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# Gains from a Unified European Community Public Procurement Market: An Analysis Using Auction Theory

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## I. INTRODUCTION

Although the Council of the European Communities (Council) attempted to open the awarding of public works contracts to intra-community competition as early as 1971,[1] a recent survey revealed that little progress had been made toward that goal in the subsequent thirteen years.[2] This lack of progress seems surprising given the almost universal agreement about the gains to be realized from competition in government contracting.[3] One possible explanation for the lack of progress is that these gains have been overstated or are unattainable.

The Council's 1971 directive apparently was an attempt to create intra-community competition by requiring member country purchasing bodies to award large contracts through open tendering procedures.[4] Theoretically, open tendering leads to a larger number of bidders, enabling the seller[5] to capture all the potential gains from trade. Competition among suppliers then results in a con-

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1. *Directive 71/305/EEC*, 14 J.O. COMM. EUR. (No. L 185) 5 (1971); *Directive 77/62/EEC*, 20 O.J. EUR. COMM. (No. L 13) 1 (1977) (opened public procurement of goods and equipment to European Community competition).

2. COMMISSION OF THE EUROPEAN COMMUNITIES, 5 RESEARCH ON THE "COST OF NON-EUROPE" BASIC FINDINGS (1988) [hereinafter BASIC FINDINGS] (Data were only available through 1984.).

3. BASIC FINDINGS, *supra* note 2; Finsinger, *Non-Competitive and Protectionist Government Purchasing Behavior*, 32 EUR. ECON. REV. 69 (1988); Harrison, Rutherford & Wooton, *The Economic Impact of the European Community*, 79 AM. ECON. REV. 288 (1989).

4. *Directive 71/305/EEC*, 14 J.O. COMM. EUR. (No. L 185) 5 (1971).

5. Throughout this article theoretical auction models are introduced first with the analysis focusing on one seller and many potential buyers. These buyers are the bidders in the auction. In the subsequent application of the theoretical models to the government procurement process, the government purchasing body is generally the seller, selling a contract for specific goods or services to potential suppliers. The suppliers hoping to receive the specific government contract are the bidders.

tract price equal to the cost of production for the most efficient producer of the good. Open bidding encourages the least cost producer to reveal itself to the purchaser. Therefore, open tendering in public procurement results in lower costs and greater revenues for member governments.

Despite these arguments in favor of the adoption of open tendering and persistent pressure from the Council,[6] open tendering amounted to only seven percent of the total value of contracts awarded by public purchasing entities in the Common Market countries in 1984.[7] A survey of public procurement practices documented persistent attempts to avoid open tendering by dividing large contracts into several contracts each falling within the small contract exception and by asserting a national interest exception permitted by the 1971 council directive.[8] The Commission of the European Communities (Commission) responded to this finding by proposing a council directive which allows contracting authorities to award contracts by negotiated procedure only in severely limited circumstances.[9] However, this proposal assumes that member governments are somehow acting suboptimally when they use these tactics to award contracts.

Economic theory suggests that, in general, individuals and organizations make optimal decisions. The actions actually taken by an organization may be viewed as optimal and used to infer information about what the organization is trying to accomplish.[10] Application of this reasoning to

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6. *See, e.g.*, Proposed Council Directives at: 1989 EUR. COMM. DOC. (COM No. 141) (1989); 1988 EUR. COMM. DOC. (COM No. 733) (1988); 1988 EUR. COMM. DOC. (COM No. 354) (1988); 1987 EUR. COMM. DOC. (COM No. 134) (1987); 1986 EUR. COMM. DOC. (COM No. 679) (1986).

7. BASIC FINDINGS, *supra* note 2, at 84.

8. *Id.* at 178-254 *passim*.

9. PROPOSED COUNCIL DIRECTIVE, 1988 EUR. COMM. DOC. (COM No. 354) art. 9 (1988). Contracts can be awarded by negotiated procedure only (1) in the event of irregular tenders or tenders which are unacceptable, when the original contract terms are not substantially altered, (2) when the works involved are for research and development and (3) in exceptional cases, "when the nature of the works or the risks attaching thereto do not permit prior overall pricing." *Id.* The proposal also streamlines and strengthens the Council's enforcement mechanisms to prevent abuse of the exception.

10. More precisely, economic theory suggests that observed actions and institutions represent equilibrium, optimizing responses by rational agents to their economic envi-

government procurement implies that purchasing entities act optimally when they circumvent the open tender requirements. Therefore, either the benefits of increasing intra-community competition through open tenders in public procurement have been substantially overestimated, or government purchasing entities award contracts primarily on the basis of non-economic criteria.[11] This article explains the microtheoretic auction models that should provide the basis for any estimated governmental cost savings, and evaluates the likelihood that previously projected gains from opening public procurement to intra-community competition will in fact be realized. Section II discusses the potential gains by eliminating nontariff barriers and using competitive bidding procedures for government contracts. Section III explains the two basic auction models and their implications for the types of bidding processes governments might employ in awarding contracts. Problems of bidder collusion and the inability to commit to the auction, which make the theoretical and empirical gains less likely to be realized, are also analyzed in this section. The article concludes that previously projected gains probably represent an upper bound on achievable savings by opening the public procurement sector to intra-community competition. Potential gains will likely be split between buyer and seller, rather than accruing solely or substantially to government purchasing entities.

## II. Projected Gains

The elimination of nontariff barriers, such as implicit "buy

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ronment. *E.g.*, Alchian, *Uncertainty, Evolution, and Economic Theory*, 58 J. Pol. Econ. 211 (1950); Fama & Jensen, *Separation of Ownership and Control*, 26 J.L. & Econ. 301 (1983); Alchian & Demsetz, *Production, Information Costs, and Economic Organization*, 62 Am. Econ. Rev. 777 (1972). Revealed preference theory of consumer behavior uses this concept to infer information about the consumer's preferences over commodities. *See* H. Varian, Microeconomic Analysis 101-02 (1978).

11. Although this article focuses on the economic gains of open tendering and intra-community competition, there can be other economic reasons, such as the stimulation of economically depressed regions or the elimination of youth unemployment, for avoiding open tendering and awarding government contracts locally. However, as these are permitted exceptions to open tendering even under the proposed council directives, they are assumed to be of secondary importance.

national" policies and discrimination against foreign suppliers through national technical standards, represents one potential source of gains from increased competition.[12] For this reason, the Commission has attempted to thwart the strategic use of nontariff barriers by proposing that all contracts conform to European Community technical standards, and by stipulating that bids cannot be excluded from consideration solely because they are presented in technical standards different from those of the country in which the contract is being awarded.[13] The proposed amendments also attempt to eliminate preferential treatment of domestic bidders by requiring all information about forthcoming contracts to be published in the *Official Journal of the European Community* at least as early as it is released domestically.[14] While it is clear that the removal of these barriers will result in cost savings, it is almost impossible to quantify the amount involved.[15]

A second source of community gains is the lower expected cost of government procurement due to competition generated by using open tendered bidding rather than restricted or single tendered bidding. The potential gain from competitive bidding can be analyzed using auction models, and is the focus of the remainder of this article.

Most of the empirical estimates of the potential gains from opening public procurement to intra-community competition implicitly combine the effects of savings from both the elimination of nontariff barriers and the use of open tendered bidding.[16]

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12. BASIC FINDINGS, *supra* note 2, at 178-254.

13. PROPOSED COUNCIL DIRECTIVE, 1988 EUR. COMM. DOC. (COM No. 354) (1988).

14. *Id.*

15. A purely theoretical analysis of the elimination of all nontariff barriers within the European Community predicts an increase in the potential gain from membership for the United Kingdom of over 300 percent in equivalent variation. Harrison, Rutherford & Wooten, *supra* note 3, at 292. Equivalent variation provides a convenient methodology for comparing the welfare effects of various projects or policies. Equivalent variation "uses the status quo prices as the base and asks what income change at the current prices would be equivalent to the proposed change." H. VARIAN, MICROECONOMIC ANALYSIS 264 (2d ed. 1984). Therefore, the theoretical analysis suggests that eliminating *all* nontariff barriers would have roughly the same effect as increasing incomes in the United Kingdom by 300 percent. Unfortunately it is impossible to use this information to draw inferences either about the savings in public procurement in the United Kingdom or the potential gains in other European Community countries from eliminating all nontariff barriers.

16. For example, government purchasing behavior is frequently recognized as the major nontariff barrier to trade. ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT, COLLUSIVE TENDERING: REPORT OF THE COMMITTEE OF EXPERTS ON RESTRICTIVE

The most comprehensive study, sponsored by the Commission, estimated potential savings in annual public expenditures of eight to nineteen billion european currency units (ecus) consisting of:

> [a] three to eight billion ecus (one to two percent of 1984 public purchasing) for the five study countries: Belgium, France, Germany, Italy, and the UK, from new trade at the prices of the lowest cost country, arising directly from opening up public procurement . . . .
> [b] one to three billion ecus (around a half a percent of 1984 public purchasing) as a result of competitive pressure on prices in sectors not previously open to international competition . . . .
> [c] four to eight billion ecus (one to two percent of 1984 public purchasing), with some time lag, in economies of scale arising from the restructuring of industry in the previously protected sectors supplying equipment for defense, power generation, railways and telecommunications.[17]

These projected savings were obtained by making cross-country comparisons of prices on selected items and using these figures to generate assumptions about price level changes for all product categories.[18] The accuracy of the estimated savings of eight to nineteen billion ecus depends upon the accuracy of the assumptions from which the projected price changes are derived. Auction models are a powerful tool which may be used to assess the merit of these assumptions.

## III. Auction Theory

The traditional argument for requiring governments to award contracts through open tendered bidding is that competition among bidders ensures that all the gains from trade are realized by the seller.[19] However, recent theoretical models of optimal auctions and bidder behavior suggest that although the equilibrium outcomes of most auctions will be pareto efficient,

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Business Practices 12 (1976) ("Government buying or selling policies are recognized as giving rise to one of the principal non-tariff barriers to trade and are under study at international level with a view to eliminating discriminatory buying policies and practices and to restoring open and equitable competitive conditions.") [hereinafter OECD Report].

17. Basic Findings, *supra* note 2, at 6-7.

18. *Id.* at 50.

19. *E.g.*, Friedman, *A Competitive Bidding Strategy*, 4 Operations Res. 104 (1956).

little can be predicted about the division of the trading surplus in general.[20]

There are two basic auction models which differ both in their characterization of bidder knowledge and in their conclusions about optimal bidder strategy. The independent private values model assumes that every bidder's valuation of the good is independent of every other bidder's,[21] and may describe bidding for basic government supply contracts. The common values model, which allows valuations to be mutually dependent, may be a better characterization of the sale of such things as oil, mineral, or timber rights.

### *A. Independent Private Values Model*

The independent private values model assumes that "a bidder's payoffs can depend only on (i) what he knows, (ii) whether he wins, and (iii) how much he [bids]. Value is treated as a purely personal matter: each bidder knows what the goods are worth to himself, and no bidder cares what they are worth to others."[22] Independent values is an appropriate characterization of a supply auction if each bidder is aware of its own cost structure, and if information that any bidder could infer from the values or bids of other bidders will not alter any bidder's assessment of its own cost. In contrast, if knowledge of another supplier's valuation of the supply contract causes any bidder to reassess its own cost or bid, the auction is best described by the common values model.

In the independent private values model, if the bidders and the seller are risk neutral, the seller maximizes expected revenue by auctioning the item. Competition ensures that the seller is

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20. Maskin & Riley, *Optimal Auctions with Risk Averse Buyers*, 52 ECONOMETRICA 1473 (1984); Milgrom & Weber, *A Theory of Auctions and Competitive Bidding*, 50 ECONOMETRICA 1089 (1982); Myerson, *Optimal Auction Design*, 6 MATHEMATICS OPERATIONS RES. 58 (1981); Riley & Samuelson, *Optimal Auctions*, 71 AM. ECON. REV. 381 (1971); Milgrom, Auction Theory, Address to the 1985 World Congress of the Econometric Society (December 22, 1985) [hereinafter Milgrom Address].

21. Vickrey, *Counterspeculation, Auctions, and Competitive Sealed Tenders*, 16 J. FIN. 8 (1961).

22. Milgrom, *The Economics of Competitive Bidding: A Selective Survey* in SOCIAL GOALS AND SOCIAL ORGANIZATION; ESSAYS IN MEMORY OF ELISHA PAZNER 261, 265 (Hurwicz, Schmeidler & Sonnenschein eds. 1985) [hereinafter *Milgrom Survey*]. "Goods" should be understood to mean the contract in this context. Some scholars suggest that this model adopts a restrictive interpretation of value. They argue that it implies that a contract cannot be resold or subcontracted because, if such subcontracting were permissible, the cost (value) to the contractor would depend upon the subcontractor's cost. *Id.*

rewarded as if she were the strongest bargainer, and she captures most of the gains from trade.[23] This result is robust to the actual type of auction employed, due to the fact that every bidder has no better strategy than to report his true cost or type.[24] Thus, under these quite restrictive conditions, the seller captures all the gains from trade by awarding the contract to the lowest price producer for approximately his marginal cost. If all public procurement processes matched the above assumptions and the supply technology exhibited either increasing or constant returns to scale, then it would be appropriate to measure the gains from completing the internal market by extrapolating from the lowest price prevailing in any European Common Market country as was done in the Commission's survey.

The choice of optimal auction, sealed versus ascending bid, is more sensitive to the amount of known information when bidders are risk averse, since risk aversion alters the behavior of buyers.[25] If the seller selects an ascending bid auction, a risk averse bidder will still find it optimal to bid until the price of the item exceeds its value to him. Equivalently, in a supply contract context, the risk averse supplier will lower his bid until it equals his marginal cost, at which point he will withdraw from the bidding. This same result holds in a uniform price sealed bid auction where all of the goods are sold at the value of the greatest rejected bid.[26]

When bidders are risk averse, the seller maximizes expected revenue by conducting a discriminatory sealed bid auction where the objects are awarded to the highest bidders at their bids. In this form of auction, a participant's bid influences both the probability that he "wins" the object and the price paid to receive it. By raising his bid slightly from its value in a risk neutral setting, a risk averse buyer partially insures himself against

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23. *Id.* at 269.

24. *Id.* A result is "robust" when it is invariant to changes in underlying assumptions. *See, e.g.*, H. THEIL, PRINCIPLES OF ECONOMETRICS 615-17 (1971).

25. Maskin & Riley, *supra* note 20, at 1473; Milgrom & Weber, *supra* note 20, at 1116-17; *Milgrom Survey*, *supra* note 22, at 272-73.

26. *Milgrom Survey*, *supra* note 22, at 262-63; Vickrey, *supra* note 21, at 8. For example, assume there are three goods for sale and there are five bidders, each of whom desires one of the goods. Assume the five bids are 20, 15, 13, 10, and 2. The parties bidding 20, 15, and 13 each receive the good and pay 10, the amount of the highest rejected bid. Since the amount paid by a bidder is independent of his own bid, he has no incentive to lie about the value of the good to him, and he will always bid the true value. See *Milgrom Survey*, *supra* note 22, at 261-64 for a description of the various types of auctions.

losing. Therefore, risk averse participants bid slightly more than their true valuations, which benefits the seller.[27]

United States Treasury Bills are presently sold using a discriminatory auction which, arguably, allows the government to obtain financing on the most favorable terms.[28] A proposal to switch to a "Vickrey" or uniform price auction was rejected, even though these alternative auctions could potentially increase economic efficiency by reducing resources spent in bid preparation and increasing the number of potential bidders.[29] Therefore, policy objectives also play a role in the choice of auction. If the goal is economic efficiency rather than cost minimization of a given public procurement plan, a uniform price auction may be preferable to a discriminatory auction. European Community legislation apparently leaves the choice of auction, other than open or restricted, to the contracting body even though theory suggests that greater savings could be achieved by requiring the use of discriminatory sealed bid auctions for specific contracts when the bidders are expected to be risk averse.

### *B. Common Values Model*

The second theoretical model of auctions, the common values model, assumes that the true value of the object to be auctioned is the same to all bidders, but the true value is unknown and has to be estimated. Bidders' values are assumed to be affiliated or positively correlated.[30] For example, this model has been applied to bidding for timber rights, mineral rights, and offshore petroleum leases[31] because "the actual value of what is acquired will not be ascertained until the timber [is] cut, the minerals [are] mined, or the oil [is] extracted."[32]

In contrast to the basic independent values model where a

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27. *Milgrom Survey*, *supra* note 22, at 273.

28. *See id.* at 263, 273.

29. Smith, *Bidding Theory and the Treasury Bill Auction: Does Price Discrimination Increase Bill Prices?*, 48 REV. ECON. & STAT. 141 (1966); Brimmer, *Price Discrimination in the United States Treasury Bill Market*, 44 REV. ECON. & STAT. 178 (1962); Goldstein, *The Friedman Proposal for Auctioning Treasury Bills*, 70 J. POL. ECON. 386 (1962).

30. Milgrom & Weber, *supra* note 20, at 1089; *Milgrom Survey*, *supra* note 22, at 272.

31. Reece, *Competitive Bidding for Offshore Petroleum Leases*, 9 BELL J. ECON. 369 (1978); Wilson, *A Bidding Model of Perfect Competition*, 44 REV. ECON. STUD. 511 (1977); *Milgrom Survey*, *supra* note 22, at 274-85.

32. *Milgrom Survey*, *supra* note 22, at 285.

bidder's optimal strategy is to bid aggressively up to his true value, the aggressive bidder following that strategy in the common values model frequently suffers from a "winner's curse." The intuitive explanation of this result is simply that "a bidder wins often when he overestimates [the true value] but wins only rarely when he underestimates [it]."[33] Therefore, "winning" is "bad news" about the value of the item being acquired[34] in the sense that all other bidders estimated that the true, unknown value of the object is less than the amount paid by the winner.

When there is affiliation and bidders' valuations are positively correlated, information linkages[35] occur which can be exploited by the seller to increase the expected payoff. Since all bidders are estimating the true value of the item, observing other participants' bids reveals information about their value estimates. This information may cause bidders to revise their estimates of value. When one bidder's estimate rises, he expects others' estimates also to increase. Since the bid price is increasing in value, each bidder expects the price to rise when his own assessment of value increases. Consequently, each bidder places a higher bid in attempting to win the auction.[36]

There are two competing forces affecting the bidders' behavior in the common values model. First, bidders have an incentive to "shade" bids, or bid lower than their estimate of value to avoid the winner's curse. Second, bidders have an incentive to increase their bids to ensure they obtain the item when they observe higher bids by other auction participants. Therefore, the optimal choice of auction for the seller is the ascending bid auction. "In an ascending-bid auction, the equilibrium price depends on the information of losing bidders through the bids they place. That dependence, or 'linkage', is absent in the sealed-bid auction. Its presence in the ascending-bid auction leads to a higher predicted price."[37] However, nothing can be predicted about how the potential gains from trade will be divided between the seller and the successful bidder.

The critical characteristic of the common values model is the uncertainty surrounding the true value of the object to be

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33. *Id.* at 265.

34. Milgrom Address, *supra* note 20, at 30.

35. *Milgrom Survey*, *supra* note 22, at 277-78; Milgrom Address, *supra* note 20, at 33.

36. *Milgrom Survey*, *supra* note 22, at 278.

37. Milgrom Address, *supra* note 20, at 7.

auctioned. Bidder estimation of value creates the linkages that enable the seller to increase expected revenue. In general, however, the seller gains only by creating linkages which undermine the privacy of the winning bidder's information[38] since the gains from trade are split between the two. Therefore, when attempting to maximize expected revenues, the seller will always disclose any private information about the value of the object if the information can be credibly revealed:[39]

> [R]evealing information has two effects. [When bidders' estimates] are strictly affiliated . . . the seller's information tells each bidder something about his competitor's type. As a result, the bidders with lower types will, on average, raise their assessments of their competitors' bids. They will then bid more aggressively, and that will tend to make the higher types raise their bids too . . . . In [models involving the winner's curse], bidders tend to shade their bids to avoid the curse, and the lower types, who are overly pessimistic, shade their bids excessively. When the seller provides public information, he alleviates the winner's curse, allowing lower types to bid more aggressively on average, which in turn causes everyone to bid more aggressively. This raises revenues.[40]

If the seller chooses to act in concert with a particular bidder, perhaps to ensure that a domestic supplier wins a particular contract, the seller could reveal the private information only to that bidder. The superior information should ensure that the desired bidder successfully obtains the contract. This type of collusive behavior between the seller and any particular buyer is difficult to detect and eliminate. The Commission has attempted to ensure equal access to information by requiring that notice of all large contracts be published in the *Official Journal of the European Community* at least as soon as it is published in domestic sources.[41] However, this is unlikely to be sufficient to prevent intra-country collusion if purchasing agents feel compelled to buy nationally or patronize local suppliers.[42]

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38. *Id.* at 6.

39. Credibility implies that there is some way to verify that the seller is revealing truthful information. Otherwise, bidders will realize that the seller has no incentive to provide the best possible information and will ignore any statements the seller makes.

40. *Milgrom Survey*, *supra* note 22, at 279.

41. *Directive 71/305/EEC*, 14 J.O. COMM. EUR. (No. L 185) 5 (1971); *Directive 77/62/EEC*, 20 O.J. EUR. COMM. (No. L 13) 1 (1977).

42. Although the survey failed to find explicit "buy national" policies, many purchasing authorities expressed a national or local preference. BASIC FINDINGS, *supra*

When true value can be observed, even imperfectly, after the contract is awarded, the seller should tie contract price to the observed value.[43] For example, in the lease or sale of mineral rights, the optimal contract should call for royalty payments based on actual production. Although this argument suggests that cost-sharing provisions should be included in public construction contracts, there is a rather large caveat. Cost-sharing provisions create incentives for contractors to exercise suboptimal cost control since the contractors only pay part of the additional expenses incurred. Therefore, the optimal contract in a construction context is likely to depend upon the amount of uncertainty and the ability to monitor the contractor.[44]

### *C. Commitment to the Auction*

The preceding analysis about the seller's optimal auction assumes that the seller can precommit to use the auction and to refrain from making a profitable offer later. For example, a government purchasing entity must be able to state that a given supply contract will be awarded to the lowest bidder, but if all the bids exceed a given threshold the contract will not be awarded. Then, if all bids exceed the threshold, the purchasing agent must forego the purchase rather than negotiate directly with any of the suppliers who could have bid at the auction. If the purchasing agent can negotiate directly with suppliers after the auction, the suppliers' optimal bids change. Generally, the induced changes in the agents' optimal bids make it impossible for the seller to enforce any reservation price, which reduces the expected revenue from any type of auction.[45]

Since governments cannot refuse to supply services and must purchase supplies, it is practically impossible for public purchasing officials to precommit to the use of a one-time auc-

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note 2, at 75-176 *passim*.

43. Milgrom Address, *supra* note 20, at 7.

44. Government procurement contracting has been examined outside the auction context in several models with varying assumptions. The predicted optimal contract varies widely with the formulation of the individual models. *E.g.*, Baron & Besanko, *Monitoring, Moral Hazard, Asymmetric Information, and Risk Sharing in Procurement Contracting*, 18 RAND J. ECON. 509 (1987); McAfee & McMillan, *Bidding for Contracts: a Principal-Agent Analysis*, 17 RAND J. ECON. 326 (1986).

45. Milgrom Address, *supra* note 20, at 42; OECD REPORT, *supra* note 16, at 67 ("However, it should not be forgotten that a widespread use of negotiations after the submission of bids might lead firms to adjust their bids and conduct so that they deliberately maintain their price margins until a late stage of the negotiations.").

tion for the sale of a specific contract. Public purchasing agents typically have the ability to refuse all tendered bids and to negotiate with suppliers later if all bids fall outside some acceptable range.[46] Theoretically, this suggests that governments, on average, are paying more in supply contracts and receiving less in sale contracts than is optimal. However, in a widely documented deviation from announced auction rules, the American government collected more than expected on a sale of factories:

> In 1955, Congress set up a commission that was directed to sell competitively and individually by unit a number of government owned synthetic rubber plants built during World War II including a plant with three units located in Torrance, California. Shell Chemical Company made an offer for the entire Torrance plant that turned out to be substantially higher than the sum of the high offers on the individual units. When commission representatives told . . . the President of Shell Chemical Company that the law did not allow Shell to bid on the entire plant, he responded that Shell was telling the government that, to Shell at least, the plant as a whole was worth more than its individual units, and that the commission should attempt to get Congress to accept Shell's offer . . . . Shell's offer was accepted.[47]

If most deviations from auction are revenue reducing, as theory suggests, then current efforts by the Commission of the European Communities to limit the use of negotiated award procedures following an open tender[48] should raise government revenues by reducing the cost of supply contracts. Again, however, the magnitude of the savings is almost impossible to predict.

### *D. Collusion and Bidder Rings*

The final obstacle facing an auction seller seeking to maximize expected profits is collusion among the bidders. If all bidders at an auction agree not to compete and to act cooperatively, the good will be sold at the seller's reservation price, giving the

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46. *Directive 71/305/EEC*, 14 J.O. COMM. EUR. (No. L 185) 5 (1971); *Directive 77/62/EEC*, 20 O.J. EUR. COMM. (No. L 13) 1 (1977).

47. Rothkopf, *Bidding Theory: The Phenomena to Be Modeled* in AUCTIONS, BIDDING, AND CONTRACTING: USES AND THEORY 105, 115-16 (Engelbrecht-Wiggans, Shubik & Stark eds. 1983)(emphasis omitted).

48. *See, e.g.*, Proposed Council Directives at: 1989 EUR. COMM. DOC. (COM No. 141) (1989); 1988 EUR. COMM. DOC. (COM No. 733) (1988); 1988 EUR. COMM. DOC. (COM No. 354) (1988); 1987 EUR. COMM. DOC. (COM No. 134) (1987); 1986 EUR. COMM. DOC. (COM No. 679) (1986).

buyers all the gains from trade. Perhaps the best example of a group of colluding bidders capturing all the gains from trade is the sale of an antique mahogany Chippendale commode.[49]

> When it was put up for sale . . . at an auction in a community a hundred or so miles northwest of London in late 1964, bidding was sluggish, and the commode fetched 750 [pounds]. The slow pace of the bidding might have been a tip-off on the operation of a ring . . . . On the evening of the day of the auction, the commode was re-auctioned in a private sale open only to members of the ring. At the so-called knockout sale, held in Leamington, several dozen dealers were present to bid in earnest . . . . At least five of them knew the true value of the commode, had the resources to buy it, and believed a good profit could be made if it could be acquired for 4,000 [pounds]. Actually, the commode brought 4,350 [pounds] at the private sale, when only a few hours earlier it had sold for 750 [pounds] in the public auction. The tremendous profit was divided equally among the ring members who remained for the final sale.[50]

Bidder buying rings are allegedly quite common at auctions.[51] Rings are reportedly stable over time and all bidders who are expected to participate actively in the auction are invited to join.[52] Therefore, ring formation is more likely when there are only a few potential bidders who are easily identified. In some countries, trade or customs unions serve as a central clearinghouse for bids, occasionally leading to collusive tendering.[53] Negotiated or restrictive procedures are potentially more susceptible to bidder cartels because fewer buyers have to be identified and approached. Consequently, switching to open tendering may reduce the cost of government procurement by making it harder for bidder rings to operate.

Historically, sealed bid auctions have been viewed as being less susceptible to bidder collusion because it is difficult for car-

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49. *The Curious Case of the Chippendale Commode*, Sunday Times (London), Nov. 8, 1964, at 8-9.

50. R. CASSADY, AUCTIONS AND AUCTIONEERING 181 (1967).

51. Graham & Marshall, *Collusive Bidder Behavior at Single-Object Second-Price and English Auctions*, 95 J. POL. ECON. 1217, 1220 (1987) ("So prevalent are rings, in fact, that a retired auctioneer once noted that in 40 years of auctioneering, he had yet to attend an auction at which a ring was not present."); Robinson, *Collusion and the Choice of Auction*, 16 RAND J. ECON. 141 (1985); R. CASSADY, *supra* note 50, at 177-92.

52. Graham & Marshall, *supra* note 51, at 1220-21.

53. OECD REPORT, *supra* note 16, at 18-22.

tel members to monitor "cheating" on the cartel when bids are not observed.[54] The first theoretical auction model incorporating cooperative play by buyers "proved" that in a sealed bid auction no equilibrium existed in which a cartel could function.[55] Unfortunately, more realistic auction models have revealed that collusion among buyers can be the optimal strategy in either an ascending bid or a sealed bid auction.[56] The optimal sealed bid auction awards the object to the highest bidder at the second-highest bid price.[57] As long as the winning bidder pays the cartel the difference between the price actually paid and the price which would have been paid if all cartel members bid noncooperatively, membership in the cartel is optimal. Since the winning bidder's payment is split among all cartel members, all potential bidders are better off in the cartel than acting individually.[58]

If the ring is undetected by the auctioneer, the item will be sold at approximately the seller's reservation value and the ring will divide the gains from trade among its members. If the ring is discovered, the auctioneer should increase the reservation value of the article to capture some of the potential gains for the seller.[59] Detection of bidder cartels may be easier in ascending bid auctions where bids are called out and the auctioneer arguably has more flexibility in dealing with any cartel discovered.[60]

A 1976 Organization for Economic Cooperation and Development (OECD) report documented widespread problems of collusive tendering in European sealed bid auctions.[61] For example, in Germany, the Federal Cartel Office estimated that 2000 enterprises in northern Germany in the building industry "had taken part in collusive tenders between 1959 and 1973. However, administrative proceedings were instituted against only 559 builders."[62] This collusion had the effect of raising prices an esti-

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54. *E.g.*, R. CASSADY, *supra* note 50, at 177-92.

55. Robinson, *supra* note 51, at 141.

56. Graham & Marshall, *supra* note 51, at 1217.

57. *Id.* This ensures that each bidder's optimal strategy is to report his true value. *See supra* note 26.

58. *Id.*

59. *Id.* at 1222.

60. R. CASSADY, *supra* note 50, at 177-92 (The auctioneer can respond to fictitious bids or reserve the item. Members of the ring cannot question the validity of the fictitious bids without revealing that they are colluding.).

61. OECD REPORT, *supra* note 16.

62. *Id.* at 24.

mated nine percent.[63] In the United Kingdom, the supply of telephone cable to the post office, bid under competitive tender, was subject to collusive agreements from 1965 to 1975. "Under the most important of these the four [major] suppliers of external telephone cable . . . allocated quotas for the various items [among] themselves and adjusted the prices they tendered to achieve the desired distribution of the work in the award of contracts."[64] The report concluded that one of the most effective means of dealing with collusion in sealed bid procurement tenders was to negotiate directly with individual suppliers, giving each the opportunity to "cheat" on the cartel.[65]

Negotiating individually with cartel members will only induce members to cheat if the cartel cannot effectively punish the cheaters, perhaps by excluding them from the next round of bidding. Therefore, this practice is unlikely to have an effect on bidder behavior when groups of the same bidders participate regularly in government auctions. In addition, as previously discussed, deviating from a one-time auction induces bidders to adjust their bids in anticipation of the ensuing negotiations, making these negotiations necessary if the government is going to capture any of the gains from trade.

## IV. Conclusion

Opening public procurement in the European Community to intra-community competition should lead to cost savings. The magnitude of these savings depends critically on the removal of existing nontariff barriers and on ensuring that government sellers capture most of the potential gains from trade generated by a competitive auction.

The estimate of an eight to nineteen billion ecu savings may overstate the true gain from competition in public procurement since it is based on estimates of price level changes which implicitly assume that all the gains from trade go to the purchasing entity. When auction models are employed to analyze expected bidder behavior, it becomes apparent that the purchasing agent obtains all the gains from trade only in extremely limited circumstances: (1) all bidders have independent valuations for the contract, (2) governments can credibly precommit to always

63. *Id.*
64. *Id.* at 25.
65. *Id.* at 57.

award the contract at the initial auction, and (3) there is no bidder collusion. Since typical procurement auctions are characterized by uncertainty about contract value, inability to commit to the auction sale, and opportunity for bidder cartels, it is likely that bidders will win a substantial share of the projected gains from completing the internal market for public procurement.

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