PRO-COLLUSION FEATURES OF COMMONLY USED SCORING RULES IN PUBLIC PROCUREMENT

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ABSTRACT. This paper shows, through practical simulations and a significant case study, how some of the most commonly used types of scoring rules worldwide enable collusive bidding strategies otherwise not possible. Such strategies are based on the ability of a group of bidders to coordinate and submit their bids in order to change the score of the other bidders to penalize their evaluation and ranking. Notwithstanding this evidence, public procurement regulation from different countries, as well as supranational organizations, recommend to use this collusion prone type of scoring rule. Finally, the paper puts forward an alternative scoring rule immune from this kind of bidder manipulation.

INTRODUCTION

Public procurement rules worldwide require that contracts be awarded on the basis of objective, measurable, impartial and valid criteria which ensure compliance with general principles such as transparency, non-discrimination and equal treatment and which guarantee that tenders are evaluated in conditions of effective competition. The evaluation methods must ensure the procuring entity attains competitive and best value procurement. Most public procurement laws and guidelines provide two main criteria to award a contract, namely a price-only criteria or a weighted multiple criteria. These correspond to the "lowest price" and the "most economically advantageous tender" criteria provided by the European Union Directive 2004/18/EC,[1] or the "lowest evaluated bid" and the "quality-and cost-based selection" criteria provided by the World Bank Guidelines for Procurement of goods, works, and non-consulting services and Guidelines for Selection and employment of consultants, respectively,[2] or the "lowest tender price" and the "most advantageous tender" criteria provided by the UNCITRAL Model Law on Public Procurement,[3] or the "lowest price technically acceptable source selection process" and the "Tradeoff process" criteria provided by the US Federal Acquisition Regulation.[4]

The first criteria is generally recommended for procurement where technical specifications, terms of reference, or statement of works, and bill of quantities are clear, responsiveness is easy to determine, and price or cost is the overriding evaluation criterion compared to other aspects of value for money. Some examples are standard goods such as office equipment, communication equipment, simple machinery or raw materials or for the procurement of services and works when the requirements can be quantitatively and qualitatively defined.

The second criteria is to be used for more complex procurement where the evaluation requires a number of criteria other than price to be considered and balanced in order to ensure best value for money, and where there are different types of scales to be used for the various elements of the offer. This needs a weighted scoring method where price, including other price related factors such as cost for maintenance and support and life cycle cost, is one of the evaluation

criteria (i.e. the financial criteria) along with other criteria such as quality, availability, time, compliance, etc. (i.e. the technical criteria), that are all part of the equation to determine the best return on investment of the procurement of goods, works or services. Hence, the relative importance of each evaluation criterion needs to be weighted. The application of this criteria also needs the contracting authority or entity to be ready to pay for quality and to enjoy flexibility in handling different levels of quality.

In general, the more complex the requirements, the more difficult it is to compare the proposals, the price should have less importance on the award and less are the points allocated to the financial offer. On the contrary, the more straightforward the requirements, the more significant the price should be, provided that the other criteria are also met.[5]

Under the weighted scoring method, the contracting authority or entity must specify, in the contract notice or documentation, the criteria on which it will base its evaluation and the relative weighting of each of those criteria. In general, the weighted scoring method may be written as follows:

$$\sum_{e}^{E} w_e * C_e \qquad (1)$$

where C_e is the evaluation criteria for the element e of the offer and w_e the weight for the same element e, with $\sum_{e}^{E} w_e = 100$ and C_e returning coefficients ranging from 0 to 1 so that the final ranking may vary from a minimum score of 0 to a maximum score of 100. In other words, C_e is the scoring rule and w_e is the maximum number of points reserved for the element e of the offer.

However, apart from the above obligations, the law or regulations very often do not stipulate how the evaluation procedure should be conducted (e.g. the EU Directive 2004/18/EC and the UNCITRAL Model Law on Public Procurement), namely how to set the weights, w_e, and the scoring rules, C_e. Thus, a contracting authority or entity is

at liberty to set the method for such procedure aimed at evaluating the degree to which each offered product or service contains preferable characteristics, where the higher the degree, the more advantageous it is. The scoring rule may be expressed in terms of numerical ratings, such as a discrete scale of 1 through N, with N being the highest rating (to be eventually divided by N in order to have the range to vary between 0 and 1), or a continuous scale returned by a mathematical formula whenever the element has a quantitative nature (i.e. price, time to delivery, etc.). Also, the latter type of scoring rule is of primary importance in the case of electronic auctions, since it is the only one that allows the automatic calculation of the ranking of the outstanding offers in real time (Bichler & Kalagnanam, 2003, Kalagnanam & Parkes, 2005, Asbjornsen & Shalev, 2010, Leipold, Klemow, Holloway, & Vaidya, 2004, Soudry, 2004).[6] Public procurement rules in most countries, as well as supranational organizations, often fix the mathematical formula to score quantitative elements of the offer, such as price.

The economic literature has studied weighted scoring methods from the perspective of the optimal design of multidimensional auctions (Che, 1993, Branco, 1997, Asker & Cantillon, 2008, Dini, Pacini & Valletti, 2006). Che (2009) shows that implementing the optimal auction mechanism needs an appropriate weighting and a scoring rule that is linear in price, while Branco (1997) generalizes Che's results to the context where the costs of the several bidders will not be independent. Asker & Cantillon (2008) characterize equilibrium behavior in scoring auctions when private information is multidimensional and the scoring rule is linear in price. Dini, Pacini & Valletti (2006) discusses the relation between buyer's needs/preferences, optimal weighting and scoring rule, putting forward a linear type of scoring that allows bidders to choose their bidding strategies consistently with the buyer's needs/preferences. On the other hand, Decarolis (2009) and Conley & Decarolis (2011) study bidders coordination mechanisms with manipulable awarding rules and show empirically how bidders elaborate sophisticated response in order to coordinate entry and bidding to rig these criteria.

This paper takes an approach similar to the latter authors focusing on the issue of choosing scoring rules (C_e) that ensure

conditions of effective competition in competitive tenders awarded under the weighted multiple criteria. This paper contributes to the study of evaluation criteria as for quantitative and measurable elements of the offer, which are little studied in economics but widely used in practice. In the following, the second section describes the most commonly used scoring rules, the third section shows through plausible simulations the pro-collusion features of scoring rules, the fourth section illustrates a real world case of collusion carried out through manipulating the scoring rule and the last section concludes.

COMMONLY USED SCORING RULES

Two of the most commonly used scoring rules as evaluation criteria for quantitative and measurable elements of the offer/proposal, such as price, worldwide, provides that the lowest evaluated financial proposal is given the maximum financial score and other proposals are given financial scores that are inversely or directly proportional to their prices.[7] Both scoring rules are based on two simple mathematical formulae that return the coefficients to plug in *(1)* straightforwardly. The first one, that we call the "lowest price" formula, assigns to the price bid by the *i-th* bidder, P_i, a coefficient, $C_{p,i}$, equal to the ratio between the lowest bid price, P_{lowest}, and P_i, as in equation *(2)*.

$$C_{p,i} = \frac{P_{lowest}}{P_i} \qquad (2)$$

The second one, that we call the "interdependent linear" formula, consists in a linear interpolation between the base price P_{base} (or the value of the contract), which takes 0, and the lowest bid price P_{lowest}, which takes 1, computing the coefficients $C_{p,i}$ of the other bids P_i in between linearly and proportionally, as in equation *(3)*.

$$C_{p,i} = \frac{P_{base} - P_i}{P_{base} - P_{lowest}} = \frac{D_i}{D_{highest}} \qquad (3)$$

where D_i is the percentage discount bid by the *i-th* bidder and $D_{highest}$ is the highest discount bid in the tender.[8] Both formulae allow for collusive strategies since the coefficient assigned to each bidder depends on the bid distribution. More specifically, the coefficients depend on statistics – the average, the minimum, the maximum and so on – worked out from the distribution of received bids. Indeed, the above formulae are known as "interdependent" formulae because the coefficient for a bidder depends on the other bidders' coefficients.[9] As such, a more or less restricted group of bidders may collude and arrange a strategy in order to manipulate the final ranking and penalize other bidders. In the next two sections, practical simulations and a real world case study are presented on this account.

However, a different type of formulae exists that overcomes the issue of manipulation since the coefficient assigned to each bidder depends only on his own bid. One of these formulae represents a variation of equation *(3)* and is called "independent linear" formula, as in equation *(4)*.

$$C_{p,i} = \frac{P_{base} - P_i}{P_{base} - P_{threshold}} = \frac{D_i}{D_{threshold}} \qquad (4)$$

In this formula, the procurement entity substitutes the lowest bid with a threshold price, $P_{threshold}$, which represents the threshold price below which the procurement entity does not assign additional points; in other words any bid below the threshold price receives a coefficient equal to 1. On the other hand, $D_{threshold}$ is the maximum price discount above which bidders gets the same coefficient of 1. Apart from preventing collusion, this kind of formula carries the clear advantage

of allowing each bidder to evaluate, before the tender takes place, his own bid as well as the monetary cost of each scoring point (which is equal to $\frac{D_{threshold}}{w_p}$, where w_p is the weight, or the maximum number of points, given to the price element of the offer within the weighted scoring method). Each bidder, as a consequence, is able to choose the bidding strategy that maximizes his probability of winning the tender and consistently with the procurement entity's preferences over different possible price-quality combinations.[10]

MANIPULATION STRATEGIES OF SCORING RULES

In this section we present some examples and simulations that explain the functioning and the manipulation risks of the "interdependent linear" formula and the "lowest price" formula. Let A and B be two leader firms in a certain market who are used to competing against each other in competitive tenders. They know their respective strengths and weaknesses and one of the two may have an incentive to manipulate the awarding criteria set by the procuring entity in the tender notice. In what follows we show how manipulation can be achieved through a collusive agreement with a third firm, say C, that chooses a bidding strategy that undermines the strengths of one firm in order to favor the other in awarding the contract. In the first example the procuring entity chooses the "lowest price" formula *(2)* and in the second the "interdependent linear" formula *(3)*. We contrast the outcome of those formulae with a benchmark represented by the "independent linear" formula *(4)*.

Example 1: Manipulation of the "Lowest Price" Formula

The procuring entity publishes, for a given contract X, a tender notice establishing a base price of $1,000,000, 50 points for the price, 50 points for quality and the "lowest price" formula as evaluation criterion. Bidder A has a competitive advantage over bidder B in quality, at the same time B has a competitive advantage over A in price. Both bidders are aware that, in order to obtain a

minimum profit, A will be able to offer a quality corresponding to 35 points and a 5% discount in price corresponding to $950,000, while B will be able to offer a quality corresponding to 30 points and a 15% discount in price corresponding to $850,000. A third bidder, C, is able to offer the same price of B ($850,000) and the minimum acceptable quality corresponding to 0 points. As shown in the first row of Table 1, in this scenario B is the winner with a score of 80 points (30 from quality and 50 for the lowest price bid) since A would get 79.74 points only (35 from quality and 44.74 for the financial offer). Instead of improving quality, A could ask C to bid a lower price so that A will be the winner. In fact, C will never be awarded the contract because of its low quality. This would be the case if C's discount improved from 15% to 20% (i.e. from $850,000 to $800,000). Table 1 shows how the final ranking changes depending on C's bid (the winner is in bold letters) and proves that a different formula, the "independent linear" formula can eliminate room for such a manipulation. Accordingly, under the latter formula the score of A and B is not influenced by C and the ranking does not change.

TABLE 1

Final Ranking for Contract X assuming different prices bid by C

Price bid by C ($)	Score *"Lowest price" formula*			Score *"Independent linear" formula*		
	A	B	C	A	B	C

850,000	79.74	**80.00**	50.00	43.33	**55.00**	25.00
840,000	79.21	**79.41**	50.00	43.33	**55.00**	26.67
830,000	78.68	**78.82**	50.00	43.33	**55.00**	28.33
820,000	78.16	**78.24**	50.00	43.33	**55.00**	30.00
810,000	77.63	**77.65**	50.00	43.33	**55.00**	31.67
800,000	**77.11**	77.06	50.00	43.33	**55.00**	33.33
790,000	**76.58**	76.47	50.00	43.33	**55.00**	35.00
780,000	**76.05**	75.88	50.00	43.33	**55.00**	36.67
770,000	**75.53**	75.29	50.00	43.33	**55.00**	38.33
760,000	**75.00**	74.71	50.00	43.33	**55.00**	40.00
750,000	**74.47**	74.12	50.00	43.33	**55.00**	41.67

Note: Each row shows the tender ranking according to the price offered by C and the evaluation formula. The threshold price in the "independent linear" formula is equal to 70% of the base price ($700,000).

Example 2: Manipulation of the "Interdependent Linear" Formula

The procuring entity publishes, for a given contract Y, a tender notice establishing a base price of $1,000,000, 50 points for the price, 50 points for quality and the "interdependent linear" formula as evaluation criterion. Bidder A has a significant competitive advantage over bidder B in quality, at the same time B has a significant competitive advantage over A in price. Both bidders are aware that, in order to obtain a minimum profit, A will be able to offer a quality corresponding to 50 points and a 5% discount in price corresponding to $950,000, while B will be able to offer a quality corresponding to 25 points and a 15% discount in price corresponding to $850,000. A third bidder, C, is able to offer the best price (25% of discount

corresponding to $750,000) and the minimum acceptable quality corresponding to 0 points. As shown in the last row of Table 2, in this scenario A is the winner with a score of 60 points (50 from quality and 10 for the price bid) while B would get 55 points only (25 from quality and 30 for the price bid). Instead of improving its offer, B could ask C to cut its discount and bid a price such that B will be the winner. In fact, despite its high discount C will never be awarded the contract because of its low quality. This would be the case if C's discount declined from 25% to something less than 20% (i.e. from $750,000 to $810,000). Table 2 shows how the final ranking changes depending on C's bid (the winner is in bold letters) and again proves that the "independent linear" formula can eliminate room for such a manipulation. Accordingly, under the latter formula the score of A and B is not influenced by C and the ranking does not change.

TABLE 2

Final Ranking for Contract Y assuming different prices bid by C

Price bid by C ($)	Score *"Interdependent linear" formula*			Score *"Independent linear" formula*		
	A	B	C	A	B	C
850,000	66.67	**75.00**	50.00	**58.33**	50.00	25.00
840,000	65.63	**71.88**	50.00	**58.33**	50.00	26.67
830,000	64.71	**69.12**	50.00	**58.33**	50.00	28.33
820,000	63.89	**66.67**	50.00	**58.33**	50.00	30.00
810,000	63.16	**64.47**	50.00	**58.33**	50.00	31.67
800,000	**62.50**	**62.50**	50.00	**58.33**	50.00	33.33
790,000	**61.90**	60.71	50.00	**58.33**	50.00	35.00

780,000	**61.36**	59.09	50.00	**58.33**	50.00	36.67
770,000	**60.87**	57.61	50.00	**58.33**	50.00	38.33
760,000	**60.42**	56.25	50.00	**58.33**	50.00	40.00
750,000	**60.00**	55.00	50.00	**58.33**	50.00	41.67

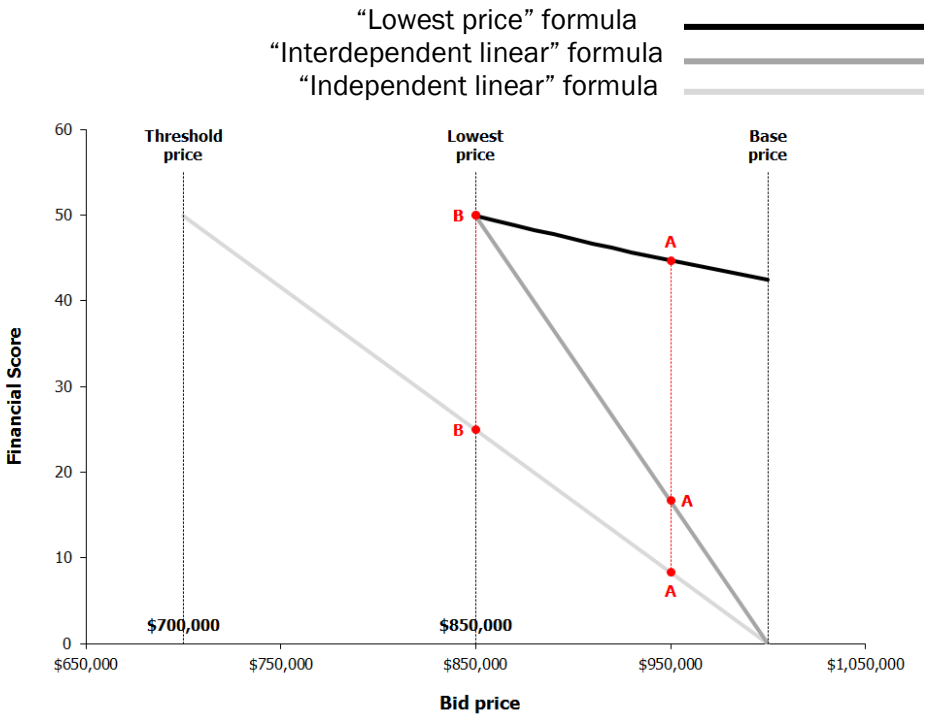
Note: Each row shows the tender ranking according to the price offered by C and the evaluation formula. The threshold price in the "independent linear" formula is equal to 70% of the base price ($700,000).

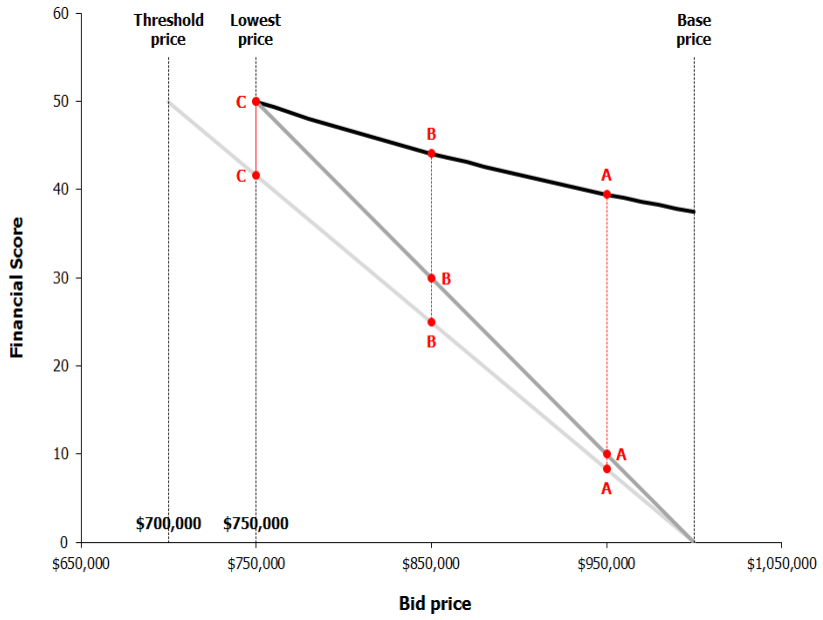
As also shown in Figure 1 the "independent linear" formula is not subject to the manipulation discussed in the two examples because its shape is "independent" of changes in the distribution of the bids. On the contrary, the shapes of the "lowest price" formula and of the "interdependent linear" formula depend on such distribution.

As anticipated in the previous section, the "independent linear" formula has an additional advantage since it allows to calculate, before the tender takes place, the monetary cost of each scoring point. Dini, Pacini & Valletti (2006) demonstrate that this is very useful for procuring entities and bidders, since the former can set the weights and the scoring rules, i.e. the weighted scoring method, according to their specific preferences/needs and the latter can choose their bidding strategy according to the monetary cost of each scoring point.[11] On the contrary the "lowest price" formula and the "interdependent linear" formula may generate a final ranking that does not maximize the procurement entity's preferences (this is the case in the last six rows of Table 1 and in the first five rows of Table 2).

FIGURE 1

Financial Scoring according to Examples 1 and 2





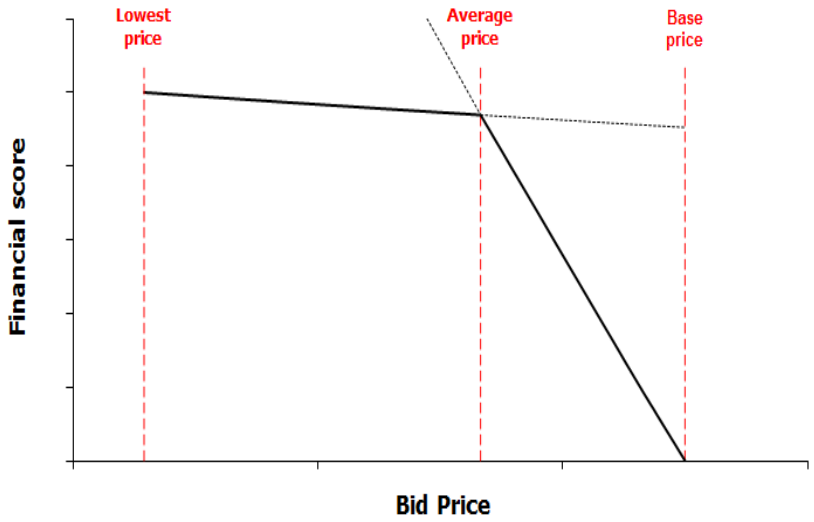
A CASE STUDY ON COLLUSION THROUGH SCORING RULE MANIPULATION

This section presents a clear real world example of scoring rule manipulation in public procurement. This refers to a tender for the supply of the so-called “ticket restaurant”, i.e., prepaid meal vouchers given by organisations/companies to their employees to have a meal at their convenience. The tender was published in the Official Journal of the Italian Republic, n. 244 of 18th October 2000, by Consip, the national government procurement agency of Italy. The tender was valued at a total of approximately €420 million for a 2-year period supply and had been divided into five geographical lots of equal amount (about €84 million), corresponding to the North-East (Trentino, Veneto, Friuli, Emilia Romagna and Toscana), North-West (Valle d'Aosta, Piemonte, Lombardia and Liguria), Centre (Umbria and Lazio), Centre-South (Marche, Abruzzo, Molise, Campania and Puglia) and South and Islands (Basilicata, Calabria, Sicilia and Sardegna).

The tender, based on the restricted procedure, aimed at establishing the conditions at which the winner was going to supply ticket restaurant for a face value of €4.65 each. The main qualification criteria required an annual specific turnover equal at least to 10 mln of euro for each lot, no limits on the number of lots to participate and specific limits for the formation of temporary joint ventures (the leader company possessing at least 60% of the minimum requirements and a minimum of 10% for the others). The award criteria was the most economically advantageous tender with an equal weighting for the financial and technical offer (max 50 points each). The 50 points reserved for the technical offer were allocated as follows: 40 points reserved for the existent number of affiliated restaurants (i.e. the restaurants willing to accept the meal vouchers as payment) in the provincial capitals included in the specific geographical lot; 6 points reserved for the number of towns included in the specific geographical lot where there was at least one affiliated restaurant; 2 points reserved for the electronic processing system for ticket restaurant supply orders; 2 points reserved for the introduction of the electronic ticket restaurant in specific sample areas to be identified.

FIGURE 2

Shape of the Financial Scoring Rule in the Consip Tender



On the other hand, the 50 points reserved to the financial offer were to be assigned on the basis of the following scoring rule as evaluation criteria:

$$Financial\ Score = \begin{cases} 50 \times \dfrac{P_{lowest}}{P_i} & \text{if } P_i \le P_{average} \\ 50 \times \left(\dfrac{P_{lowest}}{P_i} \right) \times \left[1 - \dfrac{P_i - P_{average}}{P_{base} - P_{average}} \right] & \text{if } P_i > P_{average} \end{cases} \quad (5)$$

where P_{base} was the base price (i.e. the value of the contract), P_{lowest} the lowest bid price, $P_{average}$ the average bid price, P_i the bid price, and 50 the financial weight, w_p. Figure 2 shows the shape of (5).

In November 2002 the pre-qualification session was held, following which ten firms were invited to tender for the lots they had indicated. Table 3 reports the name of the firms, their turnover and

respective market share, and the number of affiliated restaurants. Moreover, Table 4 shows the composition of the five temporary joint ventures (TJVs) agreed by eight of the ten firms invited for a specific geographical lot and the corresponding share of the potential profits. Indeed, the bids submitted for each lot included only one by a TJV and a variable number by individual bidders. For each lot, the best offer was that of the TJV (see the five final rankings in Figure 3).

TABLE 3

Firms Participating in the Consip Tender

Firms	**Turnover** (2001)	**Market share** (%)	**Affiliated restaurants** (1999)
Gemeaz Cusin Srl	€ 817,791,320	40.0%	60,000
Pellegrini Spa	€ 274,000,000	13.4%	25,000
Ristochef Spa	€ 191,047,731	9.3%	20,000
Sodexho Pass Srl	€ 159,645,000	7.8%	30,000
Cascina Scarl	€ 151,526,848	7.4%	15,000
Day Ristoservice Srl	€ 148,830,638	7.3%	30,000
Qui! Ticket Service Spa	€ 103,687,587	5.1%	25,000
Ristomat Srl	€ 93,766,514	4.6%	25,000
Repas Coupon Lunch Srl	€ 67,000,000	3.3%	15,000
Sagifi Spa	€ 38,130,411	1.9%	15,000
Total	€ 2,045,426,049	100.0%	260,000

The investigation of the Italian Antitrust, AGCM (2002), found that just those eight firms formed a cartel with the aim to eliminate

any possible competition between eight of the ten firms taking part in the call for tenders by jointly establishing a price for the supply that was higher than it would have been without the agreement and guaranteeing that each firm would be awarded at least one of the lots or part of it. The collusive strategy was centered around the manipulation of the the mathematical formula (5) to evaluate price bids, in order to damage the two bidders out of the cartel (the two underlined in Table 3) that, indeed, were those offering the best discounts (see Figure 3). The manipulation was executed by *i)* the submission of a bid price by the TJV comprised between the average and the lowest bid price to minimize the distance in terms of financial points with respect to the probable best bid price coming from those firms not participating in the cartel agreement and *ii)* the submission of non-competitive bid prices (i.e. very close to the base price) by the firms participating in the cartel, but not included in the TJV for that specific lot, to ensure that the price bid by the TJV effectively would have fallen between the average and the lowest bid price. The other ingredients of the collusive strategy were *iii)* establishing only one TJV per each lot to gain nearly all the technical points and *iv)* rotating the participants across the TJVs to guarantee a "fair share of the cake". The eight firms were eventually fined by the Italian Antitrust (see AGCM, 2002).

TABLE 4

Temporary Joint Ventures Agreed by the Eight Colluded Firms

TJV *North-West* Lot	Profit share
Ristochef	47.3%
Ristomat	3.8%
Qui	48.9%

TJV *North-East* Lot	Profit share
Ristoservice	29.0%
Ristomat	20.4%
Sodexho	50.6%

TJV *Center* Lot	Profit share
Gemeaz	75.0%

TJV *South-Islands* Lot	Profit share
Ristoservice	29.0%

La Cascina	25.0%

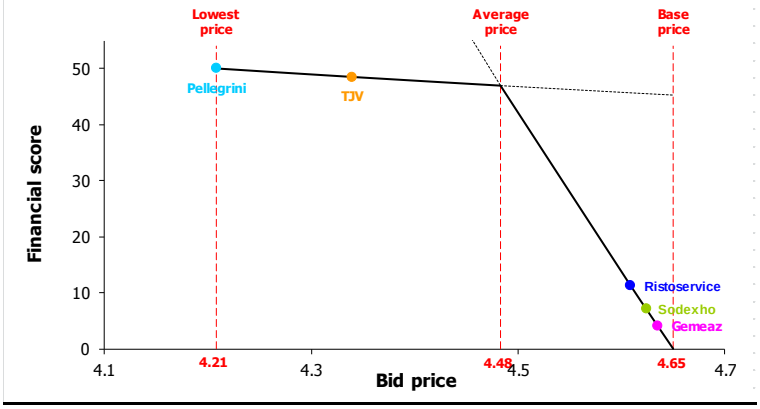
Ristomat	20.4%
Sodexho	50.6%

TJV *Center-South* Lot	Profit share
Gemeaz	85.0%
Sagifi	15.0%

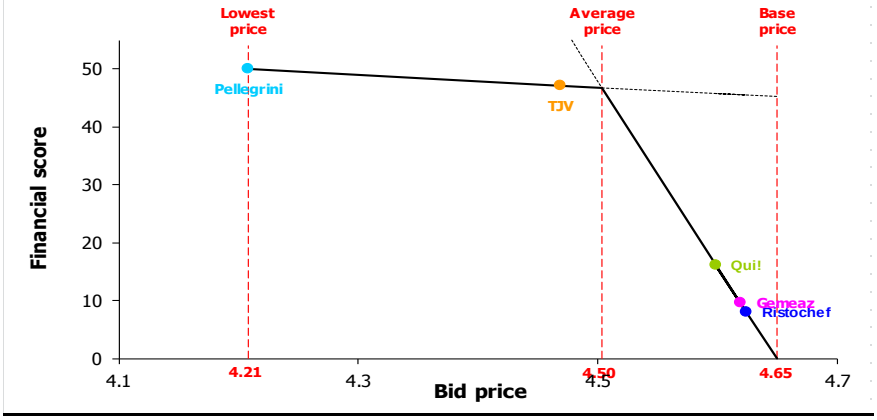
FIGURE 3

Financial Scoring and Final Ranking in the 5 Lots of the Consip Tender

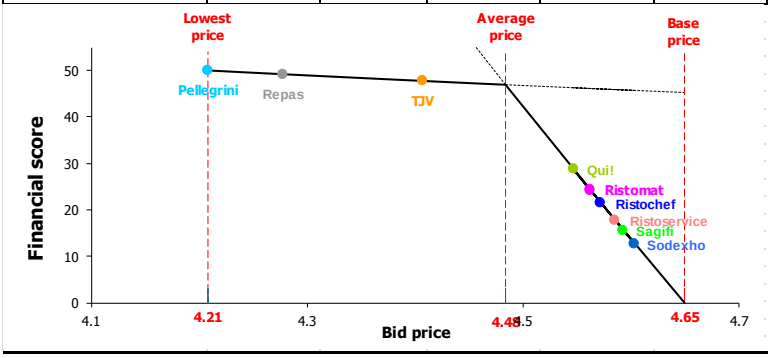
North-West Lot	Financial score	Price (€)	Discount (%)	Technical score	Total score
Pellegrini	50.00	4.21	9.50%	33.81	83.81
TJV (Ristochef, Ristomat, Quil)	48.48	4.34	6.67%	42.69	91.17
Ristoservice	11.32	4.61	0.89%	33.48	44.80
Sodexho	7.10	4.62	0.56%	35.84	42.94
Gemeaz	4.17	4.63	0.33%	49.48	53.65
Average		4.48	3.59%		
Lowest		4.21	0.33%		



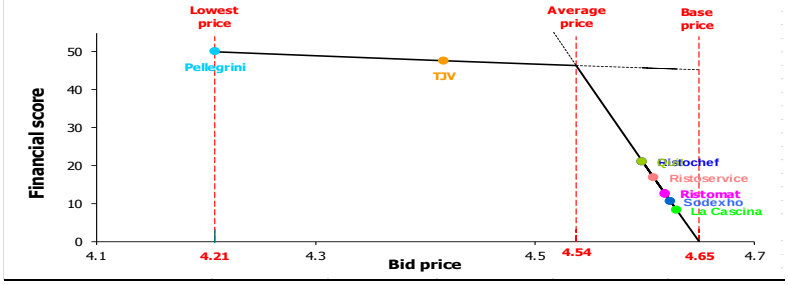
North-East Lot	Financial score	Price (€)	Discount (%)	Technical score	Total score
Pellegrini	50.00	4.21	9.50%	31.94	81.94
TJV (Ristoservice, Ristomat, Sodexho)	47.08	4.47	3.89%	49.22	96.30
Ristochef	8.10	4.62	0.56%	33.68	41.78
Qui!	16.14	4.60	1.11%	27.94	44.08
Gemeaz	9.70	4.62	0.67%	44.94	54.64
Average		4.50	3.15%		
Lowest		4.21	0.56%		



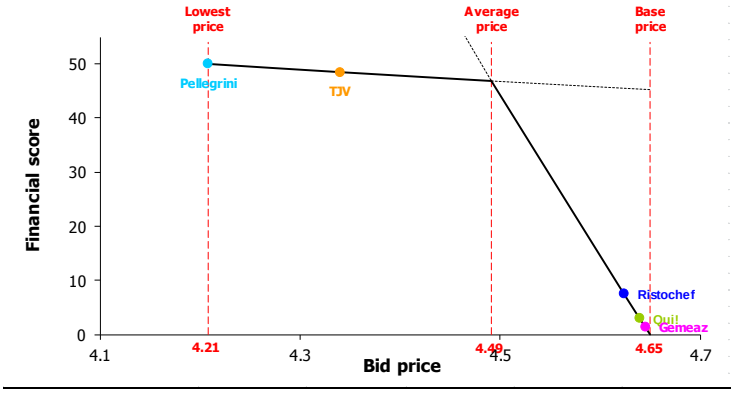
Center Lot	Financial score	Price (€)	Discount (%)	Technical score	Total score
Pellegrini	50.00	4.21	9.50%	25.81	75.81
Repas	49.18	4.28	8.00%	29.28	78.46
TJV (Gemeaz, La Cascina)	47.74	4.41	5.22%	49.48	97.22
Ristoservice	17.88	4.59	1.39%	29.63	47.51
Sodexho	12.81	4.60	1.00%	31.71	44.52
Sagifi	15.66	4.59	1.22%	2.86	18.52
Ristochef	21.54	4.57	1.67%	23.12	44.66
Qui!	28.80	4.55	2.22%	23.15	51.95
Ristomat	24.43	4.56	1.89%	30.17	54.60
Average		4.48	3.57%		
Lowest		4.21	1.00%		



Center-South Lot	Financial score	Price (€)	Discount (%)	Technical score	Total score
Pellegrini	50.00	4.21	9.50%	30.3	80.30
TJV (Gemeaz, Sagifi)	47.63	4.42	5.00%	49.48	97.11
Ristoservice	16.86	4.61	0.89%	33.6	50.46
Sodexho	10.57	4.62	0.56%	33	43.57
La Cascina	8.30	4.63	0.44%	10.86	19.16
Ristochef	21.08	4.60	1.11%	26.88	47.96
Qui!	21.08	4.60	1.11%	31.12	52.20
Ristomat	12.66	4.62	0.67%	30.4	43.06
Average		4.54	2.41%		
Lowest		4.21	0.44%		



South-Islands Lot	Financial score	Price (€)	Discount (%)	Technical score	Total score
Pellegrini	50.00	4.21	9.50%	37.41	87.41
TJV (Ristoservice, Ristomat, Sodexho)	48.48	4.34	6.67%	48.01	96.49
Ristochef	7.47	4.62	0.56%	23.85	31.32
Qui!	2.92	4.64	0.22%	35.28	38.20
Gemeaz	1.46	4.64	0.11%	45.89	47.35
Average		4.49	3.41%		
Lowest		4.21	0.11%		



CONCLUSION

Public procurement needs accurately designed competitive tenders. To this regard, evaluation criteria spell out the rules of the game by which all offers will be compared. They have to ensure fair treatment of all suppliers, fostering genuine competition among them. Evaluation criteria to be successful need to have different characteristics, such as objectivity, measurability, validity and impartiality.

Objective criteria ensure that offers are evaluated consistently, even if they are evaluated by different evaluators, and that a third party can ascertain that the offer has certain features. Measurable criteria allow evaluators to assign rankings, for example giving points against degrees of achievement up to a set maximum of points, where the measurement can be verified in a reliable manner. Valid criteria are related to the required performance, i.e. to features critical for the execution of the contract, on the basis of which to assign a higher ranking to those suppliers who actually have a relatively high probability of successfully performing the work. Impartial criteria does not give an unfair advantage to one supplier over another, nor are they tailored around the qualities of preferred suppliers.

However, these characteristics are not sufficient to ensure free competition. Effective evaluation criteria need to be not manipulable, to avoid the risk of transforming a competitive tender in a collusive tender. Our analysis reveals that commonly used scoring rules worldwide are collusion prone type and that firms do indeed form cartels that coordinate the entry and bids of their members. This incentive to cooperate is offered by a specific feature of this type of scoring rule, namely the dependence of one bidder's score from other bidders' bids, via statistics – the average, the minimum, the maximum and so on – calculated out of the bid distribution.

As shown by the economic literature, competitive tenders to attain best value procurement need procuring entities to enjoy discretion when setting the weighted scoring method. This implies that regulators should refrain from fixing specific mathematical formula for scoring rules in order to attain a higher degree of

transparency and combat corruption by eliminating the administration's discretion in awarding contracts. Indeed, this was more generally recognized by the European Court of Justice (2004): "*the abstract and general fixing by the national legislature of a single criterion for the award of public works contracts deprives the contracting authorities of the possibility of taking into consideration the nature and specific characteristics of such contracts, taken in isolation, by choosing for each of them the criterion most likely to ensure free competition and thus to ensure that the best tender will be accepted.*" This means that ensuring effective competition needs discretion for the procuring entity when designing the tender, and that this kind of discretion does not necessarily run counter transparency.

NOTES

1. See article 53(1), Directive 2004/18/EC.
2. See page 23 (par. 2.49-2.54), World Bank (2011a), and page 13 (section II), World Bank (2011b).
3. See article 43(3), UNCITRAL (2011).
4. See Federal Acquisition Regulation 15.101-1 and 15.101-2 respectively. See also the "price and price-related factors" criteria under the use of sealed bidding (FAR 14.101, 14.201-5, 14.201-8, 14.408-1).
5. From the recital 46, Directive 2004/18/EC: "*Where the contracting authorities choose to award a contract to the most economically advantageous tender, they shall assess the tenders in order to determine which one offers the best value for money. In order to do this, they shall determine the economic and quality criteria which, taken as a whole, must make it possible to determine the most economically advantageous tender for the contracting authority. The determination of these criteria depends on the object of the contract since they must allow the level of performance offered by each tender to be assessed in the light of the object of the contract, as defined in the technical*

specifications, and the value for money of each tender to be measured. In order to guarantee equal treatment, the criteria for the award of the contract should enable tenders to be compared and assessed objectively."

6. From article 54(5), Directive 2004/18/EC: "*The invitation shall also state the mathematical formula to be used in the electronic auction to determine automatic rerankings on the basis of the new prices and/or new values submitted. That formula shall incorporate the weighting of all the criteria fixed to determine the most economically advantageous tender, as indicated in the contract notice or in the specifications."* From article 53(1)g, UNCITRAL (2011): "*The criteria and procedure for evaluating bids in accordance with article 11 of this Law, including any mathematical formula that will be used in the evaluation procedure during the auction."*
7. See page 69, UNOPS (2006), or the Instructions to Consultants Data Sheet clause 27.1 at page 29, World Bank (2011c), and end-page 21 in World Bank (2011b), or page 64, Europaid (2007), or the Annexes G and P of the Italian Public Procurement Regulation (DPR 207/2010).
8. This formula for price evaluation for works is the only one allowed by the Italian Public Procurement Regulation (DPR 207/2010). This is also stipulated by several sentences on this account (see Cons. St., sez. V, 28/09/2005, n.5194; Cons. St., sez. V, 9/06/2008, n. 2848).
9. See Dini, Pacini & Valletti (2006) for this type of classification.
10. See Dini, Pacini & Valletti (2006).
11. However, as a reference case, both the Italian jurisprudence and the AVCP (the Italian public procurement authority) have made the use of the "independent linear" formula more difficult, since they censured the use of threshold prices. AVCP (2009) stated that putting a threshold price on the procurement notice, this would become a sort of focal point for bidders, that would be interpreted as the price wished by the procuring entity. Then, all

bidders would bid very close to the threshold price, making the tender a competition on quality only.

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