The Pros and Cons of Information Sharing

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Preface

"The Pros and Cons of Information Sharing" is the fifth in the Swedish Competition Authority's Pros and Cons series. This volume collects the five papers that formed the base of an inspiring and well-attended conference, which was held in Stockholm on November 10. The authors presented their work and senior officials from competition authorities around the world acted as discussants. The lively debate and the many appreciative comments I heard at the conference is testimony of the high professional standard of the contributions and of their relevance for competition policy.

I would like to express my sincere gratitude to all contributing authors, to the discussants and to the chair of the conference, Amelia Fletcher, OFT. At the Swedish Competition Authority, our chief economist Mats Bergman has been the editor and Niklas Strand has managed the project; they both deserve due credit. Finally, many thanks to Maria Segerström and Fariba Gerayeli, who provided invaluable assistance in organizing the conference and in producing this conference volume.

Stockholm, November 2006

Claes Norgren

Director-General

Table of contents

The contributors

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Valerie Y. Suslow is Associate Professor of Business Economics and Public Policy at the Stephen M. Ross School of Business, University of Michigan. She received a Ph.D. in Economics from Stanford University in 1984 and a BA from the University of California at Berkeley in 1979. Professor Suslow was awarded a John Olin National Fellowship at the Hoover Institution at Stanford University, and has taught at INSEAD in France and the Politecnico di Milano in Italy. She is a senior editor at the *Antitrust Law Journal*. Her fields of research and teaching include applied microeconomics, industrial organization, and competition policy. Her published work includes papers on international cartels, both historical and modern, the impact of international cartels on developing countries, and pricing in oligopoly industries, including aluminum and pharmaceuticals. Professor Suslow has prepared background papers for the U.S. Department of Justice and the World Bank on competition policy issues, and she has consulted on several price-fixing investigations, both domestic and international.

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Econometric Society since 1992 and member of its Council since 2006. From 2001 to 2005 he was Professor of Economics and Finance and The Portuguese Council Chaired Professor of European Studies at INSEAD, and from 1991 to 2001, Director of the Institut d'Anàlisi Econòmica, CSIC. He has taught at Harvard University, Universitat Autònoma de Barcelona, Universitat Pompeu Fabra, the University of California at Berkeley, the University of Pennsylvania, and New York University (King Juan Carlos I Chair).

Professor Vives' fields of interest are industrial organization and regulation, the economics of information, and banking and financial economics. He has published in the main international journals and is the author of *Oligopoly Pricing: Old Ideas and New Tools* (MIT Press, 1999). He has been editor of main international academic journals and currently he is the Editor of the *Journal of the European Economic Association*, and Co-editor of the *Journal of Economics and Management Strategy*. His current research interests include dynamic games of complementarities, innovation and competition, banking crisis and regulation, information and financial markets, competition policy, and the location of headquarters. Dr. Vives has been a consultant on competition, regulation, and corporate governance issues for the World Bank, the Inter-American Development Bank, the European Commission as well as for major international corporations.

Peter Møllgaard is Professor of Law & Economics at, and Chairman of, the Department of Economics of the Copenhagen Business School, where he has been teaching economics since 1996. He received a Ph.D. in Economics from the European University Institute in Florence in 1993 and a M.Sc. in Economics from the University of Copenhagen in 1989. His fields of research and teaching include industrial organization, competition policy, regulation, and microeconomics. He has published papers on market manipulation, oligopolistic coordination, vertical restraints, joint ventures, market domination, competition policy and innovation, competition compliance, countervailing power, calculation of damages in cartel

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Dr Cristina Caffarra is an expert in the application of modern industrial economics to competition law, and in the empirical analysis of markets in the context of competition investigations. Before the EU Commission she has been advising on merger cases such as TotalFina/Elf, Air Liquide/BOC, GE/Honeywell, UP Kymmene/Norske Skog/Haindl, BP/E.ON, Tetra/Sidel, NewsCorp/ Telepiù, Continental/Phoenix, Telefonica/O2, Ineos/BP Dormagen and Inco/Falconbridge as well as in the appeal of EDP-ENI/GDP before the CFI. She has worked on numerous cartel investigations, and has been involved throughout the European Commission's investigation of Microsoft (on behalf of interveners such as Sun Microsystems and CCIA), including Microsoft's appeal before the Courts. She has also provided expert witness testimony to competition authorities of several member states, including the UK, Germany, Italy, Belgium, Ireland, Spain, Finland and Sweden and other jurisdictions such as South Africa.

Dr Caffarra joined CRA in June 2005, when CRA International acquired Lexecon Ltd. Prior to becoming part of CRA International, Lexecon Ltd was a leading specialist firm of economists expert in the application of economic analysis to competition and regulatory matters, and to commercial litigation. Dr Caffarra joined Lexecon Ltd in 1996, and became a Director in 1999, sharing her time between Brussels and London. She holds a first degree in Economics (honours) from Italy, and a D.Phil. (Ph.D.) in Economics from Oxford University. She has worked for research institutions both in Italy and at Oxford. She has written several articles for competition journals and presented paper on the economics of competition law at numerous conferences.

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1. Introduction

Mats Bergman

In order to make the right decisions, firms need information about costs, about demand conditions and, at least from the firms' point of view, about the actions that their rivals are planning. Good information will allow the firm to plan production and marketing activities, to invest in new capacity or in R&D and to price its products competitively. Similarly, consumers will be able to make rational choices if they are well informed about different products' prices and characteristics. On the other hand, detailed information about rivals' prices, production and sales can help stabilize cartels, by making it easier for the cartel members to monitor each other. Less obviously, increased market transparency in general can make the market more collusive, raising the overall price level rather than helping consumers to make good choices.

This conference volume focuses on arrangements set up by firms to share information between them. In this context, information sharing is most naturally defined as the sharing of such information that is normally regarded as confidential: production costs, detailed information about quantities sold, actual transaction prices (i.e., including individual discounts), planned future pricing, et cetera. In the normal course of business, firms will disseminate information about the characteristics of the products they sell and the prices of those products; this would normally not be considered as information sharing.

At the other extreme, if competitors secretively share information on intended future pricing and output, this comes very close to actually *making* anti-competitive agreements. Since cartel agreements are not enforceable in courts, they can in a certain sense be seen as information sharing about future intentions. However, to analyze

explicit anti-competitive agreements as information sharing is not likely to be very productive.

Instead, information sharing can be seen as a facilitating practice that enables the firms to engage in tacit or explicit collusion. As such, it can be contrary to Article 81 of the EC Treaty, even if there is no explicit cartel agreement. It could be seen as an illegal form of concerted practices or, possibly, as indirect evidence of a secret illegal agreement. The argument for the latter would be that firms would not voluntarily share confidential information unless they had already agreed to restrict competition between them.

Unless the information sharing involves the firms' intended future conduct (i.e., unless the sharing is of such a nature that it amounts to an explicit anti-competitive agreement), it should likely be analyzed as a violation of Article 81(1) because of its *effect*. That is, the competition authorities must, most likely, establish that the information sharing at least has the potential to limit competition. As always, the firms can respond by arguing, under Article 81(3), that the information sharing agreement should be exempted, because of its predominantly positive effects.

This means that, in most instances, the competition authorities must analyze the effects of an information sharing agreement. In turn, this underlines the importance of insights from the economic literature on the effects of information sharing, the main theme of this volume.

In the opening contribution, Richard Whish discusses EC legal practice on information sharing. Following existing practice, he stresses the importance of the structure of the concerned market, the nature of the information exchanged and whether the exchanged information becomes available to the public or not.

Information exchange in oligopolistic markets has been seen as more problematic than information exchange in markets with low concentration. If the information becomes available to the public (or the purchasers), this is likely to make the exchange less problematic. Similarly, aggregated information and old information is less problematic, while data on individual firms or individual

transactions is more problematic, in particular if the information concerns recent transactions.

Whish concludes by observing that the exchange of information can result in an infringement of Article 81, even where it is not part of a broader cartelization of the market. He observes, however, that careful analysis is required and that except in the case of the exchange of information about future prices, an effects analysis is required before an agreement can be condemned under Article 81. Even so, information sharing can result in fines, although at lower levels than what has been seen in hard core cartels.

Valerie Suslow and Margaret Levenstein, in the second contribution, focus on the role of information exchange in explicit cartels. They base their conclusion on a sample of 41 international cartels fined by the EU.

In the first part of the paper, Suslow and Levenstein categorize four purposes of information exchanges: to reduce strategic uncertainty, to influence the terms of the collusive agreement, to monitor the participating firms' compliance with the cartel agreement and to build trust among the conspirators. The first category involves the exchange of "cheap talk", i.e., non-verifiable and non-costly communication, with the intention of coordinating activities, in the mutual interest of the participating firms. Here, since the members' interests are aligned, they only have to achieve coordination. The second category involves verifiable and costly communication within the cartel, in order to, i.a., divide the profit between the members. In this case the members' interests are conflicting; hence they need to send costly signals, such as price wars or signals that reveal their cost structure. Monitoring, the third category, makes cheating on the cartel less likely, because more rapid discovery reduces revenues from cheating. Finally, trust-building adds a "psychological" cost of cheating on the cartel.

In the second part of the paper, theory is confronted with empirical observations. The authors find that in many cartels there is a hierarchy of communications. Top-level management meets infrequently and apparently mainly in order to build trust, to reduce

strategic uncertainty and to agree on how to divide the cartel profits. Lower-level staff meets more frequently, mainly for monitoring purposes. While the former meetings mainly rely on oral communication, e.g., about prices, the latter meetings often involve the exchange of verifiable written communication of sales quantity data. Sometimes third parties, such as trade associations, are used to verify the exchanged information. A main conclusion is that communication and exchange of information apparently is of great value for a group of firms that wants to collude, since otherwise cartels would not so consistently and so systematically pursue activities that expose them to high legal risks.

The third contribution, by Xavier Vives, discusses the theoretical insights from the economics literature on information sharing. The firms' incentives to exchange information, as well as the welfare effects, hinges critically on a number of factors: the type of competition (simply put, price competition or quantity competition), whether the information exchange mainly reduces uncertainty over cost or demand conditions, whether the uncertainty is over industry-wide or firm-specific phenomena and the industry's degree of concentration.

Since in some circumstances the firms will have unilateral incentives to exchange information, the observation that information is exchanged cannot be used as evidence of the existence of an illegal collusive agreement. Furthermore, since in some situations information sharing is welfare improving, a general prohibition would not be a good policy. On the other hand, there are certain situations in which information sharing is welfare reducing, even if it is not part of a collusive scheme and does not by itself facilitate collusion. In particular, in markets characterized by price competition, information sharing often has negative consequences.

In order to develop a policy towards information sharing, it is necessary to look also at the collusive risks. Briefly, information sharing can facilitate coordination within a cartel by enabling the colluding firms to *achieve* the collusive outcome. It can also help them

maintain the collusive equilibrium, by facilitating monitoring of the members' market activities.

Balancing the pros and cons of information sharing, Vives concludes that private communication among the participating firms about future plans as well as the exchange of individual data on prices and quantities carries high risks of collusion; exchange of individual data on demand and cost carries medium risks; while the exchange of aggregate data carries low risks. Consequently, the competition authorities should take a tough stance towards the exchange of individual price and quantity data and towards the exchange of non-public information on future prices and output. A more nuanced policy is warranted concerning the exchange of individual cost and demand data, since this is likely to be beneficial in markets with quantity competition, while the exchange of aggregated data is unlikely to be harmful. Finally, the degree of concentration within the industry should be factored in, since information exchange is less likely to have negative impacts in non-concentrated markets.

In the fourth contribution, Peter Møllgaard and Per Baltzer Overgaard focus on the role of transparency for effective competition – according to economic theory and as evidenced in a number of actual competition law cases on information exchanges and collusion. The theoretical literature that is surveyed suggests that improved information flows between oligopolists increases the scope for coordinated behaviour, because deviations from (tacit or explicit) collusive behaviour will be detected more quickly and with higher probability, and because uncertainty about rivals' future intention will be reduced.

However, flows of information that increase market transparency for consumers as well has ambiguous effects. Easier comparison of prices and product characteristics makes the consumers more sensitive to prices. On the one hand, this increases the temptation for each of the colluding firms to reduce prices, since this will increase sales substantially. On the other hand, with price sensitive consumers the firms will earn only small profits if they fail to collude

and this creates incentives for the firms to maintain collusion. In other words, the "punishment" for defecting from collusion will be severe.

An interesting example of the possible downside of increased transparency, that is discussed in the paper, is the decision by Danish authorities to mandate the publication of transaction prices in the concrete industry. Prior to the decision, large individual (but undisclosed) discounts were offered relative to list prices. After the decision, and contrary to expectations, average prices *increased* by up to 15-20 per cent.

Christina Caffarra and Kai-Uwe Kühn, in the final contribution, set out by suggesting that while private communication about planned future pricing should not be accepted, a more reasoned approach should be used vis-à-vis what they consider "information exchange": private communication about current market information or past actions in the market. In particular, they argue that a policy of prohibiting the sharing of *disaggregated* data simply because it is disaggregated is too simplistic.

They propose a four-step analysis for assessing information sharing. First, some types of information sharing should always be allowed, e.g., aggregated information and cost data. (I.e., they propose a "safe-haven" rule.) In the second step of the analysis, the authorities should be required to spell out a clear theory, tailored to the situation at hand, of how information sharing could facilitate collusion. In the third step, an assessment should be made of the extent to which the information exchange improves the firms' ability to monitor a hypothesised collusive agreement; what the authors call the marginal impact of the arrangement. In the fourth and final step, efficiencies that the information exchange gives rise to should be evaluated and weighed against the anti-competitive effects. In the final step, the burden of proof should lie on the firms, while in the previous steps it should rest on the authority.

In the second half of the paper, the proposed test is applied to a case brought by the Italian competition authority. The case concerns information sharing between the mother companies of JVs that are

active in the distribution of jet fuel at Italian airports. The JVs manage jet fuel logistics and deliveries on behalf of six large oil companies; each JV is the sole provider of these types of services at the airport where it is active. The JVs provided the oil companies with data revealing each firm's deliveries to each airline at a specific airport on a monthly basis. Although seemingly in conflict with principles established in previous cases, Caffarra and Kühn argue that because the oil companies competed for annual supply contracts with the airlines and because these contracts specified the *share* of an airline's demand that the oil company should provide, high-frequency data on *deliveries* under these contracts did not in any way facilitate monitoring of a putative collusive agreement.[1]

[1] The views presented in this chapter are the authors' views. Carlo Bardini, who was responsible for the case at the Italian Competition Authority, disputes that the chapter gives an accurate account of the factual circumstances. In particular, he argues that important circumstances have been disregarded, while he is also critical of some of the legal and economic reasoning. The Authority holds the view that Article 81 was violated. Its decision, available at www.agcm.it, has been appealed and the court's decision is expected early in 2007.

2. Information agreements*

Richard Whish

2.1 The arguments in favour of and against information agreements

Not infrequently competitors agree to exchange information with one another.[1] Such agreements can pose problems for competition authorities. Exchanges of information may be highly beneficial. Competitors cannot compete in a statistical vacuum: the more information they have about market conditions, the volume of demand, the level of capacity that exists in an industry and the investment plans of rivals, the easier it is for them to make rational and effective decisions on their production and marketing strategies. They may benefit by exchanging information on methods of accounting, stock control, bookkeeping or on the draftsmanship of standard-form contracts. Benchmarking, whereby firms measure their performance against the 'best practice' in their industry, may enable them to improve their efficiency.[2] Information may also be

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

[1] See generally O'Brien and Swann *Information Agreements, Competition and Efficiency* (1968); Evans *Trade Associations and the Exchange of Price and Non-price Information* [1989] Fordham Corp Law Institute (ed Hawk), pp. 709-746.

[2] See Henry *Benchmarking and Antitrust* (1993) 62 Antitrust Law Journal 483; on benchmarking and EC law, see Carle and Johnsson *Benchmarking and EC Competition Law* (1998) 19 ECLR 74; Boulter *Competition Risks in Benchmarking* (1999) 20 ECLR 434.

exchanged about new forms of technology and the results of research and development projects. By spreading technological know-how, information agreements can help to increase the number of firms capable of operating on the market.[3] Buyers too will benefit from an increase in information: the more they know about the products available and their prices, the easier it will be to make satisfactory choices. Indeed perfect competition is dependent on consumers having perfect information about the market: market transparency is, in general, to be encouraged.

Against this the dangers of information agreements have to be borne in mind. The essence of competition is that each producer should act independently on the market and not co-ordinate its behaviour with that of its rivals. If competitors agree to divulge to one another detailed information about their pricing policies, investment plans or research and development projects, it becomes easier for them to act in concert. Indeed in some circumstances it may be that the mere exchange of information will in itself be sufficient to eliminate normal competitive rivalry. The overriding principle is that certain forms of contact between competitors should be avoided. This was explained by the European Court of Justice ('the ECJ') in *Thyssen Stahl AG v Commission*[4], at paragraphs 82 and 83 of its judgment when it was discussing the nature of concerted practices under Article 81(1) EC:

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[3] See Teece *Information Sharing, Innovation and Antitrust* (1993), 62 Antitrust Law Journal 465.

[4] Case C 194/99 [2003] ECR I-10821. The ECJ's judgment on this point can be traced back to its 1975 judgment in Cases 40/73 *Suiker Unie v Commission* [1975] ECR 1663, [1976] 1 CMLR 295, §§173-174; §20 of the Commission's 2006 Information Note, *Issues raised in discussion with the carrier industry in relation to the forthcoming Commission guidelines on the application of competition rules to maritime transport services*, available at http://europa.eu/en, relies on the ECJ's judgment in *Suiker Unie*.

82 The criteria of coordination and cooperation necessary for determining the existence of a concerted practice, far from requiring an actual plan to have been worked out, are to be understood in the light of the concept inherent in the provisions of the EC and ECSC Treaties on competition, according to which each trader must determine independently the policy which he intends to adopt on the common market and the conditions which he intends to offer to his customers (see Case C-7/95 P *John Deere*, paragraph 86, and the case-law cited therein).

83 While it is true that this right of independence does not deprive traders of the right to adapt themselves intelligently to the existing or anticipated conduct of their competitors, *it does, however, strictly preclude any direct or indirect contact between such traders, the object or effect of which is to create conditions of competition which do not correspond to the normal condition of the market in question*, regard being had to the nature of the products or services offered, the size and number of the undertakings and the volume of the said market (Case 7-95 *John Deere*, paragraph 87, and the case-law cited therein)' (emphasis added).

The problem for competition law is to distinguish those exchanges of information which have a neutral or a beneficial effect upon efficiency from those which seriously threaten the competitive process by facilitating collusive behaviour.[5] The line between these situations may be a fine one and proper characterisation can be difficult; however it is important to devise administrable rules which businesses, professional advisers, competition authorities and courts

[5] See Kühn and Vives *Information Exchanges Among Firms and their Impact on Competition* (European Commission, June 1994, revised ed, February 1995).

can apply. It is useful also to bear in mind that, in some cases, the exchange of information is part of a broader plan to cartelise the market: it is not unusual to find cases where firms fix prices, share markets, allocate quotas and also exchange information in order to monitor the operation of the cartel and to ensure compliance with its rules. These are cases of *explicit* collusion, whereas in other cases the Commission may consider intervention under Article 81 even though there is no broader cartel, because the exchange of information may make it easier for the parties to align their behaviour without actually entering into an explicit agreement or concerted practice to rig the market. Here the danger is that the exchange of information will facilitate *tacit*, as opposed to *explicit*, collusion[6]. This chapter is predominantly concerned with the application of Article 81 to information agreements that are not part of an explicit cartel.

From a theoretical perspective it is possible to say a little more about the type of information agreements which could harm competition.

2.2 The relevance of the structure of the market

In the first place it is important to consider the structure of the market. It will be easier to restrict or distort competition in an oligopolistic market where the products are homogeneous. The greater the degree of product differentiation and the more atomistic the structure of competition, the more difficult and expensive it will be for firms to achieve collusions, whether of an explicit or a tacit kind. This suggests that information agreements should be considered in their economic context and that they should be particularly carefully scrutinised in oligopolistic markets, and that

[6] On this point see §18 of the Commission's 2006 *Information Note* (see note 4 above).

scarce enforcement resources would be most beneficially concentrated on such areas.

2.3 The nature of the information exchanged

Another important consideration is the type or quality of information which is imparted. Whilst it may be beneficial to firms in an industry to exchange statistical information of a general nature which enables them to build up an overall picture of the level of demand or output in it, or the average overhead costs of each competitor, it does not follow that they should be permitted to inform each other of matters such as pricing policies or research and development projects which in the normal course of things might be regarded as secret matters. Also the effect of an information agreement might be considered less serious where purchasers as well as sellers have access to the information in question. Furthermore a distinction may be drawn between pre-notification and post-notification agreements: in the former case, firms inform one another of their intended future conduct; this can obviously be more anti-competitive than in the latter case, where firms simply pass on information of action which has already been implemented. Where historic information is exchanged, it will be relevant to consider how recent it is: the older it is, the less impact it is likely to have on competition.

2.4 The means by which the information is exchanged

In practice information may be exchanged in a variety of different ways. The method chosen will depend on the needs of the industry. Parties may simply agree to exchange information with one another at periodic intervals. Alternatively this may be - and in practice often is - achieved through the medium of a trade association, whose duty

is to accumulate relevant information and disseminate it amongst its members.[7] Information may be transmitted to competitors through articles or notices in the press or trade journals. In principle however the method chosen to exchange information ought not to colour its analysis for the purpose of competition law. In each case the important question is whether the agreement might impair competition or enhance efficiency and the form the practice takes does not determine this issue.

2.5 'B2B' market places

A specific issue that has been of interest to competition authorities in recent years has been whether the establishment of business-to-business, more commonly known as 'B2B', electronic markets may give rise to competition law problems, and specifically whether they could facilitate collusion and/or foreclose access to the market. Clearly the competition authorities would not be happy if Internet chat rooms were to become the twenty-first century equivalent of the 'smoke-filled rooms' of the nineteenth and twentieth centuries. In a B2B market undertakings establish an electronic market place where it is possible, for example, to sell and purchase goods and services via the Internet. Typically electronic market places such as this may result in a considerable exchange of information, both between sellers and purchasers but also between competitors themselves, on both the selling and purchasing side of the market. Universal access to the Internet means that this information is instantly accessible to everyone involved in the electronic market. In the US, the Federal Trade Commission ('the FTC') held a public workshop on 29 and 30 June 2000 to consider whether B2B exchanges of information could

[7] See Bissocoli *Trade Associations and Information Exchange under US and EC Competition Law* (2000) 23(1) World Competition 29.

give rise to antitrust problems.[8] On 26 October it published a staff report[9] representing the views of the staff, though not necessarily of the Commissioners of the FTC. In this report, the potential of B2B marketplaces to generate efficiencies is noted, including the promotion of transparency in the market; however the possibility that they might facilitate collusion is also mentioned; other problems could be the exercise of buyer power and the possibility that B2Bs might operate in an exclusionary manner. The FTC closed its investigation of the Covisint B2B, established between a number of car manufactures in relation to the purchase of components[10], without taking any action against it.

In the UK, the Office of Fair Trading commissioned a study on E-commerce which considered some of these issues and which was published in August 2000[11]; the study noted that internet technology could potentially offer an 'ideal micro-climate for collusion, due to increased communication and transparency in the market'.[12] It also contained a table of the existing B2B e-markets, demonstrating how rapidly this particular form of business behaviour has grown.

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[8] See *Entering the 21st Century: Competition Policy in the World of B2B Electronic Market Places*, this can be accessed on the FTC's website at http://www.ftc.gov/bc/b2b/index.htm; this was followed by a second workshop on 7 and 8 May 2001 *Emerging Issues for Competition Policy in the World of E-commerce*, accessible at http://www.ftc.gov/opp/ecommerce/; see further Baker *Identifying Horizontal Price Fixing in the Electronic Marketplace* (1996) *65* Antitrust Law Journal 41; Stroux *B2B E-market-places: The Emerging Competition Law Issues* (2001) 24 World Competition 125.

[9] Available at http://www.ftc.gOv/os/2000/10/index.htm#26.

[10] See http://www.ftc.gov/os/2000/09/covisintchrysler.htm; Covisint was also approved by the European Commission in July 2001.

[11] OFT Economic Discussion Paper 1 (OFT 308) *E-commerce and its implications for competition policy* (Frontier Economics Group, August 2000); see also OFT Economic Discussion Paper 3 (OFT 377) *Innovation and Competition Policy* (Charles River Associates, 2002), §§6.47-6.53.

[12] OFT 377, §6.54.

2.6 Information agreements under US law

In the US the application of section 1 of the Sherman Act 1890 to information agreements has produced some anomalous decisions. In *American Column and Lumber Co v United States*[13] the Supreme Court ruled that an agreement to exchange price information in an atomistic market where conditions for collusion were unpropitious infringed the Act whilst in *Maple Flooring Manufacturers' Association v United States*[14] it reached the opposite conclusion where the market was oligopolistic and the opportunity for price fixing much greater. It would seem that these cases are classic examples of the problems which can be caused where courts fail to analyse competition cases in their economic context. More recently the Supreme Court's decisions seem to have involved a greater sensitivity to the economic issues raised by information agreements, even if its actual decisions on the facts can be criticised.[15] The present position would appear to be that there is no *per se* rule against the exchange of information; rather, a rule-of-reason standard is applied, albeit that information agreements are presumptively illegal where the market is oligopolistic.[16]

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[13] 257 US 377 (1921).

[14] 268 US 563 (1925); see Posner *Antitrust Law* (University of Chicago Press, 2nd ed, 2001), pp. 161-167 for a critique of these two cases.

[15] See *United States v Container Corpn of America* 393 US 333 (1969); *United States v Citizens Southern National Bank* 422 US 86 (1975); and *United States v United States Gypsum Co* 438 US 422 (1978).

[16] On current US law see the Department of Justice and Federal Trade Commission *Antitrust Guidelines for Collaborations Among Competitors* (April 2000, reprinted in 4 Fed Reg Rep (CCH) 13,160, also available at http://www.usdoj.gov/atr/public/guidelines/jointindex.htm); Scherer and Ross *Industrial Market Structure and Economic Performance* (Houghton Mifflin, 3rd ed, 1990), pp. 347-352; *Bissocoli* (n 339 above) pp. 84-91; De Santi and Nagata *Competitor Communications: Facilitating Practices or Invitations to Collude?* (1994) 63 Antitrust Law Journal 93.

2.7 Article 81(1)

The European Commission has accepted that information agreements may have beneficial consequences and has attempted to indicate the point at which an agreement will begin to come within Article 81(1). In its 1968 *Notice on Cooperation Agreements*[17] it described various types of agreement which could be regarded as beneficial and unlikely to infringe Article 81(1). Amongst the list were agreements whose sole object was an exchange of opinion or experience, joint market research, the joint carrying out of comparative studies of enterprises or industries and the joint preparation of statistics and calculation models. Clearly these agreements involve the exchange of information, but the Commission considered they were not objectionable if they simply enabled firms to determine their future marketing behaviour freely. However it did warn that it would watch to ensure that an agreement does not lead to a restraint of competition and it specifically remarked that competition could be restrained by exchanges of information on an oligopolistic market for homogeneous products. The Commission stressed this in its decision in *UK Agricultural Tractor Registration Exchange.*[18] The 1968 Notice is no longer in force, having been replaced by the Commission's *Guidelines on Horizontal Cooperation Agreement*[19]*;* these Guidelines do

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[17] JO [1968] C 75/3, [1968] CMLR D5.

[18] See *UK Agricultural Tractor Registration Exchange* OJ [1992] L 68/19, [1993] 4 CMLR 358, §§37 and 38, upheld on appeal to the CFI in Cases T-34 and T-35/92 *Fiatagri UK Ltd v Commission* [1994] ECR II-905 and 957 and further on appeal to the ECJ in Cases C-7/95 and C-8/95 P *John Deere v Commission* [1998] ECR I-3111 and 3175, [1998] 5 CMLR 311; on the Commission's decision in this case, see Lenares *Economic Foundations of EU Legislation on Information Sharing Among Firms* (1997) 18 ECLR *66.*

[19] OJ [2001] C 3/2, [2001] 4 CMLR 819, §8.

not deal with information agreements[20], but they do not say anything to cast doubt on the views expressed in the earlier Notice.

In a series of decisions the Commission has objected to information agreements which it considered might restrict competition. Many of the decisions in which the Commission has considered the exchange of information have been prompted by other infringements or suspected infringements of Article 81; for example, in *Wood Pulp*[21] the Commission was concerned about concerted practices to fix prices in that industry (on appeal its decision was substantially annulled)[22], whilst in *UK Agricultural Tractor Registration Exchange*[23] the Commission's action followed allegations of interference with parallel imports of tractors into the UK: subsequently in *Ford Agricultural*[24] Ford was found to have infringed Article 81(1) by doing so. In *Building and Construction Industry in the Netherlands*[25] the Commission condemned the exchange of information which supported the anti-competitive tendering arrangements in that industry.

From the Commission's decisions, the appeals in the *Tractors* case and its *Information Note* published in September 2006 on the Commission's proposal to produce guidelines on information agreements in the maritime transport sector[26], the following picture of the application of Article 81(1) to such agreements emerges.

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[20] [2001] 4 CMLR 819, §10.

[21] OJ [1985] L 85/1, [1985] 3 CMLR 474.

[22] Cases C-89/8 etc *A Ahlström Oy v Commission* [1993] ECR 1-1307, [1993] 4 CMLR 407.

[23] OJ [1992] L 68/19, [1993] 4 CMLR 358.

[24] OJ [1993] L 20/1, [1993] 5 CMLR 135.

[25] OJ [1992] L 92/1 [1993] 5 CMLR 135, §§98-99, upheld on appeal Case T-29/92 *SPO v Commission* [1995] ECR 11-289.

[26] See Commission Press Release IP/06/1283, 29 September 2006, and the *Information Note* referred to in note 4 above.

2.7.1 Agreement to exchange information

To infringe Article 81(1), undertakings must have agreed to exchange information. It is not sufficient simply that they are able to obtain information about each other's behaviour, for example through the press or by discussions with customers; this in itself does not involve the necessary ingredient of an agreement. Where a third party, acting independently, collects, compiles and supplies information to customers, Article 81(1) would not be infringed. In *Wood Pulp*[27] the ECJ ruled that the fact that pulp producers announced price rises to users before those rises came into effect was not, in itself, sufficient to constitute an infringement of Article 81(l).[28] On the other hand, exchanges of information which were not obligatory in a contractual sense could amount to a 'gentleman's agreement' or a concerted practice and so be caught by Article 81(1) where they have the effect of restricting or distorting competition.[29]

2.7.2 Market structure

The Commission will investigate the structure of the market in which the information agreement is operable: the more concentrated the market is, the more likely the Commission is to hold that competition is being restricted. For example, in both *International Energy Program*[30] and *Non-ferrous Semi-manufacturers*[31] it specifically referred to the oligopolistic structure of the markets in question. In *UK*

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[27] Cases C-89/85 etc *A Ablström Oy v Commission* [1993] ECR 1-1307, [1993] 4 CMLR 407.

[28] [1993] ECR 1-1307, [1993] 4 CMLR 407, §§59-65.

[29] See eg *IFTRA Free Trade Rules on Glass* OJ [1974] L 160/1, [1974] 2 CMLR D50: the Commission concluded that the exchanges of information that took place were an integral part of the participants' intention to protect national markets.

[30] OJ [1983] L 376/30, [1984] 2 CMLR 186.

[31] Commission's Vth *Report on Competition Policy* (1975), point 39.

Agricultural Tractor Registration Exchange[32] the Commission condemned an information exchange system, placing considerable emphasis on the fact that the UK tractor market was oligopolistic: in particular it took into account that four firms on the UK market had a combined market share of approximately 80% and that in some geographical areas the concentration was higher; that barriers to entry were high, especially as extensive distribution and servicing networks were necessary; that the market was stagnant or in decline and there was considerable brand loyalty; and that there was an absence of significant imports.[33] The Commission seems to have considered that the exchange of detailed information about retail sales and market shares broken down by product, territory and time periods was a *per se* infringement in an oligopolistic market, that is to say that the agreement had the *object* of restricting competition.[34] However it is questionable whether this analysis is correct in relation to agreements to exchange information (except perhaps information about future prices), and the Commission published a Press Release after the decision in *Tractors* in which it said that the same result would not necessarily arise in the car market, which is much more competitive.[35] The question of whether information agreements restrict competition *by object* is discussed further below[36].

In its decision in *Wirtschaftsvereinigung Stahl*[37], condemning an information agreement under Article *65* ECSC, the Commission stressed at paragraphs 39 and 44 to 46 of its decision that the market in question was concentrated and had high barriers to entry. In

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[32] OJ [1992] L 68/19, [1993] 4 CMLR 358.

[33] OJ [1992] L 68/19, [1993] 4 CMLR 358, §35.

[34] OJ [1992] L 68/19, [1993] 4 CMLR 358, §§37-43.

[35] Commission Press Release IP/92/148, 4 March 1992.

[36] See §2.7.7 below.

[37] OJ [1998] L 1/10, [1998] 4 CMLR 450; this decision was annulled on appeal Case T-16/98 *Wirtschaftsvereinigung Stahl v Commission* [2000] ECR II-1217, [2001] 5 CMLR 310.

Eudim[38] the Commission was more relaxed about the exchange of information between wholesalers of plumbing, heating and sanitary materials. The information related both to the purchasing and the selling activities of members of the association; even though some of the information was of a kind that would normally be regarded as confidential, the Commission had no concern at all about the purchasing side of the market, which was highly competitive, and considered that, since there was no oligopoly on the selling side, there could be no appreciable effect on competition.

The Commission's *Information Note* of September 2006 states, at paragraph 21, that one of the issues that it focuses on in deciding whether an information agreement could be harmful to competition is the structural characteristics of the market on which the exchange takes place.

2.7.3 Type of information exchanged

In *Re VNP and COBELPA*[39] the Commission said that, whilst it was permissible to exchange general statistical information which could give a picture of aggregate sales and output in an industry without identifying individual companies, it would be contrary to Article 81(1) for firms to provide competitors with detailed information about matters which would normally be regarded as confidential.[40] It also suggested in this decision that Article 81(1) would more likely be infringed where the information exchanged was concealed from customers.[41] In *UK Agricultural Tractor Registration Exchange*[42] the

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[38] OJ [1996] C 111/8, [1996] 4 CMLR 871.

[39] OJ [1977] L 242/10, [1977] 2 CMLR D28.

[40] This formula has been repeated on subsequent occasions: see eg *Re Italian Cast Glass* OJ [1980] L 383/19, [1982] 2 CMLR 61.

[41] See similarly *Genuine Vegetable Parchment Association* OJ [1978] L 70/54, [1978] 1 CMLR 534.

Commission was influenced in its adverse view of the information exchange by the fact that participants in the system had kept the information confidential amongst themselves; when this decision was upheld by the ECJ, it noted that the information exchanged was not available to purchasers, but only to the parties to the agreement.[43] This shows that where the availability of the information is asymmetric, there is more likely to be an infringement of Article 81(1): the private enhancement of market transparency between competitors gives cause for concern whereas improved public transparency may not.

The critical question therefore is to decide what type of information the Commission considers would normally be regarded as confidential: at what point do firms cross the threshold from innocent exchanges to infringements of Article 81(1)? One would expect the Commission to object most strongly to agreements to exchange information about prices and it has done on various occasions.[44] However it has also objected to information agreements relating to other matters. In *Re Cimbel*[45] it condemned the obligation upon members of a trade association that they should inform each other of projected increases in industrial capacity: such an obligation could prevent one firm from gaining an advantage over competitors by expanding in time to meet an increase in demand. Similarly it condemned the obligation to inform rivals of investment plans in

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[42] OJ [1992] L 68/19, [1993] 4 CMLR 358.

[43] Cases C-7/95 P and C-8/95 P *John Deere v Commission* [1998] ECR 1-3111, [1998] 5 CMLR 311, §91.

[44] See eg *Ship's Cables* Bull EC 9-1975, point 2107; *IFTRA Fair Trade Rules on Glass* OJ [1974] L 160/1, [1974] 2 CMLR D50; *Dutch Sporting Cartridges* Bull EC 7-8/73, point 211; *Re Vimpoltu* OJ [1983] L 200/44, [1983] 3 CMLR 619; exchange of information by buyers could also be caught: *Belgian Industrial Timber* Bull 10-75, point 2104, [1976] 1 CMLR Dll.

[45] OJ [1972] L 303/24, [1973] CMLR D167.

Zinc Producer Group.[46] It has condemned exchanges of information which specifically identify the output and sales figures of individual firms[47] and which might have the effect of rigidifying the operation of a distribution system, particularly if it might facilitate the partitioning of the market.[48] In 1999 the Commission closed its files in relation to a number of cases involving the exchange of information between manufacturers of tractors and agricultural machinery and their trade associations, in the aftermath of its *Tractors* decision[49], after it had ensured that individual data would not be exchanged earlier than one year after the event to which it pertained and that aggregated data would not be exchanged if it could be used to identify individual information about the position of undertakings.[50] In *EATA*[51] the Commission objected to the exchange of information as to capacity, percentage utilisation and forecast capacity in the maritime transport sector, noting, specifically, that the information was not aggregated but clearly stated to which party it related.[52]

In *Steel Beams*[53] the Commission found an information exchange on orders and deliveries of beams by individual companies in each

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[46] OJ [1984] L 220/27, [1985] 2 CMLR 108.

[47] See *Associated Lead Manufacturers* OJ [1979] L 21/16, [1979] 1 CMLR 464; *Atka A/S v BP Kemi A/S* OJ [1979] L 286/32, [1979] 3 CMLR 684; *Benelux Flat Glass* OJ [1984] L 212/13, [1985] 2 CMLR 350; *UK Agricultural Tractor Registration Exchange* OJ [1992] L 68/19, [1993] 4 CMLR 358.

[48] *Camera Care Ltd v Victor Hasselblad* OJ [1982] L 161/18, [1982] 2 CMLR 233; *UK Agricultural Tractor Registration Exchange* OJ [1992] L 68/19, [1993] 4 CMLR 358, §§53-56.

[49] OJ [1992] L 68/19, [1993] 4 CMLR 358.

[50] See the Commission's XXIXth *Report on Competition Policy* (1999), pp. 156-157.

[51] OJ [1999] L 193/23, [1999] 5 CMLR 1380.

[52] OJ [1999] L 193/23, [1999] 5 CMLR 1380, §§153-155.

[53] OJ [1994] L 116/1, [1994] 5 CMLR 353, §§263-272.

Member State to go 'beyond what is admissible'[54], since the figures exchanged showed the deliveries and orders received by each individual company for delivery to their respective markets; this information was updated every week and circulated rapidly among the participants. The Commission added that the exchange was not limited to figures 'of a merely historical value with no possible impact on competition'.[55] The Court of First Instance ('the CFI') confirmed the Commission's assessment, since the exchange of confidential information undermined the principle that every trader must determine its market strategy independently[56]; on appeal the ECJ upheld the judgment of the CFI[57]. In *Wirtschaftsvereingung Stahl*[58] the Commission decided that an exchange of information on deliveries and market shares in relation to various products infringed Article 65(1) ECSC; on appeal the CFI annulled this decision because the Commission had erred in its findings of fact.[59] In *CEPI/Cartonboard*[60] the Commission indicated its intention to approve an information exchange agreement once it had been amended so that only historical, aggregated data would be involved.

The Commission's *Information Note* of September 2006[61] states that the Commission looks at the characteristics of the information exchanged when determining the application of Article 81, including the nature and type of information exchanged, the level of aggregation of the information and the period to which the

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[54] OJ [1994] L 116/1, [1994] 5 CMLR 353, §267.

[55] OJ [1994] L 116/1, [1994] 5 CMLR 353, §268.

[56] Cases T-141/94 etc *Thyssen Stahl AG v Commission* [1999] ECR 11-347, [1999] 4 CMLR 810, §§385-412.

[57] Case C-194/99 P [2003] ECR I-10821.

[58] OJ [1998] L 1/10, [1998] 4 CMLR 450.

[59] Case T-16/98 *Wirtschaftsvereinigung Stahl v Commission* [2001] ECR 11-12217, [2001] 5 CMLR 310.

[60] OJ [1996] C 310/3, [1996] 5 CMLR 725.

[61] See note 4 above.

information relates, the frequency of exchange and the delay of release of the data.

2.7.4 Alternative sources of information

The fact that information might be obtainable from other sources was considered by the Commission in two decisions not to diminish the unlawfulness of an agreement between competitors to exchange information;[62] however it is not clear whether the Commission would appear to the same viewpoint today.

2.7.5 Mode of exchanging information

The Commission has been equally prepared to condemn information agreements operated through the medium of trade associations as straight contractual arrangements. For example in *Re Italian Cast Glass*[63] manufacturers provided information to FIDES, a trust company whose function was to monitor the operation of a quota scheme. The Commission in this case fined both the producers and FIDES. In *UK Agricultural Tractor Registration Exchange*[64] the information was exchanged through the Agricultural Engineers Association.

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[62] *VNP/COBELPA* OJ [1977] L 242/10, [1977] 2 CMLR D28; *Genuine Vegetable Parchment Association* OJ [1978] L 70/54, [1978] 1 CMLR 534.

[63] OJ [1982] L 383/19, [1982] 2 CMLR 61.

[64] OJ [1992] L 68/19, [1993] 4 CMLR 358.

2.7.6 B2B markets[65]

The Commission has yet to adopt a formal decision on a B2B case under Article 81. However it has sent comfort letters in several cases. The first example occurred in the case of *Covisint*[66]*;* several more were sent towards the end of 2001 and in the first half of 2002.[67] Many other cases have been dealt with under the EC Merger Regulation rather than Article 81.[68] The Commission's approach has been benign: however, certain guidelines should be followed when establishing B2Bs. First, it is important that B2Bs do not allow the exchange of information of the kind discussed above, since that could facilitate collusive behaviour; second, if necessary 'firewalls' should be established to ensure against such an anticompetitive exchange; thirdly, joint purchasing or commercialisation within a B2B should accord with the general principles set out by the Commission in its Horizontal Cooperation Guidelines[69]; fourthly, the Commission may not accept rules that require *exclusive* use of a particular B2B; and fifthly the Commission is likely to require that

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[65] See Vollebregt 'E-Hubs, Syndication and Competition Concerns' (2000) 21 ECLR 437; Lancefield 'The Regulatory Hurdles Ahead in B2B' (2001) 22 ECLR 9.

[66] Commission Press Release IP/01/1155, 31 July 2001.

[67] See *Eutilia and Endorsia* Commission Press Release IP/01/1775, 10 December 2001; *Eurex* Commission Press Release IP/02/4, 3 January 2002; *Inreon* Commission Press Release IP/02/ 761, 24 May 2002; *Multi-bank trading platform* Commission Press Release IP/02/943, 27 June 2002; *Ondeo and Thames Water* Commission Press Release IP/02/956, 28 June 2002.

[68] See eg Case No M.1969 *UTC/Honeywell/i2/MyAircraft.com*; Case No M.2075 *Jupiter/ M&G/Scudder/JV*.

[69] OJ [2001] C 3/2, [2001] 4 CMLR 819.

open, non-discriminatory access to the B2B is available to all interested buyers and sellers.[70]

2.7.7 'Object' or 'effect'?

An important practical question is whether agreements to exchange information can ever be characterised as having as their object the restriction of competition, or whether they can infringe Article 81 only where an anti-competitive effect can be demonstrated. As is well-known, Article 81(1) applies to agreements that have as their 'object or effect the prevention, restriction or distortion of competition …'. The ECJ established as long ago as 1966, in *STM v Maschinenbau Ulm*[71], that, where an agreement has as its object the restriction of competition, there is no need for the Commission (or a plaintiff in a national court) to also demonstrate an anti-competitive effect. Over the years the ECJ (and the CFI) have developed the case-law, with the result that it is now fairly clear that certain types of agreement, for example horizontal price fixing and market sharing, are to be regarded as having as their object the restriction of competition. This of course alleviates the burden on the Commission which, otherwise, would be required in each case to carry out a lengthy effects analysis.

The question arises as to whether information agreements fall into the 'object' box, or whether they require effects analysis. It would appear to be the case that exchanges of information about future prices will be considered to restrict competition by object. For example it has been established that mere attendance at meetings where a competitor discloses its pricing plans to other firms is presumptively caught by Article 81, even in the absence of an explicit

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[70] For a helpful summary of the Commission's practice, see Lucking *B2B e-marketplaces and EC competition law: where do we stand?*, Competition Policy Newsletter, October 2001, p. l4.

[71] 1966] ECR 235, [1966] CMLR 357.

agreement to raise prices[72]. Similarly in the UK the Competition Appeal Tribunal has held that, where participants in a competitive tender for construction contracts inform one another as to how they intend to respond, they are party to a concerted practice to fix prices[73]. In these cases the exchange of information is indistinguishable from explicit collusion. However in other cases it seems much more appropriate that effects analysis should be carried out. As the discussion at the start of this chapter demonstrated, it is by no means easy to determine when the exchange of information is pro- or anti-competitive, and where doubts of this kind exist, effects analysis, in principle, is called for. The suggestion of a 'per se', or 'object' approach, suggested in *Tractors*[74] ought not be given undue weight: indeed in its 2006 *Information Note*[75] the Commission stated, at paragraph 17, that:

> 'It is difficult to establish *general* rules to distinguish between information exchanges that are neutral or even pro-competitive from those that are restrictive of competition. To date the Commission has adopted a case by case approach assessing each case in relation to the features of the market(s) where the exchange takes place'.

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[72] See eg Cases T-42/68 etc. *Tate & Lyle v Commission* [2001] ECR II-2035, [2001] 5 CMLR 859, §§42-68.

[73] Case 1032/1/1/04 *Apex Asphalt and Paving Co Ltd v Office of Fair Trading* [2005] CAT 4, [2005] Comp AR 507.

[74] See §1.7.2 above.

[75] See note 4 above.

2.7.8 Exchange of information as evidence of a concerted practice

In *Wood Pulp*[76] the Commission had regarded the exchange of information, both direct and indirect through the press, as supporting evidence of a concerted practice to fix prices; according to this view, not only is it an offence to exchange information, but this fact may be taken to show a further, and more serious, infringement of Article 81. On appeal, however, the ECJ overturned the Commission's decision in this respect, concluding that the system of price announcements could be regarded as a rational response to the fact that both buyers and sellers needed information in advance in order to limit their commercial risks. The fact that price announcements were made at similar times could be regarded as a consequence of the natural degree of transparency of the market rather than an artificial transparency established by the pulp producers.[77] However, despite the fact that the Commission lost on this occasion, an unlawful exchange of price information could be taken as evidence of a concerted practice to fix prices in a clear case[78]; and the Commission has held that the exchange of firm-specific information - for example as to sales quantities - as an adjunct to a cartel is itself contrary to Article 81(1).[79]

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[76] OJ [1985] L 85/1, [1985] 3 CMLR 474.

[77] Cases C-89/85 etc *A Ählstrom Oy v Commission* [1993] ECR 1-1307, [1993] 4 CMLR 407.

[78] In *Wood Pulp* the ECJ considered that the fact that members of the US trade association, KEA, exchanged information on prices could be taken to mean they had also concerted on those prices: ibid, §§130-132.

[79] *Amino Acids* OJ [2001] L 154/24, [2001] 5 CMLR 322, §229.

2.7.9 Fines

In the Commission's early decisions on information agreements it refrained from imposing fines on the parties, even though they were held to have infringed Article 81(1), in view of the novelty of its application in this area. However in subsequent cases it made it clear that in appropriate cases it would not hesitate to punish undertakings which participate in anti-competitive information agreements. This turned to reality in *Fatty Acids*.[80] The Commission imposed a fine of EUR 50,000 on firms which entered into an agreement to exchange information which enabled each to identify the individual business of its two main rivals on a quarterly basis, thereby removing an important element of uncertainty on the part of each as to the activities of the others. This means that firms must be careful not to divulge information to competitors which could be considered confidential or sensitive, particularly in oligopolistic markets; it also means that if and when competitors do meet, for example at conferences or trade association meetings, they should studiously avoid exchanging such information. The Commission clearly intends to signal to firms that they will be at risk if they contact one another in any way in respect of sensitive business matters; it is important not artificially to increase the transparency of the market.

2.8 Article 81(3)

Under EC law the main question has revolved around the application of Article 81(1) to information agreements, and in *Re VNP and COBELPA*[81] the Commission indicated that an information agreement within Article 81(1) would be unlikely to be given an individual exemption. In *UK Agricultural Tractor Registration*

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[80] OJ [1985] L 3/17, [1989] 4 CMLR 445.

[81] OJ [1977] L 242/10, [1977] 2 CMLR D28.

Exchange[82] the Commission rejected the parties' request for an exemption in terse terms. However in exceptional circumstances an agreement may satisfy the criteria of Article 81(3) because of its beneficial effects. In *International Energy Program*[83] a programme was drawn up between 21 States belonging to the OECD. The purpose of the programme was to establish cooperation between States in the event of disruptions in the supply of oil. The participation of companies was an important element in this programme and they were required *inter alia* to supply important and normally secret information in the event of a disruption. The Commission granted an individual exemption: not surprisingly it felt that the strategic importance of maintaining supplies of oil outweighed the loss of competition occasioned by the exchange of information. In *EWIS* the Commission indicated that it intended to take a 'favourable decision' in respect of an agreement for the exchange of statistical data, stock levels, consumption, quarterly forecasts, usage capacity and other matters in the waste paper industry. The information was to be divulged confidentially to a central agency, which would then circulate it in an aggregated form. It is not clear whether, by taking a favourable decision, the Commission was indicating that the agreement fell outside Article 81(1) altogether or whether it considered it was worthy of individual exemption; the former seems more likely than the latter.[84]

2.9 Conclusion

The exchange of information can result in an infringement of Article 81, even where it is not part of a broader cartelization of the market. However the subject is by no means straightforward, and careful

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[82] OJ [1992] L 68/19, [1993] 4 CMLR 358.

[83] OJ [1983] L 376/30, [1984] 2 CMLR 186; see Brands *The International Energy Agency and the EC Competition Rules* [1984(1)] LIEI 49.

[84] OJ [1987] C 339/7.

analysis is required. For this reason it would seem that, except in the case of the exchange of information about future prices, an effects analysis is required before an agreement can be condemned under Article 81.

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

*Margaret C. Levenstein and Valerie Y. Suslow**

3.1 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.

3.2 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 communication, the message is backed up by distinctly non-verbal

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

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 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

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[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).

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

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[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.

[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.").

3.3 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. 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

[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.

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]

3.3.1 Hierarchy and Communication

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

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[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).

[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.

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 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

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[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.

> [.]%, 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 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

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

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

> 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]

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

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

[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.

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.

3.3.2 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 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

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

[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.

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. 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

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

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 [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

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[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.

[27] Id. §71.

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 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

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

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 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

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

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 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

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[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.

[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.").

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 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

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

[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.

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 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

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[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.

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

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 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

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

[43] Capobianco (2004), pp. 1264-1266.

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 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

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[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 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.

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.

3.4 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

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[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.

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 union[1]

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 Members[2]**	**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) *Monthly*	2 levels *2-3 times per year with intermittent contact in between meetings*

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 *4 meetings*
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 *Twice per year, with lowest-level communicating weekly or even daily*
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 *At least quarterly*	1 level, plus general assembly *At least twice per year*

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 *Monthly*	2 levels *Twice per year, with regular contact and frequent bilateral contacts*
Copper Tubes (industrial)	Small	TA originally formed to set quality standards, later used to form cartel	Sales, market shares; customer accounts	1 level *At least twice per year*
Copper Tubes (plumbing)	Medium	TA used as cover	Sales; orders; market shares; prices *Monthly*	2 levels *1-2 times per year, on average*
Fine Arts	Small		Customers; variety of other matters (auctions, vendors, dealers)	1 level *2-4 times per year*

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 *TA, 2-4 times per year; cartel also met outside TA several times per year; other regular bilateral contacts*
Graphite Electrodes	Medium	At least first cartel meeting, if not others, coincided with TA meeting	Prices; customers; sales *2-3 times per year*	2 levels *1-2 times per year, with frequent bilateral contacts and occasional local meetings (as frequently as once per month in one country)*
Graphite, Isostatic	Medium		Sales; customers; prices (sometimes, at bilateral meetings)	4 levels *Twice per year (varied by country)*

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 *2 times per year, on average; intermittent contacts from 2-3 times per week to 2-3 times per month*
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 *Trilateral and bilateral meetings held anywhere from 2-6 times per year*
Lysine	Medium	TA created to facilitate collusion	Sales *Monthly*	1 level *Planned to meet quarterly, but in practice met more frequently*

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 *Sales exchange was "regular"*	2 levels *Top level 1-2 times per year; operational level 3-4 times per year; bilateral meetings as well*
Methylglucamine	Small		Sales (by country); customers (oral, never systematic)	1 level *Once per year*
Monochloroacetic Acid (MCAA)	Small	AC Treuhand (formerly Fides) collected data and disseminated aggregate statistics. *Cartel members met with Treuhand representative twice per year.*	Sales; price; customers *Quarterly*	2 levels *Top level met 2-4 times per year; sales managers met on an ad hoc basis and also had telephone contact*
Nucleotides	Small		Sales; prices	1 level *Twice per year*

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 *Quarterly*	2 levels *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*
Paper, Carbonless	Large	TA meetings functioned as cartel meetings for 1 year; after that, used as cover	Sales; prices; customers	2 levels *5 times per year, on average, with ad hoc contacts in between*

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) *Aggregate data sent by Fides to participants, some of it monthly, some bi-annual, some annual*	2 levels *Annual general meeting, with lower level meetings 5-8 times per year*
Plasterboard	Small	TA used as cover	Sales (by country) *First annually, then every six months, then quarterly* *Part way through cartel duration, an "independent consultant" was brought in to monitor data exchange*	1 level *Meetings at irregular intervals, but other contact (phone, etc.) throughout*

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) *Regular exchange, at least twice per year.*	2 levels *Twice per year, with separate preparatory meetings by Japanese firms; also bilateral meetings and telephone contacts*
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) *Orders updated weekly; deliveries updated quarterly*	Multiple levels *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)*

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 *External auditor checked data*	2 levels *Early years: top level met quarterly and sales managers met 1-2 times per month* *Later years: top level met monthly and sales managers met with different frequencies in different countries*
Steel, Stainless	Medium	Firms met under auspices of European Coal and Steel Community, but went beyond what law allowed		1 level *1 initial meeting, followed by ad hoc contacts*
Raw Tobacco, Spain	Medium	Partly regulated industry; several TAs ("agricultural unions"); subset of TAs fined	Prices; quantities *Twice per year*	2 levels *Ad hoc (e.g., twice one quarter and 4 times another quarter)*

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) *Monthly* *(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)*	4 levels for A & E *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* Other vitamins, 2 levels *Normally met quarterly*
Vitamin B4 (Choline Chloride)	Medium	TA used as cover	Sales; prices; customers (by country); exports (on occasion)	2 geographic levels (global and European) *Global met every six months; European met every 3 months (with phone calls every one to two weeks)*

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

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 associations "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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4. Information sharing: economics and antitrust

Xavier Vives[*]

4.1 Introduction

A classic Industrial Organization textbook stated more than 25 years ago that:

> "The law on trade association price and cost reporting activities is one of the most subtle (and some add the most confused) branches of antitrust doctrine" (Scherer (1980, p. 522)).

Most likely this statement is still true today. The origin of the problem can be traced to some contradictory decisions of US Courts (American Column (1921), Linseed Oil (1923), Maple Flooring (1928), First Cement (1925)). The present position seems to be that to exchange information is not illegal per se and that it should be challenged only if it helps to reach agreements on prices or to restrict competition. During the 1920's and 1930's the attempts to form cartels using trade associations to monitor the agreements ended up in the late 1930's and early 1940's with consent decrees which established the rules that guide the statistical programs of the trade associations. Nowadays, a tough line is followed on information

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exchanges about current prices in oligopolistic markets.[1] In general, antitrust authorities, including the European Commission, look with suspicion information exchanges of individual firms' data, prices and quantities in particular, because it may help monitoring deviations from collusive agreements.

Information sharing among firms has received substantial attention from the economics literature. Firms may exchange information about current and past behavior, such as customer transaction data as well as cost and demand conditions. This type of information exchange typically involves verifiable information. Firms may also exchange information about intended future conduct, such as future prices or production, new products or capacity developments. This typically involves soft information. Since firms may have incentives to share information for efficiency or collusive reasons, the welfare impact of information sharing practices is in general ambiguous.

In this paper I will survey the incentives to share information and the welfare consequences in static (non-collusive) models in Section 4.2; the analysis of the collusive potential of information exchange in Section 4.3; the impact of information technology on transparency and unilateral and coordinated exercise of market power, and I will conclude with some competition policy implications.[2]

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[1] Case US v. Container Corporation of America.

[2] I will draw on my previous work on the topic (see Vives (1984), Vives (1990), Kihlstrom and Vives (1992), Kühn and Vives (1995), Sections 8.3, 8.4 and 9.1.5 in Vives (1999), Vives (2002) and Vives (2006)).

4.2 The incentives of firms to share information and the welfare implications in static (non-collusive) models

Firms may exchange cost or demand information trying to adapt their output and pricing decisions to uncertainty. For example, they may exchange cost information with benchmarking procedures, trying to attain the best practice in the industry. The incentive to share information for a firm is the increased precision of information obtained, from the pooled information of rivals, about common value uncertain payoff relevant parameters. However, rivals will also get more precise information and strategies will be affected. The final result is that, in general, the increased precision has a positive effect on a firm's expected profits, while the profit impact of increased precision of rivals, together with the correlation of strategies which follows, depends on the nature of competition and shocks.

Whenever there is a mechanism to share information truthfully, like a trade association, the equilibrium incentives to share information work out so that depending on the type of uncertainty (private value or firm specific shock versus common value or industry wide shock) or nature of competition (strategic substitutes versus strategic complements) [3], to unilaterally share information or not is a dominant strategy. The result is that, with the exception of Bertrand competition with cost uncertainty, to reveal information

[3] Competition is of the strategic complements (substitutes) type if the marginal profitability of any action of a firm is increasing (decreasing) in the actions of rivals. This implies that best response functions of firms are upward (downward) sloping. This is typically the case in Bertrand (Cournot) competition with differentiated products. (See Chapters 2, 4 and 5 in Vives (1999).)

unilaterally is a dominant strategy with either private values[4] or common values with strategic complements. With common value and strategic substitutes, not revealing is a dominant strategy. (See section 8.3 in Vives (1999)). If firms are able to enter into industry-wide agreements, firms want to share information if pooling increases expected profits. There is a large range of circumstances where pooling does raise profits (exceptions are Bertrand competition under cost uncertainty and common value and strategic substitutes competition (e.g. Cournot rivalry with substitutes) with a low degree of product differentiation or slowly rising marginal costs). The implication of the results in the literature is that information sharing cannot be taken as prima facie evidence of collusion since it often raises profits under one-shot market interaction.

When there is neither a trade association, nor a dynamic reputation to provide a credible mechanism to share information truthfully, then incentives to share depend on whether information is verifiable or not. If information is not verifiable (e.g. soft information) then typically information revelation is not possible because all firms would like to be perceived as being of the most favorable type (e.g. low cost in Cournot competition). If information is verifiable then information unravels as "good" types reveal their information while "bad" types are uncovered even if they try to hide. The practical implication for competition policy is that allowing verification mechanism fosters information sharing. However, if information is verifiable but whether the firm is informed is not, then the unraveling result need not hold, and firms can selectively disclose acquired information (Vives (2006)).

Information could also be shared through costly signaling – like wasteful advertising - or with dynamic competition in which production levels are observable or via exchange of sales reports.

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[4] More specifically, when each firm receives a perfect signal about its payoff-relevant parameter, which may be potentially correlated with those of rivals.

The welfare analysis of information sharing is complex. The impact on consumer surplus and total surplus depends on the type of competition (strategic substitutes or complements) and uncertainty (private or common value, cost or demand) as well as on the number of firms. Three main effects are at play. The first effect is an output adjustment to information. Pooling information allows firms to better adjust to demand and costs shocks. This will tend to improve welfare except if the firm is a price setter with market power. In that case, more information about an uncertain demand will give the firm greater scope to extract consumer surplus – just as in the case of a monopolist. Under cost uncertainty more information may soften price competition. The second effect of information sharing is to induce output uniformity across varieties. This effect is positive given the existence of consumer preference for variety. In monopolistic competition information sharing tends to make the outputs of varieties more similar with common value uncertainty and less so with private value uncertainty. The output adjustment effect tends to dominate and with monopolistic competition and demand uncertainty information sharing increases (decreases) expected total surplus under Cournot (Bertrand) competition (Vives (1990)). Finally, a third effect of information sharing is the selection among firms of different efficiencies, transferring production towards more efficient firms. The practice of benchmarking and incentive schemes based on relative performance is related to this effect.

There are potentially large efficiency benefits from information exchange. For example, the production rationalization effect of cost information exchange under Cournot competition can be very large, and is of a larger order of magnitude than the market power effect except for very concentrated markets (Vives (2002)). This effect is larger the larger the degree of uncertainty (and ex post differences in efficiency levels). This means that in markets where concentration is not very large the policy towards information sharing may have a much larger welfare impact than classical antitrust curbing of market power.

In summary, information sharing cannot be taken as prima facie evidence of collusion, since firms may have unilateral incentives to share information and there is a range of situations where the exchange is welfare improving. However, there is another range of situations where information sharing, with no attempt to support collusion, is welfare reducing. The welfare impact depends on a range of factors but tends to be positive with Cournot/quantity competition and negative with Bertrand/price competition (the latter with the exception of cost uncertainty with common value). When there is no collusion concern therefore, competition policy should in general be lenient with information sharing under Cournot competition and tough under Bertrand competition. It must be noted that to distinguish markets characterized by quantity or price competition is not easy but not impossible.[5] An indirect way to allow information sharing is to facilitate the verification of information with benchmarking or the formation of trade associations which can audit and check the information reported by their members.

4.3 Information exchange and collusion

Information sharing can constitute a facilitating practice to help collusion. For collusion to be sustainable, firms must coordinate and agree on what cooperative outcome above the competitive level (or

[5] For example, in the Airtours case both the Commission and the ECJ concluded that competition was mainly in terms of capacities (Cournot). In some instances the type of competition may depend on the horizon contemplated. In the short run, for given capacities of production, competition may be best described in prices, while in the long run, when capacities are adjustable, may be best described in quantities. For example, competition among gas stations in a small town in the short run, for given locations and capacities of the stations, will be in price with spatial differentiation. In the long run, when new stations can be opened or new entrants can enter, competition may be best described in capacities/locations.

Nash equilibrium of one-shot interaction) to implement and what mechanism to use to avoid defections. Furthermore, once the mechanism is in place it must pay for firms to abide by the mechanism. Here monitoring of actions of the firms trying to collude is crucial for the threat of retaliation in case of deviation to be effective. Information sharing may help firms solve the coordination and monitoring problems. In any case, the collusive concern is more acute with a few players because the critical discount factor above which collusion is possible typically increases with the number of firms in the market.

A main challenge for antitrust authorities, as emphasized by Kühn and Vives (1995), is that inferring collusion from market data is difficult even when sufficient data is available. Indeed, quantitative studies have been shown to be quite sensitive to the specification of the empirical model.[6] The implication is that competition authorities have relied on a "parallelism plus" doctrine to show collusion. This means in practice that to infer collusion market evidence has to be supplemented by hard evidence on facilitating practices. Communication among firms, which is typically traceable in records or meetings, may provide such evidence.

Communication about future conduct may help solve the coordination problem. This communication is typically soft information about planned prices, production, new products or capacity expansion and can be explicit or implicit with signals. The information communicated is not verifiable and is basically cheap talk. Despite this it may help solve coordination problem by reducing strategic uncertainty. For example, in experiments with repeated games communication tends to move prices towards collusive outcomes. To be sure sharing of plans could also be an indirect way to share information about demand or costs. It has been claimed, for example, that the role of the publication of production plans in the US automobile market is to reveal demand information

[6] A typical example is provided by the different conclusions arrived at by Porter (1983) and Ellison (1994) on the railroad cartel in the 1880s in the US.

(Doyle and Snyder (1999)). However, since there are other ways to share directly information about demand it should be explained why this indirect way is used.

The ATP (Airline Tariff Publishing) case provides a good example of sharing of price announcements with electronic databases. This refers to a joint venture of all US airlines to collect and store data prices quoted on computer reservation systems. A practice of price posting with no commitment value for customers (a price pre-announcement with first ticketing date) was discontinued by consent decree (running up to 2004). Furthermore, "footnote designators" were simplified so that they could not be used to signal coordinated pricing in linked routes. It was feared that the price pre-announcements could be used as a tâtonnement to settle on collusive prices. This case set no legal precedent in the US because it never went to trial and the remedy addressed only institutional aspects of the airline industry. However, it clarified the DOJ's willingness to pursue coordinated pricing facilitated with rapid communication. (See Borenstein (1994)).

The European Commission (1985) charged wood pulp producers of violation of Article 81(1) for colluding on (quarterly) price announcements and transaction prices and in exchanging price information. The European Court of Justice (1993) rejected the claim that price announcements and parallel pricing are sufficient to infer collusion since alternative non-collusive explanations of pricing were consistent with the data. Furthermore, price announcements were made public to consumers and in fact were introduced because of pressure from downstream paper customers. Buyers considered them a commitment to maximal prices providing insurance and price protection. This would be akin to price announcements in ATP without a first ticketing date.

We see therefore that antitrust practice, in accordance with theory, contemplates the coordinating potential of communication of plans but considers as possible countervailing factor the benefit that consumers may obtain from a price announcement that represents a commitment.

Information exchange about cost or demand conditions has also dynamic effects and may help both the coordination and the monitoring problem. First of all, it may help in dividing market or allocating cartel quotas and therefore may help coordinate on a collusive outcome. For example, asymmetric costs which are private information represent an obstacle for even a legal cartel in which side payments are possible because production has to be allocated efficiently among cartel members in order to implement the monopoly rule. [7] If the cartel strategies have to be self-enforcing and firms are sufficiently impatient, they may not be able to sustain collusion without communication on costs (Athey and Bagwell (2001)). Cost communication would therefore be a facilitating device for collusion. However, forbidding communication may result in productive inefficiency. Sufficiently patient colluding firms may tolerate a high degree of productive inefficiency before lowering prices. This trade off on the effects of communication may be more acute with price than with quantity competition. Similarly, with private information on uncertain demand firms must coordinate on allocative firm efficiency. Communication then improves coordination by avoiding undercutting by poorly informed firms, allows firms to avoid costly price wars and to adjust better prices. The latter effect may benefit consumers if firms collude (see Gerlach (2006)). In this context partial communication (for example, in high demand states) may be enough to sustain full collusion.

Second, information exchange on demand and output levels reduces the noise in market statistics and helps making inferences and detecting deviations. It may help in creating a public record on which to base the collusive scheme. This is so in particular the more disaggregated (by submarkets or product groups) is the information, helping to detect deviations and to tailor punishments to deviators. Reducing demand uncertainty enlarges the scope of attainable

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[7] See Cramton and Palfrey (1990) and Kihlstrom and Vives (1992).

collusive outcomes by increasing the efficiency of monitoring (Green and Porter (1984)).

The exchange of information about current and past individual conduct has even more potential to solve the monitoring problem. Information on customers, orders, and prices is typically hard, verifiable, information. It helps in detecting deviations (Stigler (1964)), reducing uncertainty and, indeed, creating a public record on which to base a collusive scheme (Kandori and Matsushima (1998). For example, producer price transparency is good for collusion because it makes detecting price cuts easier. However, from the repeated game literature with private monitoring (Compte (1998) it also follows that long reaction lags and infrequent communication may be enough to sustain collusion. More frequent signals about the behavior of others may help to detect cheating more easily but if the private signals received by players are independent then delaying their revelation may in fact diminish the cost of deterrence.

The UK Tractor (1992, 1994) case provides a clear illustration of the collusive potential of detailed firm information exchange. The UK tractor market was concentrated and in decline, with a trade association which allowed detailed and frequent information exchange allowing identification of most tractor sales. Sales took place by individual negotiation in a sequence of auctions for contract purchases. In this context a bidding ring would need to know whether an auction has taken place and who has won it. Despite the potential efficiency reasons for the exchange (to deal with warranty claims and to monitor the performance of retailers and salespeople) the Commission concluded (1992) that "own company data and aggregate industry data are sufficient to operate in the agricultural tractor market". That is, individual data of other firms were not necessary. The agreement was found to be in violation of Article 81(1) because the market was concentrated, it allowed each firm to monitor sales of rivals, and constituted a barrier to entry. It should be considered also that the information exchanged was not made available to purchasers. The Court of First Instance upheld the decision (1994). This is a case where the information exchange is

attacked directly and not only as materially helping a collusion case. Another pure information exchange case is Fatty Acids (1986). Following an excess capacity period in the 1970s, the market leader Unilever unilaterally reduced capacity and proposed an individual data exchange on sales with two other major producers (Henkel and Oleofina). In this exchange it was understood that a customer switch between majors were "stolen sales" while new customers were "legitimate gains". The implied objective was to sustain collusion among the majors and exclude small firms. The strategy was successful in so far that the market share of Unilever remained constant and that of the other two majors increased. The Commission fined the firms for anti-competitive information exchange (Article 81. (1)). (See Kuhn and Vives (1995)).

In summary, the collusive potential of communication and information exchange can be classified as follows.

- High:
  - Private communication of future plans (but public commitment to customers may yield benefits).
  - Exchange of individual data on prices and quantities.
- Medium:
  - Exchange of individual data on demand and costs.
- Low:
  - Exchange of aggregate data.

4.4 Information technology and market transparency

An open issue is the impact of information technology on the anti-competitive potential of information dissemination, transparency,

and sharing. Internet is a formidable search-facilitating technology, for example with search engines facilitating price comparisons. Price transparency lowers search costs for consumers and has a competitive static (unilateral) effect. Indeed, price transparency increases the effective demand elasticity facing a firm because it makes easier for customers to react to price cuts. This was corroborated in a classic study about the competitive effects of advertising the price of eyeglasses (Benham (1972)). However, it must be pointed out that search costs are the product of the impact of technology and firms' response, basically differentiation attempts, be it obfuscating price comparisons, facilitating quality information (Amazon) or providing complementary "clicks and mortar" services (Barnes & Noble).

Consumer price transparency has furthermore potential ambiguous dynamic coordinated effects. This is so because with more transparency it is more tempting to undercut, because of the higher elasticity, but at the same time more severe punishment for deviants are possible. The result is ambiguous in general but the net effect in the Hotelling model of product differentiation is that collusion is harder to sustain with more consumer transparency (see Schultz (2002)). Still, with endogenous search decisions in a homogeneous product market, increasing transparency may increase collusion because rational consumers will only increase search in the punishment phase, and not in the collusive phase when all firms charge the same price. Hence, in general we are back to an ambiguous impact of consumer transparency on collusive potential.

Sometimes transparency may imply a less competitive outcome. A transparent second price (ascending) procurement auction may be less competitive than a non-transparent (sealed bid) first price auction. Suppose that firms (the bidders) have idiosyncratic costs and face an elastic demand. Then it can be shown that firms bid

more aggressively in a one-shot first price auction.[8] Furthermore, a second price auction is collusive-prone since firms can signal intentions and threats (with multiple objects in particular as the example of the 1999 spectrum auction in Germany shows). This same reasoning may imply that transparent Internet car sales can be more like collusive-prone second price auctions, while dealer sales may be more like non-transparent first price auctions (not allowing dealers to infer secret price cuts of rivals).[9] A case where making the market more price transparent raised average prices occurred when the Danish competition authority decided in 1993 to collect and publish actual transaction prices in the ready-mixed concrete industry (Albaek et al. (1997)).

In general, producer transparency tends to be good for collusion while consumer transparency has ambiguous effects. Information technology has different faces. It may allow the tracing of information exchange, making the discovery of anticompetitive practices easier to monitor, or it may allow records to be erased easily in chat rooms, for example. At the same time electronic communication may allow quick responses and the implementation of contingent complex retaliation strategies. The jury is out on what will be the aggregate effect of information technology on the scope for collusion.

4.5 Implications for competition policy

Information exchange can be not be construed to be prima facie evidence of collusion because, as we have seen, it may emerge in a

[8] In a second price auction we obtain the Bertrand outcome with complete cost information, while in a first price auction we obtain the Bertrand outcome with incomplete cost information. In the latter case firms set the price below the expected Bertrand price with complete information. See Hansen, (1988) and Vives (2002).

[9] See Scott-Morton et al (2000) for a discussion and evidence on this issue.

wide range of competitive circumstances and lead to efficiency gains. However, information exchange can be welfare reducing also, both in collusive and non-collusive environments. This is particularly so in concentrated markets protected by barriers to entry where the collusive concern looms larger. Some of the implications for antitrust of what we have learned about the impact of information exchange follows.

In regard to the exchange of individual price and quantity data a tough line seems appropriate. The reason is that the collusive potential is large and the efficiency benefits can be obtained most likely with the exchange of aggregate data. This is consistent with antitrust practice in the US and the EU. It is arguable whether in the EU the exchange of individual price and quantity data should be considered a restriction of competition and infringement of Article 81(1) by *object* (i.e. in itself), at least in concentrated markets. In this case the form of the agreement to share information creates a presumption that Article 81(1) is infringed, but if there are sufficient efficiencies associated with information sharing, Art 81(3) would automatically create an exemption for the agreement. In a court proceeding, however, the firms would carry the burden of proof to demonstrate that the efficiencies are real, that they could not be obtained otherwise and that they more than compensate the potential anti-competitive effects. Another approach is to consider an agreement in violation of Article 81(1) if it has the *effect* of reducing competition. This corresponds to the US rule of reason, where the authorities have the burden of proof of demonstrating that the agreement infringes Article 81(1). This approach requires more analysis by the competition authority to substantiate that the agreement harms competition (in this case Article 81(3) may still be applicable).

In regard to the exchange of demand and cost data, antitrust practice is more permissive both in the US and the EU. From an analytical point of view, the exchange at the individual level is a grey area in terms of impact. Here an analysis of the effect of the practice (rule of reason) seems appropriate. For example, exchanging cost

information or benchmarking in Cournot competition may have large efficiency benefits. Therefore a safe haven policy could be instituted to allow the exchange in unconcentrated Cournot markets where the collusion risk is low. Recall that information sharing on costs or demand is good for welfare with Cournot competition independent of whether uncertainty is of the private or common value variety (see section 8.3.3 in Vives (1999)). There is debate about whether this recommendation is practical given that to distinguish the mode of competition is not always easy. My view is that the difficulties of such task have been overemphasized. Things are more complicated with Bertrand competition. Then information sharing tends to be bad for welfare with the exception of the common value cost uncertainty case, and the impact on collusive potential and efficiency must be assessed.

The robust result is that when antitrust authorities examine a case they should take into account that the welfare consequences of information exchange are significant, and relatively more than classical market power concerns except in very concentrated markets. Indeed, market power vanishes quickly with a few competitors while the effect of private information decays more slowly with the number of firms. The exchange of aggregate data should not raise concerns of facilitating coordination unless there is independent evidence of collusion in the industry.

In regard to communication of future prices or outputs a tough line seems appropriate, in particular if the communication is not public and does not represent a price commitment to customers.

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5. Transparency and competition policy*

*Peter Møllgaard** and Per Baltzer Overgaard****

Abstract

Transparency may be a two-edged sword in oligopolistic markets where it affects both the incentive to deviate from a collusive agreement and the severity of the potential punishment by rival firms. We provide an overview of theories relating transparency to collusion and competition. This is followed by a brief overview of some practical cases to suggest that the efficiency concerns raised by theory are more than academic speculation. The cases considered include Danish ready-mixed concrete, Swedish retail gasoline, and liner shipping, in addition to seminal cases such as airline tariff publishing, Ivy League, wood pulp, and UK tractors. We conclude with a taxonomy of information exchange and some general lessons for competition policy.

JEL Classification: D18; D43; L13; L41
Keywords: Transparency, Information Exchange, Tacit collusion, Competition Policy, Cases

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5.1 FAQs: Frequently asked questions about transparency

Q: What do Swedish gasoline retailers have in common with ocean container carriers, U.S. airlines, Ivy League college presidents, and sellers of tractors in the UK?
A: All have been involved in increasing transparency through some exchange of information with competitors and have been accused of facilitating collusion. Some have had to pay large fines and others huge damages.

Q: Why is it that increasing transparency is bad?
A: In fact, it is not always bad. There are pros and cons of transparency and information exchange.

Q: So when is transparency bad? What are the cons?
A: Transparency may be problematic in highly concentrated markets where it may provide firms with information about cheating by rivals. The suspicion that rivals' cheat destabilises collusive agreements and could trigger punishments. I. e. the suspicion creates competition. So, increased transparency means that firms might stop cheating to avoid the punishment, and this implies that the collusive agreement works better. This may lead to higher prices.

Q: Is this not merely theoretical babble? Do you have any concrete examples?
A: It is not babble, and we do provide a very clear concrete example in section 5.3.1. Increased transparency among Danish producers of ready-mixed concrete led to improved coordination of seller behaviour and increased prices by 15-20 per cent.

Q: So when is transparency good? What are the pros?
A: Transparency may be good in fragmented search markets, where it may reduce customers' cost of searching for the best deal. If firms

do not think strategically, transparency will typically not harm their customers and may improve the functioning of markets greatly.

Q: What is transparency, really?
A: Transparency is a buzz word with a positive ring to it. It may be taken to mean improved information among sellers and/or buyers regarding the price of goods or services but also about the characteristics (quality) of these.

Q: Then, surely, improved information among buyers regarding characteristics of goods cannot be bad – even in concentrated markets?
A: Actually, it may be bad. This is because improved information sharpens competition, should the collusive agreement break down. The more imminent threat of punishment for cheating must then be balanced against a higher one-off payoff for the firm that cheats. It is, in general, not possible to determine which of these two effects dominate.

Q: Could you provide an overview of the theoretical foundations that relate transparency to competition and collusion?
A: Yes, we do so in section 5.2. We first discuss the role of information in the perfectly competitive benchmark and the nature of second best results in connection with this. We then discuss fragmented search markets and focus particularly on concentrated oligopolistic markets.

Q: Then, how does this relate to competition policy? Could you give an overview of this?
A: We provide an overview of the most important cases on both sides of the Atlantic in section 5.3 and conclude with lessons for competition policy in section 5.4.

5.2 Transparency in theory

5.2.1 Transparency in fragmented markets

Economists will often start their thinking about competition policy from the *perfectly competitive benchmark*. Perfect competition is based on the assumptions that there be many buyers and sellers (a fragmented structure), that the good is homogeneous, that there are no barriers to entry, and that buyers and sellers are perfectly informed, i.e. that markets are fully transparent.

If all markets are perfectly competitive, then the economy has attractive features in terms of welfare (Pareto Efficiency; under usual conditions). However, if the conditions are not fulfilled, so that all markets are not perfectly competitive, then one cannot make a judgement as to whether improved transparency will increase or reduce welfare (the theory of the second best). Thus, at this general level already, economic theory (of general equilibrium) emphasizes that the pros and cons of transparency need to be weighed carefully, taking the circumstances of the specific situation into account.

Except for the assumption regarding perfect customer information, Stiglitz (1989) retains the assumptions of the perfectly competitive benchmark. In his model, potential customers are imperfectly informed about price quotes of the many different suppliers, and their search costs[1] of obtaining accurate price information are strictly positive. In the most basic tourist-and-natives model, one group of customers (natives) is perfectly informed of the prices at different outlets, while the remaining customers (tourists) are initially imperfectly informed and need to search to discover prices.

[1] See Stigler (1961) for a seminal study on the role of consumer search costs.

Depending on the relative importance of the two groups, this may lead to absence of (pure strategy) equilibria or to the complete breakdown of the market. Other possible equilibrium outcomes include prices significantly in excess of unit costs, prices which are non-decreasing in the number of suppliers, and price dispersion for homogeneous goods. These phenomena represent fundamental departures from the perfectly competitive benchmark and illustrate the fundamental role played by information or transparency.

It follows from Stiglitz-type models that if consumer search costs can be reduced significantly, then prices may also fall by a substantial amount. This type of result explains the lobbying of consumer protectionists for easier price comparisons across products. Indeed, consumer agencies have a tendency to focus on the ability of consumers to do comparison shopping and often pay little attention to the effects on interfirm competition.

5.2.2 Transparency in static oligopoly

The economics of interfirm information sharing in static oligopoly was pioneered by Kühn and Vives (1995).[2] They investigated the incentives of firms to share information about demand or costs and the welfare effects of such information sharing. They identified a trade-off between privately beneficial effects related to improved precision of planning against the (possibly) negative strategic effects on competition. How this trade-off is resolved depends on both the nature of competition (quantity setting versus price setting) and the nature of the initially dispersed information (stochastic shocks with predominantly common components vs. shocks with predominantly private, firm-specific components).

[2] See also Kühn (2001), Vives (2002), OECD (2001) and Nitsche and von Hinten-Reed (2004).

Kühn and Vives (1995) are able to state relatively clear and unambiguous analytical results for a given combination of these drivers, but they are sceptical as to the antitrust implications, since specific modelling details are key to assessing first whether firms have an incentive to share information and second whether information sharing has positive or negative welfare effects. Given the limited information available to competition authorities, the theoretical results are not immediately useful in their case work.

5.2.3 Transparency in dynamic oligopoly

The incentives to share information and the general effects of changing market transparency are altered, if the oligopolistic interaction is dynamic or repeated, rather than static or one-shot. To see this, think of a symmetric oligopoly, in which firms simultaneously decide on prices or quantities in every period. Assume that the (unique) non-cooperative Nash equilibrium of the stage game leads to payoffs of N to each firm.

If firms are able to collude perfectly, we would expect the payoff to be $C > N$ to each firm. In general, prices will be higher and quantities lower when the firms collude. This means that there is an incentive to deviate from the collusive arrangement to obtain even higher profits, $D > C$. In the static setting this incentive to deviate destabilises the collusive agreement, since all firms realize the incentive of the rivals to cheat, and it follows that the only possible equilibrium is the static Nash equilibrium.

In the dynamic or repeated setting, firms have access to a richer set of strategies. A classical example is the application of Nash trigger strategies: Firms start out by colluding and continue this as long as they have observed that all rivals have done the same. If a firm deviates from the collusive action, all firms revert to the strategy of the static Nash equilibrium in all future.

We assume that all firms value the future the same, i.e. that there is a common discount factor, d, which is larger than 0 but lower than 1. Then the collusive path will give rise to a present value of

$$C + dC + d^2C + \ldots = C + dC/(1-d).$$

If a firm deviates, the associated present value will be

$$D + dN + d^2N + \ldots = D + dN/(1-d).$$

Straightforward algebraic re-ordering will show that if the discount factor is sufficiently high, i.e. if the players value future incomes sufficiently, then it is possible to sustain perfect collusion with Nash-trigger strategies. Intuitively, this is so when the temptation to increase short-run payoffs ($D - C$) is less important than the present value of the long-run deterrence ($C - N)d/(1- d$) resulting from the implied reversion to the static Nash equilibrium in all future. In algebraic terms, perfect collusion is sustainable if the discount factor exceeds a critical limit which depends on the temptation to deviate and the deterrence implied by the Nash reversion:

$$d \geq \underline{d} \equiv \frac{D - C}{D - N}$$

Note that we have already made strong assumptions as to the transparency of the market: Implicit in the arguments above is that firms will observe any deviation with certainty and be able to react

on this information already after one period. If, for example, the firms knew that deviation would never be discovered, then the argument would fall apart, and we would be left with the short-run incentive to deviate – just as in the static situation.

In general, the longer it takes before a deviation is discovered or the less likely it is that it will be discovered, the more difficult will it be to sustain perfect collusion. Hence, increased transparency, in the sense of faster or more reliable information about deviations, may allow prices to increase from static Nash equilibrium prices to monopoly prices.

5.2.4 Cheap talk to deal with a plethora of equilibria

What happens when the discount factor is below the critical limit necessary to sustain perfect collusion? Møllgaard and Overgaard (2001) show that, in this case, firms may be able to sustain partial collusion. Abandoning collusion altogether is not the only alternative to perfect collusion. Firms may instead expand output or reduce prices from the monopoly level, until the temptation to deviate is balanced by the deterrence of reverting to the Nash equilibrium.

This result reflects a more general result of dynamic oligopoly games, namely that there may be many equilibria if firms are sufficiently patient (i.e., value future payoffs enough or have sufficiently high discount factors). These "Folk Theorem" results of repeated games raise the issue of strategic uncertainty: it is not immediately obvious which among the many equilibria firms should expect to play. This, in turn, means that there is a genuine risk of coordination failure on the part of the firms.

To get around this problem, firms might want communicate future intentions to decide which equilibrium to play. Such "cheap talk" will allow firms to coordinate on a focal point to avoid coordination failure, i.e. that different firms play strategies that belong to different equilibria. Such information exchange regarding

future actions is fundamentally different from the [3]information exchange about past actions (discussed above), which is necessary to sustain a collusive agreement, once it has been established which equilibrium to play.

5.2.5 Transparency on the customer side

So far, we have focused on information that affects firm behaviour directly. But information may also be used by the firms' customers. Note, however, that in practice it may be very difficult to separate information available to firms from information available to customers. Nonetheless, it is interesting to consider the information flows on the customer side more closely (and taking the extreme view that firms are fully informed about everything already).

An improvement of customer information will make customers more sensitive to price differences. If the improved information regards prices, it is unlikely that any customer with knowledge of a lower price will buy the higher-priced firm's product. If the improved information regards product characteristics, customers will be able to better assess the quality/price relationship and will switch more easily.

Thus, improved customer information will make competition in the Nash equilibrium of the static stage more intense and, hence, reduce the payoff, N, associated with the punishment for deviation. Taken alone, this increases the deterrence and contributes to sustaining collusion.

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[3] Such a coordination device may have collusive potential even in fragmented markets. Consider a market with many small service providers. If their trade association introduces a standard cost calculation method (e.g. a common spread sheet) this might assist the firms in finding a common price level – especially if the method includes suggestions as to the mark up.

The flip side of the coin is, however, that improved customer information and more price sensitive customers also increase the temptation to deviate from a collusive agreement by increasing *D*.

When both the temptation to deviate and the deterrence increase it is, in general, not possible to assess the effect of improved customer information on the sustainability of perfect collusion or the maximal prices that are sustainable under partial collusion.

Nilsson (2000), Møllgaard and Overgaard (2001, 2002), and Schultz (2004, 2005) analyze the effects of customer information on the trade-off between the temptation to deviate and the deterrence. The general conclusion is that "the Devil is in the detail" and that general policy conclusions are unwarranted. Rather, the effect of information or transparency needs to be assessed on a case-by-case basis.

Nilsson (2000) models increased transparency as a reduction in consumer search costs. In the static equilibrium, a reduction of search costs leads to a reduction of the expected price. However, in a dynamic version of the model, he finds that it is easier to sustain collusion with lower search costs.

Møllgaard and Overgaard (2001, 2002) employ a model of perceived product differentiation. Increased transparency is interpreted as an improved assessment amongst consumers of real quality differences. In duopoly, they find that the "optimal level of transparency" for society is not full transparency but some measure of imperfect transparency. By the "optimal level of transparency" they mean the level for which it is most difficult to sustain collusion, viz. the level that gives rise to the highest critical limit for the discount factor. This is true not only for the relatively simple Nash trigger strategies but also for more sophisticated (repeated-game) punishment strategies. Møllgaard and Overgaard (2001) also show that with partial collusion, prices may fall with improved transparency at low levels of transparency but may increase with improved transparency at high levels of transparency.

Schultz (2004) studies the effect of transparency in a Hotelling market with endogenous choice of product characteristics. In modelling terms, increased transparency captures that a larger fraction of consumers are informed about prices and product characteristics. In this static model, increasing market transparency leads to less product differentiation, more competition, lower prices, lower profits, and higher welfare. Schultz (2005) studies the effect of transparency on the sustainability of tacit collusion in a differentiated Hotelling market where product characteristics are given. In this model, increasing transparency makes tacit collusion more difficult, especially when products are differentiated.

Thus, in a sense, Schultz' results point to positive effects of increased transparency, Nilsson's results point to negative effects of increased customer information, while Møllgaard and Overgaard cover the middle ground.

To summarize: the theoretical results show that increased transparency, in the sense of improved information flows between oligopolists (shorter detection lags, higher probability of detection, more information about future intentions), increases the scope for coordinated behaviour. Increased transparency, interpreted as easier comparison of prices or product characteristics for customers, may increase or decrease the scope for collusion.

5.3 Cases

In the following we provide an overview of some important antitrust cases on both sides of the Atlantic to illustrate the effects of transparency or information exchange and the way competition authorities have dealt with them.

5.3.1 Danish ready-mixed concrete: price effects of increased transparency

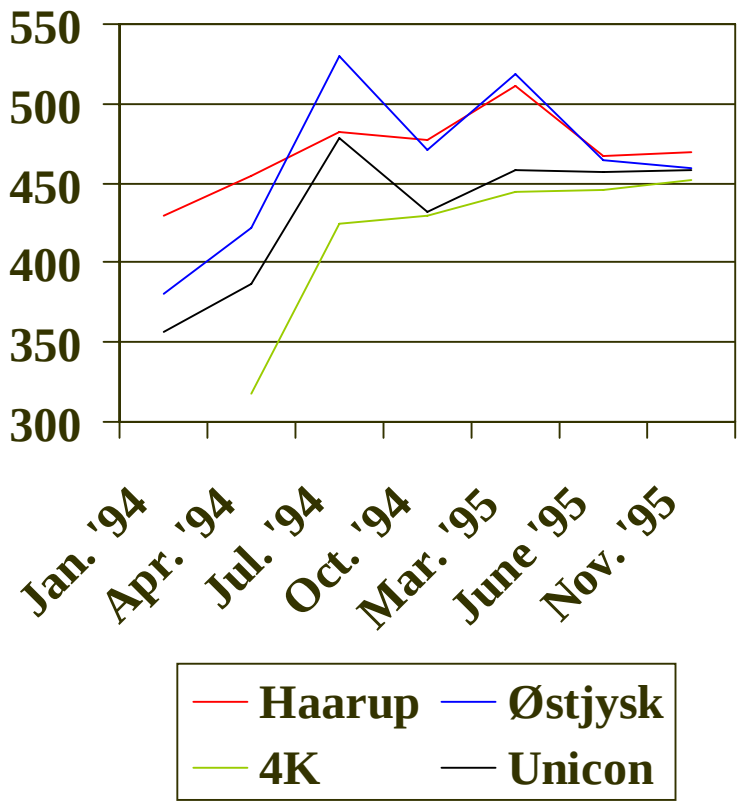
Improved transparency may have significant anticompetitive effects as the following case will show. In the beginning of the 1990s, the Danish Competition Authority received information of ailing competition in the ready-mixed concrete industry. Persistent rumours of large individualised confidential discounts were particularly disturbing.

At the time, the competition legislation in Denmark prescribed improved transparency as the prime weapon against anticompetitive behaviour. Hence, the Authority decided to gather and publish firm-specific transactions prices for two grades of ready-mixed concrete in three regions of Denmark. By so doing, the Authority hoped to inform customers of bargain deals and expected them to take a tougher stand in subsequent negotiations.

However, following the initial publication of this information, average prices increased by 15-20 per cent within a year in the Aarhus region – see figure 1. The region can best be described as a tight oligopoly of four firms. At that time, Denmark experienced an annual inflation of at most 2 per cent and stable or decreasing input prices. It can also be ruled out that a business upturn caused the increase in prices, since capacity constraints were very lax.

Figure 1

Average price (DKK/ton) of ready mixed concrete (10 MPa) in Aarhus



Improved transparency seems to have led to improved coordination of the pricing policies: after a year of publication, the initial price dispersion was all but gone. Further evidence shows that average prices increased because firms stopped granting the large individualised discounts. The likely reason is that the improved transparency allowed light to descend upon deviations from the

collusive agreement – and, so, the firms simply stopped granting discounts.

In this case the Competition Authority unwittingly enabled the reliable detection of cheating which, in turn, is a prerequisite for sustaining collusion – hardly what they were aiming for. The case illustrates that if firms can react to information before it can be exploited by customers, then the latter may be harmed rather than helped by price transparency. For further information on this case, see Albæk, Møllgaard and Overgaard (1996, 1997).

5.3.2 Swedish gasoline: Communication to eliminate discounts

For well over a decade, the Swedish Competition Authority has suspected that major Swedish gasoline retailers have used various information sharing arrangements to exchange sensitive pieces of information to the detriment of competition. In the mid-90s the authority first attempted to intervene to limit this information exchange. This, however, was subsequently overturned by the courts. For a brief account of this case, see OECD (2001, pp. 157-161).

Finally, though, in 2005, the Swedish appellate court (the Market Court) largely upheld a prior decision of the lower court in a new case brought by the Swedish Competition Authority and fined five retail gasoline chains around EUR 15 million for violating the ban on anticompetitive coordination. Dating back to 1999, the offence related to the coordinated reorganisation of discount schemes: a general lowering of discounts, establishment of maximum discounts to various customer groups and coordinated action vis à vis major customers. The claim by the Swedish Competition Authority of outright coordinated changes in road-sign (post) prices was eventually disbanded.

What is mainly of interest in this case from the perspective of the present paper is that the evidence presented to the courts by the competition authority largely dealt with communication between

company representatives on their intentions – so the focus was on future actions rather than on past actions.

From the perspective of motorists, gasoline is largely a homogenous good, although there may be some product differentiation by location. Thus, from the point of view of retailers, market fundamentals might suggest intensive Bertrand-style competition in the absence of some kind of coordination (be this tacit or explicit). In addition, in the late 90s gasoline discounters were making inroads into the markets and putting pressure on margins. Thus, posted prices and discounts were candidates for adjustment. However, given the dynamic (repeated) nature of the Bertrand-style strategic market interaction, strategic uncertainty regarding price levels, discounts and timing of changes was rampant. In the words of the Market Court ruling (see Swedish Market Court, 2005, p. 37):

> *"Further, it is clear that the large volumes sold in the relevant markets imply that even small differences in price and discount levels have a large impact on company margins. In the view of the Market Court, this must imply that timing is of essence to the companies, in the sense that, on the one hand, it is costly for them – even for a short duration – to be pegged at the wrong levels of prices and discounts, and, on the other hand, that it is important to continuously be "right on the mark" in terms of discount levels offered to attract – and keep – customers."* (our translation)

Thus, representatives of five leading gasoline retailers (with a total market share of around 80%) initiated communication over discount levels and timing of adjustments. It is interesting to note that the framework for this communication was largely a series of meetings between several or all of the five companies within the so-called VSRP group. The VSRP group consisted of four of the five companies, and according to agendas and minutes of the meetings it convened to discuss issues related to gasoline additives to substitute

for lead.[4] However, according to additional notes and e-mails procured in "dawn raids" on the companies as well as testimony presented in court, prices, discounts, and timing were also discussed at the meetings.

Ultimately, the main question before the courts was whether there could potentially be and, in fact, were significant efficiency-enhancing features of the (private) exchange of information relating to future discount schemes and timing of changes in discount levels. The answer of the Market Court was in the negative, and it decided to raise the fines levied by the lower court. For more on this case, see Swedish Market Court (2005).

5.3.3 Information exchange systems in liner shipping

Container shipping has been run through a series of "liner conferences" for more than hundred years. Container shipping provides regular shuttle service in a network connecting ports all around the world with a fixed time table. Shippers (customers) are charged standard rates that are agreed by the liner conferences. For many years container shipping has enjoyed a special treatment from cartel laws, justified by large investments in vessels and port facilities. Antitrust authorities, however, increasingly have become wary of granting such exemptions from competition law, arguing that liner conferences were essentially cartels.

In 1992, a number of large ship owners notified the European Commission of the Trans-Atlantic Agreement (TAA). The Commission prohibited the TAA (and price fixing activities that could have the same or similar effects) in 1994. This led the parties to the TAA to notify the Commission of the Trans-Atlantic Conference Agreement (TACA) that suggested that the members could agree on the rate, charges and other conditions of carriage using a common

[4] The four companies had previously been granted an exemption to coordinate on issues of gasoline additives.

tariff. Members of TACA had a market share of around 70 percent of the trade between Northern Europe and the United States.

As discussed in section 5.2, one of the main problems of cartelists is that cooperation tends to break down if detection is uncertain. The parties to TACA proposed to solve this problem by setting up the "TACA Enforcement Authority," an independent body to police the duties and obligations of the parties. The TACA Enforcement Authority could investigate any breach of the terms of the agreement. It would have total unfettered access to all documents related to a carriers activity within the TACA and would be authorized to inspect records and property as well as interview and take statements from persons. It would be entitled to impose fines for any breach of the agreement and was entitled to fine any refusal to allow access by the parties. Recidivism, in respect of all breaches, was also to be fined.

The TACA Enforcement Authority would clearly have reduced or eliminated any uncertainty as to whether the agreement is followed by all members. In this manner, it would have served to make cheating on the agreement readily observable and immediately punishable, thus supporting the price fixing agreement. For this reason, the European Commission decided in 1998 to prohibit TACA and fine the parties a total of EUR 273 million. The fine was annulled in 2003 by the European Court of Justice, arguing that the shipping companies had notified the Commission of their cooperation. However, the Court upheld the Commission's contention that the original agreement conflicted with EU competition rules.

The European Liner Affairs Association suggested to replace the current liner conferences with an information exchange system the content of which would be to make some information (e.g., monthly capacity utilization forecasts and commodity developments) available only to members of the association, while other information will be made public to shippers as well (e.g., forecasts of demand and quarterly price indices for different types of cargo per trade leg). However, on 25 September 2006, the European Council agreed “to repeal Regulation 4056/86 putting an end to the possibility for liner

carriers to meet in conferences, fix prices and regulate capacities as of October 2008." See press release IP/06/1249 of the European Commission.

This case is summarized by Møllgaard (2004). The complete decision is available from the Official Journal of the European Communities L95/1, April 9, 1999 (pp. 1-112); see also EU press release IP/98/811 (Sept. 16, 1998).

5.3.4 Airline tariff publishing: Coordination of future actions

In the US, the Department of Justice brought a price-fixing case against the Airline Tariff Publishing Company (ATP), a joint venture created by eight major US airlines. ATP collected fare information from the airlines and disseminated it on a daily basis to all airlines and the major computer reservation systems that serve travel agents. ATP thus allowed air carriers to respond quickly to each others' prices and made the deterrence more imminent which in itself facilitates collusion.

However, in addition ATP could serve to coordinate future actions to eliminate strategic uncertainty about which equilibrium should be played. It allowed air carriers to engage in "cheap talk", i.e. to engage in communication that did not commit the carriers to a particular course of action but rather allowed them to "negotiate" without meeting in a smoke-filled room, in order to coordinate on the collusive outcome.

To stop an unwarranted discount, a carrier could unilaterally announce a Last Ticket Day for that fare. That would be a date sometime into the future and only if it was left unchanged would the fare actually expire. If the other firms followed suit by making similar announcements, they would all go ahead and implement it, i.e. let the fare expire. If not, the Last Ticket Day could be changed to a later date or eliminated. No trade was then made based on this information and in this sense talk was cheap.

If a carrier wanted to suggest a new and higher fare, or to deter rivals' deviation through the threat of a price war, it could make us of a First Ticket Day, representing the first date of sale for a fare. Again, this would be some date in the future. Tickets could not yet be sold before that date, and, so, the prices that were communicated represented no commitment. If the other firm(s) obeyed (followed the higher price or stopped the deviation), the First Ticket Day for that fare could be effortlessly repealed. The case revealed how 'junk fares' were eliminated through several rounds of 'negotiations' that lead to an increase of junk fares by $20 (each way) in hundreds of city-pair markets.

The ATP case was settled through consent decrees in 1994. First Ticket Days were prohibited so that an announcement of e.g. a low price could result in a sale immediately. Last Ticket Days were similarly prohibited (if not used in advertising campaigns) to eliminate another signalling device for the carriers. The elimination of First and Last Ticket Days made it more difficult for carriers to coordinate on a particular equilibrium, and this could prevent the adaptation of the implicit collusive agreement to future changes in market conditions. For further information on this case, see OECD (2001, 191-193) and Gillespie (1995).

5.3.5 Ivy League information sharing

College presidents of Ivy League Universities and Massachusetts Institute of Technology (MIT) used their winter budget-planning process to share information about prospective tuition increases before the public announcement. They also discussed salary increases of faculty at the different universities, in order to coordinate these.

The vice president of Brown University described this as "an informal swapping of intentions" and continued: "Our desire is to keep the price close to our competition so that applicants don't have to decide between schools on the basis of finances." (As quoted by OECD (2001, p. 193)

Again the purpose of the communication was to increase tuition and eliminate competition through the elimination of strategic uncertainty and establishment of a focal point. For more on this case, see OECD (2001, 193-196).

5.3.6 Wood pulp

In the European Union, the Commission decided that a number of wood pulp producers had colluded on price announcements and by exchanging information. This decision was ultimately overturned by the European Court of Justice, in part because wood pulp producers did not revise their announced prices that were thus perceived to involve more commitment.

In 1977, the European Commission opened its investigation of the European wood pulp industry concerning its conduct since 1973. In its December 1984 decision (OJ L85/1), the Commission alleged that the firms involved were colluding on price announcement and transactions prices.

A complicating issue was the existence of the exports cartel "Kraft Export Association" (KEA) that was permitted in the United States according to the Webb-Pomerene Act. In its decision, the European Court of Justice put weight on the fact that the alleged practices were explicitly allowed in the US by the Webb-Pomerene Act and therefore fell outside the jurisdiction of the Euopean Treaty.

Firms that were not based in the US (and did not take part in the KEA) could not benefit from this exclusion. However, the Court opined that parallel pricing and price announcements were not *per se* proof of collusion. Collusion charges were only upheld in the relatively few instances where the Commission found hard evidence

of cartel meetings. For a fuller discussion of this case see section 3.1 of Kühn and Vives (1995).

5.3.7 UK tractors: information exchange is prohibited

In 1988, three trade associations notified the EU Commission of the UK Agricultural Tractor Registration exchange, an information exchange agreement that had been in force since 1975. The exchange disseminated detailed information on retail sales and market shares of eight importers and manufacturers of tractors in the UK. The market was fairly concentrated with a four-firm concentration ratio of 77 per cent.

The European Commission found that the information exchange violated Article 81 (then 85) since it allowed all firms to monitor each other's sales and since it constituted a barrier to entry into the British market in the eyes of the Commission. (OJ 1992 L68). John Deere Ltd appealed the decision but in this case the Court of First Instance upheld the Commission's decision on all counts.

The firms involved countered that they needed the information exchange to process warranty claims and to monitor the sales efforts of marketing personnel. The Commission concluded that these efficiency effects could be achieved through comparison of own company data with aggregate industry data.

This case was the first to revolve purely around information exchange. The EU Commission did not make allegations of explicit collusion. For more on this case, see OECD (2001, pp. 30-31), Georgantzis and Sabater-Grande (2002), Kühn and Vives (1995, pp. 96-102), Kühn (2001, pp. 195-196) and Halliday and Seabright (2001, pp. 90-92).

5.4 Lessons for competition policy

Based on the theories summarized in section 5.2 and the antitrust practice considered in section 5.3, we develop a taxonomy of information exchange in Table 1.

Table 1

A taxonomy of information characteristics

Information characteristics		
Information content	Past behaviour	Future behaviour
Target group	Firms: Private information	Customers and firms: Public information
Degree of commitment	Customers can trade on information	Customers cannot trade on information (cheap talk)
Degree of verifiability	Hard information (verifiable)	Soft information (not verifiable)
Level of aggregation	Firm- and/or transaction-specific information	Aggregate industry information
Timeliness	New	Old

We distinguish between information regarding future behaviour and information regarding past behaviour. Information regarding future behaviour may allow oligopolists to focus on one equilibrium among many possible – to establish a focal point. Information about past behaviour may allow them to detect and, therefore, deter deviations.

We also distinguish between private information (i.e., information which is disseminated only to rivals) and public information (i.e., information that customers will also receive). It is unlikely that information flows can be controlled in a way that allows only customers to receive the information.

Another distinction relates to the degree of commitment involved in the information exchange. This is particularly important for information regarding future behaviour. If customers can actually trade at the given prices, the information involves commitment. If customers cannot trade, the information exchange is "cheap talk".

The degree of verifiability is also important. Hard information is verifiable (by definition) and is important especially for information regarding past behaviour. Non-verifiable information about past behaviour cannot be used to determine whether somebody has cheated. Information about future behaviour is typically soft (non-verifiable) unless it involves commitment (in which case it is merely a public price announcement). Thus, "cheap talk" is soft information by nature.

The level of aggregation is important for the usefulness of information. Firm- and/or transaction-specific information may be used much more precisely to target punishment or to send messages, while aggregate information does not allow this.

Finally, we distinguish between old and new information. Old information (whether on past or intended future behaviour) is less useful for coordination purposes than new information.

From the previous two sections (see also Kühn (2001)), we then draw the following lessons for competition policy:

- Private communication about future prices or production plans significantly helps firms coordinate on finding the right collusive agreement. Since customers do not have access to such information, it involves little commitment, and it is hard to see the "efficiency defence" for this type of information exchange. Accordingly, it should be prohibited. Cases in mind could be the ATP case and the Swedish gasoline case referred to above.
- Public communication about future prices or production plans that permits customers to trade on these (so they involve commitment) are less problematic and should not be prohibited on a priori grounds. The competition authority needs to scrutinize individual cases. This situation corresponds with the ATP case after the ban on First and Last Ticket Days.
- Exchange of (private or public) disaggregated information about past prices and quantities has a very significant potential to improve oligopolistic coordination and should be prohibited, especially if the information is hard and new. Relevant cases might be the TACA agreement where a cartel enforcement authority had access to the books of the participants (making information hard) on a continuous basis (making the information new) and UK Tractors.
- Exchange of aggregated and/or old data is largely innocent, but care should be made to check the effective level of aggregation, i.e. that firms cannot "invert" the aggregation procedure. The exchange of aggregate industry information may help firms in their planning and in the monitoring of e.g. their sales force and so has a significant efficiency potential.

Our brief survey suggests that the effects of increased market transparency on competition and market efficiency are somewhat ambiguous and depend on the specifics of a given case. In rough summary, we conclude that improved information flows between

firms about past behaviour have a clear potential to facilitate collusion and dampen price competition in a dynamic setting.

Improved information about product characteristics flowing to consumers seems to have rather ambiguous effects: If market behaviour is initially largely myopic, then increased transparency is likely to intensify price competition. However if firms, in particular, are forward-looking, then increased consumer sensitivity to prices may or may not facilitate collusion.

In addition to the price effects that we have identified, a competition authority would typically have to assess how improved transparency, from the perspective of consumers, economizes on search costs (brings down the effective price faced by potential customers at different outlets), which in itself will contribute positively to market efficiency. This effect is often hailed as the main benefit of the Internet (viz. comparison shopping and online auctions/exchanges). We end this paper by a few remarks on market transparency and information dissemination in the online economy.

Improved market transparency in the online economy involves a fundamental trade-off as has been realized by competition authorities. In relation to online B2B exchanges, FTC Commissioner Orson Swindle remarked that "... it is clear that while a B2B exchange can be very pro-competitive, such an arrangement can also give rise to anticompetitive information-sharing among actual or potential competitors. This can increase the likelihood of collusion on price, output, or other competitive variables, to the detriment of competition and consumers. Ease of access to common cost or pricing information via websites could increase sellers' incentives and ability to collude."
(See http://www.ftc.gov/speeches/swindle/princetonclub2k.htm).

Similarly, the EU Commission has recently expressed doubts as to the blessings of market transparency in the online economy. In a public remark on emerging Internet exchanges, competition commissioner Mario Monti noted that "... [w]hen examining the anatomy of cartels, we must … take into account the impact of ... new technologies. ... [I]n some cases collusion is facilitated by new

technologies that allow for rapid dissemination of information and create more transparency in the market" (see Monti (2001, p. 16)).

The Danish Competition Authority (2001) has followed suit in a recent public statement. In relation to B2B exchanges there are several issues of potential concern to the authority. The questions to be asked are: who organizes the exchange? Which pieces of information are made available? Who has access to enter and extract information from a given site? Increased transparency (on prices and characteristics) associated with an online exchange may not be intended to reduce competition. On the contrary, it may be intended to facilitate comparison shopping. But the ultimate effect may still be to facilitate tacit collusion in actual cases.

Thus, a concern seems to be building that new information and communication technologies as for example encrypted chat rooms that replace the old-fashioned smoke-filled rooms represent an important challenge for competition policy towards transparency and information exchange. This re-emphasizes the role of whistleblowers and leniency programmes in cracking cases of hardcore collusion.

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6. The cost of simplistic rules for assessing information exchange: The Italian jet fuel decision

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Abstract

In this paper we review the theory and practice of anti-trust policy towards information exchange agreements, adopting as a case study a recent investigation of the jet fuel market in Italy. The competition authority based its views closely on the level of disaggregation of the information being shared, concluding the exchange of information had clear anticompetitive effects and even constituted direct evidence for an underlying collusive "understanding". Jet fuel suppliers were found to have operated a collusive regime, in which the information exchange was a facilitating device. We develop a framework for analysing such cases, and show how the rigorous application of such framework would have very likely led to different conclusions.

6.1 Introduction

Information exchanges have long come under close scrutiny by competition authorities because of their potential for facilitating collusion. In two important precedents for European antitrust policy (the *Fatty Acids* and the *UK Tractor* cases,) the European Commission established that information exchanges in themselves can constitute

[*] The authors advised one of the interested parties in the investigation. However the opinions expressed here are exclusively their own.

a violation of Art 81. However, such an infraction was clearly considered much less severe than a collusive agreement, and correspondingly fined less heavily. Recent investigations by national competition authorities have tended to go much further and concluded that certain information sharing practices (e.g. those that involved high levels of disaggregation) ought to be considered strong evidence for existing collusion – especially in the presence of parallel conduct. As a result, relatively innocent violations of "best practice" rules in industry information sharing practices have attracted extremely heavy penalties for collusive conduct.

Much of the theoretical and policy literature on information exchanges (e.g. Kühn and Vives 1995, Kühn 2001, Carlton, Gertner and Rosenfield 1997) has focused on the question of whether there are circumstances in which an information exchange should be considered an antitrust violation *in itself.* This literature has attempted to derive a set of rules for identifying information exchange arrangements as more or less worrisome from an antitrust point of view. However, these rules were derived on the background of a limited set of existing economic models, and a body of case experience that is now almost 15 years old. In the meantime our knowledge of the efficiency benefits of information exchanges has expanded, and the case material has become richer.

It therefore appears to be a good time to re-evaluate policy rules for information exchange in the light of these developments. Are there important limitations to the rules suggested, for example, by Kühn and Vives (1995), that we should consider in case practice? Our recent case experience calls in our view for a shift in emphasis. For example, to what extent can violations of the principles for "safe" information sharing arrangements identified in the literature be used as direct evidence for collusive behaviour in the market? When is information exchanging a relevant issue for the assessment of whether collusion has occurred? Under what circumstances is a case against information exchange by itself justified?

In this paper we use a recent investigation of the market for the supply of jet fuel in Italy (case I641, *Rifornimenti Aeroportuali,* AGCM

decision no. 15604), as a case study for examining these issues. The case is especially interesting because it nicely illustrates the importance of distinguishing between information exchanges that can be used as evidence for existing collusion, and exchanges that should only be deemed as anti-competitive in themselves – even though collusion is not proven. We use this case to demonstrate that simplistic rules based on the level of disaggregation of information are not an appropriate screen for filtering out anticompetitive information exchanges. We then suggest a set of "best practice" rules in line with modern approaches to antitrust.

The jet fuel case is also of particular interest because it involves features of the market that have important implications for the interaction between information sharing and the functioning of the market. While jet fuel is contracted for by airlines through a bidding process, there is considerable cooperation between jet fuel suppliers at the post-contracting stage. Oil companies swap and trade product to minimise transport costs, as is common in the trade of all petroleum products. But there are also important reasons for cooperation because of economies of scale in the storage of fuel at airports and the delivery of jet fuel from local storage into the plane. For this reason these activities are typically run as joint ventures between oil companies. More than one joint venture for such an activity exist only at the very largest airports. One feature of storage and delivery joint ventures is that they lead to a large amount of detailed information exchanges about delivery quantities at a highly disaggregated level.

The questions that arise in this context go to the heart of the role of information exchanges in antitrust policy: Can information exchanges at the JV level affect competition between the oil companies? At which level of the vertical supply chain could competition be affected? Is the intense information exchange on deliveries problematic for competition in the market? Do the rules suggested by Kühn and Vives (1995) about information dis-aggregation apply in such case?

We begin this paper by revisiting some of the theoretical issues that arise in the assessment of information exchanges. We first discuss the relationship between collusion theory and information exchange concerns. We then discuss under what circumstances information exchanges could be used as evidence for existing collusion. We conclude that rules on information exchanges that are not concerned with the communication of future conduct should primarily be of a preventive character, and cannot serve for evidentiary purposes in collusion cases.

We then go on to analyse the logic of preventive rules against certain types of information exchanges. Here we extend previous discussions in the literature on the theory of information exchanges: first, information exchanges have been more clearly shown in recent years to have important efficiency effects, especially in vertically related markets; second, there is a fundamental difference in the impact of exchanges of sales and delivery data: disaggregation of delivery data cannot reasonably be considered to affect collusion possibilities.

Our review suggests that overly simplistic rules on information exchanges can lead to highly undesirable outcomes when applied in practice. However, even the more sophisticated contingent rule systems developed in the policy literature (as in Kühn and Vives 1995) are generally not sufficient to guide analysis in many specific cases. We therefore suggest a systematic approach to the assessment of information exchange arrangements, which should include the following steps:

a) A well-specified theory of the case: how could collusion arise in this market and what information would help firms to collude?

b) An assessment of the marginal impact of the observed information exchange system on market transparency. In particular, it would have to be shown that the particular information exchange could significantly increase the ability

of firms to punish others for deviating from a collusive agreement;

c) An assessment of efficiency defences for the observed information exchange behaviour. This assessment would lead to the case being closed if there are material potential benefits to the information exchange. This would be in accordance with the conservative rules suggested in the literature (see Kühn and Vives 1995, Carlton, Gertner, and Rosenfield 1997, Kühn 2001).

In the second half of the paper we apply the theoretical insights of the first part of the paper to the Italian jet fuel case. The competition authority ("AGCM") concluded that the oil companies active in the supply of jet fuel to airlines at Italian airports had shared sensitive commercial information through airport JVs of which they were members. They considered this as evidence for a collusive agreement. The six suppliers under investigation were fined a record sum of 315 million Euro collectively. The decision is currently under appeal.

We argue that the AGCM's conclusions were unjustified. The case provides a clear example where the misguided application of simplistic policy rules about the degree of data aggregation has led to inappropriate fines. We show in this example that a clear "theory of the case" is crucial for assessing the potential impact of information exchanges. We illustrate how disaggregation of delivery data cannot be regarded as having the same impact on competition as sales data. We then show how we should assess the marginal impact of a information exchange regime on the transparency of the market. We conclude from this analysis that there was no economically sound reason to intervene against the information exchange system observed in this market, since its potential impact on the ability to collude was negligible.

Instead of following misguided collusion investigations, cases like the Italian jet fuel case ought to be taken as opportunities for antitrust authorities to develop systematic ways of working with

firms in an industry to achieve information exchanges that have as little potential for harm to competition as possible while preserving the efficiency enhancing features. It may well be good competition policy practice to eliminate "unnecessary" information exchanges, even where they do not appear to pose an immediate danger to competition in the market. This policy goal does not, however, warrant dubious practices the full force of antitrust enforcement against collusive agreements.

6.2 Policy implications of modern economic research on information sharing

6.2.1 The relationship between information sharing and collusion

A substantial body of economic literature has clarified the antitrust issues raised by information exchange agreements and practices (see Kühn and Vives 1995, Carlton, Gertner, and Rosenfield 1997, Kühn 2001). In the absence of concerns about collusion there would be no sound reason for intervening against information exchanges. In non-collusive environments information exchanges may increase or decrease economic welfare depending on the fine structure of the modelling assumptions (see Kühn and Vives 1995). Such assumptions are impossible to verify in practice. They are also far too complex and subtle for being easily understood and acted on by firms. Rules based on non-collusive models would therefore only create legal uncertainty without any well established competition benefits.

The policy concerns are quite different when one considers the potential impact of information exchanges on the ability of firms to collude. Collusion can only be maintained in a market if deviations from collusive conduct can be detected and consequently punished

through harsher competition. In markets in which firms cannot easily monitor their rivals' actions (for example because price setting is secret and sales are not disclosed) collusion becomes very hard to maintain because deviating firms need not fear detection and punishment. Exchanging information about past actions of competitors, or current information about the state of demand, can improve the monitoring of competitors' actions. In particular, direct observation of their actions eliminates the monitoring problem. But better information about demand will also make the monitoring problem less severe. Hence, information exchanges can significantly increase the likelihood of collusive conduct arising.

It has also recently been claimed that information exchange can also facilitate the reaching of an agreement. For good reason such claims have not been made in the academic policy literature we have cited. The basic factors influencing the "ability to reach a collusive agreement" are extremely poorly understood both theoretically and empirically (see Kühn 2006 for an extensive discussion of this point). While for the issue of monitoring, discussed above we can fairly confidently predict from theory that the potential effect of information exchange is large, this is not the case for barriers to achieving an agreement (either explicitly or implicitly). In fact, there is a complicated interaction between the ability to monitor and the ability to reach agreement that makes it impossible to give sound advice for policy on the basis of theory on the "ability to achieve collusion". Similarly, empirical work in this area is extremely hard to interpret and we do not believe that there exists solid evidence to support the idea that information exchanges substantially facilitate the reaching of agreement (as opposed to facilitating monitoring). In the cases we know of in which it looks plausible that information exchange was used for collusive purposes the informal descriptions of industry seem to indicate that the purpose was one of monitoring (see the Fatty Acids case). We feel that basing competition policy on arguments about the ability to achieve agreement would at this point in time come down to permitting pure speculation on the part of a

competition authority.[1] Since we do not wish to engage in such speculation here we will not address here how information exchanges might impact the ability of firms to come to a collusive agreement.

An important complication for the design of policy rules is that many forms of information exchange have obvious efficiency benefits. For example, the exchange of information to benchmark cost performance can lead to greater efforts to reduce cost, and consequently generate lower prices for consumers. Doyle and Snyder (1999), for instance, have strongly argued that exchange of information on expected future demand (directly or indirectly) can rationalise production and thus lead to cost advantages. There are numerous other examples which can be cited for efficiency enhancing information exchange.

Because of these important efficiency effects of information exchange, placing limits on such activity is problematic. Kühn and Vives (1995) and Kühn (2001) have argued that only information exchanges with a high degree of disaggregation of information should ever come under scrutiny due to a strong likelihood of efficiency benefits from exchanges. This follows the principle that only the types of information exchange should be suppressed that have a significant likelihood of facilitating collusion and at the same time are unlikely to generate efficiency benefits. This is particularly true for highly disaggregated data about firms actions and market

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[1] In our experience, there appears to be a tendency in current antitrust practice to discount the results of the modern theory of collusion when it contradicts traditional policy rules. This is usually done with appeals to claimed impacts of some practice on the "ability of coming to a collusive agreement". Since such arguments cannot be refuted in the absence of rigorous theoretical or empirical work, such appeals allow a way out of the rigorous application of economics to collusion issues in antitrust and merger policy. We see this as a development that has the potential to undermine the progress that has been made in putting antitrust and merger analysis on a more rigorous footing.

conditions. The reason is that such disaggregation can help to design individualised punishments, thus making collusion easier. At the same time, some aggregation of information usually does not interfere with the realisation of efficiency benefits. The *UK Tractors* case is a prime example where the efficiency effects outlined by the parties could be equally realised through a system with more aggregated information, while a clear and strong potential for facilitating collusion could be demonstrated. Optimal policy design towards information exchange is precisely about being systematic in assessing these trade-offs.

6.2.1.1 Can we infer collusion from an observed information exchange?

Our analysis of the relationship between information exchange and collusion directly leads to the question of how we should interpret the detection of questionable information sharing practices. Are such practices evidence for an existing collusive agreement, and should they be punished as such? Or is intervention primarily justified for *preventive* reasons, namely to reduce the potential for collusion at some future date?

To clarify such discussion, it is helpful to be very precise with what we mean by "information exchange". In line with Kühn and Vives (1995) and Kühn (2001), we believe it is appropriate to make a fundamental distinction between two different types of communication: private communication about *planned future conduct* (often referred to as "cheap talk"), and private communication about *current market information, or past actions in the marke*t. In the rest of this paper we use the term "information exchange" to include only the sharing of information that does not concern communication about *planned future conduct*.

There is consensus in the literature that private communication about planned future *pricing* behaviour should always be seen as *direct evidence for collusion*. The reason is that there simply exists no

good efficiency argument to justify firms talking about their planned pricing conduct, while communication about future conduct is crucial in coordinating on a collusive outcome.

The treatment of private communication about planned future *production* is more controversial: Kühn (2001, p. 184) takes a sceptical view, but still does not view it as conclusive evidence of collusion. Others stress the potential for efficiency enhancing effects. Doyle and Snyder (1999), for instance, have analysed information exchanges of this kind in the automobile industry and argue that production forecasts are the only means by which firms can effectively communicate their private information about demand. They, therefore, interpret such exchanges not as cheap talk, but as a credible way of conveying *current market information.* Note that Doyle and Snyder justify communication about planned future conduct as a credible way to communicate about current information. We will abstract from this ambiguity in the rest of this paper.

While private communication about *future* pricing (and to a limited extent, future production) should be seen as direct evidence of collusion, information exchange, i.e. *communication about current market conditions or past actions*, is fundamentally different. When firms talk about future prices it is hard to imagine any other purpose but a collusive intent. This is not the case with information exchanges – even when they are significantly more disaggregated than a competition authority would like. For example, non-price information may be highly disaggregated simply because this was the way it was collected and no one bothered to aggregate the information. Firms will avoid the cost of aggregating information if this saves work. The fundamental reason for the information exchange may still be an efficiency enhancing one. In these cases, the role of competition policy is to detect such schemes, and where appropriate ensure that alternative systems are put into place, that do not pose the same collusive risks. The high deterrent fines that are appropriate for collusive conduct are not warranted in such a scenario.

But could the presence of highly disaggregated information signal an attempt to collude? Kühn and Vives (1995), for example, argue that in many cases the start of a collusive phase is associated with an abrupt increase in the intensity of information exchange, and an increase in the level of disaggregation of the information exchanged. Such an event would raise suspicions about collusive activity. But (even when in conjunction, for example, with a finding of parallel pricing) such information exchanges should never be considered conclusive evidence for collusion. Parallel pricing and information sharing are perfectly consistent with a fairly competitive market in which firms realise efficiency gains from information exchanging. Where the potential social benefits are large, there is simply no good argument that could make information exchange decisive for a finding of collusion. On the other hand, there is little value added from the finding evidence for an information exchange agreement when there is strong evidence for collusive behaviour already. In such cases the evidence is sufficient to fine firms for collusive behaviour without any reference to information exchanges. We will elaborate on this point in more detail when we discuss the Italian jet fuel case.

6.2.1.2 Restricting information sharing as a preventive policy?

Our argument, that information exchange should not be used as positive evidence in collusion cases, does not of course imply that information exchanges should never be challenged. We do believe that such arrangements can be considered as violations of antitrust laws in themselves under some restrictive circumstances. The idea is that in a world in which proving collusion is difficult, preventive measures should be taken to reduce the likelihood of collusion – as long as the costs of such measures are limited.

Even preventative intervention necessarily requires a demonstration that the observed information exchange arrangement *could* potentially facilitate collusion. The arrangement should,

furthermore, only be limited to the extent that its main efficiency-enhancing purpose can still be achieved.

The *UK Tractor* case is a classic example to illustrate how policy can be balanced in this way. The information exchange was so detailed that every single transaction could be identified. Kühn and Vives (1995) explain how such information can be crucial in sustaining a type of collusion called a "bidding ring". At the same time, all the efficiency goals claimed by the defendants could be shown not to require this level of data disaggregation. The remedy thus did not require the wholesale elimination of all information exchanges, but an obligation to exchange only data at a much higher level of aggregation.

Collusion theory provides some helpful insights as to when an information exchange should be deemed particularly problematic. For example Kühn and Vives (1995) have suggested the following classification for assessing the relative danger of different information exchange practices:

a) The monitoring of *past prices or past output* will generally eliminate all uncertainty about rivals' conduct. This is problematic because, under perfect monitoring, collusion is considerably easier than when some uncertainty about past behaviour is preserved;

b) The exchange of information about *current demand* is less powerful in facilitating monitoring: it can reduce demand uncertainty, and thus make inferences about rivals' behaviour more precise. However, it can never fully eliminate uncertainty about the rivals' past conduct. Kühn and Vives (1995) and Kühn (2001) therefore argue that such information exchanges should be treated significantly more leniently;

c) The degree of data aggregation on transactions is of importance in assessing the potential for information exchange to facilitate collusion. Highly disaggregated data is primarily of concern because it can facilitate punishments

that are targeted at deviators. Such punishments are known to enhance the ability to collude. Furthermore, data disaggregation over time may allow faster responses to deviations from collusive agreements, making punishments against deviators swifter and thus more effective.

We believe there are some observations that can be added to this list. In particular,

d) The exchange of *cost* information cannot really help the monitoring of collusive agreements. All that a firm needs to know about a rival to make collusion successful is whether the rival complied with a price or a quantity agreement. This may be hard to monitor when demand is uncertain. But cost uncertainty does not create a monitoring problem. Firms can always agree on prices that do not vary in the unobserved costs, and perfectly monitor such an agreement in the absence of demand uncertainty. At the same time, the revelation of cost information typically enhances competition in the absence of collusion (see Spulber, 1995). The sharing of cost information should therefore not be regarded as anticompetitive.

e) There is a big difference between the sharing of sales information and of delivery information. Information disaggregation on deliveries cannot improve monitoring in a market.

Point (d) could potentially be challenged by the observation that some collusive agreements could be made more efficient for the firms when information exchange is allowed. Similarly, it has been suggested that the conclusion of an agreement could be facilitated. While we have explained why we do not think sound policy should consider the latter point., the first has some basis in economic theory. However, the feasibility of monitoring is of much greater importance for enabling collusion than an information exchange that can only have an impact on the efficiency of a collusive agreement. Since such

an effect is almost impossible to evaluate we do not think competition policy would be well served by attempting to evaluate such an effect. We are better off focusing on effects we know are large, whichthis means focusing on the fundamental monitoring mechanism.

Point (e) also requires some explanation. In most markets there is little distinction a sale and a delivery. For example, in the UK tractor case, a tractor sold was a tractor delivered. Seeing whether a tractor was sold was sufficient to monitor sales quantities in this market. However, there are many other markets in which competition is *for long-term contracts*. The relevant information for collusion is whether a party has made the contract sale or not (or possibly the total sales quantity in the contract). But in such markets the total quantity is often delivered gradually over time. Now suppose that the total sales quantity is known. Then further disaggregation of *delivery data adds no relevant information* for contract competition. If a firm deviates and produces too much, this will be detected when total sales are known. Breaking down sales into many delivery units does not add relevant information. This is an important point because such markets often require detailed delivery information for logistics purposes, so that the efficiency gains from disaggregating delivery information may be large.

Both the rules of Kühn and Vives (1995) and our additional rules provide some rough guidance that is finer than simplistic statements about the degree of data aggregation. However they do not provide good guidance for the trade-off between the dangers to competition, and the efficiency benefits of the information exchange. The reason is that this requires knowledge of the specific efficiency gains achieved by an information exchange agreement. However, there are potentially so many different types of benefits from information exchanges that it is very hard to systematically list them. For this reason it is inevitable to adopt a case-by-case approach, which can be guided by contingent rules about the relative anticompetitive threat from different information exchange agreements. It is however important to note that there is theoretical reasoning and empirical

evidence available for helping in such an assessment. For example, recent work in operations research has revealed that information exchange along the vertical supply chain can generate significant efficiency gains by allowing firms to limit their storage costs. Such theories can be highly useful in assessing cases involving joint ventures in the supply chain, where vertical information exchange may necessarily imply horizontal information flows. We will come back to this issue in our discussion of the case.

The overall lesson from the economic literature is that the assessment of information sharing and exchanges must be very specific to the industry in question. The analysis needs to set out in detail the precise channel through which an information exchange may enhance the potential for collusion, and any such effect must be weighed against the potential efficiency benefits of the information exchange.

6.3 An economic approach to assessing information exchange agreements

While the criteria we discussed in the last section provide some guidance for policies towards information exchange agreements, they cannot be easily reduced to a set of simple rules. As we have seen it is not even the case that high degrees of data disaggregation should always be considered problematic. Information exchanges should be dealt with in a similar way as other practices that have to be analysed in a "rule of reason" fashion: we need a systematic procedure that includes some "safe haven" rules, the specification of a "theory of the case", clear criteria for the competitive harm that could be generated from the information exchange, and finally close attention to efficiency arguments.

First, we see benefits in a clear "safe haven" rule that exempts some information exchange agreements from scrutiny. For example, the exchange of aggregate data should never be deemed reason enough for a detailed investigation. Information exchanges about

costs should also not come under scrutiny because they cannot help facilitate the monitoring of a collusive agreements. Similarly, the degree of disaggregation of delivery data should be irrelevant to any investigation.

Second, any investigation of information exchange agreements should start with a clear "theory of the case": an analysis that determines at what level of the market collusion could plausibly happen, and how the particular information in question could facilitate such collusive behaviour.

Third, given the collusive arrangement considered as the theory of the case, one needs to assess the marginal impact of the information exchange agreement on the ability to monitor the agreement. Only where that impact is potentially large should an investigation proceed.

Fourth, there should be a thorough assessment of efficiency defences. The burden of coming up with efficiency defences should lie on the firms involved in the information sharing. Only efficiency defences suggested by the firms should be considered in the analysis. An efficiency defence should be considered invalid, if the same efficiencies could be obtained through a different information exchange agreement that generates lower risks for collusion under the theory of the case. If the benefit cannot be obtained under an alternate scheme, the case should be dropped.

Our suggested approach requires a careful assessment of the theoretical feasibility of collusion and the impact that an information exchange could have on it in order to find any presumption that an information exchange has a potential to lead to anticompetitive effects. The approach is very conservative, in line with the literature, to allow any efficiency argument that cannot be shown to be invalidated by an alternative information exchange agreement to stop a case. The reason is that the whole policy approach towards information exchanges should be preventive. A theoretical harm should not trump a well-argued efficiency reason.

6.4 A case study: the Italian jet fuel case

6.4.1 Overview

In the rest of this paper we apply the framework discussed in the first part to a recent investigation into the Italian jet fuel market. Oil companies active in the supply of jet fuel to airlines in Italy have been heavily fined based on the conclusion that they participated in a collusive agreement. However, the finding of collusion was not founded on any of the evidence that is usually required for establishing it: no evidence was produced of an agreement between jet fuel suppliers, including no evidence of meetings or any other form of communication about future conduct that could serve for the coordination of pricing policies. Instead the AGCM built its case on certain features of the bids made by the different suppliers to the airlines, that were claimed – together with information sharing arrangements at the level of airport JVs – to constitute evidence for collusion. Subject to the differences that contracting generates this is in spirit just like a parallel pricing case in which information exchange is taken as a plus factor.[2] The AGCM considered the information exchanges at the level of airport JVs to be evidence for collusion, however it did not consider in sufficient detail whether the circumstances of the market were conducive to collusion, and the specific role of certain forms of information sharing to enable collusion. If performed correctly, we believe that such an analysis would have led to a very different conclusion.

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[2] Although this is not a traditional parallel pricing case because the similarity of contract conditions does not refer to the price but other parts of the contract, specifically share of deliveries, it is in the same spirit in the sense that there is an attempt to make inferences from the pattern contract terms to the existence of a collusive agreement.

6.4.2 Market background

6.4.2.1 The sale of jet fuel to airlines

The sale of jet fuel to airlines, in Italy as elsewhere, is structured as a bargaining process for supply contracts. Each airline periodically issues a call for tender that covers its anticipated fuel requirements at every airport in a broad geographic region (or even world-wide). The airline solicits for each airport in the region a bid with two basic components: a *price per unit of fuel* delivered "into plane", and the *share* of the overall volume requirements each oil company is willing to provide at that price.[3] The initial round of bidding is normally followed by a bargaining process in which the airline seeks to negotiate a lower price from each bidder and to adjust shares so that accepted bids add up to 100% of the airline's volume requirement. Oil companies will frequently be awarded a lower share than they originally bid for (and possibly no share at all); but it can also happen that the shares initially bid fall short of the airline's total requirement.

"Share contracts" are used by the airlines mainly because they are a good instrument for sharing idiosyncratic airport, supplier, and airline risk. From the point of view of an airline, relying on a single jet fuel supplier for all its fuel needs would involve too much risk: if the supplier's operations are disrupted for any reason, the airline's

[3] Most contracts specify both the shares of the airline's requirement at the various airports that are awarded to the supplier, and the corresponding expected volumes. In their final version, a few contracts appear not to actually specify the share, but only the expected volumes. However, even in these cases the bidding and bargaining process is explicitly about shares of supply. As the initial tender document issued by the airline specifies expected total requirements, "shares" are still implicitly defined even when only expected volumes are written in the contract. Economically this means that all contracts can be regarded as "share contracts".

entire jet fuel demand would have to be re-sourced, at short notice. Given that certain logistics have to be in place for an oil company to supply an airline at an airport, it may be impossible or at least very costly to identify an alternative source from another party without a pre-existing contract. The simultaneous use of multiple jet fuel suppliers both reduces the severity of any such potential problem (only part of the jet fuel demand would have to be re-sourced) and simplifies its solution (there is at least another supplier with whom the airline has an established commercial relation, and who will have stocks at the airport).

From the point of view of the jet fuel supplier, it would be similarly a bad strategy to commit a large share of volumes to a single airline at one airport. A jet fuel supplier typically needs to solve complex planning problems to optimise the utilisation of its production and logistic capacity. Large variations in volumes sold at any given airport would require re-optimisation of the logistic chain, and may result in cost increases (e.g. because of lower capacity utilisation and/or the need to use more expensive flexible resources). Since the volatility of demand of a given airline is likely greater than the volatility of aggregate demand at any airport, a jet fuel supplier can insure itself against idiosyncratic airline risk by spreading its supplies over several airlines (for a given share of deliveries to a given airport). Such insurance strategies are efficiency enhancing because they reduce the demand risk for the jet fuel supplier, and therefore lower the required risk premium.

The insurance motive for share contracting also leads to strong predictions about price movements, when the relative risk of airline contracts change. For example, if one airline develops a greater risk of bankruptcy, jet fuel suppliers have a rational incentive to shift share away from it, and towards lower-risk airlines. As a result, the equilibrium price charged to the airline with increased bankruptcy risk will be higher, and/or payment terms will be adjusted. Note that in this case all suppliers will adjust their prices in the same direction. This could be mistaken for collusion but would be true even in a perfectly competitive market. In equilibrium, the relative market

share position may not adjust at all unless suppliers differ in their ability to absorb risk. These considerations potentially played an important role in this case because it followed a complaint by Alitalia, which at the time was facing significant financial difficulties and was complaining about prices and payment terms offered by the oil companies.

The *duration* of the contracts solicited by and signed with the airlines is usually one year, but shorter and longer contracts are also observed, and airlines do have flexibility in specifying and negotiating contract duration.

The *price* that is agreed with the airlines following negotiations with each supplier individually is defined in terms of a mark-up or "differential" over a benchmark price. The practice of pegging the contract price to a market benchmark is a form of "indexation" that reflects the presence of considerable aggregate uncertainty in the market. Contract prices are made contingent on the variability in the spot market price. In Italy, the generally recognised benchmark price is the Platts Cargoes FOB Med (Basis Italy) quotation for jet aviation fuel, with the differentials, or mark-ups over the benchmark price, reflecting local supply conditions, as well as local marketing costs (including airline and airport-specific factors).

An important feature of the bidding and bargaining process for jet fuel contracts that we have just described is that *the contract negotiation process itself leads to considerable revelation of information over time.* The airlines typically reveal considerable information on rivals' actual or alleged positions in order to induce a reduction in prices, or a revision in shares. This often includes some feedback on the reasons why a supplier may not have achieved its share target, or may have lost share at a given airport, including the identity of rivals who may have gained share at one's expense and some indication of the difference between the supplier's bid and the winning bids.

6.4.2.2 The organisation of jet fuel delivery services into plane

Significant economies of scale exist in the installation and operation of assets for the distribution of refined products to the points of consumption. As a result, market structures in distribution tend to be relatively concentrated. The supply of jet fuel to aircrafts at any airport has two distinct logistic components: *storage* of fuel at the airport, and *delivery into plane*. Often, especially at larger airports, a *hydrant* distribution system (a system of underground pipelines) is used to transport the fuel to hydrant pits adjacent to aircraft embarking positions, thus eliminating the need to transport the fuel from storage to aircraft via bowsers or tank trucks.

Storage: the demand for jet fuel at airports is subject to unforeseen variations (e.g. arising from last-minute changes to flight schedules, or temporary delays in the pipeline or other means of supplying fuel to the airport). For this reason, and given the paramount importance of avoiding flight delays, typically a buffer of two to three days' supplies is held in storage on site.[4] Airport storage activities involve significant economies of scale, as a result of which it would be less efficient and much more costly for each supplier to install separate storage facilities.[5] For reasons of space and security, airport authorities frequently allow only a single storage services operation (often subject to "open access" clauses that allow other suppliers to join as members via purchase of an equity interest, or simply to use

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[4] This may be less at major airports, e.g. only one to two days. Larger stocks, including compulsory storage, are maintained elsewhere in less expensive locations, further upstream in the supply chain.

[5] With separate facilities, suppliers would not be able to exploit the available scale economies and would also forego the opportunity of pooling their storage requirements, so that more storage capacity would be installed than is actually needed. Availability of space for such facilities is also a significant factor, since many airports are land-constrained and cannot spare acreage for construction of multiple tank farms. For security and again space reasons, airport authorities oppose the proliferation of facilities.

the common facilities as non-members at some reasonable tariffs). Fuel storage facilities at many airports throughout the world are thus common facilities, owned by joint ventures that are operated on a cost-sharing basis. Without these, distribution costs at many airports would typically be much higher. The cost saving benefits of joint operation (together with the fact that common facilities are usually operated under open access provisions) explain why they have been routinely exempted from antitrust rules against horizontal concentrations. In Italy, even at each of the largest airports of Fiumicino (Rome) and Malpensa (Milan), there is only one JV running storage operations (with non-shareholders granted access rights).

Hydrants: At larger airports, and also at many medium- sized ones, the fuel that is taken from storage for delivery travels through an extensive underground pipeline system to hydrant pits adjacent to parked aircraft, where *into plane* delivery crews (see below) connect final filtration and testing equipment located on hydrant service vehicles and the *into plane* loading lines. Economies of scale and requirements of the airport authorities typically imply that only a single hydrant system is built. The joint airport storage and the hydrant facility are typically managed by the same operator.

Delivery into plane: After a final quality control check, fuel is delivered into the aircraft by *into plane* delivery crews. The main cost component for these operations is manpower. This activity also has some economies of scale because the cost of delivery declines the more deliveries are carried out by any given crew. However, the size of such scale economies is not as large as in the case of storage facilities (i.e. the minimum efficient scale is not as large). At medium-to-large airports, there can therefore be multiple into plane delivery operations,[6] though for safety considerations (to limit the number of

[6] Regulation also plays a part, with the EU Ground Handling Directive (and related national implementing legislation) establishing that airports above a certain size (2m passengers a year) must have at least two *into plane* service companies.

trucks from different companies on the tarmac at the same time) into plane delivery is also typically organised in the form of joint ventures. These JVs include oil companies with activities at the airport, and occasionally also airlines (though not in Italy) or airport authorities. "Open access" clauses for equity participation and throughput services to non-members are common for these companies.

Coordination of activities between storage and into plane delivery JVs: To ensure that aircrafts are refuelled promptly and efficiently, without causing unnecessary delays, storage and into plane delivery JVs must coordinate their activities. Storage JVs must to ensure that the right volumes are released on behalf of each oil company to the right into plane JV once the fuel is in storage. Furthermore, the storage JV must ensure correct booking of the delivery against the account of the right supplier (informing the supplier of any shortfall, and facilitating – if required – "into tank" swaps to cover supply disruptions for any one supplier). "Into plane" JVs organise the delivery schedule on behalf of its members: this primarily involves optimising its manpower requirements given the flight schedule at the airport (what flights of which airline leave at what time throughout the day) and the information it receives both from airlines and oil companies on the volumes each supplier is contracted to provide to each airline. In addition, "into plane" JVs must coordinate their activities daily to ensure that, for airline customers shared by different JVs, deliveries are split according to the respective shares of the contracting oil companies and of course that the planes to be fuelled are scheduled appropriately to avoid two different crews turning up to supply one aircraft, and none to another one.

Activities of this kind require a smooth flow of information along the vertical supply chain. Changes in demand at the airplane and airport level must be known, so that adjustments can be made in planning deliveries at a given airport. Work in recent years in the area of operations research has focused attention on efficiency gains from increased information flows in vertical supply chains, and has

found significant efficiency gains for inventory holdings (see for example Cachon and Fisher 2000). In addition, information must also be made available to the members of the JV to ensure that they discharge their fiduciary duties and ensure that the JV is well managed, that volumes delivered on behalf of each member meet the agreed shares of supply, and there are no biases in service quality for any one member. These are important aspects that must be considered when assessing the potential for anticompetitive effects of the information transmitted within and between JVs.

6.4.3 The AGCM's collusion case

Competition in this market takes place at the stage of *bidding for supply contracts*, while there is no competition at the final delivery stage – operated through JVs. The AGCM concluded that certain features of the bids (e.g. the fact that the volumes being bid by different suppliers sometimes summed up to exactly 100% of the requirements of the specific airline at the specific airport), together with certain market outcomes and the highly disaggregated information on deliveries being available to JV members (monthly data on deliveries to each airline by each supplier at the airport) justified the conclusion that suppliers had engaged in collusion. We briefly discuss in this section why such conclusion is not consistent with "best practice" antitrust enforcement, and why the information sharing practice the AGCM objected to were in fact inadequate as evidence to prove existing collusion.

The AGCM's finding of collusion relied essentially on circumstantial factors. The investigation did not produce documentary evidence that jet fuel suppliers agreed on, or even discussed, their future commercial conduct. Where documents were found that discussed competitors' bidding strategies in future rounds of negotiation, the language was generic, and as far as we can tell consistent with the possibility that the information in question could have been generated from market intelligence – for instance, in

the course of contractual negotiations with airlines. The typical evidence for collusive behaviour, namely the simultaneous finding of documents containing the same information about planned conduct at different companies, was absent in this case. Finding a document with annotations on the expected conduct of rivals is not evidence of collusion, or of communication between rivals.

At the same time, evidence from past negotiations did not appear consistent with the notion of an effective information exchange about future conduct. Oil companies' documentation on the progress of contract negotiations often reflected uncertainty on their part about the expected behaviour of rivals. Such uncertainty appears inconsistent with systematic coordination of conduct in the contract negotiation stage.

The AGCM also argued that further evidence of lack of competition in the Italian market was provided by the fact that jet fuel differentials above Platts' reference prices in Italy were higher than in other European airports. They also claimed that market share volatility in the jet fuel supply market was low at the aggregate level.[7] In themselves such arguments – even if true – would constitute poor evidence for collusion. Differences in average price levels in different countries can arise for many reasons (e.g. heterogeneity in airport size, properly measured, between Italy and allegedly "low price" countries like the UK). And while there is consensus that high market share volatility makes collusion unlikely, low market share volatility does not imply the opposite.

The more important question for our discussion is whether weak "evidence" for collusion of this type can ever be "strengthened" by the simultaneous existence of information exchanges of highly disaggregated data on delivery quantities. Why would a finding of relative price differences be more likely to suggest collusion when an information sharing practice is in place? To the extent that price differences across countries can be plausibly explained by observable

[7] These facts were disputed by at least some of the parties. This is not however central to our discussion.

heterogeneity, the differences cannot be used as evidence for collusion whether there is information exchange or not. But even where observed heterogeneities do not explain the price differences, the mere finding of an information exchange agreement does not explain the price difference by itself. This could only be the case if the presence of different information exchange regimes across Europe were correlated with the price differences. Such evidence is no proof for collusion but might at least be suggestive about information exchange agreements having a potential effect on the price level. However, the AGCM's decision tells us nothing about information sharing practices elsewhere in Europe.

Could the existence of information sharing practices "strengthen" evidence on low market share volatility? This is again hard to see. Information exchanges might even reduce market share volatility in a competitive setting (if firms have more similar assessments of market demand as a result) and increase it under collusion (if the information allows adjustment to relative demand shocks). Low market share volatility is not evidence for collusion in the presence of information sharing. There is also no consistent economic argument implying that the sharing of information is more likely to be for collusive purposes if market share volatility is low. These are simply pieces of evidence that do not support a case of collusion by themselves, and *do not become stronger through accumulation*.

Another alleged piece of evidence for collusion cited by the AGCM policy was the observation that there are instances where share bids added up to exactly 100%. The AGCM concluded that this could only happen as a result of collusion, as it required prior communication. Again such a conclusion is economically dubious. As changing one's pattern of supply to a given airport implies adjustment costs for the suppliers, it may very well be rational to simply roll-over contracts from a year to the next. Even if that occurred randomly and independently for each oil company, there would be a positive probability of observing share bids that add up to 100%. But even if the AGCM had a point that certain bidding patterns could be suggestive of coordination, it is still the case that

the presence of an information sharing agreement cannot add anything to the case. Either the observed behaviour necessarily arises because of coordination – but then the information exchange is irrelevant for reaching that conclusion – or such conclusion cannot be drawn. Observing information exchange does not make an incorrect argument more plausible.

The only circumstance in which information exchanges could be used as evidence for collusion is where the specific exchange is *much more likely* to occur in a collusive regime. This is not automatically the case even for information exchanges that involve highly disaggregated data. As long as there is a non-collusive explanation for the information exchange it is not possible to attribute the information exchange to an attempt to collude. For example, In the case of Italian airport JVs there may be a trivial explanation for the high degree of disaggregation of data: for instance, JV managers may find it easier to simply circulate a pre-existing spreadsheet with disaggregated data then to spend the time and effort to aggregate data before distributing it. As long as there is no significant cost involved in disaggregating the data it will be impossible to make an inference about the data exchange serving a collusive purpose.

Kühn and Vives (1995) have emphasised that information exchanges could provide evidence for collusion when the alleged "start" of a collusive arrangement coincides with a sudden increase in the amount of information exchanged, and the level of disaggregation of the data. For instance, in the *Fatty Acids* case the start of what looked like a collusive period clearly coincided with a subset of firms starting to exchange disaggregated data. Furthermore, there was evidence for what precisely the disaggregated data was used for. This combination of the timing of the exchange with documentation for the actual use of the data can amount to credible evidence for collusion. This was not a feature of the Italian jet fuel case.

6.4.4 Could information sharing practices in this market be anticompetitive?

While information sharing practices even on highly disaggregated data cannot form a central piece of evidence in a collusion case, there is nevertheless the possibility that an information exchange agreement could be anti-competitive in itself – especially in the context of a preventive policy aimed at preventing practices that could possibly facilitate future collusion. Given the very circumstantial evidence that actual collusion was in place, this would have been *a priori* a more reasonable approach for the AGCM to take. In this section we discuss how an analysis focusing on this particular issue could have proceeded following the steps we have outlined in Section 3: developing a collusive "theory of the case", then describing the potential marginal impact of the information exchange regime observed, and finally looking at the potential efficiency benefits.

6.4.4.1 Developing a "theory of collusion" that fits the nature competition in the case

Competition in the jet fuel market only takes place at the stage of bidding and negotiation for supply contracts to the airlines. The services of storage and into plane delivery are inputs into these contracts. Since the joint ventures that operate these activities price their services on the basis of a cost sharing mechanism, competition is not an issue for these activities. In other words, firms cannot eliminate competition between them by taking profits through the JV input price. Given this, what can be the effects of the observed information exchanges at the level of airport JVs on competition at the stage of contract negotiations?

The dissemination of information through JV channels could have an impact on the scope for collusion only if it had the potential to substantially facilitate collusion *at the stage of bidding and bargaining*

for supply contracts. Sharing information can only have an impact on the scope for collusion in a market if it substantially improves the monitoring of competitors' actions. Two types of information might help to support a collusive mechanism: first, information that reveals *whether some competitor has deviated* from a collusive agreement; and second, information that reveals *which particular competitor* was responsible for the deviation. The first type of information is crucial for sustaining a collusive equilibrium. The second type of information may allow "punishments" to be more narrowly targeted at selected rival(s), and thus make punishments in a collusive equilibrium more efficient, but it is not critical to sustain a collusive equilibrium.

Could the information available to JV members as a result of their participation in JVs significantly affect the monitoring of competitors' bidding and negotiation behaviour? This is not a priori impossible. If the information exchange regime allows firms to find out something about the bidding behaviour of their rivals, then the information exchange agreement could facilitate collusion in the market. However, monitoring of rivals' prices is not decisive in the case of bidding for *share contracts*. As long as a rival's bidding does not lead to a reduction in the share allocated to other firms in a collusive agreement, competitors should not care about the price charged by competitors. In other words, when there is share bidding, all that rivals would need to do is to agree on the share they should bid for and refuse to accept larger shares. It is therefore sufficient for a collusive agreement to monitor the shares achieved in a round of bidding.

Collusion in this market would then involve a sequence of contract bids of different sizes, in which firms made bids for prices and delivery shares with an agreement in place on the delivery shares. An information exchange agreement could help in such a situation, to the extent that it helped reveal (or to reveal "faster") whether someone deviated form the agreement on shares and who was the "deviator". Such an effect can only occur if the marginal impact of the information exchange regime on the ability to monitor

the share part of the bid is substantial. Otherwise, the information exchange regime would have little impact on the ability to collude.

6.4.4.2 The marginal impact of the information exchange on monitoring possibilities

A. High market transparency is guaranteed by the contracting process itself

Contracting for the supply of jet fuel has the unusual feature that, in addition to bargaining over a price per unit, the airline and the oil company bargain over the supply of a specific *percentage* of the customer's total requirement that is to be delivered at a particular airport. Much more information is automatically revealed in contracts where the *percentage* to be supplied is specified, than in standard contracts. With standard contracts, each supplier typically knows only the volumes he has contracted for. However, the customers' total purchases are not known, and therefore a supplier cannot directly deduce his market share with the customer. With a standard contract, information exchanges can increase the scope for collusion because they can allow monitoring of a market sharing agreement that could not be monitored from contract information alone. *However,* when the supplier explicitly negotiates over the *share* of the customer's total supplies he is willing to cover, the monitoring problem is in practice much reduced without any need for an information exchange: each bidder directly observes what share he attains at the end of the negotiation process. No information sharing is needed to detect whether the bidder achieves the "agreed" share of supplies. There is no need for an information exchange to improve the ability to detect whether a rival deviated from a market or customer sharing agreement. An information exchange, therefore, cannot increase the scope for collusion when negotiations are about supply shares.

The only information that is not directly revealed by a share contract is information that may help to identify the specific rival responsible for a deviation from a collusive agreement. Such information might create the scope for "targeted" punishments after a deviation and thus make punishments somewhat less costly. But while targeting of punishments can save some of the costs of imposing punishments, the impact on the scope for collusion is small in most economic models (relative to the benefit of being able to detect a deviation that has occurred). To show that the sharing of information is anticompetitive, it must be established that the information being shared could substantially improve the identification of deviators in a hypothetical collusive scheme.

In this case there is no agreement whether the bargaining process reveals more individualized information about rivals' shares. The AGCM claims to have examples in which marketing personnel explicitly attempted to obtain this information from their JV representative.[8] At the same time, however, there is clear evidence of communications that reveal the relevant information through the bargaining process. If additional information on the performance of rival bidders could indeed facilitate collusion, then airlines should anticipate such behaviour and refuse to reveal information about rival bidders to an oil company in the course of contract negotiations. It is indeed unsurprising that airlines may reveal this information in practice. It is well known in economic theory that the party that designs the sales process, i.e. the airlines in our example, has an interest in competitors knowing as much as possible about each other. For example, auction theory has established that such information induces more aggressive pricing by bidders. Industry

[8] This evidence in itself would refute the claim of the AGCM that there was systematic information exchange between the JV and the relevant marketing departments of the oil companies. If there had been such systematic exchanges up the supply chain we would not observe individual marketing managers requesting this information in specific isolated incidents.

participants describe exactly this effect when they explain why this information becomes available. They appear to believe that this information is revealed by the airlines in order to induce greater price reductions. Note that there would be absolutely no incentive for airlines to reveal this information if they believed that their suppliers were operating in a collusive regime. Under collusion the information could not increase the intensity of competition.

Irrespective of any information that may become available through the channel of airport JVs, the market appears thus to be highly transparent at least as far as effects are concerned that we know to have a large impact on the ability to collude. It then seems implausible that any information sharing agreement at the JV level could have had a significant impact on the transparency of the market, and thereby materially improved the scope for collusion at the time of bidding for share contracts.

B. Sharing disaggregated delivery information at the JV level cannot have anticompetitive effects

As part of their daily operations, the director of an "into plane" JVs regularly receives detailed information on past fuel deliveries to each of the airlines supplied by the JV at the particular airport. This information is crucial for keeping track of transactions, scheduling delivery, and appropriately billing the airlines. This data is by necessity highly disaggregated over time (typically on a monthly basis) and broken down by supplier. However, this highly disaggregated data is competitively neutral even if shared directly with the supplier. This is the case because the data concerned is delivery data, which must be assessed differently from the exchange of sales data (such as in *UK Tractor)*.

The availability of disaggregated delivery data over time serves *no purpose* in monitoring rivals' behaviour in *contract* negotiations. Disaggregation is *over deliveries,* but not over *bidding events*. Only disaggregation over *bidding events* would be relevant for the impact of the information sharing on competition. To see this, suppose that

the JV changed the frequency of data transmitted to its directors from monthly to weekly or daily. This would reveal no new information about contract terms that each oil company has agreed to with any given airline. Disaggregation over time cannot enhance collusion in this setting.

To understand this important point, it is useful to compare the situation in the jet fuel market with that in the *UK Tractor* case. In that case, each sale was concluded as a separate transaction, and for any one sale there was only one delivery. As a result, the information exchange system made it possible to identify individual transactions that could not be identified without the information exchange system. In the jet fuel market, there are many deliveries for any given transaction (a contract). However, any collusive scheme between suppliers would have to focus on the relevant actions in bidding and contract negotiations. These are the prices, and share volumes, that are bid in the auction. How much is physically delivered in a given week or month is irrelevant to competition at the contracting stage. The disaggregation of delivery figures for a given transaction thus can have no effect on the scope for collusion.

To summarise, the classic monitoring problem of imperfect observability of the strategies of other firms is virtually eliminated in the case of share contracts. This is because:

- With share contracts, the performance of one's own contract can be sufficient to reveal whether rivals have complied with a putative collusive agreement;
- Information on rivals' *individual* market shares would reveal which *particular* rival has cheated, and make more targeted punishments possible. This would potentially reduce the cost of retaliation somewhat, but not have a major impact on the feasibility of collusion;
- much of the information that detects individual deviators is revealed in the course of contract negotiations;

- Disaggregation of delivery data (in contrast to disaggregation of transactions data) adds no further information that is relevant to collusion. Hence the availability of disaggregated data over time at the level of JVs has to be considered competitively neutral;

These features of the markets allow the conclusion that the marginal impact even of a highly disaggregated information exchange on delivery data can only have a small marginal effect on the ability to collude. The value of the additional information generated through the exchange is of low value for facilitating collusion. This does not mean that the value of that information is low. On the contrary the benefits of the exchange for logistics purposes may be very high as we explain further below.

C. The marginal impact of information exchanges on collusion is even lower where collusion is a priori unlikely

To assess the risk of collusion in a market, competition policy has increasingly turned to results from the economic literature on the comparative statics of collusion models. This is valuable also in an information exchange case: if there are structural features in the market that make collusion harder to sustain, then the marginal impact of any information exchange regime must be small. The reason is that collusion is difficult to sustain even in perfectly transparent markets in such a case.

Several features of the Italian jet fuel market make it *a priori* implausible that suppliers could effectively coordinate their commercial behaviour when bidding for contracts to supply airlines. Relevant factors include:

- *Asymmetry in market structure:* It is well recognised in the economic literature that collusion is much less likely to be

successful in markets that are asymmetric.[9] In the Italian jet fuel market ENI accounts for over 40% of all jet fuel volumes sold in Italy, the next largest competitor (Esso) has a market share less than half that amount. Other jet fuel suppliers (Total, Kuwait, Tamoil, Shell) only reach shares between 5% and 15%. This qualifies as a market with very asymmetrically placed firms. These asymmetries are explained by asymmetries in the suppliers' respective refining capacities, and distribution infrastructure. While jet fuel suppliers should be expected to have some market power, a situation where the largest firm is more than twice as large as the second is a priori a very unlikely candidate for concerns about collusion.

- *Infrequent contracting with individual airlines, and asymmetries in contract size:* Two further features of the market together suggest that collusion is not easily sustainable. First, new contracts with each airline are negotiated and agreed at roughly annual intervals. When contracting is this infrequent, collusion is recognised to be less likely as there is less scope for retaliation in response to "deviations" from the putative collusive agreement. Put simply, the intuition is that delayed retaliation (i.e. punishing a rival "next year" for cheating "this year") is much less effective than retaliation that is immediate. If "punishments" can be imposed just after cheating is observed, the relative cost of cheating is increased. A punishment that is far in the future is relatively less important because firms discount future profits.

The long contracting interval would matter little if contracts of roughly similar sizes were coming up for renewal continuously throughout the year Then rival "cheating" on the contract with airline A could be punished fairly swiftly in the bidding for airline B. However this is not the case in practice. Contract sizes tend to be

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[9] Papers further developing this intuition include Compte, Jenny and Rey (2002), Kühn (2002) ,(2004) , Kühn and Rimler, M. (2006), and Whinston (2005), M. Lectures on Antitrust Economics, Chapters 1(*) and 2 (no *), Cambridge: MIT Press, 2005.

asymmetric. Alitalia, for instance, accounts for the lion's share of jet fuel demand in Italy. This generates inter-temporal variation in the demand that makes collusion more difficult. If a rival "cheats" on the large contract with Alitalia, a punishment on a much smaller contract with a smaller airline will not be severe enough to constitute an effective deterrent. In particular, the incentives to collude are relatively smaller in the case of contracts with Alitalia. This is because winning a share of Alitalia's contracts implies significant volume gains, and this increases the incentive to cheat on those contracts. The threat to "punish" cheaters in the future on much smaller contracts with other airlines remains not very credible.[10]

The AGCM has disputed this type of an analysis. Specifically, they have pointed to multimarket contact arguments, namely that oil companies could punish deviations on markets for other petroleum derivative products. However there was no evidence of this happening (only vague allusion to such possibilities), and in the absence of clear evidence of pre-existing collusion on these other markets, multimarket contacts cannot be argued to facilitate collusion in the jet fuel market. Such claims are therefore purely speculative.

On balance the structural features of the market thus suggest that the "danger" posed by any given information sharing agreement must be lower than in other markets – and therefore the observed information sharing practices are less likely to have a significant impact on the ability of jet fuel suppliers to collude.

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[10] Note that this does not necessarily mean that Alitalia obtains the lowest prices in the market. Given Alitalia's ımportance on the demand side, it is harder for suppliers to diversify the idiosyncratic Alitalia risk through contracts with other companiesç Alitalia's risk will remain a large component of the Italian portfolio. The risk premium that competitive firms have to ask of Alitalia to compensate for the risk of serving them will affect Alitalia's prices (however competitive the market is).

6.4.5 Efficiency justifications for the information structure of the JVs

The sharing of information between participants in airport JVs also appears to have important efficiency reasons, that were never even considered by the AGCM. This might be proper if the AGCM had proved the existence of collusion, but would not be appropriate when evaluating information exchanges simply as a potentially anti-competitive practice in itself.

As mentioned, JVs are each run by a manager typically employed by the JV. They also have a board of directors, representing the oil companies as owners of the JV, which performs the role of a supervisory body that monitors the activities of the management. In their capacity as JV directors, employees of the parent oil companies have access to very detailed JV data on delivery quantities and JV operating costs. The dissemination of information within a JV allows fuel suppliers to improve operational efficiency and achieve cost savings in the delivery of the fuel, which in turn allows for lower supply prices to airlines.

To carry out the activities of the JV it is not only necessary for the manager to have full access to all delivery data. In a share contracting regime it is also necessary for oil companies to be able to monitor whether the share specified in the contract has been fulfilled. For this, the oil company needs to be able to verify at least the total delivery from the JV to an airline, in order to monitor that its own actual share corresponds to that agreed in the contract. Disaggregation of this share data over time cannot have any competitive effects at all.

But there are also efficiency reasons for the sharing of much more disaggregated data between JV members, which are closely related to the function of the JVs. “Into plane” JVs face a complicated problem of cost minimisation in scheduling and coordinating fuelling services to aircrafts. Since manpower is in practice a fixed cost, the efficient operation of refuelling activities by the JV is essential to achieve low costs. In designing its schedule, the JV must

take into account that aircrafts of different sizes take different times to refuel, and refuelling costs for each plane vary because of these differences. Furthermore, each contract of an oil company with an airline implies a different mix of types of planes that have to be refuelled. An efficient pricing system for into plane services should reflect differences in refuelling costs for different planes and (ideally) also differences in marginal costs to the JV at different times of the day (for reasons such as the variance in manpower needed to fuel aircraft during peak and non-peak hours). Over the last few years JVs at major airports have become increasingly sophisticated in managing schedules and setting prices for into plane services, and this has generated significant efficiency gains. These are made possible by the collection and analysis of increasingly detailed information about JV operations. In order to achieve such efficiency gains, it seems necessary to share this information in some form with the oil companies that are the JV members.

6.4.5.1 Why JV directors need highly disaggregated data

As the pricing system for JV services is based on a cost-sharing principle, the primary task for the manager of an "into plane" JV is to find ways of minimising the costs of refuelling. A related task of the manager is to develop pricing schemes for the services of the JV that effectively capture the costs actually incurred by the JV to refuel specific planes. Since refuelling costs for different types of planes vary, the contracts held by one supplier may induce different costs per unit refuelled to those held by another supplier.

From a strictly operational point of view, only the manager of the JV needs to receive precise and highly disaggregated data on volumes supplied and costs. However, as in any company, the performance of the manager needs to be monitored by the shareholders. Where shares are traded, such monitoring is performed indirectly by the financial markets. However, airport JVs are essentially run based on a principle of cost sharing, which

implies that profits cannot exceed a set rate of return on assets. Monitoring of financial performance is therefore not possible, and all monitoring has to take the form of an audit of the activities of the manager. Indirect monitoring through other schemes like yardstick style benchmarking is also unlikely to function well. Cost structures at different airports are very heterogeneous, depending on the size of the airport, the types of planes that need to be refuelled, airline schedules etc. Benchmarking always requires units to be sufficiently similar in cost structure to give appropriate incentives.

The only way to check whether a JV manager is achieving the above objectives is for the board to obtain detailed and disaggregated information on deliveries and associated costs. This allows the directors to monitor from realised costs whether the manager is adequately pursuing the objective of cost reduction. Such audits are essential not only to achieve cost minimisation, but also to ensure that the delivery volumes (and shares) communicated by the JV member to the JV are implemented correctly by the JV. It would not be possible to control the manager and comply with their fiduciary duties, if JV directors were not provided with such very detailed information. The board of directors also periodically has to decide, on the basis of cost data, whether some more sophisticated pricing system should be implemented, and such an assessment requires disaggregated data.

It should be noted that the implicit information exchange that is generated in this way through the board of directors could not be avoided for instance by a rule that only some members (but not others) have a director on the board. Such a system would create incentives for those suppliers that are represented on the board to cooperate with the manager of the JV, to the detriment of the other JV members that are not represented on the board by biasing cost-allocation schemes in their favour. Nor would it be possible to staff the JV's board of directors entirely with outsiders, as an effective supervisory role in the JV requires a logistics background, and a thorough understanding of the JV's business. There simply are not many experts in the logistics of jet fuel delivery around that are not

employed by oil companies. Even if there were such outsiders they could not have the appropriate incentives to make operational decisions on, for example, pricing schemes that have an important effect on the profits of the oil companies. This would lead to an additional principal agent problem that would be difficult do resolve.

It should also be noted that there could in principle be no competitive effect of the information sharing with directors, if arrangements were in place that prevented the passing on of information from the operational side of the oil company to the marketing side that makes the bids. We will now show that passing on some information to the marketing side of the parent company can have significant potential efficiency benefits.

6.4.5.2 Efficiency justifications for passing JV information to the parent companies

Refuelling costs are different for different planes. For example, refuelling short-haul flights is more expensive per unit of fuel than refuelling long-haul flights. As fuel suppliers have contracts that imply different mixes of long and short haul flights, refuelling costs for these contracts will differ. It is important that actual refuelling costs are known to airlines, as they allow them to make informed choices. For example, they can target contracts with a high share of long haul flights. If such targeting is possible, competition for these contracts competition would be harsher, because costs are lower.

More generally, knowledge of actual refuelling costs allows suppliers to factor into their bid calculations the actual costs of servicing the contracts. This can only increase efficiency. Such efficiency gains can be potentially even greater looking towards the future, as JVs become more sophisticated in using cost information to price their services. For example, a sophisticated pricing system would charge different prices at congested and less congested times of the day. Knowing such cost differences would allow suppliers to

compete more aggressively for contracts with airlines that have more landing slots at low congestion/low servicing cost times, and could lead to lower prices for airlines that land at off-peak hours. Such pricing has again efficiency enhancing effects because congestion of refuelling services could be implicitly priced in the bidding process. Restricting the information flows from the JV to the oil companies may therefore eliminate potential efficiency enhancing changes.

The AGCM claims in the decision on the case that it has found vertical sharing of cost information that was used for bidding behaviour. This was interpreted as anticompetitive behaviour. However, this is precisely what should be done to make bidding behaviour more efficient in a non-collusive context. The decision thus shows the dangers of not seriously analysing efficiency defenses in information exchange cases.

6.4.5.3 How to weigh the efficiency arguments

To understand how efficiency arguments should have been "weighed" in this case the following points must be kept in mind. First, the potential anticompetitive effect of the observed information exchange is small. Hence, even if there is a minimal chance of efficiency benefits an information exchange should not be suppressed in this case. A comparison with the UK Tractor case is again useful. In the UK tractor case it was shown that for none of the efficiency purposes claimed was it necessary to generate disaggregated data. This is different in this case. It is undisputed that at some stage in the vertical chain highly disaggregated data is necessary for operations. It is also clear that access to this data is necessary for the monitoring the manager as well as for informed owner decisions on operations procedures like price schedules. Can this be delegated outsiders? Any consideration that there are efficiency losses from such delegation has to be enough not to make such a restriction. This is the difference with the UK tractor case. There was no doubt, for example, that data of competitors was not

needed to process warranty claims. The standard for an efficiency defense in information exchange cases should be low. Preventive policies are not the only way to reduce collusion and efficiency arguments therefore must have much higher weight than usual. This is especially the case when the marginal impact of the scheme is minimal as in the case described.

6.4.6 A variant on the information exchange argument: fuel exchanges

The Italian jet fuel case also raised an interesting variant on the claim that information exchanges could be anti-competitive. The AGCM observed that there was considerable swapping and trading of jet fuel between oil companies across Italy, and was concerned that this could facilitate collusion – in particular by revealing information about costs. One could think of this as an indirect information exchange arrangement, mediated through trading between competitors.

To assess this argument it is first necessary to understand what drives trading between oil companies economically. Given the different location of refineries across the Italian territory, transport costs to a given airport will tend to be different for different suppliers. However, given the supply contracts they have in place, suppliers have a strong incentive to minimise their logistics costs by saving on transport costs. Thus if company A needs to supply 100 units in location B and company B needs to supply 100 units in location A, they could simply trade 100 units in A against 100 units in B and save all transport costs. This generates considerable efficiency gains. Furthermore, once contracts are in place, oil companies have an incentive to make such trade whatever the competitive structure of the contract market. Unsurprisingly, suppliers make full use of such cost-reducing trades in the form of

fuel exchanges, as well as "buy/sell" arrangements.[11] This increases the flexibility of the logistical system, and reduces overall supply costs.

The large and obvious efficiency-enhancing role of exchanges makes them an extremely common feature in markets for all kinds of oil products all over the world. Their occurrence is unrelated to market power, and more directly depends on the respective locations of production and consumption centres. In regions where the distance between different refineries is limited, the proportion of exchanges in total deliveries should be expected to be small. Conversely, given Italy's geography, and the physical distribution of airports and refineries across the country, we would expect substantial exchanges to take place between different oil companies whatever the competitive behaviour in the auctions for jet fuel contracts.

The AGCM suggested that the persistence of significant trade over time somehow indicated collusive purpose. However, suppliers to the Italian market have developed their own pattern of buy/sell arrangements to optimise the use of their physical distribution assets, given the demand pattern that they face at the various airports. Without significant demand or cost shocks, or relocations of refining capacity, we should not expect these arrangements to change significantly over time. There is no incentive to change the cost-minimising distribution patterns that have emerged over time given the respective locations of refineries and airports, unless some exogenous shock requires re-optimisation. It is therefore clear that

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[11] These arrangements have replaced in recent years the earlier practice of "swaps", which used to be priced with reference to the parties' respective transport cost savings. In today's exchanges and "buy/sell" arrangements, company A buys a given volume from company B for delivery at a certain location, and sells a volume to B (not necessarily the same) for delivery at another location, and the two "legs" of the transaction can be priced differently based on each side's alternative options.

even if the firms were to gain knowledge about each others' cost structures this should be of little concern to competition authorities.

But there are other reasons why such arguments are invalid. First, the pricing does not necessarily reflect costs of the producer at all because price will depend on opportunity costs after production, which may be determined by transport costs etc. These will not be the costs that are relevant at the bidding stage. Second, theory suggests that information exchanges about costs have much smaller scope for facilitating collusion. For this reason we have suggested to exempt exchanges about cost data completely from scrutiny. But even if none of these arguments were accepted, the obvious efficiency effects of the buy and sell arrangements should prevent any intervention by a competition authority.

6.5 Conclusion

In this paper we have reviewed the policy rationale for regulating information exchange agreements. We have clarified that such agreements will almost never constitute solid evidence in a collusion case. But even for identifying anti-competitive information exchange agreements, simplistic rules against the sharing of disaggregated information are not a reasonable policy choice. Policy could be substantially improved by implementing a more systematic procedure by which to analyse information exchange cases. This would involve establishing a safe haven rule, a clear specification of a potential collusive threat to the market, a careful analysis of the marginal impact on the ability to collude of the existing information sharing agreement under the theory of the case, as well as a careful assessment of the efficiency benefits. Whenever significant benefits of an agreement cannot be excluded it should not be prohibited.

We have illustrated our procedure of analysis on a recent Italian case on the jet fuel industry. We believe that a careful analysis would not have supported the dramatic conclusions that were drawn in that

case, and such errors could be prevented by adopting a more stringent framework of analysis in the future.

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