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The Size of Cartel Overcharges: Implications for U.S. and EC Fining Policies

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The size of cartel overcharges: Implications for U.S. and EU fining policies

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The purpose of this article is to examine whether the current cartel fine levels of the European Union (EU) and the United States are at the optimal levels. We collected and analyzed the available information concerning the size of the overcharges caused by hard-core pricing fixing, bid rigging, and market allocation agreements. Data sets of United States cartels were assembled and examined. These cartels overcharged an average of 18% to 37%, depending upon the data set and methodology employed in the analysis and whether mean or median figures are used. Separate data sets for European cartels also were analyzed, which show overcharges in the 28% to 54% range. We similarly examined cartels that had effects solely within a single European country (which showed significantly lower overcharges, averaging in the 16% to 48% range).

In light of the desire for optimal deterrence, we compare the current fine levels in both the EU and the United States to the amounts gained on average by cartels as a result of their illegal activity. The results show that on average cartel overcharges are significantly larger than the resulting criminal fines of either the EU or the United States. This means that the United States and—especially—the EU should increase their penalties for hard-core collusion substantially.

I.   INTRODUCTION: OPTIMAL DETERRENCE OF ANTITRUST VIOLATIONS

The generally accepted approach to deterring[1] antitrust violations optimally was developed by Professor William Landes,[2] who showed convincingly that the penalties (fines and damages) from an antitrust violation should be equal to the violation's "net harm to others"[3]

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[1]   For the standard optimal deterrence approach, *see* William M. Landes, *Optimal Sanctions For Antitrust Violations*, 50 U. CHI. L. REV. 652, 656 (1983). Professor Landes was not concerned with the compensation of victims. For an analysis that takes compensation into account, *see* Robert H. Lande, *Are Antitrust "Treble" Damages Really Single Damages*, 54 OHIO ST. L.J. 115, 161–68 (1993).

[2]   Landes, *supra* note 1. Professor Landes built upon and applied to antitrust a framework developed in Gary Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169 (1968).

[3]   Professor Landes employed some reasonable simplifying assumptions. The logic underlying the "net harm to others" standard was explained clearly by Professors Breit & Elzinga:

> The trick to discovering the optimal sanction is to find a rule that will force the potential cartelist to compare any cost saving from his activity with the deadweight loss triangle. If the cost saving were larger than the deadweight loss, it would be in his (and society's) interest to undertake the illegal activity. So after he deducts the monopoly profit rectangle (which is only part of the fine to be paid under the Posner-Easterbrook rule), the cartelist will examine the deadweight loss (the remainder of the fine to be paid) and compare it with the value of the cost saving. The fine that is the sum of the deadweight triangle plus the profit rectangle is the correct sanction since it will encourage the "right" amount of illegal antitrust activity. Damages larger than this . . . could lead to overdeterrence, for in that

divided by the probability of detection and proof of the violation.[4] Analysts of both the Chicago and post-Chicago schools of antitrust have almost universally accepted these principles.[5]

The "net harm to others" from cartels of course includes the wealth transfers from consumers to the cartel,[6] but it includes other,

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case the potential offender would be comparing the wrong magnitudes. After paying the trapezoid . . . the remaining part of the fine to be paid would be compared with the cost saving from the illegal activity. If it is larger than that amount, the potential cartelist would be deterred from forming the cartel. But this would be incorrect from a social standpoint if the deadweight loss triangle were in fact less than the cost saving. . . .

Therefore, the Posner-Easterbrook penalty causes the antitrust violator to compare any efficiency gains of the violation to the deadweight loss to society. The antitrust violator must be made to forgo his monopoly overcharge . . . in order to give him the proper incentives to make the correct comparison. Only a fine equal to the total loss in consumers' surplus brings about this result.

A numerical example may help to clarify the concept of the optimal antitrust sanction. Assume that a potential cartelist calculates that joining a horizontal price-fixing conspiracy will increase his profits by $100 million. He also is aware that the deadweight loss imposed on society by his activity is $50 million. If the expected value of the fine imposed is the entire amount of consumers' surplus ($150 million) would he enter the cartel? He would do so if he believed that the cartel would be accompanied by cost reductions to him greater than $50 million. If the cost saving were, say, $60 million, he would still enter the price-fixing conspiracy because he would know that his fine would be $100 million (his cartel profits) plus $50 million (the deadweight loss), leaving him $10 million more revenue than would be the case if he did not enter the cartel. In this case the cartel is accompanied by cost reductions greater than the deadweight loss it imposes on society. On efficiency grounds, it should be permitted.

WILLIAM BREIT & KENNETH G. ELZINGA, ANTITRUST PENALTY REFORM 11–12 (1986).

[4] See Landes, supra note 1, at 666–68. Thus, if the harm were 10 and the probability of detection and proof were one-third, the optimal penalty for this violation would be 30. This ignores risk aversion and other factors. See id.

[5] See the discussion in Lande, supra note 1, at 161–68.

[6] See Landes, supra note 1.

less obvious factors as well. First, market power produces allocative inefficiency—the deadweight loss welfare triangle[7]—that often is significant empirically[8] but apparently has never been awarded in an antitrust case.[9] Second, market power can produce "umbrella" effects,[10] another virtually unawarded damage from market power. Moreover, cartel members may have less incentive to innovate or to offer as wide an array of nonprice variety or quality options.[11] And, of course, all of a cartel's harms should be adjusted to present value.[12] These adjustments, combined, show that antitrust's so-called "treble

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[7]   *See* E. MANSFIELD, MICROECONOMICS: THEORY AND APPLICATIONS 277–92 (4th ed. 1982) (defining allocative inefficiency and providing a proof that it is created by monopoly pricing); MICHAEL L. KATZ & HARVEY S. ROSEN, MICROECONOMICS 114 (3d ed. 1998).

[8]   Frank Easterbrook, *Detrebling Antitrust Damages*, 28 J.L. & ECON. 445, 455 (1985). Judge Easterbrook made a number of standard assumptions and calculated that the allocative inefficiency effects of market power were half as large as the transfer effects and that, due to the omission from damage awards of this factor alone, "'[t]reble damages' are really [only] double the starting point of overcharge plus allocative loss. . . ." *Id.*

[9]   *See* David C. Hjelmfelt & Channing D. Strother, Jr., *Antitrust Damages For Consumer Welfare Loss*, 39 CLEV. ST. L. REV. 505 (1991). We recently performed our own search and also did not find such a case.

[10]   "Umbrella effects" is the name given to higher prices charged by non-violating members that were permitted or caused by the violation's supracompetitive prices. *See* PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 337.3 (Supp. 1992). To illustrate, OPEC never produced even 70% of the free world's supply of oil. *See* MOHAMMED E AHRARI, OPEC: THE FAILING GIANT 203 (1986). Yet, when OPEC raised prices, noncartel members also increased oil prices. *Id.* Moreover, the prices of fuels that were partial substitutes for oil, such as coal, uranium, and natural gas, also rose. *See* George L. Perry, *The United States, in* HIGHER OIL PRICES AND THE WORLD ECONOMY: THE ADJUSTMENT PROBLEM 102 (Edward R. Fried & Charles L. Schultze eds., 1975). Moreover, there are several additional types of harm that often are caused by cartels. *See* Lande, *supra* note 1, at 129–58.

[11]   *See* Neil W. Averitt & Robert H. Lande, *Implementing the Consumer Choice Approach to Antitrust*, ANTITRUST L.J. (forthcoming 2006).

[12]   Studies suggest that the average cartel probably lasts seven to eight years, with an additional four-plus years lag before judgment. *See* Lande, *supra* note 1, at 130–34.

damages" remedy actually is roughly equal to one times an antitrust violation's "net harm to others."[13]

Moreover, since not every cartel is detected or successfully proven, the "net harm to others" from cartels should be multiplied by a number that is larger than one (this multiplier should be the inverse of the probability of detection and proof).[14] Of course, no one can be certain about the percentage of cartels that are detected and proven. In 1986 the Assistant Attorney General for Antitrust, Douglas Ginsburg, opined that the enforcers detected no more than 10% of all cartels.[15] Other experts have suggested detection probabilities of 10% to 33%.[16] It seems very likely that the Antitrust Division's amnesty program has resulted in the detection and proof today of a larger percentage of cartels than when Ginsburg made his estimate.[17] We know of no evidence, however, that the current

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[13]   *Id.* at 158–60. This is a very rough approximation that does not include any adjustments for possible losses of innovation or diminished consumer choice.

[14]   "Multiplication is essential to create optimal incentives for would-be violators when unlawful acts are not certain to be prosecuted successfully. Indeed, some multiplication is necessary even when most of the liability-creating acts are open and notorious. The defendants may be able to conceal facts that are essential to liability." *See* Easterbrook, *supra* note 8, at 455.

[15]   *See* United States Sentencing Commission: Unpublished Public Hearings, 1986 volume (July 15, 1986 Hearing) at 15.

[16]   *See* Peter G. Bryant & E. Woodrow Eckard, *Price Fixing: The Probability of Getting Caught*, 73 REV. ECON. & STAT. 531 (1991) (finding a probability of 13% to 17% for domestic U.S. cartels); R. M. Feinberg, *The Enforcement and Effects of European Antitrust Policy: A Survey of Legal Opinion*, 23 J. COMMON MKT. STUD. 373 (1985) (finding that cartel discovery is believed by European lawyers to be about 10%); Mitchell A. Polinsky & Steven Shavell, *The Economic Theory of Public Enforcement of the Law*, 38 J ECON. LIT. 45 (2000) (stating that for the most common felonious property crimes (burglary, auto theft, and arson) U.S. arrest rates vary from 13.8% to 16.5%); and Mark A. Cohen & David T. Scheffman, *The Antitrust Sentencing Guideline: Is the Punishment Worth the Cost?*, 27 AM. CRIM. L. REV. 331, 342 (1989) (giving an illustration with a 33% probability of detection).

[17]   *See* Gary R. Spratling, *Detection and Deterrence*, 69 GEO. WASH. L. REV. 798, 817–23 (2001).

probability of detection and proof exceeds 33%, and there certainly is evidence that, despite the enforcers' superb efforts, many cartels still operate.[18] We can be virtually certain, however, that if the combined antitrust sanctions (including fines and damage payouts) total only one times the actual damages caused by the violation, firms are significantly undeterred from committing antitrust violations.[19]

Since the publication of Becker's and Landes' classic articles, optimal deterrence theory has evolved.[20] Most theories of optimal legal enforcement assume that the aim is maximization of social welfare, and this can lead to a number of interesting conclusions. For example, optimal enforcement may involve a combination of fines and imprisonment, but the latter is rare in Europe.[21] Criminal law systems with extensive protections for the accused should have

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[18]   The continued high number of U.S. Department of Justice ("DOJ") grand juries, and the recent DOJ success rate in the courts, is evidence that many cartels still exist. As of February 2004, the DOJ had approximately 100 pending grand jury investigations, 50 of which involved suspected international cartel activity. ANTITRUST DIV., U.S. DEP'T OF JUSTICE, STATUS REPORT: AN OVERVIEW OF RECENT DEVELOPMENTS IN THE ANTITRUST DIVISION'S CRIMINAL ENFORCEMENT PROGRAM (2004), *available at* http://www.usdoj.gov/atr/public /guidelines/202531.htm. Between 1993 and 2002, the DOJ opened from 19 to 51 grand jury investigations per year, most of which resulted in convictions. ANTITRUST DIV., U.S. DEP'T OF JUSTICE, WORKLOAD STATISTICS: FY 1991–2002, *available at* http://www.usdoj.gov/atr/public/12848.htm. Since 1995 the government has won more than 90% of such cases each year. If there was little or no effective price fixing during this period, the DOJ fooled a large number of grand juries, judges, and juries.

[19]   Instead of attempting to ascertain the actual probability of detection and conviction, one could focus upon the perceptions of probable defendants. It would be extremely useful to know potential price fixers' perceptions of the probability that they would be caught and convicted of price fixing, and their belief as to how much they would be forced to pay. We know of no reliable information on this issue, however.

[20]   *See, e.g.,* Nuno Garoupa, *Theory of Optimal Law Enforcement,* 11 J. ECON. SURVS. 267 (1997).

[21]   Where prisons are expensive (as in Europe), fines may be preferred to imprisonment; for whatever reason the opposite often seems to be the case in the United States.

higher sanctions, and criminal cartel fines are in fact higher in North America.[22] Deterrence is enhanced by legal systems that punish conspiracies to commit crimes, even though the conspiracy may be ineffectual. Common law systems have long relied on conspiracy theories, and EU cartel enforcement has moved in that direction.[23] Private suits often can result in overall lower costs of public and private enforcement; again, this is long-standing practice in the United States and the direction in which the EU seems to be moving. These and other predictions from optimal deterrence theory have, however, received only limited empirical verification.

In the United States and some other jurisdictions efforts to deter cartels are pursued by a combination of factors: private damage actions, and jail sentences and individual and corporate criminal fines for some types of antitrust violations. This article will focus only on the last of these types of sanctions: corporate criminal fines. We will not attempt to ascertain whether the other types of sanctions are at the appropriate level.

II. VIEWS ON CARTEL DETERRENCE IN EUROPE

European concepts of the philosophical foundation of the antitrust laws incorporate two principles.[24] First, the retribution principle stresses that sanctions should be imposed on violators in proportion to the harm inflicted on the victims. In economic terms this means that antitrust fines and compensation should be related to

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[22]   Some scholars have taken the position that criminal proceedings are inherently superior in deterring cartels because there are likely to be fewer enforcement errors than in an EU-style administrative system. *See* Maarten Pieter Schinkel & Jan Tuinstra, *Imperfect Competition Law Enforcement* (Department of Economics, University of Amsterdam, Working Paper, June 2004) (on file with the authors).

[23]   Julian M. Joshua & Sarah Jordan, *Combinations, Concerted Practices, and Cartels: Adopting the Concept of Conspiracy in European Community Competition Law*, 24 Nw. J. INT'L L. & Bus. 647 (2004).

[24]   International Competition Network, *Defining Hard Core Cartel Conduct, Effective Institutions, Effective Policies: Vol. 1: Report Prepared by the ICN Working Group on Cartels* (Bonn, Germany June 2005), *available at* www .internationalcompetitionnetwork.org.

the economic harm generated by the price fixing or other violation. Second, the utilitarian principle insists that society is best served when penalties are high enough to prevent recidivism, either by the perpetrator himself (special deterrence) or as an example to other would-be wrongdoers (general deterrence).

The idea that deterrence of one type or another is the object of anticartel enforcement seems to be well accepted by European legal writers on cartel laws.[25] Antitrust enforcement is seen as promoting societal welfare through organizational penalties that discouraged illegal future cartel formation. Less well accepted, however, is whether the victims of this illegal behavior should be compensated for their losses.

III. CURRENT U.S. FINING PRACTICES

The current criminal fines for cartels are established by Sentencing Guidelines promulgated by the U.S. Sentencing Commission (USSC).[26] These Guidelines provide that the base fine level generally will be 20% of the "volume of affected commerce."[27] The USSC's cartel fine levels, established in 1987 and in effect today, follow from its presumption "that the average gain from price-fixing is 10 percent of the selling price."[28] The USSC doubled the 10% estimate to account for harm "inflicted upon consumers who are unable or for other reasons do not buy the product at the higher price."[29] The Commission added: "The purpose for specifying a percent of the volume of commerce is to avoid the time and expense that would be required for the court to determine actual gain or loss."[30]

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[25] Wouter P.J. Wils, *Is Criminalization of EU Competition Law the Answer?*, 28 World Competition 117 (2005); and Christopher Harding & Julian Joshua, Regulating Cartels in Europe: A Study of Legal Control of Corporate Delinquency (2003).

[26] U.S. Sentencing Guidelines Manual § 2R1.1 (2005).

[27] *Id.* § 2R1.1(d)(1).

[28] *See* U.S. Sentencing Guidelines Manual § 2R1.1, application note 3.

[29] *Id.*

[30] *Id.*

The USSC Guidelines start with a base fine of double the 10% presumed overcharge and adjust this by a number of factors, such as whether bid rigging[31] or other aggravating factors are involved, and by mitigating factors as well.[32] A complex series of adjustments result in the actual fine that is to be imposed on a cartel member. (These fines usually are adjusted downward for cooperation or as a part of the Antitrust Division's leniency program.[33]) As the Sixth Circuit noted, the USSC "opted for greater administrative convenience" instead of undertaking a specific inquiry into the actual loss in each case.[34]

The USSC adopted the crucial 10% presumption because its use was advocated by the (then) head of the Antitrust Division, Douglas Ginsburg, who stated to the USSC that "price fixing typically results in price increases that has [sic] harmed the consumers in a range of 10 percent of the price. . . ."[35] While the record does not disclose how Ginsburg arrived at his 10% overcharge estimate,[36] a prominent

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[31]   If bid rigging is involved, the Base Offense Level is increased by 1. *See* U.S. SENTENCING GUIDELINES MANUAL § 2R1.1(b).

[32]   *See id.* § 2R1.1 and application note 1.

[33]   *See* Spratling, *supra* note 17.

[34]   *See* United States v. Hayter Oil Co., 51 F.3d 1265, 1277 (1995) ("The offense levels are not based directly on the damage caused or profit made by the defendant because damages are difficult and time consuming to establish. The volume of commerce is an acceptable and more readily measurable substitute").

[35]   Douglas Ginsburg, Statement to the United States Sentencing Commission 13–14 (July 15, 1986). *See* United States Sentencing Commission: Unpublished Public Hearings, 1986 volume (July 15, 1986 Hearing) at 14. If Ginsburg was correct, damages for cartels should have been tenfold their damages.

[36]   Interestingly, two economists at the Antitrust Division published an unusually thoughtful analysis of many of these issues at roughly the same time that Assistant Attorney General Ginsburg testified before the USSC. *See* Gregory J. Werden & Marilyn J. Simon, *Why Price Fixers Should Go To Prison*, 32 ANTITRUST BULL. 917 (1987). Included in this article was a tantalizingly brief survey of existing cases, and on this basis they concluded that a "[c]onservative estimate of the average price increase from price-fixing is 10 percent." *Id.* at 924–25. Even though the article's first footnote cautions that the views in the article "are not purported to reflect those of the U.S.

analysis of this issue by Cohen and Scheffman[37] published shortly
after the antitrust Sentencing Guidelines were promulgated states
that the economic evaluation of a very small number of price-fixing
conspiracies was particularly important in shaping the conclusions of
Ginsburg and the USSC that the overcharges from price-fixing
conspiracies were approximately 10%.[38]

The issue of whether the U.S. Sentencing Guidelines for cartels
were set at the appropriate level to deter antitrust violations
optimally is especially important in light of the recent Supreme Court
decision in *United States v. Booker*.[39] Writing for the Court, Justice
Stevens held that finders of fact must determine beyond a reasonable
doubt every contested fact that might increase a defendant's
punishment.[40] A separate opinion by Justice Breyer[41] concluded that
the Sentencing Guidelines are advisory instead of mandatory.[42]
Although the effects of *Booker* on antitrust penalties are complex and

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Department of Justice," one cannot help but note that this is the same
estimate that Ginsburg provided to the USSC.

[37]   *See* Cohen & Scheffman, *supra* note 16.

[38]   *Id.* at 344–45.

[39]   125 S. Ct. 738 (2005). A jury found the defendant guilty of possessing
92.5 grams of crack, a crime for which the statute authorized a minimum
sentence of 10 years and a maximum of life imprisonment, and for which the
Sentencing Guidelines required the judge to select a base sentence between 210
and 262 months. In a sentencing hearing, however, the judge determined by a
preponderance of the evidence that Booker possessed an additional 566 grams
of crack and was guilty of obstructing justice. Therefore, the Guidelines
required the judge to increase the sentence to between 360 months and life
imprisonment. The judge sentenced Booker to 30 years. *Id.* A similar scenario
occurred in the companion case, United States v. Fanfan, 125 S. Ct. 738 (2005).

[40]   The Court held that "the Constitution protects every criminal
defendant 'against conviction except upon proof beyond a reasonable doubt
of every fact necessary to constitute the crime with which he is charged.'"
Booker at 748. The Court found that a judge may sentence a defendant based
only on the facts "reflected in the jury verdict or admitted by the defendant."
Id. at 749. A judge may not use any additional fact, other than a prior
conviction, to increase the sentence. *Id.*

[41]   *Id.* at 756.

[42]   *Id.* at 764.

difficult to predict,[43] under any plausible scenario the questions addressed by this article are likely to be of increasing importance.

IV. CARTEL ENFORCEMENT IN THE EU

A. European Union cartel rules

Until World War II the United States was nearly alone in the world in having a strong commitment to anticartel enforcement.[44] National laws outlawing price fixing were passed in the late 1940s in Japan and Germany as part of the occupation policies of the Allies to prevent the reappearance of concentrated economic and political power in those former Axis countries. The antitrust laws in Germany were strengthened just before the Treaty of Rome that created the European Economic Community (EEC) was signed in 1957. Beginning in the 1960s and 1970s, and increasingly so in the 1980s and 1990s,[45] the anticartel laws of the United States and the EEC (now part of the EU) became the world's two great legal templates.[46]

Today the European Commission's (EC) Directorate-General for Competition (DG-COMP) is, like the U.S. Department of Justice Antitrust Division, one of the world's two most powerful anticartel enforcement authorities.[47] Within DG-COMP a special anticartel unit

[43] See John M. Connor & Robert H. Lande, How High Do Cartels Raise Prices? Implications for Optimal Cartel Fines, 80 TUL. L. REV. 513 (2005).

[44] WYATT WELLS, ANTITRUST AND THE FORMATION OF THE POSTWAR WORLD (2002).

[45] Harding and Joshua conclude that "European law has over [1980–1990] caught up with American law" in the sense that cartels are now subject to "categorical censure." HARDING & JOSHUA, supra note 25, at 270.

[46] International Competition Network Report, supra note 24, at 14. The EEC was renamed the European Community by the Treaty of Maastricht in 1993, which also created the EU. The European Community remains a distinct entity within the EU.

[47] In addition, the U.S. Federal Trade Commission (FTC) does file suit against cartels, but it refers "hard-core" collusion to the Department of Justice (DOJ) because violations of the Federal Trade Commission Act do not give rise to criminal penalties.
The DG-COMP has about 500 professionals, roughly half that of the DOJ's Antitrust Division. However, it has broader legal responsibilities (state subsidies, issuing negative clearances, etc.) than the Antitrust Division. Moreover, the

was created in the late 1990s, which has the power to demand information from potential violators in writing and to conduct on-premise surprise inspections.

In language not unlike that of section 1 of the Sherman Act, Article 81 of the Treaty of Rome prohibits agreements and concerted acts in restraint of trade, when that trade is between member countries of the EU.[48] All forms of naked cartel behavior are considered very serious infringements of EU competition rules. Significantly, however, allegations of price fixing are handled by the EC as an administrative proceeding; there is no concept of price fixing as a criminal justice matter under EU competition law. Unlike in the United States, EU law does not give rise to personal penalties for cartel activity. The EC maintains the fiction that its competition enforcement activities are not criminal actions, but rather punishments for violations of behavioral rules.[49]

The administrative powers and procedures of DG-COMP resemble those of the U.S. Federal Trade Commission more closely than those of

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DOJ has available investigators from the FBI, whereas DG-COMP does its own probes.

[48] "Agreements" in EU parlance are roughly equivalent to overt conspiracies in the U.S. tradition: written or oral agreements or joint announcements about conditions of sales. "Concerted practices" are forms of business cooperation based on mutual understanding or exchange of information, i.e., tacit agreements. Like the interstate commerce clause of the U.S. Constitution, the EU's competition laws were designed to preserve the smooth functioning of a customs union that is evolving into a single market.

[49] Besides the United States and Canada, at least ten other countries have laws that provide for possible criminal sanctions: Israel, Austria, Germany, France, Norway, Ireland, Slovakia, Japan, the UK, and South Korea. It is not clear, however, that all of these jurisdictions have actually imposed criminal sanctions. However, for an analysis of the Israeli floor tile cartel case, where Israeli businessmen served time in jail, *see* Scott D. Hammond, Deputy Assistant Attorney General for Criminal Enforcement, Antitrust Division, U.S. Department of Justice, *Charting New Waters In International Cartel Prosecutions*, Twentieth Annual National Institute on White Collar Crime, ABA Criminal Justice Section, March 2, 2006, Section II(A)(2), *available at* http://www.usdoj.gov/atr/public/speeches/214861.htm.

the DOJ.[50] After a lengthy investigation that relies mainly on written documents, if there is probable cause the EC issues a Statement of Objections to the putative violators. The accused companies have the opportunity to reply in writing or in a brief oral hearing. If a violation is deemed to have occurred, a draft decision is circulated to a committee of experts for comments. The final decision must be approved by the Commissioner for Competition and voted on by the full Commission. Adverse EC decisions can involve enjoining conduct, voiding contracts, or fining corporate transgressors. Cases are judged under a preponderance of the evidence standard, unlike the criminal violations by cartels of United States antitrust laws, which must be proven beyond a reasonable doubt. Once issued, the EC decision often is appealed to the EU courts. The EC's cartel decisions take an average of three years after a formal investigation is opened.[51]

EU legal thinking has begun to integrate the common law concept of conspiracy into its cartel prosecutions.[52] In 1998 the EC issued guidelines for the calculation of price-fixing fines that governed and explained its practices.[53] Moreover, in 1996 the EC issued its first corporate leniency notice, and the EC leniency policy was revised in 2002 in a way that made it closely resemble the United States policy in this area. As in the United States, the EU's leniency program is a raging success; by early 2006 it was reported that DG-COMP had a *backlog* of 80 approved cartel amnesty applications.[54]

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[50] Like the FTC, the DG-COMP investigates allegations of antitrust violations, holds hearings in which defendants can present their side of the case, makes an initial determination of guilt, recommends sanctions, has those decisions approved by the full Commission, and may have its decisions appealed by the guilty parties to two higher courts.

[51] John M. Connor, *Private International Cartels: Effectiveness, Welfare, and Anticartel Enforcement* (Dep't of Ag. Econ., Purdue University, Staff Paper 03-12, November 2003), *available at* http://agecon.lib.umn.edu/cgi-bin /pdf_view/pl?paperid=11506&ftype=.pdf.

[52] Since the 1970s "the classic price-fixing, market-sharing cartel has . . been driven underground and become strongly prohibited. . . ." *Id.* at 229.

[53] *Id.* at 242.

[54] Julian M. Joshua, Supermodels, Geeks, and Gumshoes: Forensic Economics in EC Cartel Investigations (Mar. 17, 2006) (paper prepared for the

Therefore, by the late 1990s the EU had also developed a set of government anticartel sanctions for corporations that were similar to those of the United States.[55] The main differences are with respect to private damages suit and individual sanctions. EU law and the laws of many Member States do have provisions that allow compensatory private antitrust suits. Because of numerous procedural, evidentiary, and other impediments, however, a 2004 study found that few such suits had been filed.[56] There is also an active debate as to whether EU competition law should be criminalized, and whether the individuals who organize and participate in cartels should be sent to jail.[57]

B. Cartel sanctions in the EU

Monetary fines are essentially the only sanction imposed by the EU on convicted corporate cartel participants. Like the United States, the EU has an upper limit on fines. In the United States the maximum fine is 80% of a defendant's U.S. "affected sales," that is, sales in the cartelized market during the entire conspiracy period.[58] Although we are unaware of a sound empirical analysis of the issue, anecdotal

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Amsterdam Center for Law and Economics Conference on Forensic Economics in Competition Law Enforcement) (suggesting that the policy has produced "an embarrassment of riches" because its "plodding procedures" will make it forgo prosecution of possibly more than half of the cartels).

[55]   HARDING & JOSHUA, *supra* note 25, at 216–22.

[56]   *See* DENNIS WAELBROECK, DONALD SLATTER & GIL EVEN-SHOSHAN, STUDY ON THE CONDITIONS OF CLAIMS FOR DAMAGES IN CASE OF INFRINGEMENT OF EC COMPETITION RULES: COMPARATIVE REPORT ix (2004) (survey showing only around 60 cases for competition-law damages actions, all in national courts; of these apparently 12 were on the basis of EU law, 32 on the basis of national law, and 6 on both; 28 resulted in awards).

[57]   *See* Wils, *supra* note 25.

[58]   The DOJ recommends the maximum fine at 80% of sales in the United States, and U.S. courts may have the authority, so far untested, to calculate fines on the basis of 80% of *global* sales. Under an alternative statute used only when the proposed fine exceeds the statutory cap (i.e., $10 million from 1990 to 2004, and $100 million after 2004), double the damages or double the gain can be imposed. For a discussion and citations, *see* Connor & Lande, *supra* note 43, at 524.

evidence suggests that the actual U.S. cartel fine percentages mostly fall in the 5% to 20% range. By contrast, the EU fine structure allows DG-COMP to recommend fines of up to 10% of a violator's *global* annual sales in all its product lines in the *one* year prior to the decision. For a sample of 63 cartels discovered from 1990 to 2005 operating inside the EU, the simple mean EU fine was 6.3% of EU affected sales: 55% were 5% or lower, and 28% were in the 20% to 40% range.[59]

In January 1998 the EC issued its first set of sentencing guidelines for price-fixing violations.[60] First, the EC considers the "gravity" of the offense. Although a matter of discretion, hard-core cartels are usually placed in the "very serious" category, which is the highest of three levels of price-fixing infringements. Cartels with large damages that are geographically widespread add to the gravity. The fine calculations for the most serious infringements aim to result in a fine above €20 million. Second, to account for disparities in the power of fines to deter, relatively large companies are fined more than smaller participants: in several global cartels, companies in the upper half of the cartel's size distribution had their fines doubled. Third, fines are increased by 10 percentage points per year for each year the cartel is effective. Fourth, these three factors result in a base fine (called a "basic amount") for each company that is adjusted for culpability; upward for cartel leaders and downward for various mitigating factors.[61] Fifth, under the EU's leniency notice, violators are given 10% to 50% discounts for their

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[59]   *See* John M. Connor & Gustav Helmers, *Statistics on Modern Private International Cartels* (Purdue University Working Paper, 2006) (on file with the authors) (also showing that the mean fine/sales ratio is much lower for 29 EU-only cartels and higher for 34 global cartels) and *Penalties for Price-fixers* 2 CASENOTE, May 2006, www.casecon.com/data/pdfs/casenote41.pdf (finding that only 3% of 207 corporate cartelists from 1999 to 2004 had their EU fines reduced because of the 10% sales cap).

[60]   Julian M. Joshua & Peter D. Camesasca, *EC Fining Policy against Cartels after the Lysine Rulings: The Subtle Secrets of X,* 5 GLOBAL COMPETITION REV. 5 (2004) (arguing that, except for the 10%-of-sales cap, the guidelines essentially permit unfettered discretion by the EC in setting cartel fines).

[61]   Similar to U.S. practice, mitigating factors include playing a purely passive role, non-implementation of the agreement, immediate termination after discovery, and good prior antitrust training programs.

degrees of cooperation. In a few cases, full amnesty has been granted. Finally, after applying the last four steps, the EC ensures that the fine amount does not exceed 10% of global sales in the year prior to the date of the decision. Neither will it impose a fine that will bankrupt a firm. Although the EC's fines can be based on the global sales of an offending firm, in practice cartel fines tend to be correlated with a violator's EU sales in the affected line of business only.[62]

European analysts have been critical of the EC's vast discretion in setting fines.[63] Large discounts have been awarded to companies that made low profits, were first time violators, and cooperated with the EC's investigation. There may be an unwritten rule that non-EU firms get lower reductions than those headquartered in the EU. EC Competition Commissioner Karl Van Miert rejected a U.S.-style point system as "too transparent" for violators.[64] Perhaps most interesting was Van Miert's view that EC fines should be proportionately higher than parallel U.S. fines because Europe has no tradition of individual criminal liability—neither individual fines nor jail sentences—for competition law offenses. This "U.S. plus" rule was applied to members of the lysine cartel in May 2000, but since then has been applied inconsistently.[65]

The 1998 cartel fining guidelines, for all their superficial rigor, are ultimately opaque and capricious.[66] They were designed, in response to judicial criticism, to incorporate rules that varied fines according to the gravity, duration, and intentionality of the offense and

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[62] JOHN M. CONNOR, GLOBAL PRICE FIXING Table 3.1 (2d ed., forthcoming 2007).

[63] VALENTINE KORAH, AN INTRODUCTORY GUIDE TO EC COMPETITION LAW AND PRACTICE (1997). *See also Penalties for Price-fixers, supra* note 59, at 2 (finding that "the [EU's] leniency programme appears overly generous" and that EU courts grant on average another 18% fine reduction upon appeal).

[64] Tim Alchin, *Interview: Van Miert Sees EU Cartel Fines Exceeding U.S. Penalties,* EXTEL EXAMINER (AFX) (September 8, 1999).

[65] European Commission, *Commission Decision of 7 June 2000 relating to a proceeding pursuant to Article 81 of the EC Treaty and Article 53 of the EEA Agreement (COMP/36.545/F3—Amino Acids).* Published in Brussels 7 June 2001 in redacted form.

[66] *See* Joshua & Camesasca, *supra* note 60.

proportionality across violators. One of the EC's stated objectives is deterrence, but their Guidelines attempt to do this without directly using affected sales to calculate base fines. A primary reason why EC fines are unpredictable is that the number of euros chosen as the "start point" for the fine calculations appears to be almost arbitrary. That figure is supposed to be related to gravity (i.e., the nature of the offense, market impact, and geographic extent), but the figure is also increased for large companies, and is sometimes subject to a special multiple for "deterrence" for single companies. For example, in the *Pre-Insulated Pipes* cartel the starting-point amounts were €1 million for the firms in the smallest of four size categories and €20 million for the largest; in addition the largest firm was slapped with a 150% premium "for deterrence." Thus, the starting points for firms within the same cartel varied in a 50:1 ratio.[67]

DG-COMP has an uneasy relationship with the EU courts that supervise its decisions, the Court of First Instance and the European Court of Justice. On appeal, from 1992 to 2005 these courts reduced the fines on more than 100 companies belonging to 13 cartels.[68] The size and frequency of the reductions have increased over time. From the first successful appeal (*Polypropylene* in 1992) to 1998, only four appeals were successful, with reductions averaging 10%. But nine cartels were awarded mean reductions of 47% from 2000 to 2005. As a result, an increasing number of violators have been encouraged to appeal their

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[67] *Id.* The rest of the calculation is mere arithmetic to account for duration, culpability factors, and leniency, plus a check that the final fine does not exceed 10% of sales. Moreover, even the worst offenders receive a 10% leniency discount for simply ceasing to collude after they were caught. *Id.*

[68] The authors examined EC press releases during this period. Small adjustments were made for miscalculations under the EC's fining guidelines for such things as the dates of the violations. The largest reductions were granted for procedural blunders: signatures by the wrong officials (€65 million in fines overturned), late submissions to the courts (€101 million), and failure to permit defendants to refute the evidence (€273 million). Court-mandated adjustments of cartel fines have always reduced, never increased the amounts imposed by the EC. The mean reduction in fines for the appellants was 57%; however, because not all members of the cartels appealed their fines, the mean reduction per cartel was 39%. Because these averages are strongly influenced by the total abrogation of fines for all 22 fined members of three cartels, the median reduction in fines per cartel is only 7%.

fines.[69] Nevertheless, the fines meted out by the EC for cases of price fixing reached an impressive total of more than $3 billion by 2005.[70]

On June 28, 2006 the EC revised its Guidelines for setting fines in competition cases, and the new Guideline levels are slated to go into effect for violations committed after September 2006.[71] The revised Guidelines provide that, subject to the limit of 10% of worldwide turnover, companies may be fined up to 30% of their annual sales during the entire period of violation and that a 15% to 25% fine may be imposed no matter how short the duration of the cartel. In addition, repeat offenders are to be fined more than in the past; instead of a 50% increase, the EC will impose a 100% increase for each prior offense. Its leniency policies are unaffected.[72] It currently is unknown how much of an effective increase these new guidelines will cause. One analysis suggests that, if the fines had been applied to a sample of 57 fined cartel firms, although fines apparently would have been lower for 23 (40%) of the firms/offenders, on the average they would have slightly more than doubled.[73]

C. Suits by private parties

The Sherman Act has long provided that plaintiffs in successful private antitrust suits in the United States receive automatic treble

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[69] Damian Geradin & David Henry, *The EC Fining Policy for Violations of Competition Law: An Empirical Review of the Commission's Decisional Practice and the Community Courts' Judgments* (Feb. 2005) (paper presented at the Amsterdam Center for Law and Economics Conference Remedies and Sanctions in Competition Policy), *available at* http://www.kernbureau.uva.nl/acle/object.cfm/objectid=F07DE744-C1D1-4F2E-876EEB31F7FA5B9F.

[70] John M. Connor, *Global Antitrust Prosecutions of Modern International Cartels*, 4 J. OF INDUS., COMPETITION & TRADE 239–67 (2004).

[71] *See* http://ec.europa.eu.comm/competition/antitrust/legislation/fines/html.

[72] *See id.*

[73] The study showed that on the whole they would have increased by a factor of 2.3. *See New EU Penalty Guidelines: Will the 2006 penalty guidelines decrease fines?* CASENOTE, July 2006, www.casecon.com/data/pdfs/casenote 43.pdf.

damages and reasonable attorneys' fees.[74] The idea of making injured companies or individuals into civil prosecutors was consistent with ancient traditions of English common law that were absorbed into American jurisprudence; yet, the United States is one of the few countries in the world to permit private citizens to prosecute antitrust violators for substantial compensation.[75]

By specifying that plaintiffs should receive awards equal to triple the overcharges inflicted by defendants[76] plus their legal fees, Congress intended that private parties inflict punitive sanctions on antitrust violators so as to deter those violators (specific deterrence) and also their potential imitators (general deterrence) from repeating their illegal behavior.[77] In addition, these awards apparently were intended to deny conspirators the fruits of their illegal conduct (the monopoly profits) and to compensate victims for overcharges on their purchases, the costs of investigating possible violations, the risks of nonrecovery, and their legal costs. Whether the current treble damages remedy really does all this adequately—especially in light of the fact that that the statute does not include prejudgment interest or

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[74] HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY: THE LAW OF COMPETITION AND ITS PRACTICE (1994).

[75] Since 1990 Australia, the U.K., and Canada have passed laws permitting private antitrust suits for single damages. So far, however, a number of serious procedural impediments, as well as the small size of the settlements approved by the courts of these countries, have discouraged most private civil suits.

[76] There is a lively debate in the law-and-economics literature over the desirability of treble damages suits. Papers published in the 1970s and 1980s expressed concern that treble damages would encourage buyers to delay suing price fixers in order to increase their legal recoveries—a perverse incentive. Other researchers have suggested "neutral" welfare consequences; that is, private suits result in pure income transfers with no social welfare impact. One of the latest words in this stream of the literature is David Besanko & Daniel F. Sperber, *Are Treble Damages Neutral?*, 80 AM. ECON. REV. 870 (1990). Their game-theoretic model with apparently reasonable assumptions deduces that treble damages generally lead to positive welfare increases if the probability of conviction and the multiple of damages recovered is high enough.

[77] *See* Lande, *supra* note 1.

compensate for the allocative inefficiency harms or umbrella effects of market power—can certainly be questioned.[78]

Even many of the most jaundiced observers of class actions concede that follow-on private actions are needed for deterrence.[79] Because the burden of proof is on the plaintiffs, because there is no prejudgment interest, and because most cases settle, single damages would in most cases have led to awards that were significantly less than the illegal profits obtained by the conspirators.[80] Moreover, given that legal costs are typically 10% to 33% of the treble damage awards, plaintiffs would recover much less than their injuries had Congress specified that only single damages could be recovered. Treble damages are (hopefully) designed to be high enough to provide a reasonable incentive for private parties to bring suits that have significant deterrent effects, yet not be so large that they often would lead to frivolous suits or the use of antitrust suits to harass rivals.

Complementary private suits in the national courts of the EU have been encouraged by decisions of the European Court of Justice since at least 1976, spurred in part because of low deterrence of cartels in Europe. Under EC Regulation 1/2003, national courts are authorized to use EU competition rules to award "damages to the victims of infringements."[81] Nevertheless, a study commissioned by the EC found that private antitrust litigation is "totally undeveloped" in the EU.[82]

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[78]   *See id.*

[79]   Donald I. Baker, *The Use of Criminal Law Remedies to Deter and Punish Cartels and Bid-Rigging,* 69 GEO. WASH. L. REV. 693 (2001). *See also* Donald I. Baker, Revisiting History—What We Have Learned about Private Antitrust Enforcement that We Would Recommend to Others (Feb. 26, 2004) (unpublished article, on file with author).

[80]   Legal practice does not allow defendants to subtract the extra costs associated with operating a cartel from the extra profits made. Nor can the fines and damage awards be counted as costs of doing business for income tax purposes.

[81]   Gregory P. Olsen, *Enhancing Private Antitrust Litigation in the EU,* ANTITRUST, Fall 2005, at 73.

[82]   ASHURST, STUDY ON THE CONDITIONS FOR CLAIMS FOR DAMAGES FOR BREACH OF COMPETITION RULES IN EUROPE (2004), http://ec.europa.eu/comm/competition /antitrust/others/actions_for_damages/comparative_report_clean_en.pdf.

Obstacles to this route include the inability of private parties to obtain evidence gathered by the DG-COMP (unless published), the "loser pays legal fees" rule, the lack of effective class action procedures, and disappointingly small damages awards. Although U.S. law has clearly inspired EU antitrust in many respects, the adoption of treble damages seems unlikely at this juncture. Perhaps the most likely scenario is that the U.K. or Ireland, jurisdictions with generous discovery rules, will become the legal fora of choice for EU plaintiffs. The absence of private suits is one of the main reasons that the EU antitrust system underdeters cartels.[83]

V. PRIOR COMPILATIONS OF STUDIES OF CARTEL PRICE EFFECTS

Unsurprisingly, many analysts have studied the price effects of individual cartels. Several authors have even undertaken limited surveys of this literature, the best known of which was undertaken by Judge Posner. Posner analyzed the social costs of cartelization by assembling data on 12 "well-organized (mainly international) private cartels."[84] He noted that "[s]uch estimates enable us to derive a crude and probably exaggerated, but nonetheless suggestive idea of the potential benefits of antitrust policy."[85] The studies yield a median cartel overcharge of 38% and an average cartel overcharge of 49.1%.[86]

Several other high quality surveys have been done, including a notable survey of collusion cases by Greg Werden,[87] a survey by two

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[83]   John M. Connor, Effectiveness of Sanctions on Modern International Cartels (2006) (draft manuscript on file with the author).

[84]   RICHARD A. POSNER, ANTITRUST LAW 303–04 (2d ed. 2001). Judge Posner later explained that "these 12 were the best examples I found of well-organized cartels, with the requisite data. If there are other well-organized cartels with the data needed to compute the cartel price increases I overlooked them." E-mail from Judge Richard A. Posner to John M. Connor (Feb. 2, 2004) (on file with author).

[85]   POSNER, supra note 84, at 304.

[86]   The low overcharge was 7% and the high was 100%.

[87]   Gregory J. Werden, The Effect of Antitrust Policy on Consumer Welfare: What Crandall and Winston Overlook, Economic Analysis Group Discussion Paper

of the profession's most active cartel researchers, Levenstein and Suslow,[88] and a larger survey by Professor Griffin.[89] The most authoritative of these was in 2003 by the Organization for Economic Cooperation and Development (OECD). Their report on "hard-core" cartels contains the results of a survey of their government-members on the economic harm caused by cartels recently prosecuted by the

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Table 1

Summary of Seven Economic Surveys of Cartel Overcharges

Reference	*Number of Cartels*	*Average Overcharge*	
		Mean	*Median*
		Percent	
1. Cohen and Scheffman (1989)	5–7	7.7–10.8	7.8–14.0
2. Werden (2003)	13	21	18
3. Posner (2001)	12	49	38
4. Levenstein and Suslow (2002)	22	43	44.5
5. Griffin (1989), private cartels	38	46	44
6. OECD (2003), excluding peaks	12	15.75	12.75
Total, simple average	102–104	30.7	28.1
Total, weighted average	102–104	36.7	34.6

30-2, January 2003. His sample selection criteria suggest why his results are lower than those obtained by Posner: "The studies reviewed here examine criminally prosecuted cartels in existence after enactment of the felony provisions of the Sherman Act in late 1974. The price effects of cartels at earlier times may have been substantially different because sanctions were less severe." *Id.*

[88] Margaret C. Levenstein & Valerie Y. Suslow, *What Determines Cartel Success?* (U. Mich. Bus. Sch. Working Paper No. 02-001, Jan. 21, 2002), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=299415. However, the article's estimates appear to include some peak, rather than average figures, so the median and mean figures may be somewhat high.

[89] James M. Griffin, *Previous Cartel Experience: Any Lessons for OPEC?*, *in* ECONOMICS IN THEORY AND PRACTICE: AN ECLECTIC APPROACH (Lawrence R. Klein & J. Marquez eds., 1989). We eliminated from his survey the episodes that were government-sponsored and therefore not the subject of this article.

EC or by OECD members' national antitrust authorities.[90] For the results of these surveys see table 1.

Despite these prior surveys, there does indeed seem to be a broad consensus among legal and economic writers that the question of the optimality of price-fixing penalties turns mightily on the actual degree of harm caused by cartel conduct, and that we do not know enough about this issue.

VI. A GENERAL SURVEY OF OVERCHARGE STUDIES

In our quest to find case studies of the effects of cartels on price we examined scores of refereed journal articles, working papers, monographs, and books that analyzed cartel price effects, many of which are peer-reviewed studies by economists.[91] Other sources include antitrust agencies, parliamentary inquiries, and multilateral organizations.[92] We aimed at collecting the largest possible body of information on the subject, eschewing all but the most minimal subjective quality screening.[93] We excluded from our

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[90] OECD, REPORT ON THE NATURE AND IMPACT OF HARD-CORE CARTELS AND SANCTIONS AGAINST CARTELS UNDER NATIONAL COMPETITION LAWS, Annex A (2003). Our presentation of these results in table 1 excluded four of the survey results because they almost surely are peak figures (i.e., price increases "up to 50%") instead of averages results. *Id.* at 9. In addition, one of the results was "more than 14%," but we figured it at 14%. *Id.* at 22.

[91] These studies vary substantially in terms of depth, professional orientation, and date of publication. We utilized 82 peer-reviewed journal articles, many of which contained multiple estimates. The second most frequent source of estimates was the 55 books or chapters in books. For details on sources and calculation methods, *see* John M. Connor, *Price-Fixing Overcharges, available at* http://www.agecon.purdue.edu/staff/connor /papers/PRICE_FIXING_OVERCHARGES_APPENDIX_TABLES_8-05.pdf.

[92] We have made every attempt to identify and collect all useful information on private cartel overcharges available from public sources. Because of this article's antitrust orientation, commodity agreements sponsored or protected by national sovereignty are not included because they would tend to bias upward the overcharges in our sample. In general we aimed to follow procedures that result in conservative results.

[93] Consistent with most previous studies of cartel effectiveness, we treat each cartel episode as a unique observation. Most cartels are organized and

survey cartels that were established or actively supported by governmental action.

We found 845 useful estimates of cartel overcharges or undercharges in nearly 200 publications that analyzed cartels that operated in 234 markets. Of these cartels, 36% were created by international agreements,[94] almost one-third were bid-rigging schemes, and about 60% of the cartelists were found guilty by an antitrust authority.[95] We were able to collect and analyze 674 of these estimates.[96]

A. Results of the survey

The overcharge estimates are presented in table 2, divided into periods that, broadly speaking, represent different antitrust regimes in the United States and abroad.[97] The median cartel overcharge for all types and time periods (a median that includes a significant

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fall apart only once, not counting brief disciplinary price wars. This describes one episode. However, many cartels are formed, disband, reform, and disband several times; each distinct cycle is considered an episode. Each time a new collusive episode begins, chances are that the methods and membership composition have changed.

[94] "International" describes the membership composition of the cartel, not necessarily the geographic spread of the cartel's effects. Some international cartels affected directly the commerce of only one nation, though the vast majority were international in both senses.

[95] Some cartels form, disband, and re-form many years later in the same market. Each formation is counted as a separate "episode." If a cartel was found guilty for only one of its multiple episodes, it was categorized as "guilty" for its entire existence.

[96] Researchers usually reported the *average* price increases over the whole episode, and these are the type we have analyzed. The remaining price observations were considered *peak* price effects. Generally speaking, the peaks were at least 50% higher and typically were more than double the average price enhancement achieved.

[97] For an explanation of why the particular dates and periods were chosen, *see* Connor & Lande, *supra* note 43. We choose to show the median overcharge percentages because the data are positively skewed. In such situations the means are larger than the medians, and the median is a better representation of central tendency.

number of zeros) is 25%.[98] There is a downward trend in the cartel mark-ups over time for most cartel types.[99] However, for two types of cartels, bid rigging and unsanctioned, there is no significant decline in average overcharges. While the causes of the downtrends in profitability for most types of cartels are uncertain, the influence of the spread of effective anticartel enforcement is perhaps the most obvious explanation. The greater antitrust scrutiny in the United States from the 1940s, and the increasing scrutiny in Europe since the 1960s, could have prompted cartelists to refrain from full monopoly pricing increases so as to reduce the chances of detection.[100]

A second pattern that emerges in table 2 is that in every period international cartels have been more injurious than domestic (mostly U.S.-based) cartels. In general, international cartels are about 75% more effective in raising prices than domestic or "national" cartels.[101]

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[98] The successful cartels (those with nonzero overcharges) had median average 28–29% overcharges.

[99] The correlations over time for the national and international cartels are –0.61 and –0.64, respectively.

[100] There is an overall upward trend in number of observations per year. The primary factor that explains the trend is the growth in the number of international cartels with usable data. The proportion of international schemes is especially high during the interwar period and after 1990. A second important trend is that the most recent cartel data arise from prosecuted cartels. Prior to 1946 fewer than 30% of our observations refer to cartels known to have been prosecuted. After 1990, 90% of the cartels in our sample were prosecuted or fined by one or more antitrust authority. This pattern does not necessarily mean that the probability of discovery by prosecuting bodies has gone up significantly, but it probably does represent a heightened aggressiveness in anticartel enforcement as well as a shift in research methods by social scientists. A third trend is the increasing prominence of estimates derived from bid-rigging conspiracies; after 1973, half of the episodes involved rigged bids. Relatively few international cartels rely primarily on rigging auctions or tenders for public projects.

[101] This is not so surprising in the pre-World War II era because international cartels were formed without concern about prosecution, and even in the interwar period U.S. companies may have believed that they had structured their participation in ways that would not run afoul of the Sherman Act. But the fact that the differences persisted in the postwar period is somewhat unexpected.

The clearly greater price effectiveness demonstrated by international agreements may reflect a greater degree of freedom from threat of entry by competitors than would be true for the geographically more localized cartels.

Table 2
Median of Average Cartel Overcharges, by Year and Type

Cartel Episode End Date	Membership		Legal Status		Bid-Rigging		All Types
	National	Inter-national	Found Guilty	Legal	Primary Conduct	Other	
			Median Percent*				
1780–1891	22	41	32	22	16	24	23.5
1891–1919	21	48	25	35	28	37	30.4
1920-1945	18	36–37	45	32	34	34	34.0
1946–1973	14	26	13	23	13	15	15.0
1974–1990	18–20	40–43	22	37	21	25–26	24.0
1991–2004	17–18	25	24–25	20	22	25	24.0
All Years	17–19	30–33	23–25	28	21	25–29	25.0

*   Medians of the lower bounds or the upper bounds of ranges, where appropriate. Includes many zero estimates.
SOURCE: Connor, Price Fixing Overcharges, *infra* note 103, Table 6.

The cartels from which we collected the data on overcharges functioned over various geographic areas. Some confined their operations to one nation, some to several countries in one continent, and some straddled continents (the last we refer to as global). The results show that those managed in single European countries have the lowest median overcharges (17%) but, curiously, those organized across national boundaries in Western Europe were as a group the most successful (43% median overcharge). North American conspiracies also had quite low average overcharges (21%). Median overcharges for Asian-based and global conspiracies were high (29%).

A third finding is the lower price effects of bid-rigging cartels (median 21%) compared to conventional conspiracies that set selling

prices or allocated market shares (25-29%). Bid rigging occurs mostly in national or local conspiracies, so this finding may be confounded with the geographic types just discussed above.[102] Nevertheless, this finding directly contradicts the U.S. Sentencing Guidelines that impose higher penalties for bid rigging. It also challenges a rationale of the United States' overt policy shift in the 1980s that made bid-rigging conspiracies a higher priority.

Moreover, it is striking that 79% of the overcharges were above the 10% presumption that is the cornerstone of the Sentencing Guidelines. Indeed, 60% of the cartel episodes had overcharges above 20%. If the Guidelines' fines are supposed to be large enough to deter future antitrust violations, they are clearly far too low for the task.

B. Reliability of studies

Three approaches were taken to assess the reliability of the various overcharge estimates reported in the previous section. First, confidence in the estimates may be judged in part by the sources from which the overcharge estimates were derived. The majority of the estimates are drawn from the traditional end-product outlets of academic research: books and book chapters. The peer-reviewed journals account for 65% of the total and appear to report slightly lower overcharges.[103] The majority of the government reports (4% of the estimates) were authored by civil servants with specialized training in economics, and typically these reports would be vetted by a panel of experts. In total, four-fifths of the estimates are drawn from

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[102] When two variables are positively correlated with the variable of interest (in the present case average overcharges), it is statistically often difficult or impossible to disentangle their separate impacts. This condition is referred to as confounding.

[103] See Connor & Lande, *supra* note 43, at 546–47. *See also* John M. Connor, *Price-Fixing Overcharges: Legal and Economic Evidence* (Dep't of Ag. Econ., Purdue University, Staff Paper 04-16, November 2004), *available at* http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=16093&ftype=.pdf; and John M. Connor & Yuliya Bolotova, *A Meta-Analysis of Cartel Overcharges*, INT'L J. OF INDUS. ORG. (forthcoming 2006), *available at* http://papers.ssrn.com /sol3/papers.cfm?abstract_id=788884.

the formal or informal writings of academic social scientists, and most of the remainder were the products of professionally trained individuals subject to the checks and balances of internal reviews. Courts and competition law commissions accounted for 12% of the estimates.

Second, we examined whether there are systematic differences between the average overcharges across time, using the date of publication of the study as a proxy for analytical advances. The intuition here is that the authors of more recent empirical studies of cartels have learned to avoid the methodological pitfalls of their predecessors.[104] The results show that it is not clear that the level of overcharges varies systematically over time.[105]

The third check on reliability of estimates across various analytical methods controls for changes in the composition of the sample by focusing on pairs of estimates applied to identical cartel episodes. There are 291 pairs of observations available for this analysis of reliability, which examines 6 general methods of estimation.[106] By and large, different authors and different methods

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[104] Among the economic studies that dominate the sample, there is an undeniable trend away from mere narrative historical case studies, sometimes embellished with simple graphical illustrations, towards more formal statistical modeling. In industrial economics there is a trend away from evaluating cartels from the point of view of the theory of pure monopoly toward a more sophisticated and nuanced view informed by game theory and other conceptual advances. The results of a temporal analysis are displayed in Connor & Lande, *supra* note 43, at 540–44, and Connor, *supra* note 103.

[105] It is true that correlations of overcharges over time do show downtrends for some types of cartels, but this trend could be confounded with a greater proportion of peer-reviewed publications in current research.

[106] The most widely used is the so-called before-and-after method in which the price during the episode is compared to one of three "but for" or base prices. The second most popular method is statistical modeling, which accounts for 20% of the estimates. The yardstick method accounts for about 10% of the sample. Overcharges derived from costs of production or profits are the least frequently employed method (about 3%). Sixth, approximately 10% of this article's estimates are quotes from or interpretations of decisions made by antitrust authorities.

applied to identical cartel episodes do not result in markedly different estimates.[107]

VII. CARTEL OVERCHARGES ACROSS GEOGRAPHIC AREAS

Do cartels that have fixed prices in various parts of the world vary in their abilities to raise prices? Do global (multicontinental) cartels achieve overcharges different from those of more localized conspiracies? The answers to these questions may be of interest to antitrust enforcement officials because of the implications for cartel deterrence.

Figure 1 and table 3 classify cartels according to the location of the cartel's headquarters or the place of residence of the great majority of the cartel's corporate members. In most cases the corporate membership mix corresponds to a cartel's geographic field of operations.[108] Geographic classification is usually straightforward, but requires judgment in some cases. Cartels may be composed of member companies with headquarters in only one country or one continent; in most of these cases the cartel is a "virtual" joint venture with no permanent address. On the other hand, many early twentieth century cartels established secretariats with professional staffs in London, Zurich, or similar locations. In more recent decades trade associations or management consulting firms have assisted with cartel operation. In these cases the geographic locus is easy to

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[107]   Nevertheless, there are some differences. The before-and-after method produces cartel-overcharge estimates that are quite a bit higher than an econometric model applied to the same data. What this result seems to suggest is that authors of traditional before-and-after analyses are failing to adjust for all the competitive factors that might drive up the competitive benchmark price. Second, compared with before-and-after, the cost-based and yardstick techniques yield relatively high overcharge estimates. This suggests that the methods that use costs or profits fail to fully account for all competitive industry costs, omitting perhaps those related to product marketing or overhead, or that indirect geographic spillovers from cartel activity may be more common than most analysts anticipate. If the yardsticks are product substitutes, analysts may have underestimated quality differences.

[108]   The major exception is export cartels, which are categorized in their country or region of origin but set prices in the "rest of the world."

identify. Cartels with corporate members from multiple regions are more difficult to classify, but if a supramajority of the companies were headquartered in North America, Western Europe, or Asia, the cartel is categorized in one continent. Global cartels are those with a diverse mixture of participants from two or more continents; nearly all global cartels aimed at controlling prices in at least Western Europe, North America, and East Asia.

Figure 1

Median Average Overcharges by Geographic Location*
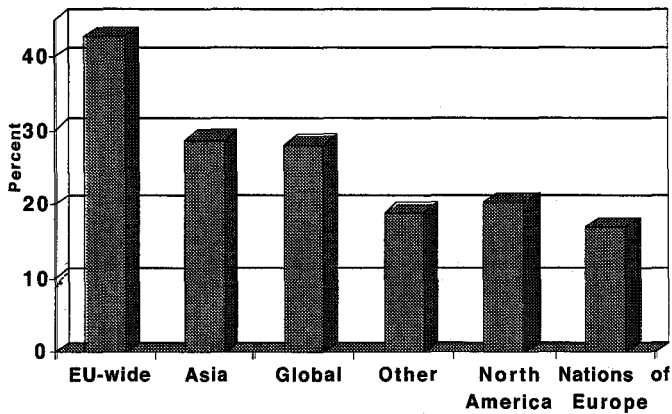
* Spreadsheet dated August 2005.

Table 3

Average Overcharges by Cartel Headquarters Location

Principal Location of Cartel Members	Number of Estimates	Average Overcharge	
		Median percent	Mean percent
USA and Canada	234	20.25	28.53
Single nations in W. Europe	136	16.95	47.98
Multiple nations in W. Europe (EU)	126	42.70	53.66
Asia and Oceania	53	28.80	52.69
Global	248	28.00	50.24
Africa, So. America, & E. Europe	23	18.80	23.89

SOURCE: Total of 770 observations from Connor, Price Fixing Overcharges, *supra* note 91, Appendix Table 2.

There are some significant differences in average cartel overcharges across geographic regions. Those that operated across multiple Western European countries[109] have the highest overcharges but, curiously, those organized *within* national boundaries of countries in Western Europe were as a group the least successful. North American conspiracies also resulted in lower overcharges than those that operated across multiple Western European countries.[110] Median overcharges for global conspiracies were relatively high.[111]

Approximately one-third of the 770 average overcharges collected are derived from reports of decisions of courts, commissions, and other government antitrust authorities. Government investigations began in the nineteenth century with commissions and committee reports authorized by the U.S. Congress, the British Parliament, the German Diet, and perhaps similar bodies in other countries, but none of these reports have been found to contain quantitative overcharges. U.S. courts began to issue opinions on cartels in the late 1890s, and as antitrust laws began to be adopted in other jurisdictions, more decisions about cartels were issued. While only a minor portion of these decisions contained usable data on overcharges, the total number of overcharge observations accelerated in the late twentieth century. As a result, more than half the estimates are derived from decisions issued after 1990. The next section reports on a survey of final decisions of U.S. courts.

VIII. SURVEY OF FINAL U.S. VERDICTS IN CARTEL CASES[112]

The amount that prices changed is not relevant to the issue of whether a cartel violated the antitrust laws.[113] It therefore is

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[109]   In the past few decades, these correspond to intra-EU international cartels.

[110]   Connor and Bolotova confirm that North American cartels and those operating within Western European nations as a whole have significantly lower overcharges. *See* Connor & Bolotova, *supra* note 103.

[111]   When this analysis is repeated using post-1989 data, the ranking remains the same but the differences are smaller.

[112]   This section is based upon Connor & Lande, *supra* note 43.

[113]   *See* LAWRENCE A. SULLIVAN & WARREN S. GRIMES, THE LAW OF ANTITRUST: AN INTEGRATED HANDBOOK 165–233 (2000).

unnecessary for the court in criminal antitrust cases to calculate the extent of any overcharges or undercharges.[114] In private civil cases, however, the damages awarded to a successful plaintiff are equal to three times the overcharges,[115] so plaintiff must demonstrate how much prices increased due to the violation.

It has been extremely difficult, however, to locate final verdicts because almost every private antitrust suit settles or is dismissed before an overcharge can be calculated by a neutral observer and made part of the public record of the case. As a consequence, final verdicts involving cartels where a judge, jury, or commission calculated an overcharge are surprisingly rare.

Settlements, moreover, are an extremely unreliable guide as to the size of the underlying cases' overcharges.[116] Settlements are by no means likely to be compromises for half of the overcharges.[117] For

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[114]   Normally the government simply relies upon the 10% overcharge presumption. On this basis the prosecutors and the defendants typically settle upon a criminal fine without calculating the actual overcharges involved. For a rare exception, see United States v. Andreas, No. 96 CR 762, 1999 U.S. Dist. LEXIS 9655, at *2 (N.D. Ill. Jan. 27, 1999), in which defendants were convicted of conspiring to fix the price and allocate the sales of lysine.

[115]   15 U.S.C. § 15 (Supp. 1992).

[116]   One might believe, for example, that a settlement represents the lower bound of the expected recovery if the case went go to trial (the present value of three times the overcharge plus attorneys' fees) since a risk-neutral defendant would be unlikely to settle for the entire expected verdict. One might also believe the supposed rule of thumb that good antitrust cases usually settle for single damages, perhaps on the dubious theory that the trebling (which produces a higher number) and the lack of prejudgment interest (which produces a lower number) would usually roughly cancel one another out. We have no evidence as to whether this is the way that plaintiffs and defendants, or their attorneys, typically behave. We have, however, heard trustworthy plaintiffs' and defendants' attorneys tell us, anecdotally, that they have settled cartel cases for single damages.

[117]   If plaintiff and defendant each had, and knew that they had, a 50% chance of winning, then the settlement might well be for 50% of the present value of the automatically trebled overcharges. But this would not be true if plaintiff's chance of prevailing was not 50%, if one party was a better bargainer, or if parties were unduly optimistic or pessimistic about their

example, a risk-averse plaintiff with a strong case might settle for very little if he or she needs the money quickly.[118] Conversely, a risk-averse defendant with a strong case might settle for what might seem like an overly generous amount to avoid even a small probability that an irrational judge or jury will award an amount large enough to cripple the company.[119] We do not believe that analysis based upon settlements would be meaningful.

We instead attempted to obtain the largest possible sample of verdicts in collusion cases. We searched for final[120] decisions in United States antitrust cases involving horizontal collusion, broadly defined to include naked price fixing, bid rigging and divisions of

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chances of prevailing. If plaintiff has only a 25% chance of obtaining class certification and subsequently proving the damages, a settlement should be at far below the level of 50% of the discounted present value of three times the overcharges.

[118]   Plaintiffs' counsel typically assert that defense counsel are able to find barely ethical ways to delay meritorious claims for years. Since antitrust awards do not contain prejudgment interest, 15 U.S.C. § 15, and plaintiffs often need the money in the short term, these delays harm plaintiffs' bargaining position significantly. Plaintiffs' counsel also assert that defendants often are able to unreasonably prevent the necessary class certifications, and otherwise to make litigation so burdensome that plaintiffs have to settle for only a small fraction of the actual overcharges.

[119]   The authors have heard variations on this theme many times. Attorneys for defendants in cases that have settled for many millions of dollars appear to believe, well after the cases were over and there was no longer any threat of further liability, that their clients never affected prices. Defendants' attorneys often assert that their clients (who were found by a court to have agreed to fix prices) were prevented by market forces from affecting prices significantly. However, rather than take the risk of having a judge or jury not believe them, they settle for a large sum.

Another factor that can make defendants want to settle even if they did not raise prices is antitrust's joint and several liability doctrine, which makes every member of a cartel liable for the overcharges of the entire cartel. This can lead to extremely large potential damages, and even a small risk of a huge payout can, from the defendant's perspective, overshadow a weak liability case. A defendant might be forced to settle for a significant amount even if it did not cause prices to be elevated.

[120]   We excluded cases overturned on appeal.

markets, where a judge, jury, or commission calculated damages that could be expressed in percentage terms.[121]

We were able to find only 25 final cartel verdicts,[122] a small sample but one roughly as large as the various surveys reported in table 1 (which reported 5–7, 12, 12, 13, 22, and 38 cases). Nevertheless, due to the sample's small size, these results should be interpreted with caution.

These 25 final verdicts had a median average overcharge of 21.6% and a mean average overcharge of 30.0%.[123] All but five found that the cartel had raised prices by more than the USSC's 10% benchmark.

How useful are the decisions of judges and juries in answering the question of how high cartels raise prices? While the common law system of jury and judge verdicts is far from perfect, it is the system we have chosen to use in a wide variety of life and death decisions affecting our society. Since the United States long has continued to use this system,[124] our nation has made an implicit decision that judges and juries are the best way to arrive at the truth the largest percentage of the time. We know of no way to prove whether judges or juries achieve results better than those of the economists who publish studies in journals and books. We are using this survey of final verdicts to supplement the more comprehensive survey reported in sections VI and VIII. Since our two major approaches reinforce one another, the credibility of each is strengthened.

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[121] Many of the verdicts were only expressed in dollar amounts that we were unable to translate into percentages, so we reluctantly had to omit these cases. *See, e.g.*, Chattanooga Foundry & Pipe Works v. Atlanta, 203 U.S. 390 (1906); Transnor (Bermuda) Ltd. v. B.P. N. Am. Petroleum, 736 F. Supp. 511 (S.D.N.Y. 1990); Phillips v. Crown Cent. Petroleum Corp., 602 F.2d 616 (1979).

[122] We surely found only a small percentage of final verdicts and would be grateful if readers of this article could inform us, at rlande@ubalt.edu, of final verdicts that we have inadvertently omitted.

[123] The nine cases that reported peak overcharges produce a median peak overcharge of 71.4% and a mean peak overcharge of 130%.

[124] In other nations with admirable judicial systems, judges or judicial panels are the vehicles of decisionmaking in antitrust cases, which are typically civil matters. *See, e.g.*, the discussion of the EU approach in MARC VAN DER WOUDE & CHRISTOPHER JONES, EC COMPETITION LAW HANDBOOK 593–629 (2003).

IX. OVERCHARGE CALCULATIONS DERIVED FROM
DECISIONS OF THE EU, EUROPEAN NATIONS,
THE U.S., AND OTHER ANTITRUST AUTHORITIES

Figure 2 and table 4 combine the overcharges from the U.S. court survey presented above with published overcharge estimates that were derived from cartel decisions by other antitrust authorities.[125] There are 248 such observations—38% from analyses of guilty findings of U.S. and Canadian courts, 26% from decisions of the EC that imposed fines, 22% from commissions of European nations, and most of the rest from Asian antitrust authorities. Texts of most of these decisions can be found on the Web sites of the authorities or in various searchable law archives.[126] In some cases press releases or press summaries from the authorities contained sufficient information to calculate an overcharge, but more commonly an analyst used the product and geographic market definition and conspiracy dates in the opinion and applied this information to prices from a third party to calculate an estimate. As in the case of U.S. final verdicts, only a small minority of available decisions contain the appropriate quantitative data.[127] As was not the case with the previously reported sample of final verdicts in U.S. collusion cases, however, these results can most fairly be attributed to their analysts, not necessarily to the judges or other decisionmakers involved.

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[125]   The source of each of these estimates is shown in Connor, *supra* note 91, Appendix Table 2. In some cases the percentage overcharge was lifted directly from the decision, or the decision revealed market prices before, during and after the cartel's effective period. In other cases a monetary overcharge was available, and the author supplied an estimate of the affected sales. Occasionally, an antitrust authority provided overcharges in a survey of its own decisions. In a small number of cases the author's method is not described. Some decisions have multiple estimates provided by several authors.

[126]   These sources include Lexis-Nexis, WestLaw, the Official Journal of the European Communities, and EUR-Lex.

[127]   Guilty pleas and sentencing memoranda of the DOJ and Canadian Competition Bureau almost never mention damages. The EC has fined almost 100 cartels since 1969, but the full decisions are not always published, and only a small number included price data. About 37 EC decisions yielded usable overcharges information. However, the Web sites of the Italian, French, Korean, and Taiwanese antitrust commissions contain the detail necessary in a large minority of cases.

The median overcharge in these cases is 23.5%, and the mean is 43%; both figures are close to the results reported for the entire sample in section VI, *supra*, of 770 overcharge estimates. Besides the EC, a large number of observations come from decisions about mostly domestic schemes made by the U.K. Monopolies Commission in the 1950s and 1960s. Most of the remaining decisions are from other commissions that typically fined international cartels discovered since 1990. The estimated overcharges from decisions of the EU, Taiwanese, and Japanese authorities are relatively high. With few exceptions, overcharges from a jurisdiction are highly positively skewed.

Three jurisdictions yield enough observations to examine changes over time. In each case, median overcharges from 1990 to 2005 are higher than from earlier periods. This increase is most likely attributable to the higher priority being given to prosecuting international cartels in the last 15 years.

Figure 2
Average Overcharges from Courts and Commissions*
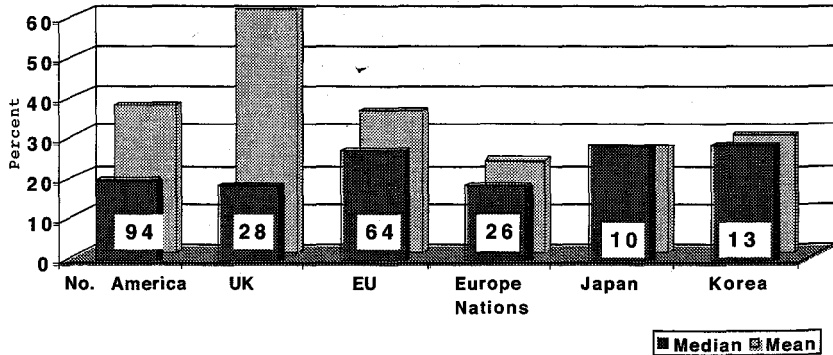
* Number of decisions shown in white.

Table 4
Cartel Overcharges from Decisions of Antitrust Authorities

Antitrust Authority	Number of Observations	Median of Affected Commerce	Mean of Affected Commerce
		Percent	
North America:	94	20.0	36.8
US and Canada, pre-1990	55	18.5	38.7
US and Canada, 1990–2005	39	21.6	34.0
United Kingdom:	28	19.0	73.3
UK Monopolies Commission	24	13.4	74.3
UK, 1990–2005	4	41.9	67.6
Other European Nations:	26	18.8	22.8
France	9	22.0	27.4
Germany	4	11.0	12.0
Italy	4	30.5	28.7
Other Europe	9	9.0	20.5
European Union:	64	27.5	35.0
European Commission, pre-1990	11	25.0	31.7
European Commission, 1990–2005	53	29.0	37.1
China	2	21.1	21.1
Japan FTC	10	28.4	26.3
Taiwan FTC	8	67.5	94.9
Korea FTC	13	20.0	29.4
Australia	2	10.5	10.5
Mexico	1	18.8	18.8
Total	248	23.5	43.0

SOURCE: Connor, Price Fixing Overcharges, *supra* note 91, Appendix Table 2. Several decisions have alternative estimates by single authors, and some have estimates by multiple authors.

X. CONCLUSIONS

Both the EU and the United States have cartel fine levels that are far too low. Because only a small percentage of cartels are detected and proven, optimal deterrence theory prescribes that cartel fine levels should be significantly higher than the actual damages they cause. Cartel formation will be deterred ideally if the "net harm to others" from cartels is divided by their probability of detection and conviction, and the result is set equal to the fine level. For this reason the fines should be substantially more than the damages they cause. Yet, cartel penalties of both the United States and— especially—of the EU probably do not even equal the damages that cartels cause.

Our survey shows that United States' cartels have historically overcharged on the average between 18% and 37%, depending upon the data set and methodology employed in the analysis and whether mean or median figures are used. These results are generally consistent with the few, more limited, previously published works that survey cartel overcharges.[128]

However, the United States' cartel fine system starts with the presumption that cartels raise prices by 10% on average, and then adjusts it by a complex formula.[129] While these adjustments certainly can result in a fine higher than 10% of sales, often they result in a significantly lower figure.[130] However, if one-third of all United States cartels are detected and convicted, a fine level of three times U.S. overcharges, approximately 54% to 111%, would be appropriate on average. Moreover, even fines set at this level would be insufficient because they do not adjust for the lack of prejudgment interest (cartel overcharges typically arise years before fines are

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[128]   The six studies we thought exhibited the highest standards of scholarship (table 1) report samples with simple average median overcharges of 28.1% and simple average mean overcharges of 30.7% of affected sales.

[129]   *See* section III *supra.*

[130]   For a variety of reasons, few firms actually pay a fine amounting to 10% (doubled) of the amount of commerce affected, especially if all figures are adjusted to constant dollars. Most violators have their fines reduced. *See* Spratling, *supra* note 17.

imposed[131]) or the other "net harms" of market power, such as the allocative inefficiency effects of market power.[132] Of course, in some cases the effects of private treble damage actions[133] and individual fines and jail time also should be considered. All told, the data suggest that the U.S. Sentencing Commission should raise the presumption that cartels raise prices by 10% to presumptions that domestic cartels raise prices by 15% and international cartels raise prices by 25%. Alternatively, if the policymakers decide that this distinction is unwise, a 20% overall presumption would be appropriate. The Guidelines also should include an adjustment that brings all overcharges and fines to their present value.

The direction of the results for European cartels is the same, but unfortunately the EU fine levels are even lower on average than the United States fine levels. Our samples of European-wide cartels show average overcharges in the 28% to 54% range, depending upon the data set, methodology employed in the analysis, and whether mean or median figures are used. Cartels that had effects solely within a single European country overcharged significantly less on average, in the 16% to 48% range, again depending upon the data set, methodology, and whether mean or median figures are used. These figures are far above the European Union's cartel fines as a proportion of EU affected sales.

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[131] Suppose a cartel overcharges in years one through seven, followed by discovery and another three years of litigation. The penalties would be assessed in year ten. The overcharges from year one should be adjusted for nine to ten years of inflation, but we have not done this. This omission means that our penalty recommendations are too low.

[132] There is an important respect in which this article's methodology has been conservative. It has focused solely on the public injury that arises from the transfer of income or wealth from purchasers to the cartel. As noted in section I, cartels also can lead to allocative inefficiency, umbrella effects, less innovation, managerial slack, and to nonprice harms to quality and variety. Yet, we have not taken these harms into account. Nor have we adjusted our results for inflation. Admittedly, some of these factors are difficult to measure. Nevertheless, while the Guidelines seem to have doubled the 10% presumption to account for these factors (see section I supra) we believe that this doubling has been overly conservative.

[133] However, on average private "treble" damages probably only constitute roughly single damages. See Lande, supra note 1.

The revised 2006 European fine levels[134] almost certainly will prove to be higher on average in practice than the ones they replace, but they might actually be lower in a surprisingly large number of cases.[135] And they still are subject to the ceiling of 10% of worldwide turnover for the preceding year. Crucially, they will only be a small fraction of their optimal size. For example, if one-third of European cartels are detected, if they last for five years on average, and if their overcharge is between 28% and 54% on average, then the optimal fine would be three times (28% to 54%) times five, or 420% to 810% of the annual sales of the convicted firm in the affected market. Yet, the total fine currently is limited to 10% of worldwide sales of the firm for the preceding year.

There is no evidence suggesting that more than one-third of European cartels are detected. Yet, the other adjustments noted in the discussion of United States fine levels should be made for the European fines as well; they should be made to account suitably for the fact that the overcharges often occur years before the fine is paid, and for the other "net harms" of market power as well.[136] Moreover, as noted earlier, the EU does not supplement its cartel fines with imprisonment and effective private enforcement.

We therefore urge the EU to increase its cartel penalties dramatically: by an order of magnitude. We also urge the EU to enact legislation that facilitates the more widespread use of private antitrust actions, including class action cases, and to impose jail sentences on those who engage in hard-core collusion.

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[134] *See supra* text accompanying note 71.

[135] *See supra* note 73 and accompanying text.

[136] These include the allocative inefficiency effects of market power and the umbrella effects of market power. *See supra* section I.