
How Do Cartels Operate?

How Do Cartels Operate?

Joseph E. Harrington, Jr.

*Department of Economics
Johns Hopkins University
Baltimore, MD 21218, USA
joe.harrington@jhu.edu*

now

the essence of **knowledge**

Boston – Delft

Foundations and Trends[®] in Microeconomics

Published, sold and distributed by:

now Publishers Inc.
PO Box 1024
Hanover, MA 02339
USA
Tel. +1-781-985-4510
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:

now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

A Cataloging-in-Publication record is available from the Library of Congress

The preferred citation for this publication is J.E. Harrington, Jr., How Do Cartels Operate?, *Foundations and Trends[®] in Microeconomics*, vol 2, no 1, pp 1–105, 2006

Printed on acid-free paper

ISBN: 1-933019-87-5
© 2006 J.E. Harrington, Jr.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording or otherwise, without prior written permission of the publishers.

Photocopying. In the USA: This journal is registered at the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients, is granted by now Publishers Inc for users registered with the Copyright Clearance Center (CCC). The 'services' for users can be found on the internet at: www.copyright.com

For those organizations that have been granted a photocopy license, a separate system of payment has been arranged. Authorization does not extend to other kinds of copying, such as that for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale. In the rest of the world: Permission to photocopy must be obtained from the copyright owner. Please apply to now Publishers Inc., PO Box 1024, Hanover, MA 02339, USA; Tel. +1 781 871 0245; www.nowpublishers.com; sales@nowpublishers.com

now Publishers Inc. has an exclusive license to publish this material worldwide. Permission to use this content must be obtained from the copyright license holder. Please apply to now Publishers, PO Box 179, 2600 AD Delft, The Netherlands, www.nowpublishers.com; e-mail: sales@nowpublishers.com

**Foundations and Trends[®] in
Microeconomics**
Volume 2 Issue 1, 2006
Editorial Board

Editor-in-Chief:

W. Kip Viscusi

John F. Cogan, Jr. Professor of Law and Economics

Harvard Law School

Hauser 302

Cambridge, MA 02138

USA

kip@law.harvard.edu

Editors

Richard Carson, UC San Diego (environmental economics)

Joseph Harrington, Johns Hopkins University (industrial organization)

Tom Kniesner, Syracuse University (labor economics)

Thomas Nechyba, Duke University (public economics)

Mark V. Pauly, University of Pennsylvania (health economics)

Peter Zweifel, University of Zurich (insurance economics)

Editorial Scope

Foundations and Trends[®] in Microeconomics will publish survey and tutorial articles in the following topics:

- Environmental Economics
- Contingent Valuation
- Environmental Health Risks
- Climate Change
- Endangered Species
- Market-based Policy Instruments
- Health Economics
- Moral Hazard
- Medical Care Markets
- Medical Malpractice
- Insurance economics
- Industrial Organization
- Theory of the Firm
- Regulatory Economics
- Market Structure
- Auctions
- Monopolies and Antitrust
- Transaction Cost Economics
- Labor Economics
- Labor Supply
- Labor Demand
- Labor Market Institutions
- Search Theory
- Wage Structure
- Income Distribution
- Race and Gender
- Law and Economics
- Models of Litigation
- Crime
- Torts, Contracts and Property
- Constitutional Law
- Public Economics
- Public Goods
- Environmental Taxation
- Social Insurance
- Public Finance
- International Taxation

Information for Librarians

Foundations and Trends[®] in Microeconomics, 2006, Volume 2, 4 issues. ISSN paper version 1547-9846. ISSN online version 1547-9854. Also available as a combined paper and online subscription.

Foundations and Trends[®] in
Microeconomics
Vol. 2, No 1 (2006) 1–105
© 2006 J.E. Harrington, Jr.
DOI: 10.1561/07000000021



How Do Cartels Operate?

Joseph E. Harrington, Jr.¹

¹ *Department of Economics, Johns Hopkins University, Baltimore, MD
21218, USA, joe.harrington@jhu.edu*

Abstract

This paper distills and organizes facts about cartels from about 20 European Commission decisions over 2000–2004. It describes the properties of a collusive outcome in terms of the setting of price and a market allocation, monitoring of agreements with respect to price but more importantly sales, punishment methods for enforcing an agreement and also the use of buy-backs to compensate cartel members, methods for responding to external disruptions from non-cartel suppliers and handling over-zealous sales representatives, and operational procedures in terms of the frequency of meetings and the cartel's organizational structure.

Contents

1	Introduction	1
2	What are the Properties of a Collusive Outcome?	5
2.1	Price	6
2.2	Quantity	24
3	How is a Collusive Outcome Enforced?	43
3.1	Monitoring	44
3.2	Enforcement	57
3.3	Disruptions	64
4	What is the Structure and Organization of Meetings?	73
4.1	Frequency of cartel meetings	74
4.2	Organizational structure of the cartel	77
5	Concluding Remarks	81
	Appendix A Industries	83
A.1	Carbonless paper	83
A.2	Choline chloride	84

A.3 Citric acid	85
A.4 Commercial explosives	85
A.5 Copper plumbing tubes	86
A.6 District heating pipes	86
A.7 Electrical and mechanical carbon graphite products	87
A.8 Fine arts auction houses	88
A.9 Graphite electrodes	88
A.10 Industrial and medical gases	89
A.11 Industrial tubes	90
A.12 Isostatic graphite	91
A.13 Lysine	92
A.14 Methionine	92
A.15 Nucleotides	93
A.16 Organic peroxides	93
A.17 Plasterboard	94
A.18 Seamless steel tubes	95
A.19 Soda ash	95
A.20 Sodium gluconate	96
A.21 Sorbates	96
A.22 Vitamins	97
A.23 Zinc phosphate	98
Appendix B Sources	99
Acknowledgements	105
References	107

1

Introduction

A recent paper reviewed various approaches to detecting collusion using patterns in firm behavior (Harrington, 2006). The efficacy of looking for patterns in prices and quantities relies on knowing what to look for. What does cartel behavior look like? How is it distinguishable from competitive behavior? Towards better addressing those questions, this paper delves deeper into cartels and explores how they operate. How a collusive outcome – in terms of price and an allocation of market supply – is determined. How a collusive outcome is monitored and enforced. How often a cartel meets and how a cartel’s organizational structure is designed. The hope is that such an exercise will produce a better understanding of how cartels operate and generate a richer set of collusive markers based on market data.

This paper does not engage in an empirical analysis as it is normally conceived. Rather, the approach is to glean what one can from about 20 cartels for which there is detailed information.¹ Though we will not be able to draw any definitive (that is, statistically significant) conclusions and indeed any claims are necessarily speculative, this is partially offset

¹It is more in the style of the classic studies by Stocking and Watkins (1946, 1948) and Hay and Kelly (1974).

2 Introduction

by being able to offer finer details about cartels which will suggest a richer set of collusive markers.² It needs to be emphasized that the case studies are largely confined to providing information during the episode of collusion. Thus, claims about how cartel behavior differs from competitive behavior will either rely on using general knowledge of competitive behavior (rather than knowledge about how this particular industry behaves when firms are not colluding) or reported information about how the colluding firms sought to change their practices.

In addition to making progress on identifying collusive markers, this analysis may also have implications for future directions in the theory of cartels. By identifying empirical regularities and institutional features of hard-core cartels, this information can be used to guide theoretical modelling. The next big step in the theory of collusion is apt to be the construction of models of hard-core cartels that take account of the manner in which firms coordinate and communicate and the realities of dealing with firm asymmetries. As firms run the risk of incurring penalties by engaging in explicit collusion, a simple revealed preference argument tells us that the outcomes under explicit collusion must be different from those under tacit collusion. What is needed are models that are designed for hard-core cartels and this requires using the rich institutional detail that case studies offer.³

The primary source material for this study are European Commission decisions over 2000–2004.⁴ These cases comprise cartel activity going back to the 1970s though largely cover activity in the 1980s and 90s. While the Antitrust Division of the U.S. Department of Justice regularly issues Press Releases, these are typical one or two pages in length which provide minimal details as to how cartels actually function. In contrast, the European Commission decisions can range from 30 to over 200 pages and provide vast information on the manner in which firms

² By a collusive marker I mean some property of firm behavior which is much more consistent with collusion than with competition.

³ One might argue that explicit collusion may only entail meeting once to coordinate on behavioral rules that are identical to what would have emerged under tacit collusion. To the contrary, hard-core cartels meet frequently and regularly. Firms are then continually running the risk of discovery and presumably they do so because these meetings generate more profitable outcomes than tacit collusion.

⁴ One decision, seamless steel tubes, is actually from December 1999.

colluded. My collection of cases were drawn from two online sources: *Official Journal of the European Union*⁵ and “Cases” at *DG Competition of the European Commission*.⁶ These cases encompass about 2/3rds of the relevant cases during that time period and represent, to the best of my knowledge, an unbiased sample.⁷

There have been several recent studies that perform a similar exercise to that conducted in this paper. Connor (2001) offers a highly detailed description and analysis of cartel behavior, though his focus is restricted to the citric acid, lysine, and vitamins cartels. Levenstein and Suslow (2001, 2004) provide case studies of bromine, citric acid, graphite electrodes, seamless steel tubes, and vitamins but their analysis is more structural – characterizing industry conditions – with less coverage of cartel operations. Using a large set of European Commission and U. S. Department of Justice decisions on price-fixing, Grout and Sonderegger (2005) provide a comprehensive examination of cartels. Related work is by Symeonidis (2003), who focuses on cartels in the United Kingdom, and Levenstein and Suslow (2006). The analyses of those papers focus on identifying industry traits that result in cartel formation, while my emphasis is on describing cartel behavior. From the perspective of screening for cartels, those studies are useful for implementing a structural screening approach – identifying those industries for which a cartel is likely to emerge – while the current study is designed to support a behavioral screening approach – identifying patterns in market data consistent with a cartel operating.

Section 2 reviews the agreements made regarding price and the allocation of the market. Procedures for sustaining that agreement are discussed in Section 3 and this includes monitoring, punishments, and the handling of external disruptions. Section 4 focuses on the frequency of meetings and the organizational structure of the cartel, while Section 5 offers a few brief concluding remarks. Appendix A provides, by way of background, a brief description of each of the industries – product

⁵ <<http://europa.eu.int/eur-lex/lex/JOIndex.do>>

⁶ <<http://europa.eu.int/comm/competition/antitrust/cases>>

⁷ For an excellent background on cartel policy in the European Union, see Harding and Julian (2003).

4 *Introduction*

description, geographic markets, companies, and cartel duration – and Appendix B lists the primary sources used in the study.

Warning: It is important to note two possible sources of bias to the case material. First, I am drawing cartels from the population of discovered and successfully prosecuted cartels. There is no reason to believe that this is an unbiased sample of the population of cartels which is the actual population of interest. It is possible that discovered cartels are the less effective ones and that is why they were discovered. Furthermore, there is the decision of the antitrust authority (which in my case is largely though not exclusively the European Commission) to prosecute a case. Similarly, there may be a bias to pursue “easy” cases or cases brought forward under the leniency program or cases pursued in other geographic jurisdictions. What biases to our analysis are introduced by this selection process is unclear but, once again, there is concern that the sample of cartels may not be representative. That our knowledge of cartels of recent vintage is largely limited to those that have been discovered is an intrinsic challenge we face when studying cartels. Second, the primary source of the material comes from one side of the case – the prosecutorial side in the form of the European Commission. There may be a different story to tell if the defendants’ perspective was also part of the material. That the leniency program was used in many of these cases suggests that at least some of the information was provided by the cartel members themselves. With these caveats in place, let us move forward.

References

- Athey, S. and K. Bagwell (2001), 'Optimal collusion with private information'. *RAND Journal of Economics* **32**, 428–465.
- Bloch, K. (1932), 'On German Cartels'. *Journal of Business* **5**, 213–222.
- Connor, J. M. (2001), *Global Price Fixing: Our Customers are the Enemy*. Boston: Kluwer Academic Publishers.
- Eichenwald, K. (2001), *Informant: A True Story*. New York: Broadway Books.
- Grout, P. A. and S. Sonderegger (2005), 'Predicting Cartels'. Office of Fair Trading, Economic discussion paper.
- Harding, C. and J. Julian (2003), *Regulating Cartels in Europe: A Study of Legal Control Corporate Delinquency*. Oxford: Oxford University Press.
- Harrington, J. E. (2004a), 'Post-Cartel pricing during litigation'. *Journal of Industrial Economics* **52**, 517–533.
- Harrington, J. E. (2004b), 'Cartel pricing dynamics in the presence of an antitrust authority'. *RAND Journal of Economics* **35**, 651–673.
- Harrington, J. E. (2005), 'Optimal Cartel pricing in the presence of an antitrust authority'. *International Economic Review* **46**, 145–169.
- Harrington, J. E. (2006), 'Detecting Cartels'. In: P. Buccirossi (ed.): *Handbook in Antitrust Economics*, MIT Press. (Forthcoming).

- Harrington, J. E. and J. Chen (2005), *Cartel Pricing Dynamics with Cost Variability and Endogenous Buyer Detection*. Johns Hopkins University, (International Journal of Industrial Organization, forthcoming).
- Harrington, J. E. and A. Skrzypacz (2005), *Collusion with Monitoring of Sales*. Johns Hopkins University, (RAND Journal of Economics, forthcoming).
- Hay, G. and D. Kelly (1974), 'An empirical survey of price fixing conspiracies'. *Journal of Law and Economics* **17**, 13–38.
- Levenstein, M. and V. Suslow (2001), *Private International Cartels and Their Effect on Developing Countries*. University of Massachusetts.
- Levenstein, M. C. and V. Y. Suslow (2006), 'What determines cartel success?'. *Journal of Economic Literature* **44**, 43–95.
- Levenstein, M. C., V. Y. Suslow, and L. J. Oswald (2004), 'Contemporary international cartels and developing countries: Economic effects and implications for competition policy'. *Antitrust Law Journal* **71**, 801–852.
- Lieber, J. B. (2000), *Rats in the Grain: The Dirty Tricks and Trials of Archer Daniels Midland*. New York: Four Walls Eight Windows.
- Marshall, R. C., L. M. Marx, and M. E. Raiff (2005), *Cartel Price Announcements: The Vitamins Industry*. Penn State University, pdf copy.
- Mason, C. (2004), *The Art of the Steal: Inside the Sotheby's Christie's Auction House Scandal*. New York: G. P. Putnam's Sons.
- Röller, L.-H. and F. Steen (2003), *On the Workings of a Cartel: Evidence from the Norwegian Cement Industry, 1955–1968*. Norwegian School of Economics and Business Administration.
- Scherer, F. M. (1980), *Industrial Market Structure and Economic Performance*. Boston: Houghton Mifflin Company, 2nd edition.
- Stocking, G. W. and M. W. Watkins (1946), *Cartels in Action: Case Studies in International Business Diplomacy*. New York: The Twentieth Century Fund.
- Stocking, G. W. and M. W. Watkins (1948), *Cartels or Competition?* New York: The Twentieth Century Fund.
- Symeonidis, G. (2003), 'In which industries is collusion more likely? Evidence from the UK'. *Journal of Industrial Economics* **51**, 45–74.