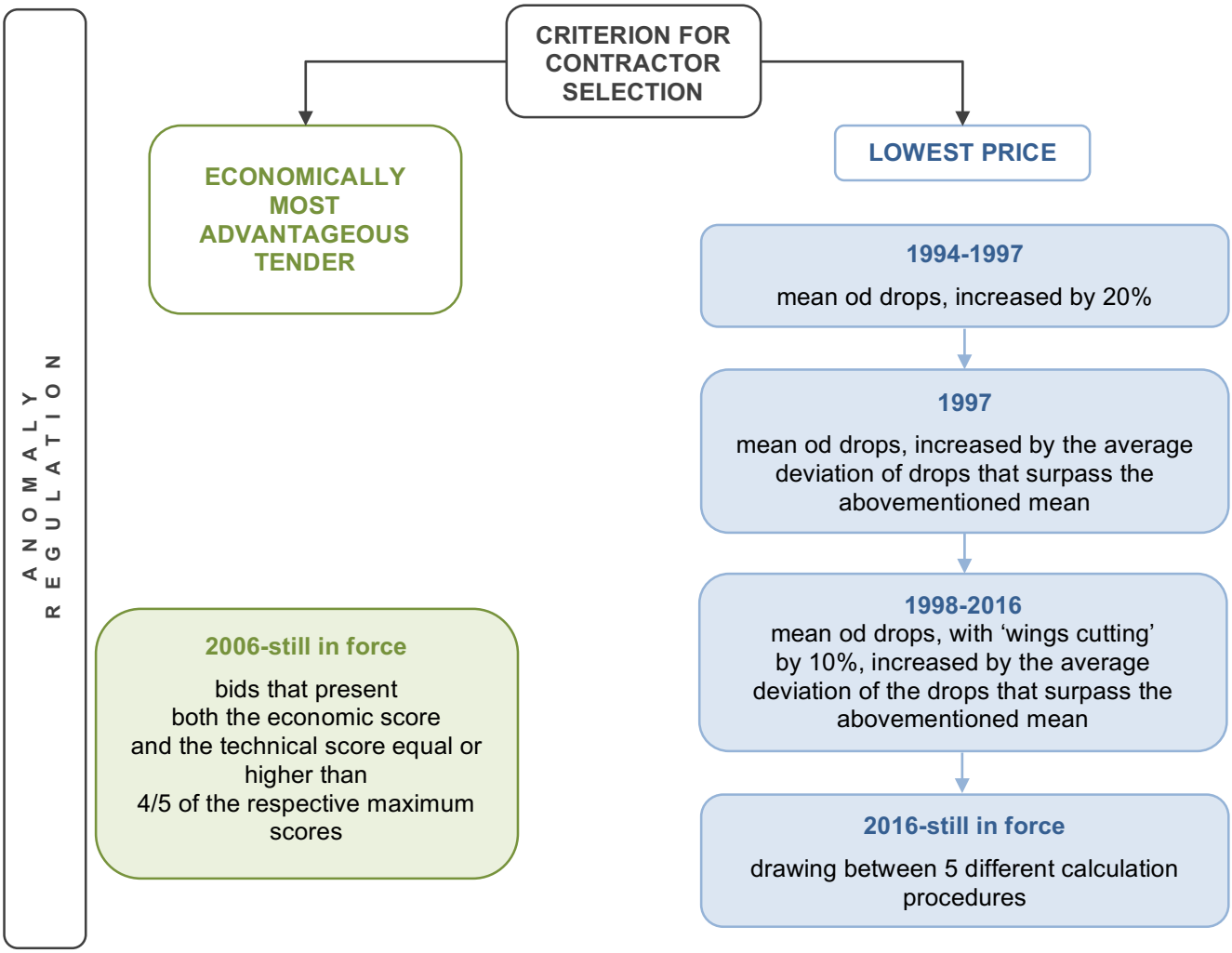
News stories tell us that calls for tenders are a fertile soil for corruption; but is the analysis of anomalous bids really the right way to investigate and identify such phenomena? As it has already been claimed (Conti & Naldi, 2008 and Conti *et al.*, 2012), there exists also a *false alarm probability* that should be taken into account – that is, the probability that using the methods introduced by the regulation for identifying the anomaly threshold might lead to label as anomalous a bid that is actually perfectly congruous. This happens because the new anti-disturbance method has the double goal to make it impossible for businesses to predict the anomaly threshold, and also find really critical situations pertaining to price; however, it prefers the first one, to the detriment of what should be its real objective.

In order to better understand what steps came in succession before arriving to the current regulation, a brief regulatory framework of the topic can be seen below.

3 HISTORIC-REGULATORY FRAMEWORK

Before 1994 – the year the Framework Law on Public Works (also known as 'Merloni' Act, from the name of its promulgator) was issued, the problem of the anomaly had already appeared and been addressed at the regulatory level, but the legislation on the matter was characterised by the Contracting Authorities' complete discretion in evaluating if the bids were congruous and then proceed to award the contract.
In its first draft, the Framework Law addressed this topic only weakly. Article 21 provided for an anomaly threshold that was to be equal to the mean of rebates, increased by 20%, and for a simple monetary 'sanction' for the bidder that offered a lower price surpassing this threshold – even though, despite this, the bidder could still win the contract. The abovementioned sanction consisted in a 50% increase of the sum of the performance bond, with the obvious intent to ensure the CA against any of the operator's possible failures to comply with the contract during its execution.

Figure 1 Time evolution of the process to determine the anomaly threshold with the lowest price criterion (blue), and to determine what bids were to undergo congruity verification with the economically most advantageous tender criterion (green).



Through the so-called 'Merloni Bis' Decree (Decree Law No 101/1995) and 'Merloni Ter' (Act No 415/1998), the regulation of the anomaly of the offer was later articulated more in depth; first of all, the 'Merloni Bis' introduced two different regulations for the calls for tenders of a sum higher and lower than the Community threshold. In both cases, the anomaly threshold was established every year by the Ministry of Public Works, on a statistical basis pertaining to the average trend of rebates in the calls for tenders carried out in the previous year[2]. At this point, once the threshold had been identified, for the calls for tenders that were above Community threshold, the CA proceeded to verify the offers' congruity, and evaluated the anomaly by requesting justifications to all the businesses whose bids presented a rebate equal or lower than the identified one; instead, for the contracts below the Community threshold, the CA had the faculty to automatically exclude bids under certain conditions (there was a minimum of 5 bids to be accepted). Alternatively, if the automatic exclusion wasn't feasible or hadn't been previously declared in the tender notice, the Contracting Authority proceeded to request and systematically verify the justifications provided by all the businesses that had presented anomalous bids, starting with the one with the lowest price, until it could identify the first congruous offer, to which the contract would be awarded. By introducing automatic exclusion, the lawmakers proved that their priority was to accelerate the procedures, even when faced with the possibility that, through this system, the most convenient bid – the congruous one, anyway – might be automatically rejected.

In 1998 the 'Merloni Ter' further changed the legislation, introducing a mathematical criterion to determine the anomaly, which was maintained until 2016 and was indistinctly applied to the contracts both above and below the Community threshold. The calculation method was based on the average of all the bids received, so that the bidders couldn't determine the threshold when presenting their bids. In other words, Article 7 provided that the anomaly threshold should be evaluated as 'an arithmetic mean of the percentages of rebates of all the accepted bids – excluding 10% (to be rounded up to the higher unit) of the bids respectively with the highest and lowest rebate – which should be increased by the average arithmetical deviation of the percentages of rebates that surpass the abovementioned mean'; this is the so-called 'truncated double average' method.

In 2006 the Code of Public Contracts pertaining to Works, Services and Supply (Legislative Decree No 163/2006) uniformed the regulation, extending the use of the mathematical criterion to determine the anomaly threshold also to services and supply contracts. The Code implemented European Directives 2004/17/EC and 2004/18/EC, which order to use bid selection methods that take into account the bids' quality/price ratio; for this purpose, the Code introduced the criterion of the economically most advantageous tender. For cases in which this criterion was used, a sort of 'anomaly threshold' was also introduced, on the basis of which the bid's congruity should be evaluated: the criterion provided that the bids that had to be verified were those that, after the commission had attributed a score, presented very high scores – following the references that were later maintained in the current Code.

2 The Ministerial Decree for determining the anomaly threshold that was introduced by the 'Merloni Bis' was issued by the Ministry of Public Works only on 28 April 1997.

With regards to the best value, the possibility for automatic exclusion and the single mathematical method for determining the threshold were confirmed, while the awarding method formally changed name, becoming the '*lowest price*' method. In order to summarise the different regulations for determining the anomaly threshold and to give a first demonstration of their impact on a call for tenders, below we offer a practical application:

	Bid 1	Bid 2	Bid 3	Bid 4	Bid 5	Bid 6	Bid 7	Bid 8
Drop %	5.50%	8.64%	14.10%	22.03%	23.63%	25.00%	29.55%	31.30%

Table 1 Summary of the rebates of awarding a hypothetical contract

Average of bids' drops	*18.92%*
Anomaly threshold (1994-1997)	**22.70%**
Anomaly threshold (1997)	**26.30%**
Anomaly threshold (1998-2016)	**25.05%**

Table 2 Thresholds determined with the calculation procedures regulated by the former regulations

Later, on 18 April 2014, the new European Directives 24 and 25 on public tenders in ordinary and special sectors were issued – which had to be implemented by Member States in their respective legislations before 18 April 2016. The directives required some important innovations regarding the topic of bid selection: the preference for using the EMAT criterion and the introduction of more severe measures to combat abnormally low bids, with the objective to combat *social dumping*[3] and guarantee that workers' rights are respected.

4 METHODS TO IDENTIFY THE ANOMALY IN CURRENT LEGISLATION

On 18 April 2016, with Legislative Decree No 50, the new Code of Public Contracts came into force (Legislative Decree No 50/2016), which, now integrated with the corrective actions No 56 of 19 April 2017 (Legislative Decree No 56/2017) and with the 12 ANAC Guidelines, constitutes the current reference legislation – which will be analysed in detail in the following chapter.

The Code revises and distinguishes the areas of application of the two criteria for selecting the bids, thus outlining the 'EMAT as the general and ordinary method to award contracts' and 'that of the lowest price as a residual parameter, an exception reserved for limited cases' (Deodato, 2017).

3 In economic jargon, selling goods abroad at a lower price than the one used in the internal market. Those who follow this practice are businesses and groups of businesses that operate in a quasi-monopoly regime in the internal market – so that they can sell in it at a price higher than the cost – and that benefit from such a customs protection that they are protected against the risk that their goods might flow back from abroad at lower prices that those used in the national market – Source: Enciclopedia Treccani.

In parallel to implementing the new Code of Contracts, another on-going revision process was activated (Prizzon & Rebaudengo, 2017), which was carried out by issuing ANAC Guidelines that operationally explore in depths certain articles of Ministerial Decrees, of the corrective action taken after a year from the publication of the Code, and, finally, even organising online public consultations that should support the Ministry of Infrastructures and Transport in carrying out a future reform, wanted by many people.
Two of the first measures implemented by the corrective action were the introduction of a 30% maximum for the weight of the economic score to be attributed to the bids in cases when the EMAT criterion is used, and an extension of the scope of use of the lowest price criterion, mainly by increasing the contracts' sum limit from 1,000,000 € to 2,000,000 €. Some of the sector's experts state that this 'partial rethinking (by the Government)' of the initial setting for which the lowest price criterion was supposed to be considered as a residual method compared to the EMAT, dictates 'an additional reflexion on the matter of the merits and drawbacks of the two awarding criteria, in the double perspective of administrative efficiency and corruption prevention' (Deodato, 2017). It is on the basis of statements such as this one, which can be found also in the scientific literature, that this research was carried out – with the goal to shed some light on the phenomenon of anomalous bids, examined in all of its facets, including the legislative ones, though relevant regulation is in constant evolution.
In the meanwhile, it is expected that a future reform will further revise the bid selection phase, since the consultation that ended on 10 September 2018 focused, among other things, both on article 95 '*Criteria for awarding the contract*' – which defines the areas of application of one criterion or the other – and on article 97 '*Abnormally low bids'* – which illustrates the mathematical criteria to be applied for calculating the anomaly threshold and the possibility of automatic exclusion.

4.1 Lowest price: determining the anomaly threshold

Article 97, comma 2, defines the 5 calculation procedures for determining the threshold, among which to draw during the call for tenders. The procedures are presented in the following table:

<table>
<tr><th colspan="7">Article 97, comma 2</th></tr>
<tr><th>letter a)</th><th colspan="2">letter b)</th><th>letter c)</th><th>letter d)</th><th colspan="2">letter e)</th></tr>
<tr><td>truncated double average</td><td colspan="2">truncated average with possible decrease</td><td>mean increased by 15%</td><td>mean increased by 10%</td><td colspan="2">truncated double average coefficient on the second mean[4]</td></tr>
<tr><td></td><td colspan="2">first decimal point</td><td></td><td></td><td colspan="2">drawing the coefficient</td></tr>
<tr><td></td><td>even number</td><td>odd number</td><td></td><td></td><td>0.6</td><td>0.7</td><td>0.8</td><td>0.9</td></tr>
</table>

Table 3 Procedures to determine the anomaly threshold in the current legislation

As it can be inferred from the table, in case the methods drawn are those illustrated by letters a), c), and d), the calculation procedure results completely defined after the drawing; on the contrary, in case b) it will depend on the value of the first decimal point of

4 The corrective action eliminated the coefficients higher than 1.

the mean of rebates after deducting some outlier bids; meanwhile, in case e), it will depend on a coefficient lower than 1 which is drawn immediately after the method is picked. Therefore, there are in fact 9 procedures, which, in theory, lead to 9 different anomaly thresholds.

4.2 EMAT: determining the bids to undergo congruity verification

In case of a contract awarded with the economically most advantageous tender criterion, the performance score can be attributed to the various bids through different procedures. Here we will focus on the one most commonly used by contracting authorities, that is, the aggregation-compensation method.
First of all, the Public Administration establishes *a priori* and publishes in the tender notice the method and the criteria, with the relevant scores, through which it will evaluate the bids; the sum of the scores that numerically define the importance of the criteria must be 100, including quantitative and qualitative criteria, as well as the criteria pertaining to the presence or absence of a certain characteristic.
Among the instruments supporting the contracting authority, before the aggregation of the results and the drafting of a merit-ranking list, there is the scores' reparametrisation, whose effect particularly influences the identification of anomalous bids. The term 'reparametrisation' indicates a mathematical procedure that makes the given performance scores relatively interdependent, for a certain criterion: that is to say, it consists in redefining all the scores on the basis of the separation from the bid that presents the best score. In this case, '*for the purposes of verifying the anomaly, the contracting authority refers to the scores achieved by the bidders at the end of the relevant reparametrisation*' (Guidelines No 2/2016). However, since the abovementioned verification is always 'conducted on the bids whose points relating to price, as well as the sum of the points relating to the other elements of the evaluation are either equal or higher than four fifths of the corresponding maximum points provided for in the tender notice' (article 97, comma 3), it is then predictable that, in case of reparametrisation, the scores might result quite high on average, and therefore the number of bids to undergo congruity verification might increase considerably.

5 CRITICAL ANALYSIS OF THE PHENOMENON

5.1 Variability of the anomaly threshold for contracts awarded to the lowest price

Differently than the calculation methods in force until 2016, the new Code doesn't identify the anomaly threshold relating to a specific call for tenders univocally anymore. Actually, the presence of 9 methods makes it so that an interval of rebates is created, which contains all the possible anomaly thresholds relating to the different procedures. The aim of this analysis is to characterise this interval and verify its variability, in order to study the phenomenon and later hypothesize some cause-effect correlations with other variables. To do so, we analysed two contracts that were awarded to the lowest price, both dating back to 2018 and procured by Piedmont's Municipalities, but very different in terms of type, sum at the basis of the call for tenders and number of bids received: a services contract for

16,200 € – for which 17 admissible bids were made, and a works contract for 1,804,830.14 € – that received 171 admissible bids.

Services contract								
letter a)	letter b)		letter c)	letter d)	letter e)			
51.23%	**/**	**41.25%**	**47.95%**	**46.91%**	**47.96%**	**48.69%**	**49.42%**	**50.14%**

Table 4 Anomaly thresholds determined with the methods provided for by article 97, comma 2 (services contract)

Input data - bids	Output data - thresholds
sum at the basis of the call: **16 200 €**	maximum threshold: **letter a)**
n_{bids}: **17**	minimum threshold: **letter b)**
interval of drops: **16.12% - 62.04%**	interval of thresholds: **41.25% - 51.23%**
arithmetical mean of drops: **42.64 %**	arithmetical mean of thresholds: **47.94%**

Table 5 Characterisation of the bids and the anomaly thresholds (services contract)

Works contract								
letter a)	letter b)		letter c)	letter d)	letter e)			
27.05%	**/**	**26.01%**	**29.83%**	**28.53%**	**26.81%**	**26.92%**	**27.03%**	**27.14%**

Table 6 Anomaly thresholds determined with the methods provided for by article 97, comma 2 (works contract)

Input data - bids	Output data - thresholds
sum at the basis of the call: **1 804 830.14 €**	maximum threshold : **letter c)**
n_{bids}: **171**	minimum threshold: **letter b)**
interval of drops: **14.40% - 45.25%**	interval of thresholds: **26.01% - 29.83%**
arithmetical mean of drops: **25.94%**	arithmetical mean of thresholds : **27.42%**

Table 7 Characterization of the bids and the anomaly thresholds (works contract)

Below we present the Gaussian distribution of the bids, from which interesting correlations with the anomalies' trend can be deduced: at a first analysis, it can be seen how 'crushing' the drops coincides with crushing the interval of anomaly, and how, in both of the cases analysed, this interval is adjacent to the arithmetical mean of drops, though just above it. However, it also results that in the first case (services contract), in which the rebates are highly variable, the average drop is within the anomaly interval; while for the works contract this mean is external to the same interval.

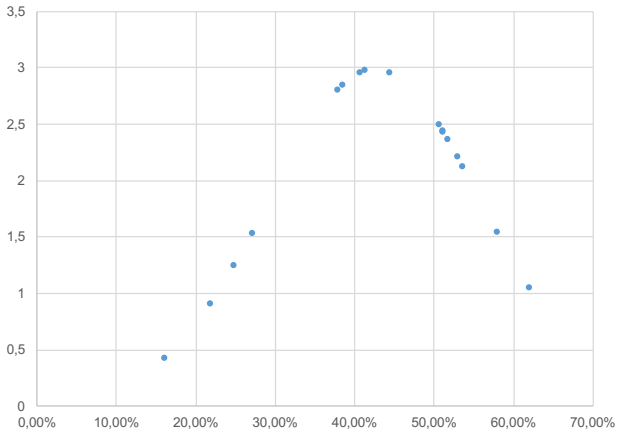


Diagram 1 Services contract. Gaussian distribution of drops

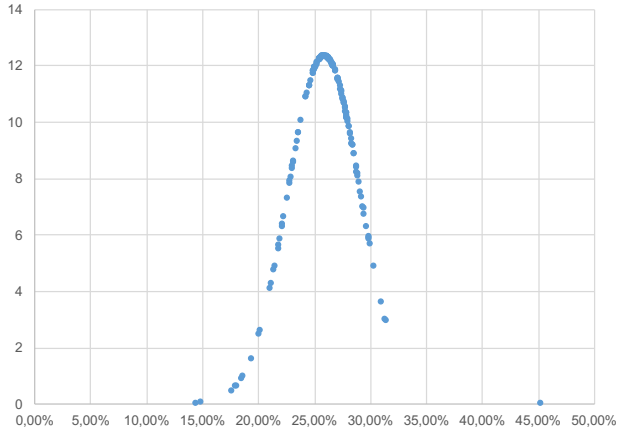


Diagram 2 Works contract. Gaussian distribution of drops

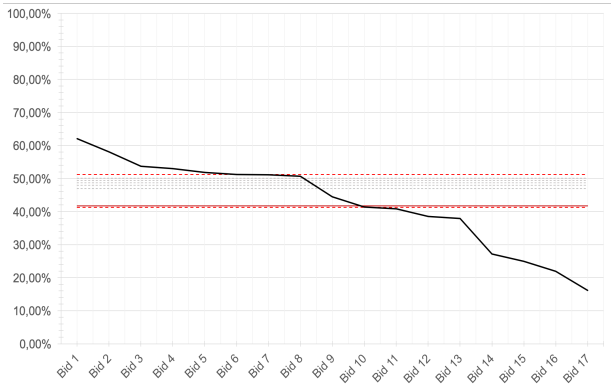


Diagram 3 Services contract. Distribution and mean of drops, with anomaly thresholds

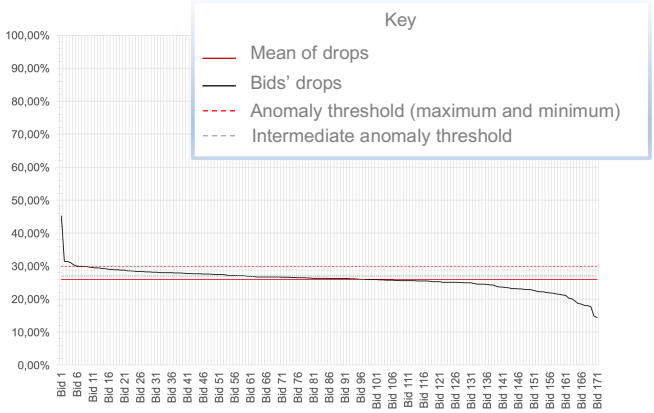


Diagram 4 Works contract. Distribution and mean of drops, with anomaly thresholds

5.2 Occurrence of anomalous bids for contracts awarded to the EMAT

It is important to underline that the anomaly, for contracts awarded to the EMAT, is evaluated separately for the so-called '*technical offer*' (which includes all the qualitative and quantitative criteria that define the merits of the bid), and for the '*economic offer*'. Economic offer means, in fact, the drop, which will subsequently univocally characterise the bids through the lowest price parameter. Despite this, in this case, the legislation provides that the criterion for defining the anomaly must be direct, and therefore easily predictable *a priori* by any bidder: if the economic score of the bid surpasses 4/5 of the maximum score (which in most cases is set at 30/100), such an economic offer will result as anomalous. However, in order for the whole bid to be overall considered anomalous, both the economic offer and the technical one must result as anomalous at the same time – but for the technical offer the business's precision in foreseeing the budget can reach very scarce levels of precision. This can lead to bidders presenting very articulated estimates with the specific aim to win the contract, and therefore it shouldn't be excluded that one victorious bid might still present an anomaly, even if only on one of the two sides, either the economic or the technical one – especially if we consider that there is no automatic exclusion provided for this type of awarding method. In the analysed case (a

works contract with a sum of 337,000€ at the basis of the call for tenders), since the distribution of the scores published in the tender notice assigned 70 points to the technical offer and 30 points to the economic offer, the results are a threshold of 56 for the first one and one of 24 for the second one, respectively.

Article 97, comma 3							
Bid	Score for criterion A)	Score for criterion B)	Total Technical Offer	Reparametrisation of the Technical Offer	Drop	Total Economic Offer	Total
1	31.39	30.00	61.39	63.46	17.00%	16.45	77.84
2	40.00	27.72	67.72	70.00	18.12%	17.54	85.26
3	9.62	0.00	9.62	9.94	10.00%	9.68	19.30
4	36.96	5.70	42.66	44.10	18.92%	18.31	60.97
5	15.70	29.62	45.32	46.85	6.89%	6.67	51.99
6	35.44	30.00	65.44	67.64	27.19%	26.32	91.76
7	13.16	11.39	24.55	25.38	30.99%	30.00	54.55
8	4.56	10.25	14.81	15.31	18.12%	17.54	32.35
9	17.72	0.00	17.72	18.32	19.02%	18.41	36.13
10	0.00	0.00	0.00	0.00	24.88%	24.08	24.08
11	10.13	8.35	18.48	19.10	5.00%	4.84	23.32
12	28.35	6.46	34.81	35.98	14.00%	13.55	48.36

Table 8 Works contract. Awarded to the EMAT. Procedure for assigning the scores to the bids

In this case the bid to undergo verification is offer No 6, which presents the characteristics provided for by the legislation (both scores higher than 4/5). Obviously, neither the one who formulated the maximum drop, nor the one that presented the most convenient offer in technical terms are to be verified by the PA: this means that there is a substantial correlation between services offered and price (high drop and “limited technical offer”; quality technical offer and low drop).

6 FINAL CONSIDERATIONS AND FUTURE DEVELOPMENTS

As it was seen, for contracts awarded to the lowest price, after the letter of article 97, comma 2 the calculation procedure for determining the anomaly threshold is drawn during the call for tenders – and if we hypothesize the automatic exclusion of the anomalous bids referred to in comma 8 of the same article – one of the 9 possible awarding scenarios described here comes to be.

Letter	Threshold	Winning bid and relevant drop	Number of anomalous bids
a)	51.23%	Bid 7 – 51.13%	6/17
b)	41.25%	Bid 11 – 40.80%	10/17
c)	47.95%	Bid 9 – 44.44%	8/17
d)	46.91%	Bid 9 – 44.44%	8/17
e) 0.6	47.96%	Bid 9 – 44.44%	8/17
e) 0.7	48.69%	Bid 9 – 44.44%	8/17
e) 0.8	49.42%	Bid 9 – 44.44%	8/17
e) 0.9	50.14%	Bid 9 – 44.44%	8/17

Table 9 Services contract. Awarding scenarios

Letter	Threshold	Winning bid and relevant drop	Number of anomalous bids
a)	27.05%	Bid 60 – 26.92%	59/171
b)	26.01%	Bid 96 – 25.99%	95/171
c)	29.83%	Bid 10 – 29.70%	9/171
d)	28.53%	Bid 24 – 28.42%	23/171
e) 0.6	26.81%	Bid 63 – 26.74%	62/171
e) 0.7	26.92%	Bid 61 – 26.89%	60/171
e) 0.8	27.03%	Bid 60 – 26.92%	59/171
e) 0.9	27.14%	Bid 57 – 27.13%	56/171

Table 10 Works contract. Awarding scenarios

It can be noted how, in the case of the services contract, the fact that one letter could be drawn rather than another one – though this generated a range of anomaly thresholds that is definitely wide (+10% between a) and b)) – doesn't significantly change the result of the call for tenders (the contract would be awarded to the same offer in 6 cases out of 8); conversely, for the works contract we analysed – though with an extremely reduced anomaly range (less than 4% between b) and c)) – the result of the call for tenders would be greatly influenced, as the contract would be awarded to the same bidder in only 2 cases out of 8.

Conversely, for contracts awarded to the EMAT, the commission proceeds during the call for tenders to verify the congruity of all anomalous bids, starting with the one with the highest price, until a congruous one can be found. In the case under examination here, offer No 6 – which evidently resulted to be congruous after congruity verification – won the bid, despite the apparent economic advantage represented by offer No 7.

This first analysis brought to light some thoughts for further reflexion, both at the level of principles and at the level of methods, regarding the current regulation of the anomaly during a call for tenders. As we saw, the range represented by the anomaly thresholds can be very wide, which could maybe compromise the possibility for Public Administrations to save some money, especially in cases of contracts awarded for sums that are close to the maximum limit of 2 million euros.

Considering that the next amendments to the Code could lead to an increased threshold for the possibility to apply the lowest price criteria for works contracts (from 2 million euros to 5 million euros), it would be interesting to verify, starting from a congruous reference sample, whether there is any correlation between the anomaly of the bid and other characteristics of the calls for tenders – for example differentiating between contracts for works, services or supply, or between open procedures and invitation procedures. Such an analysis, which should be able to use the database relating to public contracts, would allow us to keep track of the phenomenon at the territorial level: firstly, at the regional level, and secondly, after a more in-depth analysis, at the national level.

Further interesting correlations, which could be the subject of future analyses, for the purposes of anti-corruption and transparency, are those between anomalous bids and economic operators that presented them: for example, dimension, number of employees and professional history can concur to form a framework of information on businesses that might amplify their credibility in the eyes of Contracting Authorities. In another perspective, this same information can also be used as variables for defining *red flags* or anomaly indicators.

Finally, after ascertaining that the competition crisis is growing and that businesses are ready to lower their profits by increasing the drops, it would be interesting to quantify this phenomenon within a time framework, also in light of the predictions on the future trends of the construction market and of the market of public contracts.

Certainly, the topic of anomaly regulation is currently very important, both at the international and national level. In the latter, the topic is particularly important for Professional Associations and Production Associations, and, therefore, it will probably be reformed in the next amendments to the Code – which we hope will answer the requests of the stakeholders involved.

In times of crisis such as this one, controlling the impacts of a new regulation is the only way to issue reforms that will address and solve the actual problems of the sector, thus optimizing public investments.

Bibliography/web references

Reference legislation:

Act No 109 of 11 February 1994, on “Public Works”.

Decree Law No 101 of 3 April 1995, on “Urgent Amendments to the Regulation on Public Works”.

Act No 415 of 18 November 1998, on “Amendments to the Regulation on Public Works”.

Legislative Decree No 163 of 12 April 2006, “Code of Public Contracts Regarding Works, Services and Supply, in implementation of Directives 2004/17/EC and 2004/18/EC”.

Legislative Decree No 50 of 18 April 2016, on “Code of Public Contracts”.

Guidelines No 2, in implementation of Legislative Decree No 50 of 18 April 2016, titled “Most Economically Advantageous Offer”, approved by the Authority’s Council with Deliberation No 1005 of 21 September 2016.

Legislative Decree No 56 of 19 April 2017, on “Supplementary and Corrective Measures to Legislative Decree No 50 of 18 April 2016”.

Online articles, journals and other publications

ANAC – Italian National Anti-Corruption Authority. Efficiency of public contracts and development of corruption risk indicators. 2018 Report.

P. Ballesteros-Pérez, M. C. González-Cruz, A. Cañavate-Grimal, E. Pellicer. Detecting abnormal and collusive bids in capped tendering. *Automation in Construction* **2013**, 215-229, DOI: 10.1016/j.autcon.2012.11.036.

P. Ballesteros-Pérez, M. Skitmore, E. Pellicer, M. C. González-Cruz. Scoring rules and abnormally low bids criteria in construction tenders: a taxonomic review. *Construction Management and Economics* **2015**, *4*, 259-278, DOI 10.1080/01446193.2015.1059951.

P. Ballesteros-Pérez, M. Skitmore, Estimating the number of new and repeated bidders in construction auctions. *Construction Management and Economics* **2016**, *12*, 919-934, DOI: 10.1080/01446193.2016.1231408.

P. Ballesteros-Pérez, M. Skitmore, E. Pellicer, X. Zhang. Scoring Rules and Competitive Behavior in Best-Value Construction Auctions. *Journal of Construction Engineering and Management* **2016**, *9*, DOI: 10.1061/(ASCE)CO.1943-7862.0001144.

M. A. Bergman, S. Lundberg. Tender evaluation and supplier selection methods in public procurement. *Journal of Purchasing and Supply Management* **2013**, *2*, 73-83, DOI: 10.1016/j.pursup.2013.02.003.

E. Bianchi. L'intervento. Le inchieste in Campania e i rischi di eccesso di discrezionalità legati all'offerta più vantaggiosa. *Edilizia e Territorio – Quotidiano del Sole 24 Ore* of 17 March **2017**a.

E. Bianchi. Offerta più vantaggiosa, insieme all'appalto su esecutivo non porta all'offerta migliore. *Edilizia e Territorio – Quotidiano del Sole 24 Ore* of 9 October **2017**b.

A. Calveras, J. J. Ganuza, E. Hauk. Wild bids. Gambling for resurrection in procurement contracts. *Journal of Regulatory Economics* **2004**, *1*, 41-68, DOI: 10.1023/B:REGE.0000028013.76488.44

P. L. Conti, M. Naldi. Detection of anomalous bids in procurement auctions. *Decision Support Systems* **2008**, *1*, 420-428, DOI: 10.1016/j.dss.2008.08.002.

P. L. Conti, L. De Giovanni, M. Naldi. A rank-and-compare algorithm to detect abnormally low bids in procurement auctions. *Electronic Commerce Research and Applications* **2012**, *2*, 192-203, DOI: 10.1016/j.elerap.2011.12.008.

C. Deodato. Correttivo/3. L'intervento: più spazio al massimo ribasso, ecco perché è una scelta giusta. *Edilizia e Territorio - Quotidiano del Sole 24 Ore* 5 May **2017**.

M. Fazekas, I. J. Tóth, L. P. King. An Objective Corruption Risk Index Using Public Procurement Data. *European Journal on Criminal Policy and Research* **2016**, 369-397, DOI: 10.1007/s10610-016-9308-z.

M. Gunduz, V. Karacan. Abnormally low tender problem in public works. International Conference on Management Science & Engineering, Long Beach, USA, 10-12 settembre 2008, DOI 10.1109/ICMSE.2008.4669141.

M. Gunduz, H. V. Karacan. Assessment of abnormally low tenders: a multinomial logistic regression approach. *Technological and Economic Development of Economy* **2017**, *6*, 848-859, DOI 10.3846/20294913.2015.1071294.

T. Hanák. Electronic Reverse Auctions in Public Construction Procurement - Empirical Evidence from the Czech Republic, *Archives of Civil Engineering* **2016**, *3*, 47-60, DOI 10.1515/ace-2015-0082.

G. Latour, M. Salerno. Correttivo appalti: il focus con le 20 maggiori novità per imprese, Pa e professionisti. *Edilizia e Territorio – Quotidiano del Sole 24 Ore* of 19 April **2017**.

Ministry of Infrastructures and Transport. Consultation on the Code of Contracts. 2018 Report.

F. Prizzon, M. Rebaudengo. Il nuovo codice dei contratti pubblici, tra innovazioni e criticità. *Territorio Italia* **2017**, 2, DOI: 10.14609/Ti_1_17_5i.

Studies Service of the Chamber, ANAC, CRESME. The market of public contracts - Works, Services and Supply in the 2012-2016 time period. 2017 Report.

J. Stake. Evaluating quality or lowest price: consequences for small and medium-sized enterprises in public procurement. *Journal of Technology Transfer* **2017**, *5*, 1143-1169, DOI 10.1007/s10961-016-9477-4.

Web references

Website ANAC – Italian National Anti-Corruption Authority URL < www.anticorruzione.it/> (date of access 12/24/2018)

Website Bosetti Gatti & Partners s.r.l. URL <http://www.bosettiegatti.eu/> (date of access 12/2/2018)

Youtube Channel: Polito Lectures, Appalti pubblici e collettività: opportunità e interferenze (Torino, Italia, 16 giugno 2017) – <https://www.youtube.com/watch?v=d1kQI8r-WWM&list=PLI9o1OThVB5AHtzlSYlqER4rRG1AEfMUz> (date of access 12/14/2018)

Website Edilizia e Territorio – Quotidiano del Sole 24 Ore URL < http://www.ediliziaeterritorio.ilsole24ore.com/> (date of access 12/21/2018)

Website Ministry of Infrastructures and Trasports – <http://www.mit.gov.it> (date of access 13/12/2018)

Website of the Law Firm 'Studio Legale Bisconti Merendino' URL < https://www.studiobisconti.it> (date of access 12/2/2018)

Website Treccani URL< http://www.treccani.it/> (date of access 12/27/2018)