Second, we need to purge from our records all information that would allow a reasonable estimate of a but-for price from a benchmark period. All older transaction data needs to be discarded, or transferred to our accountant/consultant, who can archive it should you need it for some purpose in the future. You will not be able to access that data without going to the firm's Swiss location and working there.

3 Narrative of a Bidding Ring

3.1 Preamble

This chapter deals with collusion at auctions by bidding rings. Bid rigging is a violation of the Sherman Act for both auctions and procurements. A large amount of bidding in the United States occurs at auctions, especially ascending-bid auctions.[1] For example, tobacco, timber, art, antiques, the assets of many bankrupt firms, and numerous other commodities are sold via ascending-bid auctions.[2]

In this chapter, we provide a fictional account of a bidding ring operating at an ascending-bid auction. Footnotes indicate similarities between our story and known bidding cartels, including stamps,[3] antiques,[4] machinery,[5] and real estate.[6]

In the previous chapter, we focused on cartels. In order for an industrial cartel, such as the vitamins cartel, to implement a collusive scheme,

1. First-price sealed-bid auctions and procurements account for a significant amount of economic activity as well. Bidder collusion is common at these. In chapter 1, we provide an example of collusion at a first-price sealed-bid auction. Compared to first-price sealed-bid collusive mechanisms, mechanisms for collusion by bidders at ascending-bid auctions provide a better vehicle for explaining how bidders accomplish the suppression of competition.
2. Theoretical results for ascending-bid auctions also apply to procurements conducted via "reverse auctions," where the bids decline until there is only one supplier willing to provide the good at the indicated price.
3. *NY et al.* v. *Feldman et al.*, 210 F. Supp.2d 294 (S.D.N.Y. 2002) (hereafter, *NY* v. *Feldman*).
4. *U.S.* v. *Ronald Pook*, No. 87–274, 1988 U.S. Dist. LEXIS 3398 (E.D. Pa. April 18, 1988) (hereafter *U.S.* v. *Ronald Pook*).
5. *U.S.* v. Seville Industrial Machinery Corp., 696 F. Supp. 986 (D.N.J. 1988) (hereafter *U.S.* v. *Seville Industrial Machinery*).
6. *District of Columbia, ex rel. John Payton, Corporation Counsel* v. *George Basiliko, et al.*, No. 91–2518, 1992 U.S. Dist. LEXIS 1260 (D.C. February 10, 1992) (hereafter *District of Columbia* v. *George Basiliko*).

it typically must orchestrate cartel bids at procurements. That said, no one would characterize the vitamins cartel as a bidding ring. A bidding ring's central focus is the suppression of competition at an auction or procurement. Typically, a bidding ring "squares up" the allocation of the collusive gain shortly after each auction or procurement through side payments or interfirm arrangements such as subcontracts or joint ownership. The line between bidding rings and cartels becomes blurry when, for example, colluding bidders use a bid-rotation scheme that relies on a market share agreement to determine which bidders are supposed to win particular procurements.[7]

Overall, colluding firms will strive to do what is minimally necessary to be profitable. For vitamin producers, rigging bids alone would not be adequate to prevent deviant conduct by cartel members because each firm would have an incentive to secretly sell additional product outside of the context of standard procurements. A market share agreement, with the associated monitoring and redistributions, eliminates this incentive. In other environments, rigging bids may be all that is required. For example, if a seller offers a fixed number/type of items at an auction without reserve, then secret deals to purchase incremental units are not relevant.

3.2 The Instruction Begins

We describe a fictional bidding ring that frequently participates at auctions to acquire items. The items might be stamps, used industrial metal-working machinery, antiques, or a number of other products. For the purposes of this exposition, we focus on antiques.[8] Our use of the example of antiques is solely for expositional purposes, and much of what we discuss in this chapter illustrates fundamental principles of bidder collusion.

The members of our bidding ring frequently appear at antique auctions in a particular geographic area to attempt to acquire items from estates. An experienced member of this ring, an antiques dealer, has an employee that he wants to train to represent the firm at the auctions as a member of the bidding ring. The experienced member of the ring provides a tutorial for the employee in which he explains the fundamental principles of the ring. The experienced bidder begins his instruction as follows.

7. One example is the electrical contractors conspiracy, which is sometimes referred to as the "phases of the moon" conspiracy. See Richard A. Smith, "The Incredible Electrical Conspiracy," *Fortune*, April 1961, 63, 132–80, and May 1961, 63, 161–224.
8. A bidding ring of antiques dealers was prosecuted in *U.S.* v. *Ronald Pook*.

3.3 Two Motivations for the Ring

I do not want you to take any notes today. We are going to talk about a number of things regarding auctions and how our firm buys antiques at auctions. Just listen and I will let you know when it is appropriate to ask questions. To start with, I am going to talk generally about why this is important to our business. Then we will move on to the details of how things operate.

You probably have not noticed, but at some of the auctions you have attended, there is a group of antique dealers who are not bidding as individuals, but rather as a group. The antique dealers in this region have a bidding ring. In a nutshell, we suppress competition among ourselves to keep auction prices lower. There are two central motivations for our behavior. I will call these scenarios 1 and 2.

3.3.1 Scenario 1: Symmetric Information Regarding Quality

Suppose a Chippendale highboy is being sold.[9] It is a good reproduction and somewhat valuable, but nevertheless a reproduction. I recognize that some refurbishment will be required to bring out the full value of the piece. It is clear that other dealers will know the piece is a reproduction. Some other dealers who have similar pieces already in stock will have a very low value for the item. Those who think it would be a good addition to their inventory will have higher but different values because dealer costs of refurbishment will differ.

Collectors attending the auction will have much less ability to cost-effectively refurbish an antique, especially a large piece like a highboy. Thus, the dealers will have a cost advantage even though a collector will typically have a higher value than the dealers once the piece is refurbished.

By bidding as part of a ring, we protect the return to our investment in refurbishment capability as well as our investment in our retailing ability (showroom, customer contacts, etc.). Furthermore, given the large number of pieces that come up at a typical auction, demand among collectors is more random than among dealers. A given dining

9. A "highboy" is a tall chest of drawers. A specific highboy was a focus of some of the court argument in *U.S.* v. *Ronald Pook*, p. 4.

room set may be of no interest to any collector in the bidding audience, but some group of dealers will always be willing to take the item into inventory. By forming into a ring, we suppress the competition among ourselves for pieces for which we are essentially the only bidders present.

3.3.2 Scenario 2: Asymmetric Information Regarding Quality

Suppose that the item being sold is an authentic Chippendale highboy circa 1780 that was made by a renowned Boston craftsman. If it is obvious to almost everyone that this is an authentic period piece, then we are essentially in scenario 1, where dealers and collectors have similar information and dealers have relatively minor differences in their values for the piece based on differences in their costs of refurbishment.

But suppose that it is not obvious that this is an authentic period piece. Suppose that the highboy has been listed incorrectly in the auction bulletin as a reproduction and, furthermore, that the piece is in somewhat rough condition. My inspection reveals that some bad reconditioning has been done in the past that has diminished the value of the piece, but the reconditioning has also made the piece appear to be a basic reproduction to all but the most trained and experienced eye. Based on my expertise, I know what it is going to take to get maximal value from the highboy. Three of our antique dealer competitors, who have equivalent expertise to me with regard to pieces like this, will almost surely also recognize it as an authentic piece.[10] However, no one else will recognize it as an authentic piece.

In this scenario, the four expert dealers would forfeit the returns to their expertise if we bid against one another at the auction. Additionally, our competitive bidding would convey our assessment of the authenticity of the piece to the less expert dealers and collectors, who would then enter the competition against us. Naturally, in the normal course of business, I would not volunteer an assessment of the authenticity of the item as if it were a free piece of information, but when expert dealers bid competitively against one another, that is exactly what we do.

The Chippendale highboy might be worth $2,000 if it were not an authentic period piece, but if two expert dealers bid against one another,

10. Cassady (1967, p. 180): "Probably the expert making the original discovery would be able to guess the identity of the knowledgeable individuals among the antique dealers known to him."

driving the price up to $25,000, we tell the auctioneer, all the collectors, and everybody else at the auction that we have made a determination that this is an authentic period piece of high quality. By bidding against one another, we have diminished our own profits and provided a free appraisal to everybody in the market, and thereby empowered others to bid because we removed concerns about authenticity. To protect our informational advantage and secure the appropriate return on our hard-earned expertise, we agree not to bid against one another.

The majority of the volume we encounter falls under scenario 1. However, although scenario 2 is far less common, it can be quite profitable. Overall, by bidding as part of a ring, we protect the return to our expertise and investments, which in scenario 1 relates to refurbishment and in scenario 2 concerns the actual nature and quality of items.

3.4 Ring Logistics

We will now go through the logistics of what we do in the ring. The ring has been around for many years and its membership is quite fluid.[11] Essentially, almost every antique dealer in this region of the country is a member of the ring.

3.4.1 Ring Bidding

The auctions we attend are largely oral, ascending-bid auctions. During these auctions, you will observe that a number of different dealers place bids, but when any ring member bids, no other member of the ring will raise the price. If one ring member drops out of the bidding, then some other ring member may enter, but two ring members will not bid against one another. That simple bidding rule suppresses competition among ring members, and it allows us to win every item for which a ring member has a higher value than the bidders outside the ring. If a ring member has the highest value for an item among all bidders at the auction, then the ring will win the item.

Once a member of the ring wins an item, then the ring determines its final ownership. A member of the ring who wins an item at the main auction does not own it. A ring member who wins at the auction has an obligation to pay the auctioneer for the item because the auctioneer views that person as the owner of item. But a ring member winning an

11. This is a characteristic of rings at many ascending-bid auctions. This is unlike cartels, as well as rings at first-price auctions.

object must bring the object to what is called a "knockout" after the auction to allow others in the ring the opportunity to obtain ownership of that item. Ultimate ownership is determined at the knockout. (Knockouts were used in *U.S.* v. *Ronald Pook*,[12] *U.S.* v. *Seville Industrial Machinery*,[13] *District of Columbia* v. *George Basiliko*,[14] and *NY* v. *Feldman*.[15])

12. As stated in *U.S.* v. *Ronald Pook*: "When a dealer pool was in operation at a public auction of consigned antiques, those dealers who wished to participate in the pool would agree not to bid against the other members of the pool. If a pool member succeeded in purchasing an item at the public auction, pool members interested in that item could bid on it by secret ballot at a subsequent private auction ('knock out') . . . . The pool member bidding the highest at the private auction claimed the item by paying each pool member bidding a share of the difference between the public auction price and the successful private bid. The amount paid to each pool member ('pool split') was calculated according to the amount the pool member bid in the knock out." (*U.S.* v. *Ronald Pook*, p. 1)

13. The mechanism used by the industrial machinery bidding ring of *U.S.* v. *Seville Industrial Machinery* in the period after 1970 was similar to that used in *U.S.* v. *Ronald Pook*. Some dealers of used industrial metal-working machinery from the New York, New Jersey, Pennsylvania, and Connecticut area regularly formed a ring to suppress bids at bankruptcy/liquidation auctions. The auctions typically used an ascending-bid format. If a ring member won an item at the main auction, that member was obligated to bring it up for sale at another auction which occurred after the main auction that was attended by only ring members. The results of this latter auction process, called a "knockout," determined the ultimate ownership of the item and the division of the collusive gain. (Prior to 1970 members of the ring were given an opportunity to make vague indications of interest prior to the auction, and then only the ring organizer submitted bids at the auction based on his educated guess about the likely high value for the object from among the ring members.) (*U.S.* v. *Seville Industrial Machinery*) See also Marshall and Meurer (2004).

14. The decision for the real estate bidding ring in *District of Columbia* v. *George Basiliko* states: "the defendants and the co-conspirators discussed and agreed . . . not to compete with one another to win the bid; selected a designated bidder to act for the conspirators . . . ; discussed and agreed on specific payoffs that conspirators present would receive for not bidding, or discussed and agreed to hold a private, secret auction among themselves after the designated bidder won the public real estate auction . . . ; in many instances, held a secret auction in which the conspirators bid solely among themselves to acquire the property for a price higher than the price paid by the designated bidder at the public real estate auction and agreed to divide the difference between the public real estate auction price and the secret auction price by making payoffs among the conspirators; arranged by contract or other means for the secret auction winner to take title or ownership of the property; and made the payoffs that they had agreed to make." (*District of Columbia* v. *George Basiliko*, p. 6)

15. In the collectable stamp bidding ring of *NY* v. *Feldman*, "The ring used an internal auction or 'knockout' to coordinate bidding. Ring members would send a fax or supply a written bid to an agent (a New York taxi and limousine driver employed by the ring), indicating the lots in which they were interested, and what they were willing to bid for them in the knockout auction. The taxi driver would then collate all the bids, determine the winner of each lot, notify the ring as to the winners in the knockout and send the bids to another ring member who would coordinate the sidepayments after the target auction was concluded. Depending on who actually won the knockout, the taxi driver

3.4.2 Ring Knockout

I will now explain how the knockout works. Suppose that members of the ring have won fifty items at the auction: highboys, lowboys, sofas, love seats, dining room sets, mirrors, lamps, tables, and chairs. After the auction is over, all of the items are brought to the knockout for determination of ultimate ownership among members of the ring. The knockout is a separate auction that is conducted after the main auction. The only participants at the knockout are ring members.

Often, I assume the role of the auctioneer at the knockout. I am also a bidder as a member of the ring. The knockout auctioneer calls up the first item that was won at the main auction by the ring. Suppose that is a Federal-style dining room set that sold for $38,000 at the main auction. The knockout auctioneer solicits what are called "bonus bids." These are bids from ring members in excess of $38,000.

Suppose I enter a bonus bid of $1,000. If the bonus bidding stopped there, then I would have to reimburse the original buyer the $38,000 that he paid for the item, plus I would have to put $1,000 "into the hat." I will explain what we do with the money that goes "into the hat" in a moment.

Suppose instead that the bonus bidding does not stop at $1,000, but rather ends with my bid of $20,000. Then I pay the ring member who won the item at the main auction $38,000, and in addition I put $20,000 "into the hat." If there is no bonus bidding, then the ring member who won the object at the main auction keeps it and nothing is put into the "hat."

As we go through this process for the remaining forty-nine items, we build up a lot of "hat" money. At the end of the day, the "hat" money is divided up among all the members of the ring.

At the last auction we went to, there were ten members of the ring and the "hat" money was approximately $500,000. That money was divided equally, so we each walked away with $50,000 in "hat" money.

would, usually, either bid for the winner in the target auction, using the bid supplied in that auction as the upper limit, or organize for another auction agent to bid for the winner on the same basis. In the language of auction theory, the knockout was conducted using a sealed-bid format, with the winning bidder getting the right to own the lot should it be won by the ring in the target auction. The winning bid in the knockout set the stopping point for the ring's bidding in the target auction. Since bidding in the target auction was handled by the ring's agent, monitoring compliance with this policy was not a problem. Sidepayments were used by the ring to compensate ring members for not competing for a lot, when the ring was successful in winning that lot." Asker (2008, p. 4)

Without a ring, much of that money would have been paid to the auctioneer. Instead, it was kept within the ring.

A wonderful part of the process is that we do not need to have any discussion ahead of time about who is planning to bid on what, the maximum price we are willing to bid up to, or anything else. The rule for bidding at the main auction is extremely simple—if any member of the ring is bidding on an item, then no other member of the ring bids against him or her.

Nested Knockout

There are some subtleties associated with the knockout that we need to cover. Antique dealers are all different. I am a relatively powerful, wealthy, experienced dealer. There are others who are far less experienced, far less wealthy, and do not know as much. Everybody who is a dealer makes a contribution to the ring by not bidding at the main auction. But those contributions are different. My contribution is much bigger than that of a less experienced dealer. To capture that in terms of the payoff we get from suppressing our bids, we sometimes run a "nested knockout."[16]

A nested knockout can be illustrated in a simple example. Suppose that there are three powerful, experienced, wealthy dealers, while there are seven lesser dealers. The items we won at the main auction go to the knockout, where the three dealers who are more experienced and wealthy form a ring using the same rules as at the main auction in terms of the implementation—if any member of this inner ring of three is bidding at the knockout, then neither of the other two bids. If one of the seven not in the inner ring wins the item at the knockout, then we apply the same rules as before—bonus money is put into the "hat" and divided equally on that item. But, if one of the three from the inner ring

16. Cassady (1967, p. 182): " . . . not only is there a ring whose purpose is to eliminate competition in the public auction, but a ring within the ring for the purpose of paying off unimportant members on the basis of a modest enhancement in price, thus leaving most of the advantage to those in the inner circle."

In the court's decision in the matter of *U.S..v. Seville Industrial Machinery*, there was an expression of astonishment at the lack of cooperation among members of the cartel. The court noted that the cartel had subcartels and that the subcartels would often bid collusively against those not in the subcartel at the knockout. Subcartels were often nested, namely a subcartel within a larger subcartel within another, and so on, where there would be as many knockouts as levels of nesting. The court viewed the subcartels as a kind of collusive cannibalism: "If the evidence presented in this case is indicative of the ethics of this or any segment of the business community, then we should weep for its existence and fear for its future." (*U.S.* v. *Seville Industrial Machinery*, p. 993)

wins the item, then bonus money still goes into the "hat" and is still divided up, but after the knockout there will be a second knockout, where only the three dealers in the inner ring participate. The items at this second knockout will be those items that these three won at the first knockout. At the second knockout, the three inner ring members bid competitively in terms of bonus bids.

As an example, suppose that at the main auction $38,000 was paid for the item. Suppose that one of the inner three wins the item at the first knockout for a $5,000 bonus bid, and at the second knockout there was a $10,000 winning bonus bid. The first $5,000 gets divided equally among all ten bidders participating in the ring. The next $10,000 of bonus bid is divided among the inner three only. It is in this way that we ensure that the payoffs from participation in the ring are commensurate with the contribution of each individual to the profitability of the ring.

Some rings prefer to use a sealed-bid knockout, where the high bonus bidder wins, but the payments to each ring member depend on their bonus bids. In this case, the effects of a nested knockout can be achieved directly.[17]

Knockout Bidding Incentives

There is another subtlety of the bidding at the knockout that you need to know. You have to be careful what you reveal during the bonus bidding process. If you convey to the other bidders that we have a customer interested in a particular Federal-style dining room set, perhaps by being somewhat anxious or making some open comment about how this would be great for us to acquire, it is guaranteed that you are going to be run-up in bonus bidding at the knockout as ring members attempt to extract as much of our profits as possible. Because

17. As shown by Graham, Marshall, and Richard (1990), these payments can be designed so that each ring member receives its imputed Shapley value (a measure of its contribution to the ring).

The knockout scheme used by the stamp cartel described in Asker (2010) was conducted using a variant of the nested knockout studied by Graham, Marshall and Richard (1990). "Sidepayments were used by the ring to compensate ring members for not competing for a lot, when the ring was successful in winning that lot. . . . Thus the sidepayments involve ring members sharing each increment between bids, provided that their bids are above the target auction price. Half the increment is kept by the winner of the knockout, and the balance is shared equally between those bidders who bid equal to or more than the 'incremental' bid. The sidepayments were aggregated and settled on a quarterly basis." Asker (2010, pp. 727–28) of this, you must not convey information of any sort about our level of interest in an item.

Because of the incentive to run-up the bonus bidding, there can be "overbidding" at the knockout.[18] Even if I am not interested in an item, I may bid up the bonus bid just because I get a piece of it. If I think the probability is low enough that I would actually win something, but I can increase my payoff a couple thousand dollars by putting in a bonus bid, that is something I will do. This incentive is there for everybody, so you get over-bidding at the knockout. Although everybody will say how lousy the item is and how much work it will take to make it right, you must ignore that. It is just talk to keep the bonus bidding under control.

3.5 Ring Membership

You might have noticed a few months ago that there was someone who appeared at an auction and was bidding quite aggressively for certain items. This was a dealer who had come in from a different region of the country. Prices were ascending to levels that made us extremely uncomfortable for a number of reasons. First, we do not like paying that much for the items. Second, we were conveying to the entire group of bidders that the set of items being auctioned that day were largely authentic period pieces. If that continued that could hurt us on all items being sold during the auction because it would become clear that the estate from which they came was one where the previous owner had made substantial investments in authentic period pieces.

After three or four had gone off at high prices, a couple of us walked over to the out-of-town dealer and had a conversation with him. We explained that we were running a bidding ring and that he was invited to participate. After some brief discussions, that dealer stopped bidding on all future items unless it was clear to him that no other ring member was interested. By quickly including the out-of-town dealer, we were no longer providing free appraisals to everyone at the auction, and we were no longer cutting dramatically into our profits.[19]

18. Cassady (1967, p. 182): ". . . the buyer of an item in the final round may pay as much for it in the end as if he had bought it in open competition at the public auction, because he may use up his dividend in overbidding at the settlement."

19. See Graham and Marshall (1987), especially "Fact 4" on pages 1220–1221. See also Cassady (1967, p. 180): ". . . individuals have to be compensated in some way for their willingness to withhold bids and to keep their knowledge to themselves."

3.6 Auctioneer's Response

You may be concerned about the response of the auctioneer at the main auction to the presence of a ring. The auctioneers we face are typically not oblivious to the fact that they are confronting a ring.[20] They understand that dealers are not bidding against one another. Nevertheless, at the end of many auctions, they will offer the ring the use of the auction hall to conduct the knockout. Sometimes auctioneers will engage in behavior like "quick knocks," awarding items to non-ring bidders before the bidding has completed, or employing a "protecting bidder," who is somebody they can point to for an incremental bid for an item should the ring start to substantially eat into their revenues. But most of the time, auctioneers realize that rings have many opportunities to bid at a lot of different auctions in this geographic area. If the ring is sufficiently unhappy with an auctioneer, they can choose not to show up at that auctioneer's sales. The ring is a strong bidder and the withdrawal of ring participation is a major revenue blow for an auctioneer.

Sometimes when the auctioneer is selling items on a consignment basis, getting 5 to 10 percent of the revenue from the sale, the auctioneer can be lured into joining our ring.[21] This can be terrific for profits. Here is how that might work in practice. Suppose that the auctioneer was going to set a reserve price of $20,000 on an item and that the ring would have been willing to pay up to $25,000. The auctioneer's commission on that might be $2,000. If we think the bidding competition will be weak, we might offer the auctioneer $3,500 to $5,000 to drop the reserve price to $5,000. We would arrange this prior to the auction with nothing in writing. Some auctioneers are quite resistant to getting involved (they may be court-appointed as part of a bankruptcy or the liquidation of an estate), but others are quite agreeable.

3.7 Implementation of Sidepayments

Let us talk about the actual implementation of the side payments. We do not want a paper trail associated with ring members writing each

20. See Marshall and Meurer (2001, pp. 358–59) for a discussion of strategic conduct by an auctioneer to combat rings.

21. An analogous situation occurred where a consultant was hired to function as the procurer for a city and the award was made to a firm that was a business associate of the consultant. (*K. Buddie Contracting Inc.* v. *Seawright*, 595 F. Supp. 422 D.C. Ohio, 1984)

other checks with memo lines reading "payoff for ring activity." Instead, you might have noticed that the ring members are constantly suing one another. We sue one another over any number of things. Breach of contract is a frequent one. Almost none of this litigation is meaningful.[22] All we are doing is stating a complaint, filing it through our attorneys, and settling under strict confidentiality. In this way, I settle up the side payments from the knockouts that I owe other ring members under cover of a litigation settlement. We have attorneys who are agreeable to handling our business in this way. They look away, but we do not really care about any of that. If they were ever challenged by the bar, they would simply say this was a legitimate piece of litigation, and that costly court time and court resources were avoided through settlement. These are standard arguments offered for settling rather than litigating. Also, the settlements can and should be done under seal. Overall, this mechanism provides complete cover for settling up the knockouts.

3.8 Questions and Answers

At this time let me ask you if you have any questions.

• *Question 1:* What if we win an item at the auction but do not take it to the knockout?

• *Answer 1:* There is obviously an incentive for ring members not to take items won at the main auction to the knockout; however, this is the most egregious behavior possible within the ring. That behavior will be severely punished. Dealers behaving this way will be kicked out of the ring. Out-of-town dealers who might not find getting kicked out of our ring as a serious punishment are the real threat in this regard. When we ask out-of-town dealers to join our ring, we insist that they not bid until they are certain no other ring member has an interest. If they want to acquire an item, we prefer they do it through the knockout, where there is no threat that they will "walk" with the item.

• *Question 2:* What is an example of a major mistake that I could make representing our firm within a ring?

• *Answer 2:* You have to know who is in the bidding ring. With regard to the main auction, you cannot put yourself in a position where the bidding is progressing, you suddenly start to bid, and only then find

22. For the use of litigation settlement to facilitate bidder collusion within the context of bid protests, see Marshall, Meurer, and Richard (1994).

out that you are bidding against a member of the ring. That is a bad outcome. The other members of the ring will be extremely upset, and then they will ask who is going to pay for the money you threw away. I do not want to answer that question. You must understand at all times at the main auction whether a bid is from a ring member or not.

• *Question 3:* You had mentioned that joint ownership happens among members of the ring. Can you tell me a little more about why that happens and how that helps the functioning of the ring?

• *Answer 3:* Sometimes it is a budget constraint issue and sometimes a mechanism for risk sharing, but that could happen whether or not a ring is at the auction. It can also facilitate the functioning of the ring. Suppose there are two dealers, myself and another dealer, who have a narrow expertise in the value of a certain item. The two of us know a group of collectors that nobody else knows, and in addition we have studied a particular narrow set of items to understand their value to this group of collectors. Any bidding that the two of us undertake against one another is going to reveal our information to the general bidding public. Similarly, bidding between the two of us at the knockout will cause other ring members to run up the bonus bidding. We can solve the problem through joint ownership and thereby avoid the awkwardness of having non-nested rings.

• *Question 4:* What do we do with government authorities that start investigating us? As best as I can tell, we are in violation of antitrust laws by engaging in this activity. What do we do, what do we say, what do we not say?

• *Answer 4:* First, do not answer any questions without our lawyer present. Second, you are not going to be talking about anything other than participating in an auction. We all participate in auctions. Even with a ring there is lots of bidding at an auction. Furthermore, I do not know if you noticed this, but in the early parts of the auctions, when the items are first ascending in value, many members of the ring are bidding against one another.[23] These are largely low meaningless prices. No one is going to actually pay $3,000 for a $23,000 Chippendale highboy. However, once we get to some price where we think we have a legitimate shot of owning the item, we stop the meaningless

23. Cassady (1967, p. 181): " . . . a well-organized ring provided for simulated competition at lower price levels."

competitive bidding because beyond that point it would be eating into our profits. That meaningless competitive bidding has several functions, but one of these functions is to provide a credible basis for saying that we were bidding against one another at the main auction. Also, in this economy, it is still not a crime to buy low. This is a big part of how we all function in any industry. There is no need to defend buying low or selling high.

There is a delicate matter that we have to pay attention to with regard to enforcement. Let's suppose that I am going to the auction and am bidding on behalf of a customer who wants a 1820 Chippendale highboy. They know the item is being sold at that auction. Further suppose that I am the high bidder at the main auction, where the bidding stopped at $3,000 and I am functioning in a ring. And suppose that the knockout bidding goes way up, ending at $20,000. If there are ten members of the ring and I walked away with the item for a $20,000 bonus bid, then I end up paying a total of $21,000 for the highboy. The auction price is going to be made public, so the buyer that I am representing is going to know I paid $3,000 for the item at the main auction. It is a little hard to explain that I actually paid $21,000 for the item when all was said and done. That is the delicate thing that requires some work. Keep in mind that the presence of a ring at these auctions is not a mystery. It should not come as a surprise except to the least experienced bidders in the room.

• *Question 5:* I thought collusion was inherently unstable because there was always a strong incentive to cheat on the collusive agreement. Why does our ring work so well? Specifically, why has this ring persisted for generations with an open membership policy and a very simple operating rule with seemingly no defection?

• *Answer 5:* That is an excellent question. You need to keep in mind that most of the auctions in which we participate are ascending-bid auctions where we can observe the identities of bidders as they submit bids. Unlike many stories you hear about the instability of cartels, this auction format is particularly conducive to collusive behavior. Suppose again that there is a Chippendale highboy, an authentic piece, that I and other dealers have recognized as such. I know that I am willing to bid up to, say, $82,000 for it. The rules that we are using at the auction mean the following: I am willing to bid up to $82,000 acting noncooperatively and I am willing to bid up to $82,000 while functioning within a ring. Hopefully, because of the ring, I do not have to bid that high.

Many people think in terms of standard sealed-bid auctions or posted-price markets when they think about the instability of cartels. Because I am willing to bid up to my maximum value for the item at an ascending bid auction, which is the same regardless if I am bidding collusively or noncooperatively, there is nothing anybody can really do to cheat, except win an item and not bring it to the knockout, which they can do exactly once because that conduct results in them being expelled from the ring.

• *Question 6:* I want to understand better about who gets to join the ring and who does not get to join. Suppose that another dealer from out of town starts bidding against the ring. It is my understanding that we invite that individual to join the ring. But what about some of the brokers who never have any inventory but are only there bidding for collectors and users of antiques? Are they always invited to join the ring?

• *Answer 6:* Pure brokers, those who never inventory any items and only buy for specific customers, are never members of the ring.[24] If they are invited and say "yes," then the ring does not want them; and if they are invited and say "no," then the ring very much wants them. So they are never asked and are not part of the ring. That needs some explanation. Either brokers have a customer for the items in question or they have no customer. If they have a customer, then their willingness to pay for the item is much higher than even the strongest ring member. If they have no customer, then their willingness to pay is zero. If a broker is part of the ring and bids at a knockout, then all other ring members know that the broker has a customer. Thus, the other ring members artificially bid up the price at the knockout to extract the broker's surplus. The extraction is so extreme that brokers who are trying to acquire items for customers prefer noncooperative conduct to joining the ring. However, if a broker has no customers, then that broker is not helping the ring suppress the price paid at the main auction yet is getting part of the "hat" money. The extreme valuations of brokers—either zero or some very high amount—results in them not participating in the ring. There is no animosity about this—it is just the way it is.

• *Question 7:* Items are not always sold by ascending-bid auctions. Sometimes there are sealed-bid auctions where the high bidder pays

24. See Marshall and Meurer (2004, p. 109).

the amount of his or her bid. Does the ring function during those auctions and does anything change in terms of its operation?

• *Answer 7:* That is a good question. Everything I have told you so far is for ascending-bid auctions where the identities of bidders can be observed. To this day, even with modern technology, that is a frequent type of auction that we encounter. Let's talk about sealed-bid auctions, where the high bidder wins and pays the amount of its bid.[25] Those auctions are problematic for us in terms of organizing and running the ring. I do not know if someone has a brother-in-law or some other agent going to these auctions as a bidder trying to undercut the ring.[26] Why might they do that? Ring members reduce their bids at a sealed-bid auction in order to secure a collusive gain, and there is no capacity for the ring to respond to a higher bid in real time. That is the nature of the auction being sealed bid. Suppose that someone I do not recognize wins at the auction. That could just be an outside bidder or, alternatively, it could be the agent of a ring member where the deviant ring member is trying to capitalize on the suppression of bids by the ring. This makes a ring a more difficult proposition at a sealed-bid auction. If you have all the bidders in the ring, then it is a fairly simple matter to run a ring at a sealed-bid auction. If there is any possibility that there are others outside the ring, then things get more complicated. If you know the identity of all serious bidders outside of the ring, then you know that if anybody outside the ring bids other than one of the serious nonring bidders, they must be an agent of someone in the ring. Then things become easy again because it is simple to monitor whether there was cheating within the ring. In the absence of knowing all of the identities of serious outside bidders, it is a difficult process to enforce the ring agreements and prevent cheating by members of the ring during the auction.

25. See Marshall and Marx (2007), especially corollary 1 and the subsequent results, discussing limitations of collusion at sealed-bid auctions.
26. See Marshall and Marx (2007), especially proposition 5 versus corollary 5.

4 Narrative of Cartel Detection

4.1 Preamble

In this chapter, we discuss the process of inferring collusion from economic evidence. As the básis for the narrative in this chapter, we return to the four colluding firms introduced in chapter 2. We assume that those four firms actually formed the proposed cartel and that they have been successfully operating for three years. As in the narrative of chapter 2, our focus is on industrial cartels, where the colluding firms produce an intermediate good to be sold to other firms.

We suppose further that one of the colluding firms is the division of a parent corporation and that the parent does not know that its division manager is a member of a cartel, although several other separate divisions of the parent have been found to be involved in price-fixing conspiracies in recent years.[1]

The parent has noticed that the division's profits have increased substantially in recent quarters and that prices for the division's product have also ascended at an unprecedented rate. The parent company uses high-powered incentive schemes to reward division managers for increasing profits, but the parent is increasingly concerned about public perceptions as well as repeated liability exposure from the involvement of division managers in price-fixing conspiracies.

The general counsel's office of the parent corporation has approached an economic consultant to help the parent corporation understand how

1. In *Vitamins,* the primary conspirators colluded in multiple vitamin products. Akzo Nobel was named in EC decisions as a participant in cartels in *Choline chloride* and *Organic peroxides*. ADM was named in EC decisions as a participant in cartels in *Amino acids* and *Citric acid* and was charged with price fixing in *In re High Fructose Corn Syrup,* 361 F.3d 439 (7th Cir. 2004). SGL Carbon AG was named in EC decisions as a participant in cartels in *Graphite electrodes, Electrical and mechanical carbon and graphite products,* and *Specialty graphite* (*isostatic* and *extruded*).