

The Pros and Cons of Information Sharing

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1. Information agreements^{*}

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^{*} For further detail, see Div II of *Butterworths Competition Law*, ch. 3; *Bellamy and Child*, §§4-115 to 4-126.

2. Cartel bargaining and monitoring: The role of information sharing

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2.1 Introduction

Cartels face three key challenges. First, in order to form a cartel, participants must agree to a set of terms. At a minimum these terms will include price or output levels and a distribution of collusive profits. Second, the cartel must enforce the agreement in the face of incentives for participants to cheat. Third, the cartel must prevent entry. Communication is used to facilitate all three tasks. Much of the communication that we observe among cartel members can be put into two categories: (1) bargaining, to decide on the terms of the collusive agreement (some of which could be thought of as communication to reduce strategic uncertainty and some of which might signal information about costs or capacity); and (2) monitoring one another after an agreement is reached, to detect and deter

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cheating. The same conversation or information exchange may play both these roles.

We begin by summarizing the main results of theoretical models considering the role of communication in collusion. We then examine the types and function of communication in a sample of contemporary international cartels, each one fined by the European Commission for price-fixing during the 1990s or 2000s. By comparing the nature of communication in convicted cartels with the role of communication in cartel stability proposed in the theoretical literature, we address what it is about communication that contributes to cartel stability. We find an important role for information exchange, both for striking the initial agreement, as well as for monitoring ongoing agreements.

2.2 Theoretical perspectives on communication and collusion

We can distinguish theoretically between four functions served by communication among cartel members. First, communication can be used to reduce strategic uncertainty. In almost all cases where collusion is feasible, there are multiple possible collusive equilibria. If all firms rank these various equilibria in the same preference order, then it is reasonable to presume (though not a foregone conclusion) that they will each select the best possible equilibria. In most cases, however, firms will have different rankings among possible equilibria, requiring some form of communication in order to move them toward an efficient equilibrium. If firms are prohibited by antitrust authorities from communicating, they may use focal points to choose among the multiple equilibria. For example, firms colluding tacitly without direct communication may use public price announcements or other forms of indirect communication to reduce uncertainty regarding the appropriate market price.

Explicit cartels, on the other hand, use direct (and repeated) communication to coordinate their activities. Much of this

communication could be termed “cheap talk,” in the sense that it is neither verifiable nor costly.¹ Rather, it is generally communication about what firms intend to do or what they think others should do. This kind of cheap talk can contribute to increasing the profitability (and therefore the frequency and the duration) of collusion. Communication has been shown to increase the extent and stability of cooperation in experimental settings.² While experimental evidence has demonstrated that focal points can coordinate players’ actions if there is a very obvious solution, perceived inefficiency or unfairness of the focal point reduces the ability to coordinate without communication.³

Second, in some cases firms use costly signals to influence the terms of the collusive agreement.⁴ The signal sent by a particular firm is designed to communicate that a proposed collusive scheme is not an equilibrium for that firm, and that the firm would prefer to compete rather than to agree to these terms. The most common, and perhaps most effective (though not the cheapest) form of signalling displeasure with a current market share allocation is a bargaining price war.⁵ While bargaining price wars may involve explicit

¹ See Farrell and Gibbons (1989) and Farrell and Rabin (1996) for useful discussions of the impact of cheap talk on collusion and in other economic settings.

² See Crawford (1998) for a review of the experimental literature on the impact of communication on bargaining. Leslie (2004) surveys the experimental literature on communication and trust, pp. 538-9. For discussion of an interesting set of experiments conducted in “real” markets that place communication and collusion in its broader social and economic setting, see List and Price (2006).

³ See Crawford (1998), p. 295 citing Van Huyck et al (1992).

⁴ Spence (1973) introduced the idea of effective, although costly, signals in his seminal article on signalling in labour markets.

⁵ See Levenstein (1996) and Gupta (1997) for examples of “bargaining” price wars. Slade (1990) examines the role of price wars in cartel learning.

communication, the message is backed up by distinctly non-verbal communication, namely the sale of output at low prices.⁶ This action communicates that the firm is prepared to sell at low cost, and therefore that the firm should receive a larger share of the collusive output quota.

There are other less costly ways that firms choose to signal their desire for agreeing on a particular division of cartel output. For example, firms have been known to provide factory tours for their competitors in order to convince them of the firm's low cost.⁷ Firms will also make the case to their competitors that past sales should determine market shares in the collusive agreement. While some economists have argued that this reflects a convenient rule of thumb for organizing the cartel, it is also reasonable to presume that past sales reflect the firm's outside (competitive) option. Firms reveal private information about factory operations or past sales in order to

See Levenstein and Suslow (2006a), pp. 48-49 for further discussion of bargaining price wars and cartel stability.

⁶ An example of explicit communication occurred when the representative of the Deutsch Bromkonvention, the German bromine cartel, came to St. Louis, Missouri in 1908 to tell representatives of the Dow Chemical Company that it would export bromine products to the United States and sell them at half the going market price if Dow did not immediately agree to its terms for selling bromine products around the world (Dow Chemical Company correspondence, Post Street Archives, Midland, Michigan).

⁷ For example, Archer Daniels Midland gave tours of its new lysine factory to its competitors (and soon to be co-conspirators), to convince them that ADM should be given a larger share of the global lysine market (Commission Decision of 7 June 2000, Case COMP/36.545/F3 – Amino Acids, §70). In a remarkably similar story a century earlier, the Dow Chemical Company gave its American competitors from Ohio and West Virginia a tour of its facilities, using Dow's patented electrolytic process, in 1910. The smaller, less technologically sophisticated competitors essentially immediately capitulated to Dow's terms (Dow Chemical Company correspondence, Post Street Archives, Midland, Michigan).

convince their competitors that they require a larger market share in order for cooperation to be incentive compatible. Sharing of private information about firm costs and firm sales is costly (and not simply cheap talk), both directly because firms may incur the cost of having the information verified by a third party and indirectly through an opportunity cost of giving up private and strategically valuable information.

The third theoretical category of communication is monitoring, which serves a very different function. While both signalling and cheap talk are intended to influence the terms of the collusive agreement, much of the information exchange that we observe within cartels is intended to monitor cartel participants. Cartels engage in extensive, creative, and wide-ranging monitoring activities in order to reduce firms' incentive to cheat on collusive agreements. This is generally the most formal and systematic of the communication efforts between colluding firms. Our interpretation is that firms would much prefer to engage in the efficient collusion of Friedman (1971) than in the inefficient collusion of Green and Porter (1984) or Abreu, Pearce, and Stacchetti (1986). Friedman (1971) demonstrates that firms may use "off the equilibrium path" threats of price wars in retaliation for cheating to provide firms with the incentive not to cheat, allowing them to escape the Prisoners' Dilemma and cooperate. However, since any cheating would be observed immediately in his model, and therefore subject to swift retaliation, firms do not cheat and price wars are not observed. In the Green and Porter class of models, firms cannot observe one another's output (or pricing) actions nor infer them with certainty from public information. Economic fluctuations require that firms revert to equilibrium "punishment" or "price war" behaviour at times in order to maintain the incentives necessary to achieve collusion. Price wars are expensive, however, both in terms of lost profits and in terms of lost trust, and colluding firms do their best to avoid them. They do this by collecting and sharing information with one another.

Since incomplete information is the source of inefficiency in these models, one might expect that the more information firms have about the probability that cheating has occurred, or the more frequently that information is revealed, the more profitable collusion will be over the long run because it will be disrupted by fewer price wars. Compte (1998), building on Abreu, Milgrom, and Pearce (1991), suggests the opposite. More information or more frequent information may actually make collusion harder to achieve or sustain, as the information received will also facilitate cheating as well as monitoring of one's competitors. More information means that each firm will have more rapid feedback about the impact of its past actions on market observables, allowing it to fine-tune its cheating. We return to this theoretical supposition below, in light of evidence on actual information sharing by cartels.

Finally, communication between colluding firms builds trust, and trust stabilizes collusion: "Communication is, of course, necessary for firms to make promises to each other to increase price or allocate markets. But promises mean little if those making promises are not trusted. Cartels rely on communication to develop that trust."⁸ Trust may increase collusive stability because it literally changes the payoffs: cartel participants establish personal relationships and come to care about their co-conspirators' welfare or their co-conspirators' view of them. Through repeated communication, they also become familiar with their co-conspirators' bargaining styles, making subsequent negotiations

⁸ Leslie (2004), pp. 580-81. Leslie distinguishes between "calculative trust" in which trust is based on an evaluation of the incentives facing the other party and "innocent trust" in which the person simply accepts vulnerability (pp. 528-530). For our purposes, the defining aspect of trust is that it reduces the cost of monitoring.

more effective.⁹ Thus, trust may reduce the costs of communication and allow the cartel to operate more efficiently.¹⁰

2.3 Communication in contemporary international cartels

We turn now to a discussion of the types of communication observed in explicit cartels. In a previous analysis of contemporary (illegal) international cartels, we found that cartels with a sophisticated internal organization are more likely to endure, all else equal (Levenstein and Suslow 2006b). Several of the components of a well-organized cartel involve information sharing. In the discussion that follows, we examine the qualitative content of this communication in order to determine what it is about communication that increases cartel stability.

We focus here on 41 international cartels that engaged in illegal price fixing or market divisions in the European Union during the 1990s or 2000s. We define an international cartel to be one that includes member firms from more than one country. Each of these cartels has been fined by the European Commission. Some of these cartels reached beyond the European Union and were truly global in nature, and many have been prosecuted in the United States and other jurisdictions. Much of the direct communication among the cartel members was informal, consisting of phone, letter, and fax correspondence as well as conversations at face-to-face meetings.

⁹ Id. pp. 565-66.

¹⁰ Id. pp. 550-51 (where Leslie makes the point that: "Absent trust, transaction costs may render agreements not cost beneficial....Trust reduces the need for negotiating and renegotiating formal rules, dispute resolution systems, and other enforcement mechanisms all of which represent transaction costs. While complexity increases transaction costs, trust reduces complexity in complex relationships. In contrast, distrust raises transaction costs.").

Other communication was more systematic and involved the regular collection and processing of information that was shared on a periodic basis. Extensive information provided in European Commission decisions allows us to observe and catalogue a few of the critical types of information sharing. We summarize key characteristics of the patterns of communication in Table 1.¹¹ While this table includes most international cartels fined by the EC during this period, we have excluded the shipping cartels (they were regulated for much of the cartel period, allowing for highly detailed information exchange), bid-rigging cartels, and cartels that have been fined, but where a public decision has yet to be released. The approximate number of members of each cartel is indicated (small, medium, and large cartels): 23 of the 41 cartels had five or fewer members. The table also contains a summary of the involvement of a trade association, if any, the extent of information exchange for monitoring purposes, the number of levels of hierarchy within the cartel, and the frequency of meetings. We begin the discussion with the role of hierarchy in information exchange, and then focus on the information exchange requirements for monitoring compliance and enforcing the agreement.¹²

2.3.1 Hierarchy and Communication

As we have argued elsewhere, “[h]ierarchy and communication are important to cartel success because the world is dynamic and

¹¹ Note that Table 1 has 33 rows, but 41 cartels because nine vitamin cartels with similar information sharing arrangements are listed in one row.

¹² For a detailed analysis of 20 European Commission decisions between 2000 and 2004, with a discussion of properties of firm behavior consistent with collusion, see Harrington (2006).

contracts are inherently incomplete.”¹³ Many contemporary international cartels have a formal hierarchical structure. In the cartels surveyed here, top executives usually struck the initial bargain. They would continue to meet two to three times per year to discuss and renegotiate the agreement, as well as set overall strategy, quotas, and prices. Lower level executives communicated more frequently in order to implement the agreement and monitor compliance. For example, senior executives in the monochloroacetic acid (MCAA) cartel met in 1996 “to discuss a number of topics, including market shares in the EEA and whether any compensation was necessary. If reparations were deemed necessary, the details of reparations would have been discussed at a subsequent meeting involving only the more junior level representatives for each of the producers.”¹⁴ The vitamins A and E cartels were among the most sophisticated, with *four* distinct layers of cartel management: top level, heads of marketing, global product marketing level, and regional product marketing level.¹⁵

A hierarchical cartel structure allows for the high-level information exchange and bargaining activities to be separated from the more micro-level (regional or local) information exchange. Bargaining communications are critical because they are intended to influence the terms of the collusive agreement. The initial terms of the agreement normally include price and output levels, and frequently also include market shares and assignment of key customers. Table 1 documents extensive hierarchical organization among most of the cartels and frequent meetings with numerous opportunities to negotiate and renegotiate. While we cannot say that

¹³ Levenstein and Suslow (2006a), p. 67. See also, Genesove and Mullin (2001) for a thoughtful discussion of the role of communication in facilitating collusion when collusive agreements are incomplete.

¹⁴ Commission Decision of 19 January 2005, Case COMP/E-1/37.773 – MCAA, §139.

¹⁵ Commission Decision of 21 November 2001, Case COMP/E-1/37.512 – Vitamins, §§172-188.

these cartels would have been impossible to sustain absent frequent communication, it clearly helped. For example, the sorbates cartel, which lasted from 1978 to 1996 and operated globally, required regular negotiation among the highest-level executives:

A joint meeting was held in August 1980 at Hoechst's headquarters in Frankfurt. The participants were the same as for the September 1979 meeting, except in the case of Ueno, where Mr. [.] replaced Mr. [..]. At that meeting, the group agreed on a target price for Europe. Hoechst demanded larger shares of the market, based on the expansion of its production facilities in 1979. Hoechst demanded a share of 53% in its home market and claimed that its share in Eastern Europe, as part of Europe, should be tripled from the existing share of [.]%, but the Japanese producers denied Hoechst's demands.¹⁶

Notice that *proposals* for a change in the cartel agreement were also discussed at these meetings. Seven months later, the group met again. This was necessitated in part because of fluctuating external market conditions:

This meeting was held in March 1981 in a hotel conference room in Tokyo. ... The group discussed market conditions in Europe and confirmed sales levels based on information from Hoechst and the trading houses. It also debated target prices and agreed on a

¹⁶ Commission Decision of 1 October 2003, Case COMP/E-1/37.370 – Sorbates, §§131-132.

specific new target price for Europe in DEM which was announced after the joint meeting.¹⁷

Cartel negotiations often expand beyond price and market share in order to address the possibility of cheating in non-price dimensions. These negotiations can lead to restrictions on terms of sale, advertising, and production capacities. If entry becomes an issue—either growth of an existing fringe or entry of new competitors—this precipitates countless discussions among top-level company executives. The optimal response often involves a multi-pronged approach of targeted price reductions, plans to acquire entrants, and, where relevant, restrictions on the sharing of technology. It is rare to find documentation of such technology discussions, but the sorbates cartel provides us with an example:

During the joint meetings, there was considerable discussion about new market entrants, particularly the Chinese and the Russians. In the late 1980s and during the 1990s several potential competitors from China requested sorbates technology from the existing producers, but Hoechst and the Japanese producers decided that no technology would be provided to other sorbates producers. Hoechst, in agreement with the Japanese producers, also encouraged [...] not to transfer sorbates technology to potential competitors. Discussions among the conspirators involved reporting on enquiries from potential market entrants and reporting on companies' individual decisions not to sell such a technology.¹⁸

¹⁷ Commission Decision of 1 October 2003, Case COMP/E-1/37.370 – Sorbates, §135.

¹⁸ Commission Decision of 1 October 2003, Case COMP/E-1/37.370 – Sorbates, §§131-132.

Much of the communication among higher level executives also has the more subtle role of fostering trust. In the cement cartel, the chairman of the European Export Policy Committee, complaining about lackluster meeting attendance said: “Probably the greatest advantage that individual members obtain from their membership is to establish and develop close personal contacts. The role of the meetings is to provide the formal structure around which such relationships may blossom.”¹⁹ In another example, plasterboard cartel members recognized that one of the objectives of the high-level information exchange was to “provide the degree of *mutual assurance* that the price war was ending” (emphasis added).²⁰

Previous case studies of cartels have also shown that communication that increases the level trust will facilitate collusion. Debra Spar (1994) argues that it was the previous cooperation of diamond miners in other non-collusive activities that created the basis of trust that supported the creation of an international diamond cartel, arguably one of the most successful and long-lived cartels in history. Gallet and Schroeter (1995) and Markham (1952) document the importance of a “culture of collusion” to the success of the rayon cartel. Baker (1989) makes a similar argument about the infamous Gary dinners. Judge Gary’s hosting regular dinners for the leaders of the steel industry undoubtedly did more than facilitate information sharing *per se*. The communication created trust, allowing cartel members to work together effectively to overcome the inevitable challenges that all cartels face.

¹⁹ Commission Decision of 30 November 1994, Cases IV/33.126 and 33.322 – Cement, p. 92.

²⁰ Commission Decision of 27 November 2002, Case COMP/E-1/37.152 – Plasterboard, §106.

2.3.2 Monitoring

While executives met regularly to bargain over the terms of the collusive agreement, much of the intra-cartel communication, particularly the more systematic information sharing at the lower-level “operational” or “technical” meetings was intended to monitor already agreed-upon collusive terms. The last column of Table 1 shows that the lower-level meetings often occurred with roughly double the frequency of top-level meetings. In several cases, the different levels of the cartel actually had their own monikers. For example, the electrical and mechanical carbon and graphite products cartel, the methionine cartel, and the organic peroxide cartels all referred to the higher-level groups as “summit” meetings, while the lower-level groups were referred to as technical, staff or organizational meetings. Others were more colourful, such as the “popes and sales” meetings of the steel heating pipes cartel and the “elephants and sweepers” of the copper tubes cartel. Cartel members (or their agents) collected and exchanged information in order to determine whether cartel members had adhered to previous agreements. This monitoring is also intended to deter cheating, by making any cheating observable to competitors. Monitoring communication can include reports of prices, individual sales, customer lists, industry aggregate statistics, exports, and imports. When cartels did not systematically share information on transactions prices, they often followed the practice of the electrical and mechanical carbon cartel which “closely monitored each other's price quotations to clients and insisted in meetings and other contacts on compliance with the agreed rules and prices of the cartel.”²¹

The vast majority of the cartels documented in Table 1 systematically exchanged information on sales volumes. Information about prices was instead exchanged verbally in

²¹ Commission Decision of 3 December 2003, C.38.359 – Electrical and Mechanical Carbon and Graphite Products, §89.

meetings or over the phone. For example, the vitamin D3 cartel, one of the least structured of the many vitamin cartels, had a regular exchange only of quantity data:

Each meeting followed the same structure. The organizer started by disclosing its sales figures (in volume) for the previous six or twelve months as appropriate. The others then shared their sales figures. Estimations were made and agreed of the future size of the market. On the basis of this overview of the market, the participants could monitor performance against target and allocate the volume quotas for the next period, generally in accordance with their agreed market shares. List prices and minimum prices were also set in these meetings.²²

Similarly, the members of a Belgian beer cartel exchanged monthly sales information broken down by distribution channel.²³ An executive of Interbrew, one of the cartel members, later explained the reasons for this information sharing:²⁴

The objective was to obtain faster and more accurate information for both the on-trade and the off-trade... There were other statistics available on the market, but they were less reliable and slower... For market estimates we used the exchanged information most of all. But the information did not influence any decisions.

²² Commission Decision of 21 November 2001, Case COMP/E-1/37.512 – Vitamins, §§469-470.

²³ Commission Decision of 5 December 2001, Case IV/37.614/F3 – PO/Interbrew and Alken-Maes, §§113-116.

²⁴ Commission Decision of 5 December 2001, Case IV/37.614/F3 – PO/Interbrew and Alken-Maes, §§122, 124.

The big competitor was not [Alken-Maes] but the private-labels.

Note that in this case, information exchange was explicitly *not* used to determine the terms of the agreement, because the binding constraint on what the cartel could do was determined by the existence of a cartel outsider. Still, the cartel collected information in order to monitor the actions of its own members.

The collection and sharing of information among these cartels was not limited to prices and quantities, but was shaped by what cartel members determined would allow them most effectively to detect and deter cheating. This often included information about customers or suppliers. In previous periods when antitrust enforcement was more lax, cartels often relied on joint distributors to enforce cartel agreements. This instrument is not generally available to cartels today, as it is readily detectable by the competition authorities. However, cartels have tried to mimic certain informational aspects of the joint distribution relationship. For example, the industrial copper tubes cartel not only fixed prices and collected sales and market share data, they also “appointed market leaders among each other for the allocated territories and customers to collect market information and monitor customer visits.”²⁵

While the copper tubes cartel shared downstream information about customers, the methionine cartel members shared information about upstream activities. Like most of the other cartels in our sample, methionine producers “reviewed ... each national market to see whether the target prices had been attained, sometimes in reference to individual customers...and demand for the product...”²⁶ They went further, though, and also “exchanged [information] concerning supplies of the main materials for methionine, capacities

²⁵ Commission Decision of 16 December 2003, Case C.38.240 – Industrial Tubes, §11.

²⁶ Commission Decision of 2 July 2002, Case C.37.519 – Methionine, §67.

[and] rates of operation of plants.”²⁷ In this case, the cartel was monitoring firm’s actions that might indicate *preparation* for cheating.

A. The frequency of monitoring

The frequency of monitoring and the amount of communication associated with it depend on the industry. In many cases, routine information was exchanged on a monthly basis, with follow-up discussions between cartel members several times per year. Table 1 documents monthly information exchanges for the beer, citric acid, copper tubes (plumbing), lysine, cartonboard, vitamins A, E, and B5, and zinc phosphate cartels. Other cartels exchanged information quarterly or bi-annually. In part, the frequency of information sharing depends on the structure of the market and how easily or quickly prices or production rates can be changed. In some industries, letters might be sent to customers once or twice per year announcing prices, while in other industries prices fluctuate more frequently. Cartels may be able to influence the length of contracts, and sometimes explicitly agree to limit contract length. In such cases, we should think of both the timing of production and pricing decisions and the timing of information sharing as endogenous. In other cases, the nature of the product or the market limits cartel options.

The frequency of communication among cartel members depends as well on the nature of the product. Homogenous goods sold in relatively small quantities are amenable to simple rules that limit the need for intra-cartel communication. Where there is a lot of product variety or sales are very lumpy, communication may be required for each transaction. For example, in the infamous U.S. electrical equipment conspiracy of the 1950s and 1960s, General Electric, Westinghouse and their co-conspirators were able to limit their direct communication by using a “phases of the moon” rule to rotate

²⁷ Id. § 71.

who would win bids. This allowed them to coordinate their bid-rigging activities with a minimum of explicit, potentially observable, communication. This worked well as an organizing principle for small electrical components which were ordered frequently by buyers. It did not work for turbine generators, an expensive and customized product in which one order could provide a year's sales. Producers of turbine generators had to communicate directly about each individual order.²⁸ Thus, the frequency of monitoring depends on the incentive to cheat. Where there is greater incentive to cheat, more communication and more monitoring are required.

Following the line of argument in Compte (1998), the fact that many cartels chose to increase the frequency of information sharing for monitoring could suggest that cartels were creating a problem for themselves, providing information to potential cheaters more quickly than cartel members could respond and punish cheating. We have not identified any evidence of concern on the part of these cartels that increased information could facilitate cheating. What we observe instead is that in order to deter cheating, cartels increase *both* the frequency of their information sharing (direct monitoring and reporting of sales) *and* the frequency of possible retaliation. If the information reported revealed an increased likelihood of cheating, the cartels simply moved up the face-to-face meeting. For example, when Hoechst, a German chemical firm and leader in the sorbates cartel, began to sell more than its co-conspirators believed it was entitled to, the response was quick. The firms did not, however, drop prices. Instead, they chose to talk sooner than planned:²⁹

This meeting was held in Zurich on 16 and 17 June 1981. It was decided to bring forward the autumn meeting in response to the "aggressive moves" by Hoechst both in

²⁸ Levenstein and Suslow (2006a), p. 73, citing Baker and Faulkner (1993), pp. 838-841, and Scherer (1980), pp. 170-175, 222.

²⁹ Commission Decision of 1 October 2003, Case COMP/E-1/37.370 – Sorbates, §137.

Europe and USA. A representative from each of the producers attended this meeting (Hoechst, Daicel, Nippon, Chisso and Ueno).

Cartels often go to great efforts to increase the frequency of reporting, suggesting that they believe that the increase in communication will prevent cheating and facilitate collusion. Thus, even where formal responses to information sharing took place at longer lags than the information sharing itself, there was almost surely the possibility of more rapid responses.

B. The role of third parties and trade associations

When trust is particularly difficult to establish, and firms doubt the accuracy of the data being exchanged, cartels often turn to a third party to facilitate or implement information sharing. This occurred, for example, in the pre-insulated pipe cartel, when a respected retired executive served as the mediator and coordinator of the cartel.³⁰ The Danish producers in this cartel also relied on auditors who “certified the total sales of pipes during the year, and the certificates were then exchanged among the cartel participants.”³¹ In other cases, private companies served as cartel observers and facilitators. Several cartels used the services of Fides, a Swiss trust company later bought out by AC Treuhand, to collect and disseminate individual firm data.³² In the organic peroxides cartel, detailed sales data of the participating companies were closely

³⁰ “A retired business executive with close personal connections to ABB who had formerly been on the Board of IC Møller was engaged as a consultant to act as the ‘coordinator’ of the cartel.” (Commission Decision of 21 October 1998, Case No IV/35.691/E-4 – Pre-Insulated Pipe Cartel, §33)

³¹ Id. §33.

³² Commission Decision of 10 December 2003 Case COMP/E-2/37.857 – Organic Peroxides, §20.

monitored by AC Treuhand.³³ The cartonboard and MCAA cartels also used the services provided by Fides/Treuhand, as shown in Table 1.³⁴ Although their actions were determined to be legal in the latter two cartels, Treuhand was fined a nominal amount for their participation in the organic peroxides cartel: not only did they aggregate and disseminate statistics, but they also acted as arbitrator in cartel disputes.³⁵

In other industries, the role of an “independent” monitor is played by trade associations. Overall, we observe active participation of trade associations in about one-third of contemporary international cartels.³⁶ Of the 41 cartels in Table 1, over one-fourth had active trade association involvement. Another fifth used meetings of their trade association as cover for cartel meetings. In addition, the Japanese firms in two of the cartels relied on the activities of Japanese trade associations created by the Ministry of International Trade and Industry. The role of the trade association, intentional or not, was often to exchange information that facilitated monitoring. In the zinc phosphate cartel, for example, the association implemented an information exchange in which each producer sent sales volume data on a monthly basis to the trade association. The trade association then legitimately sent aggregated data to all five producers, all of whom were cartel members. Producers would then meet and provide each other with individual

³³ Id. §81.

³⁴ Other international cartels, not shown in Table 1 because the Commission’s decisions were prior to 1990, also used Fides’ services. See, for example, Commission Decision of 19 December 1984, 85/202/EEC, § 43 (*Wood Pulp* case) and Commission Decision of 21 December 1988, 89/191/EEC, §11 (*Low density polyethylene* case).

³⁵ Id. §92 (AC Treuhand “acted as a moderator in case of tensions between the members of the agreement and encouraged the parties to find compromises. AC Treuhand would try to stimulate the parties to work together and reach an agreement.”).

³⁶ Levenstein and Suslow (2006b), p. 56.

sales volumes, “thereby verifying via this exchange of information their mutual adherence to the agreed market shares.”³⁷ Other times, the trade association actively assisted in monitoring the agreement. In the most extreme case, the lysine producers created a trade association with the express purpose of using it to facilitate collusion.

Trade associations in two industries (steel beams and cartonboard) were initially involved in the cartel and withdrew in the early 1990s when they received legal advice that their participation was problematic. We have seen a similar evolution in the participation of trade associations in cartels in the United States over the last century. During the 1880s and 1890s, railroad trade associations literally administered American railroad cartels.³⁸ In the first quarter of the twentieth century, U.S. trade associations played a leading role in domestic cartels, with an ambivalent response from competition agencies. During the 1920s the Federal Trade Commission helped many industry associations to form with the express intention of stemming “cutthroat competition.”³⁹ In 1918, Congress passed the Webb-Pomerene Act, giving legal status to industry associations for joint export activities, including activities that would not have passed muster with antitrust officials in the domestic market.⁴⁰ In 1933, the National Industrial Recovery Act encouraged firms to create industry associations and adopt fair pricing codes (for which they could display a “Blue Eagle” symbol). These codes were subsequently challenged by the U.S. Justice

³⁷ Commission Decision of 11 December 2001, Case COMP/E-1/37.027 – Zinc Phosphate, §69.

³⁸ See Ulen (1983) and Hudson (1890) for descriptions of the role of industry associations in the Joint Executive Committee, and the Southern Railway and Steamship Association, respectively.

³⁹ See Levenstein (1998), p. 30, for a discussion of the activities of the Federal Trade Commission in promoting uniform cost accounting and other activities by trade associations to dampen the intensity of competition.

⁴⁰ See Dick (1992) for further description and analysis of the Webb-Pomerene Act.

Department and trade associations were prosecuted for their role in facilitating collusion.⁴¹

In the post World War II period, U.S. trade associations have been reluctant to involve themselves with explicit collusion. The U.S. Justice Department provides explicit guidelines (some of them industry-specific) to industry associations to clarify which types of information exchange are considered pro-competitive and which will run afoul of antitrust law. The long history of prosecutions and negotiations between U.S. trade associations and U.S. competition regulators has by now made associations careful about their role in information exchange. It is also generally the case that U.S. trade associations have an identity distinct from their member firms and a staff that is employed directly by the association itself. This aligns the interests of the association's employees with the association and the industry as a whole, but not directly to the profits of individual firms. In contrast, many of the European industry associations that were actively involved in the cartels discussed here were run by the executives of the firms that were ringleaders of the cartel. In other cases, the key roles in the trade association rotated among high-level executives. More independent and professional trade associations are less likely to be captured by cartel interests.

Much has changed for trade associations in the EU, however, over the past decade. The *UK Agricultural Tractor Exchange* case in 1992 set out guiding principles on information exchange among competitors.⁴² Capobianco (2004) summarizes the basic guidelines:⁴³

In general, the Commission would not object to the dissemination of aggregated data, which does not allow for identification of the information related to

⁴¹ See Taylor (2002) and Alexander (1994) for analysis of the anticompetitive impact of the National Industrial Recovery Act.

⁴² See Commission Decision, *UK Agricultural Tractor Exchange*, O.J. 1992, L 68/19.

⁴³ Capobianco (2004), pp. 1264-1266.

individual companies.... The Commission has considered information historical when it dates back more than 12 months....[Another] factor that may affect the Commission's assessment of an exchange of information relates to the *frequency of exchange*....[The] Commission is particularly careful in reviewing exchanges of information in oligopolistic markets, particularly if protected by high entry barriers....Since its earliest policy statements, the Commission has drawn a distinction between exchanges of information in homogeneous product markets and exchanges of information in differentiated product markets. (emphasis original)

The Commission's decision in this case was subsequently supported by the Court of First Instance in 1994 and the European Court of Justice in 1998. Both the EC and national regulators now routinely focus on trade associations when investigating price-fixing and mergers (in concentrated industries). Trade associations in Europe have therefore of necessity become more cautious about their role in information exchanges among member firms. Still, not many years have passed since the 1998 ECJ affirmation of the Commission's decision in the *UK Agricultural Tractor Exchange* case. Although the guidelines may be much clearer than they were before, it may well take some time before European trade associations learn how to educate their members in compliance with the law. The more explicit European law and the rulings of European courts are, the faster the pace of this change will be.

One of the difficulties is that the path to compliance is not yet clearly defined. Although one can easily summarize the basic information exchange guidelines as above, this masks that there is still a great deal of ambiguity in the specifics.⁴⁴ One way in which

⁴⁴ Capobianco (2004) makes this clear in his comment on the level of data aggregation required to satisfy the EC: "There are no general criteria for

the U.S. antitrust authorities assist firms in this regard is by issuing Business Review Letters.⁴⁵ Trade associations can request a review of proposed business conduct by the DOJ (or the FTC, which issues Advisory Opinions). The DOJ then approves or rejects the request, or it may ask for a modification of the proposed practice. These statements are made publicly available and therefore serve not only as advice for the specific parties involved, but for firms and other associations as well.⁴⁶ Providing such guidance permits trade associations to engage in pro-competitive, efficiency enhancing information exchange which might otherwise be discouraged as associations attempt to determine appropriate legal and ethical boundaries to their activities.

determining the minimum level of aggregation required to prevent an antitrust investigation; when confronted with aggregated information, the Commission verifies that it is sufficient to prevent any identification on a case-by-case basis....In *CEPI-Cartonboard*, the Commission objected to the exchange of information concerning countries with fewer than three competitors and required that the information be aggregated with those of other countries. At the same time, the Commission required that order inflow information only be exchanged if there were at least ten companies...while in *European Wastepaper Information Service* the Commission seemed to request that at least four competitors be active on the relevant market." (pp. 1264-65, footnotes omitted)

⁴⁵ 28 CFR section 50.6 Antitrust Division, Business Review Procedure (2006), available at <http://0225.0145.01.040/atr/public/busreview/201659c.htm>. For the DOJ's 1992 statement about the role of the "expedited" Business Review program, including guidelines for information exchange, see <http://www.justice.gov/atr/public/busreview/201659a.htm>.

⁴⁶ The DOJ Business Review Letters are available at <http://www.justice.gov/atr/public/busreview/letters.htm>. The FTC posts its Advisory Opinions at <http://www.ftc.gov/ftc/opinions.htm>.

2.4 Conclusion

Information exchanges in explicit cartels differ significantly from the signalling and focal points that tacitly colluding firms must employ to move the industry from a non-cooperative to a cooperative equilibrium. It is in fact these differences that demarcate explicit collusion from tacit cooperation. Our larger goal is to extrapolate from the role that communication plays in stabilizing collusion among the small sample of firms where we observe explicit communication, to the potential role that indirect forms of communication might play in facilitating tacit collusion. We show here that colluding firms use numerous channels of communication, with varying levels of structure and formality. Some of the most systematic information exchanges, such as regular face-to-face meetings and written exchanges of individual firm data are undertaken at considerable risk, given the current legal environment. These risks are accepted in part because each firm believes that heightened communication will move the industry to a collusive agreement that favours the interests of their firm. Cartel members also find direct communication and accurate information exchange necessary because it reduces uncertainty and builds trust, both of which make collusion more stable.

The fact that multilateral face-to-face cartel meetings were regularly supplemented by bilateral meetings, as well as phone conversations and memos, shows how much communication was generally necessary to sustain these collusive conspiracies. Although this does not prove that explicit communication is either necessary or sufficient to sustain a collusive equilibrium, it does suggest that the inability to communicate may prove a significant impediment to the effectiveness of tacit cooperation.

Table 1**Communication in selected international cartels operating in the European Union¹**

Specific notes are listed at the end of the table, but a few general comments are necessary. First, “monitoring” presumes an exchange of market information and focuses only on the exchange of individual information. Second, the frequency of regular information exchange is presumed to be at least at the frequency of face-to-face meetings, unless noted. Third, in almost all cases there was frequent intermittent contact between multilateral face-to-face meetings: it is included in the last column of the table only if specific information was given in the EC decision. Finally, the information here should be considered a rough snapshot of the level of communication in the cartel. It is difficult to put one number (or even one descriptor) to the type of information exchange and its frequency, or to the frequency of meetings, because it might have varied over the life of the cartel and certainly varied over product market segments and geographic segments in the more complex international cartels.

Industry	Number of Members²	Trade Association (TA)³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Beer (Belgian)	Small	TA acted on behalf of brewers during regulatory period; price discussions within TA after regulatory period	Sales (by distribution channel) <i>Monthly</i>	2 levels <i>2-3 times per year with intermittent contact in between meetings</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Beer (Belgian, Private Label)	Small		Sales; Customers	1 level <i>4 meetings</i>
Beer (Luxembourg)	Small	Director of TA arbitrated cartel disputes		No evidence of meetings; sporadic correspondence
Carbon, Electrical & Mechanical	Medium	Cartel formed by TA in 1937; TA used as cover, post-WII	Prices; information on non-member competitors	3 levels <i>Twice per year, with lowest-level communicating weekly or even daily</i>
Cement	Large	Multiple TAs, with one umbrella international TA (fined); some TAs had direct cartel involvement, while others did not	Prices; exports; customers (differed by TA and by country); one TA exchanged output and capacity information <i>At least quarterly</i>	1 level, plus general assembly <i>At least twice per year</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Citric Acid	Small	TA used as cover	Sales (regional level); customers <i>Monthly</i>	2 levels <i>Twice per year, with regular contact and frequent bilateral contacts</i>
Copper Tubes (industrial)	Small	TA originally formed to set quality standards, later used to form cartel	Sales, market shares; customer accounts	1 level <i>At least twice per year</i>
Copper Tubes (plumbing)	Medium	TA used as cover	Sales; orders; market shares; prices <i>Monthly</i>	2 levels <i>1-2 times per year, on average</i>
Fine Arts	Small		Customers; variety of other matters (auctions, vendors, dealers)	1 level <i>2-4 times per year</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Gases, Industrial and Medical	Medium	TA used as cover	Prices; customers	3 levels <i>TA, 2-4 times per year; cartel also met outside TA several times per year; other regular bilateral contacts</i>
Graphite Electrodes	Medium	At least first cartel meeting, if not others, coincided with TA meeting	Prices; customers; sales <i>2-3 times per year</i>	2 levels <i>1-2 times per year, with frequent bilateral contacts and occasional local meetings (as frequently as once per month in one country)</i>
Graphite, Isostatic	Medium		Sales; customers; prices (sometimes, at bilateral meetings)	4 levels <i>Twice per year (varied by country)</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Graphite, Extruded	Small		Prices; customers	1 level <i>2 times per year, on average; intermittent contacts from 2-3 times per week to 2-3 times per month</i>
Haberdashery Products	Small		No regular exchange; to implement compensation scheme one firm finally asked for other firms' cost data and for "clarification" of sales	1 level <i>Trilateral and bilateral meetings held anywhere from 2-6 times per year</i>
Lysine	Medium	TA created to facilitate collusion	Sales <i>Monthly</i>	1 level <i>Planned to meet quarterly, but in practice met more frequently</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Methionine	Small		Sales (regional, country); production capacities; supplies of raw materials <i>Sales exchange was "regular"</i>	2 levels <i>Top level 1-2 times per year; operational level 3-4 times per year; bilateral meetings as well</i>
Methylglucamine	Small		Sales (by country); customers (oral, never systematic)	1 level <i>Once per year</i>
Monochloroacetic Acid (MCAA)	Small	AC Treuhand (formerly Fides) collected data and disseminated aggregate statistics. <i>Cartel members met with Treuhand representative twice per year.</i>	Sales; price; customers <i>Quarterly</i>	2 levels <i>Top level met 2-4 times per year; sales managers met on an ad hoc basis and also had telephone contact</i>
Nucleotides	Small		Sales; prices	1 level <i>Twice per year</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Organic Peroxides	Medium	AC Treuhand (formerly Fides) organized meetings, collected and monitored data, acted as arbitrator in disputes (fined)	Sales (by country, closely monitored by Treuhand); prices; customers <i>Quarterly</i>	2 levels <i>1-2 times per year for top level; 3-4 times per year for lower level; 2 meetings per year with AC Treuhand (in early years of cartel); ad hoc multilateral and bilateral meetings also took place</i>
Paper, Carbonless	Large	TA meetings functioned as cartel meetings for 1 year; after that, used as cover	Sales; prices; customers	2 levels <i>5 times per year, on average, with ad hoc contacts in between</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Paper, Cartonboard	Large	Data collected by multiple TAs was forwarded to Fides. (Main TA had operated under aegis of Fides since 1955; cartel formed with reorganization of TA in 1986; statistical exchange within TA altered in 1991, following legal advice.)	Prices, deliveries, order backlogs, plant downtime, capacity utilization, among other data (by country) <i>Aggregate data sent by Fides to participants, some of it monthly, some bi-annual, some annual</i>	2 levels <i>Annual general meeting, with lower level meetings 5-8 times per year</i>
Plasterboard	Small	TA used as cover	Sales (by country) <i>First annually, then every six months, then quarterly</i> <i>Part way through cartel duration, an "independent consultant" was brought in to monitor data exchange</i>	1 level <i>Meetings at irregular intervals, but other contact (phone, etc.) throughout</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Sorbates	Medium	A few years after bilateral contacts, the four Japanese firms founded an export cartel within a Japanese TA formed under the auspices of MITI	Sales; prices (by region) <i>Regular exchange, at least twice per year.</i>	2 levels <i>Twice per year, with separate preparatory meetings by Japanese firms; also bilateral meetings and telephone contacts</i>
Steel Beam	Large	European TA (members were primarily other TAs), set up during steel crisis; exchange of individual data within TA stopped after stainless steel cartel decision in 1990	Deliveries; orders (by country) <i>Orders updated weekly; deliveries updated quarterly</i>	Multiple levels <i>Monitoring committee of TA met frequently, 7-9 times per year on average; meetings outside TA took place on ad hoc basis; individual agreements among subsets of companies also existed (e.g., Scandinavian countries)</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Steel Heating Pipe (Pre-Insulated Pipe)	Medium	TA formed by cartel ringleader (purported purpose to ensure quality standards), but TA mostly used as cover ⁴	Sales; prices <i>External auditor checked data</i>	2 levels <i>Early years: top level met quarterly and sales managers met 1-2 times per month</i> <i>Later years: top level met monthly and sales managers met with different frequencies in different countries</i>
Steel, Stainless	Medium	Firms met under auspices of European Coal and Steel Community, but went beyond what law allowed		1 level <i>1 initial meeting, followed by ad hoc contacts</i>
Raw Tobacco, Spain	Medium	Partly regulated industry; several TAs (“agricultural unions”); subset of TAs fined	Prices; quantities <i>Twice per year</i>	2 levels <i>Ad hoc (e.g., twice one quarter and 4 times another quarter)</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Vitamins A, E, B1, B2, B5, B6, B9, C, Beta Carotene	Small	Japanese producers of vitamin B9 were in a trade group organized by MITI	Sales (regional and national) <i>Monthly</i> <i>(Vitamins A and E most sophisticated, but other vitamins followed basically the same procedure. Vitamin B5 firms exchanged data quarterly at first, then monthly; B9 information exchange was quarterly; vitamin C cartel identified key customers)</i>	4 levels for A & E <i>Highest level once per year; 2nd level 2-3 times per year; 3rd level 4 times per year; 4th (regional) level 4 times per year; bilateral contacts on ad hoc basis</i> Other vitamins, 2 levels <i>Normally met quarterly</i>
Vitamin B4 (Choline Chloride)	Medium	TA used as cover	Sales; prices; customers (by country); exports (on occasion)	2 geographic levels (global and European) <i>Global met every six months; European met every 3 months (with phone calls every one to two weeks)</i>

Industry	Number of Members ²	Trade Association (TA) ³	Monitoring & Frequency of Information Exchange	Hierarchy & Frequency of Meetings
Vitamin D3	Small		Sales <i>Every 6-12 months</i>	1 level <i>Twice a year</i>
Vitamin H (Biotin)	Medium		Sales (communicated orally)	1 level <i>Twice per year</i>
Zinc Phosphate	Medium	Several TAs used as cover	Sales; customers <i>Monthly</i>	1 level <i>4 times per year, on average; also ad hoc meetings</i>

Notes:

¹ Source: Various European Commission decisions.

² Small = 0-5 members; Medium = 6-10 members; Large = more than 10 members

³ Trade association (TA) meetings are listed as “used as cover” when the cartel met either immediately before or after a legitimate TA meeting.

⁴ The EC concludes, however that the trade association’s “role as a handmaiden of the cartel is apparent” (Commission Decision of 21 October 1998, Case No IV/35.691/E-4– Pre-Insulated Pipe Cartel, §116).

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