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ABSTRACT

"How High Do Cartels Raise Prices? Implications For Reform of Sentencing Guidelines"

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The current U.S. Sentencing Guidelines for criminal price fixing violations begin with an assumption that cartels raise prices by an average of 10% of the affected commerce, and use this estimate to calculate recommended fines to achieve optimal deterrence. Some have suggested that this figure might be too high, and a recent Supreme Court decision has called into question the constitutionality of the Guidelines. For these reasons the Guidelines might well be re-formulated. This article re-examines the Sentencing Commission's assumption using 2 data sources: every available economic study of cartels, and every final verdict in a U.S. cartel case that reported the overcharge percentage. The results from the different data sources and periods, show median and average cartel overcharges that are between 15% and 36%, with most of the median and average results between 20% and 30%. Based upon this finding the authors recommend that the Sentencing Commission raise the current level of cartel penalties.

How High Do Cartels Raise Prices? Implications
For Reform Of Antitrust Sentencing Guidelines

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How high do cartels raise prices? Do cartels often or

typically raise prices a significant amount for a significant

period? Or, as some suggest, are their anticompetitive effects

ephemeral because most cartels, established out of misguided

optimism by naive businesspeople, collapse so quickly that

meaningful statistics about how high they raise prices cannot

even be computed? In light of the answers to these questions, are the current United States Sentencing Commission cartel penalties - which are based upon a presumption that cartels raise prices by 10% - set at the right levels? Given our desire optimally to deter anticompetitive behavior and to permit desirable behavior, should the antitrust penalties for different types of collusion cases be changed?

Despite the importance and fundamental nature of these questions, this article represents the first systematic attempt to study these issues. This article will assemble and analyze the relevant empirical economic and legal evidence, using two very different sources of data.

The first set of evidence consists of every serious, scholarly social-science study of the effects of collusion in individual cases we have been able to find.[2] With very few exceptions[3] we attempted to report on every serious scholarly

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[2] The list of case studies that we found and used is in John M Connor, "Price Fixing Overcharges: Legal and Economic Evidence" (hereafter "Price Fixing Overcharges") which can be found at http://www.agecon.purdue.edu/directory/details.asp?username=jconnor and also at www.antitrustinstitute.org). We would be grateful to any readers who can point out case studies that we inadvertently omitted. For our inclusion methodology see Section III infra.

[3] A small percentage were excluded due to poor quality, but we made no attempt to re-do any of these analyses. See Price Fixing Overcharges, supra note 2, Appendix Table 5, for a list of excluded studies.

study that contained quantitative information on the price

effects of private cartels.[4]

Our second data source was obtained by examining every

final verdict we could find in a U.S. collusion case.[5] We

searched for U.S. antitrust cases where a neutral finder of fact[6]

reported collusive overcharges in percentage terms, and cases

where a neutral finder of fact presented conclusions that

straightforwardly could be converted into an overcharge

percentage.[7]

We will analyze this evidence[8] in light of the standard

optimal deterrence framework[9], to see how these results can help

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[4] In the vast majority of cases the writers themselves provided
the overcharge calculations, although in a few cases the results
had to be drawn from the existing material.

[5] The list of the final antitrust verdicts that we found is in
the Appendix. As discussed infra Section IV, we attempted to
find and include every final U.S. antitrust verdict. We would be
grateful to any readers who can bring to our attention any of
the large number of antitrust verdicts that we inadvertently
omitted.

[6] We did not include settlements since parties sometimes settle
for amounts that are unrelated to the actual overcharge involved
or even to whether the cartel at issue actually succeeded in
raising prices. Nor did we include allegations made by
government or private plaintiffs, or statements by defendants,
since they often are subjective.

[7] We made no attempt to second guess these judge or jury
determinations.

[8] Some economists may give greater weight to writings by
professionals in their own field than to opinions reached by

further our laws' goal of preventing antitrust violations. This

will enable us to determine whether the current U.S. Sentencing

Guidelines for cartels have been set at the appropriate levels.

Our examination is especially timely because the recent

Supreme Court decision in Blakely v Washington[10] could mean that

the U.S. Sentencing Commission's Guidelines will be rethought

completely. This decision could mean that they will be declared

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others, including judges, commissions, or juries, whereas legal
scholars may give greater credence to the latter.

[9] See the explanation of the optimal deterrence framework infra
Section I. This article will not discuss whether the antitrust
laws are exclusively concerned with deterrence or whether they
also are concerned with compensation of victims.

[10] No. 02—1632 (June 24, 2004), 2004 WL 1402697. In overturning
the sentence of a Washington state man convicted of kidnapping
and sentenced by the judge to three years more than the 53-month
statutory maximum, the Court held that the sentence violated the
defendant's right to a jury trial guaranteed by the Sixth
Amendment. *Id.* at ___. The Court held: "[o]ther than the fact of
a prior conviction, any fact that increases the penalty for a
crime beyond the prescribed statutory maximum must be submitted
to a jury, and proved beyond a reasonable doubt." *Id.* at ___
(quoting Apprendi v. New Jersey, 530 U.S. 466, 490 (2000). The
Court concluded that Washington's sentencing guidelines, which
allowed the sentencing judge to enhance the sentence based on
the defendant's "deliberate cruelty," a fact neither submitted
to the jury nor admitted by the defendant, are unconstitutional.
Id. at ___. The Court added, in footnote 9: The United States...
notes differences between Washington's sentencing regime and the
Federal Sentencing Guidelines but questions whether those
differences are constitutionally significant....The Federal
Guidelines are not before us, and we express no opinion on
them." Under this decision the U.S. Sentencing Commission might
have to prove every adjustment that goes into the culpability
index, described infra at ___.

unconstitutional,[11] employed far less often,[12] or will be in the future be applied only after juries ascertain every factor that affects the penalty under a "beyond a reasonable doubt" standard.[13] If the present Guidelines are voided, doubtless

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[11] Not long after the *Blakely decision*, a judge for the U.S. District Court for the District of Utah relied on this case to find the federal sentencing guidelines unconstitutional. U.S. v. Croxford, ___ F. Supp. 2d ___, 2004 WL 1462111 (2004). Judge Paul Cassell found that the federal guidelines "suffer from the same constitutional infirmity" as those in Washington state, and therefore could not be applied. *Id.* at __. He explained that "[i]t is clear that after *Blakely* this court cannot impose additional time on a criminal defendant through a judicial finding" of facts not considered by the jury. *Id.* at ___. While the district court's ruling is not binding outside of Utah, it is clear that the use of the federal Sentencing Guidelines, at least in certain circumstances, may violate the Sixth Amendment. The Supreme Court agreed to decide the issue by taking the cases *United States v. Booker*, No. 04-104, and *United States v. Fanfan*, No. 04-105, scheduled for Oct. 4, 2004 oral argument.

[12] Most cartel convictions are effected through guilty pleas, so the 2004 law raising of the maximum statutory fine for price fixing from $10 to $100 million in 2004 means that prosecutors will have fewer occasions on which it will be necessary to employ the Guidelines. However, the Guidelines will still be needed for plea negotiations, potential fines above $100 million, and litigated price fixing cases. See Teft W. Smith, James H. Mutchnik, & Scott M. Abeles," Harder to Prosecute? A recent Supreme Court decision could nullify enhanced antitrust penalties." Legal times, July 12, 2004, at 25.

[13] If the Department of Justice decides to employ juries for sentencing hearings in corporate criminal antitrust litigation, then evidence on every factor that affects the penalty, such as the amount of the affected commerce, will take on greater prominence. Evidence on the size of affected commerce determines the base fine, and a long list of indicators that address the motives of cartel managers are needed to arrive at the "culpability multipliers." See discussion infra at ___ and Teft W. Smith, James H. Mutchnik, & Scott M. Abeles, id.

Congress will attempt to find a way to reformulate new Guidelines that are constitutionally acceptable. It is hard to predict what the post-<u>Blakely</u> world of antitrust penalties will be like, but under any plausible scenario the questions addressed by this paper are likely to be even more important.

Before we properly can analyze this topic we will first show how the current system of antitrust penalties was formulated. Then we will demonstrate how optimal penalties for collusion should be related to the amount by which cartels are presumed to increase prices. This is the context for our examination of the question of how high cartels typically raise prices.

I. <u>Optimal Deterrence And The 10% Presumption</u>

The generally accepted approach to deterring antitrust violations optimally was developed by Prof. William Landes.[14] He convincingly showed that to achieve optimal deterrence[15] the damages from an antitrust violation should be equal to the

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[14] William M. Landes, "Optimal Sanctions For Antitrust Violations," 50 U. Chi. L. Rev. 652, 656 (1983). 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).

[15] Professor Landes was not concerned with the compensation of victims. For an analysis that takes compensation into account see Lande, supra note __, at 161-68.

violation's "net harm to others", divided by the probability of detection and proof of the violation.[16] These principles are almost universally accepted, by analysts of both the Chicago and post-Chicago schools of antitrust.[17]

The "net harm to others" from cartels of course includes the overcharges they cause.[18] But it includes other factors as well. First, market power produces allocative inefficiency — the deadweight loss welfare triangle.[19] Although this often is significant empirically,[20] it apparently has never been awarded in an antitrust case.[21] Second, the "umbrella" effects of market

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[16] See Landes, supra note 10, at 666-68. Thus, if the harm were 10, and the probability of detection and proof were .33, since 10/.33 = 33, the optimal penalty for this violation would be 33. This ignores risk aversion and other factors. Id.

[17] See the discussion in Robert H. Lande, "Are Antitrust "Treble" Damages Really Single Damages," 54 Ohio State L.J. 115, 161-68 (1993).

[18] See Landes, supra note 10.

[19] *See* E. MANSFIELD, MICROECONOMICS: THEORY AND APPLICATIONS 277-92 (4th ed. 1982) (providing a definition and proof that monopoly pricing creates allocative inefficiency); MICHAEL L. KATZ AND HARVEY S. ROSEN, MICROECONOMICS 114 (3d. ed. 1998).

[20] Judge Frank Easterbrook made a number of standard assumptions and calculated 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. . . ." Frank Easterbrook, "Detrebling Antitrust Damages," 28 J. L & Econ. 445, 455 (1985).

[21] See David C. Hjelmfelt & Channing D. Strother, Jr., Antitrust Damages For Consumer Welfare Loss, 39 CLEV. ST. L. REV. 505 (1991).

power are another virtually unawarded damage from market power.[22] Moreover, there are several additional types of harms that typically are caused by cartels,[23] and cartels sometimes have less incentive to innovate or to offer as wide an array of non-price variety or quality options.[24] Finally, all of a cartel's harms should be adjusted to present value.[25] These adjustments, combined, show that the "net harm to others" from a cartel typically equal on the order of three times the cartel's overcharges.[26]

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[22] "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 par. 337.3 (Supp. 1992) for a definition and discussion of the umbrella effects of market power. 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, prices also increased for the oil sold by non-cartel members. Id. Moreover, the price 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).

[23] The omitted factors include: (1) uncompensated plaintiffs' attorneys' fees and costs; (2) the uncompensated value of plaintiffs time spent pursuing the case; (3) the costs of the judicial system. *See* Lande, *supra* note ___, at 129-158.

[24] See Neil W. Averitt & Robert H. Lande, "Consumer Choice: Implementing A New Paradigm for Antitrust," (Draft, 2004).

[25] Studies suggest that the average cartel probably lasts 7-8 years, with an additional 4 plus year lag before judgment. *See* Lande, *supra* note ___, at 130-34.

[26] *Id.* at 158-60. This is a very rough approximation that does

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 (the

multiplier should be the inverse of the probability of detection

and proof).[27] Of course, no one knows the percentage of cartels

that are detected and proven. In 1986, the Assistant Attorney

General for Antitrust, Douglas Ginsburg estimated that the

enforcers detected no more than 10% of all cartels.[28] There are

reasons to believe that Antitrust Division's amnesty program has

resulted in a larger percentage of cartels detected and proven

today,[29] but there is anecdotal evidence that, despite the

enforcers' superb efforts, many cartels still operate.[30] From an

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not include any adjustments for possible losses of innovation or
diminished consumer choice.

[27] "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." Frank Easterbrook, "Detrebling
Antitrust Damages," 28 J.L. Econ. 445, 455 (1985).

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

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

[30] The continued high number of 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.

optimal deterrence perspective it would be necessary to know the

percentage of cartels that are detected and proven to know what

number to multiply the "net harms to others" by.[31] At a minimum,

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ANTITRUST DIV., U.S. DEP'T OF JUSTICE, STATUS REPORT: AN OVERVIEW OF RECENT
DEVELOPMENTS IN THE ANTITRUST DIVISION'S CRIMINAL ENFORCEMENT PROGRAM (2004),
at http://www.usdoj.gov/atr/public/guidelines/202531.htm (last
visited Apr. 27, 2004). 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, *at*
http://www.usdoj.gov/atr/public/12848.htm (last visited Apr. 27,
2004). The following table, extracted from this data, shows the
DOJ's success in prosecuting antitrust violations:

Total Criminal Cases	1993	'94	'95	'96	'97	'98	'99	2000	'01	'02
Filed	84	57	60	42	38	62	57	63	44	33
Won	73	51	65	38	40	64	48	52	38	37
Lost	3	4	2	5	1	1	2	-	2	1
Pending	-	-	-	-	-	17	24	35	39	34
Appeal Decisions	7	9	7	6	4	6	-	-	5	1

During the last four years more than 80 years of imprisonment
have been imposed on antitrust offenders, with more than
30 defendants receiving jail sentences of one year or longer.
ANTITRUST DIV., U.S. DEP'T OF JUSTICE, STATUS REPORT: AN OVERVIEW OF RECENT
DEVELOPMENTS IN THE ANTITRUST DIVISION'S CRIMINAL ENFORCEMENT PROGRAM (2004),
at http://www.usdoj.gov/atr/public/guidelines/202531.htm (last
visited Apr. 27, 2004). In 2002 defendants in cases prosecuted
by the Antitrust Division were sentenced to a record number of
jail days, more than 10,000 in all. *Id*. In 2003, the average
jail sentence reached a record high of 21 months. *Id*. If there
had been little or no effective price fixing during this period,
the DOJ has been fooling a lot of grand juries, judges, and
juries.

[31] Instead of attempting to ascertain the actual probability of
detection and conviction, an alternative approach would be to
focus upon the perceptions of probable defendants. It would be

however, we know that if the combined antitrust sanctions only

total one times the actual damages, firms would be significantly

undeterred from committing antitrust violations.

In the United States deterrence against cartels is supplied

by a combination of factors; private treble damages actions,

jail sentences for some categories of violations, and criminal

fines for some types of antitrust violations.[32] This article

only will focus on the last of these types of sanctions,

criminal fines. We will not attempt to ascertain whether these

other types of sanctions should be adjusted.

The current[33] criminal fines for cartels are established by

Sentencing Guidelines promulgated by the U.S. Sentencing

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extremely useful to know potential price fixers' perceptions of
the probability that they will be caught and convicted of price
fixing, and their belief as to how much they will be forced to
pay. We know of no reliable information on this issue, however.

[32] "[I]n discussing the economic effects of anticartel sanctions, it
is essential to distinguish theoretically available legal sanctions
from those actually applied as a matter of custom and policy.
Historically, the Government has also ordinarily recommended
substantial downward departures in these cases even from the fine
levels specified by the Guidelines. Members of modern international
cartels have been granted very large downward departures for minimal
cooperation almost as a matter of course, driving actual fines down
well below single U.S. damages in almost all cases.... In the
vitamins case, the second through fifth firms to plead guilty were
granted average downward departures of about 80% from the Guidelines'
maximum fines.... As a result of U.S. sentencing practices, its
criminal fines amounted to less than 11% of the vitamins cartel's
global monopoly profits." See John M. Connor, Extraterritoriality of
The Sherman Act and Deterrence of Private International Cartels at
___(Draft, March 2004).

Commission ("USSC").[34] These Guidelines provide that the base

fine level generally will be 20% of the "volume of affected

commerce".[35] The USSC's cartel fine levels, established in 1987

and in effect today, follow from its famous presumption: "It is

estimated that the average gain from price-fixing is 10 percent

of the selling price."[36]

The Commission explained how it used this estimate to

establish cartel fines. After noting that fines should be based

on consideration of both the gain to the offender and the losses

caused by the offender, the USSC noted that it would double the

10% estimate to account for harms "inflicted upon consumers who

are unable or for other reasons do not buy the product at the

higher price."[37] The Commission added: "The purpose for

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[33] The Guidelines originally provided that "[t]he fine range for an organization is from 20 to 50 percent of the volume of commerce, but not less than $100,000." 18 U.S.C. Appx. § 2R1.1 (1987).

[34] 18 USC Appx Section 2R1.1 (2003).

[35] 18 USC Appx Section 2R1.1(d)(1) (2003).

[36] See U.S. Sentencing Commission Guidelines For the United States Courts, 18 U.S. C.18 U.S.C. Section 2R1.1, Bid-Rigging, Price Fixing or Market-Allocation Agreements Among Competitors, Application Note 3.

[37] The full quotation reads: "The loss from price-fixing exceeds the gain because, inter alia, injury is inflicted upon consumers who are unable or for other reasons do not buy the product at the higher price. Because the loss from price-fixing exceeds the gain, subsection (d) (1) provides that 20 percent of the volume

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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."[38]

Although the preceding explanation does not completely

clarify why the Guidelines doubled the assumed 10% loss, the

explanation in the Guidelines' commentary implies that the

doubling could be due to such factors as the allocative

inefficiency harms of market power, the disruptive effects on

victims caused by antitrust violations[39] and/or the umbrella

effects of market power.[40] Consideration of these factors would

more than justify doubling the 10% figure to account for the

"net harm to others" from cartels.[41]

Moreover, the doubling can perhaps be explained by the

Criminal Fine Improvements Act of 1986, which provides an

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of affected commerce is to be used in lieu of the pecuniary loss
under Section 8C2.4 (a) (3)." Id.

[38] See U.S. Sentencing Commission Guidelines For the United
States Courts, 18 U.S. C.18 U.S.C. Section 2R1.1, Bid-Rigging,
Price Fixing or Market-Allocation Agreements Among Competitors,
Application Note 3.

[39] This should include the value of corporate time and disruption
caused by private suits to recover damages from cartels.

[40] It is clear, however, that the USSC's decision to double the
10% presumed overcharge does not account in any way for the
small chances of finding and convicting cartels or the lack of
prejudgment interest.

[41] See the discussion supra notes ___.

alternative fine: "If any person derives pecuniary gain from the offense, or if the offense results in pecuniary loss to a person other than the defendant, the defendant may be fined not more than the greater of twice the gross gain or twice the gross loss."[42] Perhaps the 20% figure in § 2R1.1 is a "proxy" for this "twice the gain or loss" provision in the Criminal Fine Improvements Act of 1986.

Regardless of the precise reason for this doubling, the USSC Guidelines start with a base fine of double the 10% presumed overcharge and use this in conjunction with the assigned base Offence level (of 10) for antitrust offenses. They adjust this offense level by a number of factors, such as whether bid rigging[43] and other aggravating factors were involved, and by mitigating factors as well.[44] A complex series of adjustments result in a pair of "culpability multipliers" that are somewhere between .75 and 4.0. The product of the base fine (20% of the affected commerce) and the culpability multipliers (the pair of numbers between .75 and 4.0) results in

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[42] Pub. L. No. 100-185, 100 Stat. 1280 (codified at 18 U.S.C. § 3571 (1987)) at § 3571(d).

[43] If bid rigging is involved the Base Offense Level is increased by 1. See 18 U.S.C. Appx. Section 2R1.1 (b). This indicates the USSC's belief that Bid-rigging is worse than other forms of illegal collusion.

[44] See Section 2R1.1 and Application Note 1.

the fine range that is to be imposed on a cartel member. (These

fines usually are adjusted downwards for cooperation or as a

part of the Division's leniency program.[45]) As the Sixth Circuit

noted, the Sentencing Commission "opted for greater

administrative convenience" instead of undertaking a specific

inquiry into the actual loss in each case."[46]

Since the 10% figure is so crucial to the USSC's cartel

fine Guidelines, it certainly is worth asking where this figure

came from, and what support was provided for this estimate. The

record suggests that the USSC adopted the 10% presumption

because its use was advocated by the (then) head of the

Antitrust Division, Douglas Ginsburg. In a statement to the

Commission, AAG Ginsburg explained that the standard optimal

deterrence model means that "the optimal fine for any given act

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[45] See _____ The USSC's Commentary also notes: "In cases in
which the actual monopoly overcharge appears to be either
substantially more or substantially less then 10%" the
Commission might not employ the 20% assumption. See Application
Note 3. But in practice prosecutors almost always use the figure
of 20% of affected commerce as their starting point in their
criminal fine calculations. See _____

[46] *See United States v. Hayter Oil Co.*, 51 F.3d 1265, 1277
(1995). The court noted:" 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...We find nothing other than the following
commentary language that indicates that the Sentencing
Commission adopted the theory of optimal penalties: "It is
estimated that the average additional profit attributable to
price-fixing is 10 percent of the selling price." Id.

of price-fixing is equal to the damage caused by the violation divided by the probability of conviction . . . such a fine would result in the socially optimal level of price-fixing, which in this case is zero."[47] He also stated his judgment that "price fixing typically results in price increases that has harmed the consumers in a range of 10 percent of the price..." and that these violations had no more than 10% chance of detection.[48]

This in turn raises the question of how AAG Ginsburg arrived at his 10% overcharge estimate. While we do not know all of the reasons behind his conclusion, a prominent analysis of this issue by Cohen & Scheffman published shortly after the antitrust Sentencing Guidelines were promulgated sheds some light on this subject.[49] They state that the economic evaluation of a (very small) number of price-fixing conspiracies was particularly important in shaping the 1986-87 conclusions of Ginsburg and the Commission that the overcharges from price-fixing conspiracies were approximately 10%. Cohen & Scheffman

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[47] 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.

[48] *Id.* at 15. If Ginsburg was correct, damages for cartels should have been tenfold.

[49] *See* Mark A. Cohen & David T. Scheffman, *The Antitrust Sentencing Guideline: Is the Punishment Worth the Cost?*, 27 AM. CRIM. L. REV. 331, 342 (1989).

included evaluations of *United States v. Container Corp. of America*[50] and the subsequent civil litigation; the Federal Trade Commission case involving the Bakers of Washington State; and a short survey by DOJ economists of empirical studies of bid rigging in the road-building industry in the 1980s.[51] Thus, the lynchpin of modern criminal fines - the USSC's simplifying assumption that cartels raise prices by 10% - is supported by a surprisingly small amount of evidence.

II Is The 10% Presumption Valid: Prior Analyses Of The Evidence

The USSC's 10% presumption was attacked as unreliable and excessive soon after it was issued. For example, Cohen and Scheffman's 1989 critique concluded: "[T]here is little credible statistical evidence that would justify the Commission's assumptions which underlie the Antitrust Guidelines."[52] "At least in price fixing cases involving a substantial volume of commerce, ten percent is almost certainly too high."[53] Moreover, the specific data that the Commission used was attacked as unreliable because, allegedly: "later research has cast

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[50] 393 U.S. 333 (1969).

[51] Cohen & Scheffman, *supra* note ___, at 344-45.

[52] Cohen & Scheffman, supra note ___ at 333.

[53] Id at 343.

considerable doubt on ... these estimates, concluding that the markups, if they existed, were quite small."[54]

During recent years this criticism has been repeated with more frequency and intensity. These attacks could be due to rising levels of criminal antitrust fines in recent years. Starting after 1990 a series of record corporate fines were imposed for criminal price fixing by U.S. courts.[55] Not surprisingly, attorneys who have defended companies accused of collusion in highly publicized international antitrust conspiracies have claimed that the 10% presumption has led to penalties so large they have resulted in overdeterrence. For example, just as the DOJ's campaign against international cartels was gathering steam, Adler and Laing concluded that "the fines being imposed against corporate members of international cartels are staggering"[56], and placed the blame on the "uniquely punitive" requirements of the U.S. Sentencing Guidelines. After viewing an intensification of this trend for another two years,

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[54] Id at 345.

[55] See Connor, supra note ___. No new records have been made since 1999. A similar upswing may be noted for fines imposed by the European Commission from 1995 to 2001. Id.

[56] Howard Adler & David J. Laing, "Explosion of International Criminal Antitrust Enforcement," 11 *The Corporate Counselor* 1 (1997).

Adler and Laing were even more alarmed.[57] More recently, Michael

L. Denger, a former Chair of the ABA Antitrust Section,

denounced the price-fixing fine levels because they "lack...an

empirical foundation."[58] He places the blame for excessive fines

on the Corporate Guideline's use of 20% of the volume of

affected commerce.[59] This approach, he notes, presumes a

pecuniary loss of 10% of sales due to price fixing; unlike all

other white-collar federal crimes, the actual degree of direct

harm caused does not have to be proven by prosecutors.[60]

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[57] "What is….troubling is that the company fines   ….have risen
astronomically – to levels far higher than the fines for other
serious economic crimes and in amounts that can be unrelated to
the economic harm caused by the violations.

In 1997, DOJ fines for antitrust were at least seven times
higher per case on average than fines levied for corporate
fraud, money laundering, or racketeering. The authors depend on
the multiple of seven to make their case; no evidence is
presented as to the relative harm of these white-collar crimes
in 1997 or any other year. The authors also assert that
availability of the "double the harm" standard for fines in the
1994 alternative fine provisions (18 U.S.C. § 3571 (d)) empowers
prosecutors to intimidate many corporate defendants into
acceding to excessively high fines as part of their guilty
pleas." Howard Adler & David J. Laing, "As Corporate Fines
Skyrocket," 6 *Business Crimes Bulletin 1* (1999).

[58] Remarks of Michael L. Denger, ABA Section of Antitrust Law
Spring Meeting, Chair's Program, April 24-26, 2002, "A New
Approach To Cartel Enforcement Remedies Is Needed" at 6.

[59] Id.

[60] Denger primarily uses an increase in settlement rates in
treble-damage direct-purchaser suits to establish the alleged
unfairness of the high fines imposed on corporate price fixers,
an increase that, he believes, cannot be explained by increases

Concerns about the excessiveness of antitrust sanctions are part of the larger issue of the effectiveness of antitrust interventions. In a provocative article[61] that quickly drew vigorous rebuttals,[62] Crandall and Winston argued that extant empirical evidence demonstrates that antitrust policy has been ineffective in either raising consumer welfare or in deterring anticompetitive conduct:

> We find little empirical evidence that past [antitrust] interventions have provided much direct benefit to consumers or significantly deterred anticompetitive behavior.[63]

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in overcharge rates or other factors. He cites about 8 domestic U.S. law cases that he reports as settling for 2 to 4 % of sales in the 1970s and one international case in 2001 that settled for 18 to 20%. Id at p. 3-4.

[61] Robert W. Crandall & Clifford Winston, "Does Antitrust Policy Improve Consumer Welfare? Assessing the Evidence," 17 *J. Economic Perspectives 1* (2003).

[62] Professor Kwoka faults them for their "startlingly selective" body of evidence. He suggests that they should have included serious studies with appropriate evaluation of their credibility. See John E. Kwoka, *The Attack on Antitrust Policy and Consumer Welfare: A Response to Crandall and Winston*, Working Paper 03-008, Department of Economics, Northeastern U. (March 2003)(p. 4). See also Jonathan B. Baker, The Case for Antitrust Enforcement, 17 *J. Econ. Perspectives,"* 27 (2003): Gregory J. Werden, *The Effect of Antitrust Policy on Consumer Welfare: What Crandall and Winston Overlook, EAG 03-2.* Washington, DC: Economic Analysis Group, Antitrust Division, U.S. Department of Justice (January 2003).

[63] Id. at 4. The great majority of their criticisms were directed at monopoly and merger enforcement, but remedies for the alleged overcharges that occur in collusion cases also attracted their disfavor.

To support their view that cartels are ineffective and the prosecution of overt price fixing is unwise, they cited five empirical studies of overt collusion which found that conspiracies convicted in U.S. courts has no upward effects on prices.[64] While Crandall and Winston later admitted that there are some "examples" of successful collusion, they cite no studies that support cartels' positive effect on prices.[65]

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[64] We should note that space constraints do not appear to be responsible for such a skimpy treatment of a topic that is so crucial to their article's conclusion. Moreover, they list 59 references, but their choice of two of the articles is unfortunate because both are methodologically deeply flawed. One, Craig M. Newmark, "Does Horizontal Price Fixing Raise Price? A Look at the Bakers of Washington," 31 *Journal of Law and Economics* 469 (1988) is analyzed infra at ___. The second, Michael F. Sproul, "Antitrust and Prices," 101 *Journal of Political Economy* 741 (1993) is criticized by Werden, supra note ___. Two other studies focus on an atypical alleged episode of price fixing, the so-called Overlap group of 23 elite U.S. universities that met regularly to allocate needs-based graduate scholarships; this practice was permitted to continue under a consent decree that limited the degree of detail shared.

[65] Crandall & Winston, supra note ___. They say that the lysine, citric acid, and vitamins cases are "well known". Id at ___. We are aware, however, of only one publication that covers the price effects of all three of these cases with a degree of depth. See John M. Connor, *Global Price Fixing: "Our Customers are the Enemy.*" Boston: Kluwer Academic (2001).

As for deterrence, Crandall and Winston rather grudgingly admit that the large DOJ fines meted out to cartels in recent years possibly deterred the most harmful cartels. Their reasoning, however, is difficult to understand. Perhaps they are referring to international cartels, cartels with absolutely large overcharges, or conspiracies with high percentage overcharges. In any case, why they expect the probability of discovery or relative size of expected sanctions to be greater in such cases is not clear. Moreover, the worst cartels are

The view that cartels never succeed in raising prices for any significant period has not gained many adherents in the antitrust community. Nevertheless, concern about the lack of empirical evidence about the extent of the actual harm caused by price fixing is not confined solely to those critical of the increased exposure of corporate defendants to fines for price fixing.[66] Those who believe that cartels sometimes or often can be effective naturally would like to ascertain the extent of this problem.[67]

Unsurprisingly, many economists have studied the price effects of individual cartels.[68] Several authors have even

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less likely to have been deterred by the fines since they are based on a presumption of only a 10% overcharge. Their grudging admission is, moreover, immediately tempered by a citation to an entirely theoretical analysis of the dangers of overdeterrence. Id at ___.

[66] See the discussion of this subject by Graubert, who notes that the controversy over whether antitrust payments are excessive (which he equates with payouts greater than reasonable damage estimates) is largely attributable to the "difficulty of gathering useful data." John D. Graubert, "Too Much or Too Little, a summary of discussion," American Bar Association's Antitrust Remedies Forum, Washington, DC (April 2003) at 7. See also the thoughtful discussion in Donald C. Klawiter, After The Deluge" 69 George Washington L. Rev. 745, 762-63.

[67] Id.

[68] In addition, there have been many studies of collusion that did not attempt to ascertain how high cartels raise prices. For example, Hay and Kelley authored a classic review of 65 U.S. price fixing conspiracies. See George A. Hay and Daniel Kelley, "An Empirical Survey of Price-Fixing Conspiracies," 17 *J. Law and Economics* 13 (1974). Fraas and Greer extended this to 606

undertaken limited surveys[69] of this literature in the hope that

the compilation of data would help to assess the empirical

extent of the anticompetitive effects of cartels. Probably the

best known of these surveys was undertaken by Judge Posner, who

reported the results in the first edition of Antitrust Law,[70]

with an updated version presented in the 2001 edition.[71] Posner

analyzed and illustrated the social costs of cartelization by

assembling data on 12 "well-organized (mainly international)

private cartels"[72] He noted that "[s]uch estimates enable us to

derive a crude and probably exaggerated, but nonetheless

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cases from 1910 to 1972. See Arthur G. Fraas and Douglas F.
Greer, Market Structure and Price Collusion: An Empirical
Analysis, 26 *J. Industrial Economics* 21 (1977). Both studies
contain a wealth of information about the number of
conspirators, duration, industry, and specific collusive methods
employed. However, neither survey covered the topic of price
effects.

[69] By "limited surveys" we mean that the authors did not attempt
to encompass all possible studies nor even all studies of some
defined type or period. Surveying was ancillary to the
principal objective of the works we cite.

[70] Richard A. Posner, Antitrust Law: An Economic Perspective
(1976) at 254.

[71] Richard A. Posner, Antitrust Law (Second Edition 2001) at 304.
This article's analysis focuses upon Posner's most recent list.

[72] Id. at 303. 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 to John M. Connor, Feb. 2, 2004.

suggestive idea of the potential benefits of antitrust policy."[73]

The studies yield a median cartel overcharge of 38% and an

average cartel overcharge of 49.1%.[74] His survey is not beyond

criticism,[75] but a reexamination of the original sources he

relied upon produces similar numbers (a median of 37% and an

average of 45.3%).[76]

The most recent prominent survey of collusion cases was by

Greg Werden.[77] Werden presented data from 13 economic studies

which showed price increases from 6.5% to 36%, with a median

increase of 18% and an average of 21.3%. His sample selection

criterion 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

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[73] Id. at. 304.

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

[75] Interestingly, our results are more "conservative" than his.

[76] The authors re-analyzed Posner's original sources and re-computed the relevant figures somewhat differently. For example, three of the price effects that Posner reported appear to have been short run or peak effects rather than average effects. But even after these adjustments were made the overall results did not change very much.

[77] Gregory J. Werden, "The Effect of Antitrust Policy on Consumer Welfare: What Crandall and Winston Overlook," Economic Analysis Group Discussion paper 30-2 January 2003.

cartels at earlier times may have been substantially different

because sanctions were less severe."[78]

A working paper by two of the profession's most active

cartel researchers, Levenstein and Suslow, aims at assessing

three dimensions of cartel performance, one being

"profitability", by which they mean collusive margins or

overcharges.[79] This paper contains 5 price effects for pre-World

War II cartels and 17 for more modern international cartels.

They report a median overcharge of 44.5% and a mean of 43%.[80]

However, the article's estimates appear to include some peak,

rather than average figures, so the median and mean figures may

be somewhat high.

A study by Professor Griffin tested an econometric model

that predicts the price effects of international cartels from

information on market structure and cartel practices.[81] The model

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[78] Id. at page 1, note 2. Werden notes that "While these experts [who prepared these studies] were not neutral observers, the peer review process for publication should have screened out studies not up to professional standards." Id.

[79] Margaret C. Levenstein and Valerie Y. Suslow, "What Determines Cartel Success? Version Jan 31, 2002.

[80] The low estimate was 10% and the high estimate was 100%. Id. at Table 8, page 42, and Table 15, pages 49-51.

[81] James M. Griffin, Previous Cartel Experience: Any Lessons for OPEC?, in Lawrence R. Klein & J. Marquez (eds.), *Economics in Theory and Practice: An Eclectic Approach.* Kluwer Academic (1989). Griffin specifies a formal cartel model which allows for a fringe of competitive, non-cooperating producers outside the

was fitted to data on 54 cartel episodes, most of which operated

during the interwar period.[82] Eliminating the 16 episodes that

were government-sponsored and therefore not the subject of this

Article, the mean overcharge for the 38 private cartels is 45.6%

and the median is 43.9%.[83]

Finally, the 2003 Organization for Economic Cooperation and

Development ("OECD") 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 European

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cartel. From this theoretical model, Griffin derives a simple
empirical model that explains the degree of market power with
three factors: intracartel concentration, the share of cartel
market control, and a subjective index of the degree of the
cartels' cohesion and monitoring methods.

[82] The measure of market power is the Lerner Index. See Abba P.
Lerner, "The Concept of Monopoly and the Measurement of Monopoly
Power." 1 Review of Economic Studies 157 (1934). Four of
Griffin's point estimates are slightly below zero; we convert
these to zero. The Lerner Index is $L=(P-C)/P$, where P is the
observed market price and C is the but-for or competitive
price. Because C is equal to marginal economic costs, L is also
a profit margin on sales. L is zero in perfectly competitive
markets and has a maximum value of one. The monopoly overcharge
is a mark-up: $MO=(P-C)/C$. MO is also zero in perfectly
competitive markets, but can approach positive infinity when C
is very small. MO is greater than L whenever L is positive.
Simple algebraic substitution allows one to express MO as a
function of L, viz., $MO = L/(1-L)$.

[83] Somewhat surprisingly, government-sponsored cartels in this
period had mean overcharges virtually the same as the private
schemes.

Commission or by OECD members' national antitrust authorities.[84]

Presumably the examples chosen to be reported are among the best

documented examples from 1995 to 2001 of the degree of harm

available to the authorities. While only 12 of the responses are

expressed in terms of overcharge percentages, the usable

responses represent an unusually authoritative compilation of

data on mark-ups by contemporary cartels that have been

prosecuted by courts or commissions. The 12 cases yield a median

overcharge of 12.75% and a mean of 15.75% (with a range of 3% to

31%). We excluded four of the survey results because they

almost surely are peak figures (i.e., price increases "up to

50%") instead of averages results, which might explain the

report's conclusion that the results produce a median that is

"between 15 and 20%.[85]

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[84] OECD, "Report on the nature an Impact of Hard-Core Cartels and
Sanctions against Cartels Under National Competition Laws, Annex
A (2003). A few non-members that participated in an OECD-
sponsored "Global Forum on Competition" also submitted responses
to the survey.

[85] Id at. 9. In addition, one of the results was "more than
14%", but we figured it at 14%. Id. at 22.

Table 1. Summary of Seven Economic Surveys of Cartel Overcharges

Reference	Numbers 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

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. Moreover, even if the creators of the USSC Guidelines were correct that in the 1980s cartels generally raised prices by 10%,[86] the harsher cartel sanctions imposed more recently could mean that this presumption is no longer justified. This is a gap in the

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[86] In light of the data available in 1987, we certainly are not criticizing the estimate made by AAG Ginsburg that cartels generally raised prices by roughly 10%. Considering the state of knowledge at the time his estimate was commendable. However, the broader sample available to us has yielded a larger average overcharge percentage.

literature that we hope to remedy in this article. The goal of this article is to undertake a comprehensive and systematic examination of the questions presented at the its beginning.

III. <u>This Article's Survey of Overcharge Studies</u>

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.[87] Our sources primarily are published peer reviewed studies by economists, but a few were by historians and other serious students of the subject.[88] Other sources include antitrust agencies, parliamentary inquiries, and multilateral

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[87] The majority of economic articles are written by North American academics using cartel episodes that affected commerce in the United States or Canada. Many were written primarily as historical case studies and mention price effects only in passing.

[88] 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. Some have a degree of peer review, but this varies by publisher and author. We also should mention that a high but unknown share of the more recent articles and books were written by economists who served as paid experts to a party involved in the litigation. Other sources include government reports, economic working papers, and magazine articles. Only some of these sources are subject to internal reviews by department supervisors or senior editors. In sum, three-fourths of the estimates are drawn from the formal or informal writings of academic social scientists, and most of the remainder was the product of professionally trained scholars.

organizations.[89] These studies vary substantially in terms of

depth and the degree of professional commitment to the study of

cartels. While we have not placed any time limits on our

literature search, three fifths of our estimates are from

publications dated after 1973.[90]

We aimed at collecting the largest possible body of

information on the subject, and tried to avoid applying some

sort of subjective quality screening.[91] Consistent with most

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[89] We have made every attempt to identify and collect all useful
information on private cartel overcharges available from public
sources. A few cartels operated prior to the 1890 Sherman Act,
so even the activities of U.S. firms probably were legal.
Moreover, many cartels headquartered in Europe predate the
beginnings of antitrust law there (the late 1950s in the UK,
Germany, and the European Economic Community). Because of this
paper's antitrust orientation, commodity agreements sponsored or
protected by national sovereignty are not included. There are
many fine studies of such agreements, but the inclusion of
government-sponsored or -enforced cartels would tend to bias
upward the overcharges in our sample. In general we will aim to
follow procedures that result in conservative results.

[90] See Price Fixing Overcharges, supra note ___, at Table 10.

[91] We have only included journalists' accounts of cartels that
were book-length treatments in the belief that such works are
in-depth accounts of a cartel collected from many sources, some
of them anonymous, over a period of time, and are sufficient for
the author to provide a balanced account of conflicting claims.
Books by journalists typically do not focus on the quantitative
economic aspects of the case at hand, however, so in practice
there are relatively few overcharges drawn from these sources in
the present study. We do not include overcharge estimates from
newspaper or magazine accounts. In some cases, however, we
included overcharge estimates from articles in industry trade
journals if they were cited favorably by scholars with a
background in cartel studies and otherwise seemed to constitute
serious analysis.

previous studies of cartel effectiveness, we will treat each

cartel episode as a unique observation.[92] We excluded from our

survey cartels that were established or actively supported by

governmental action.[93] We did this because we primarily are

interested in the question of how high private cartels are able

to raise prices without government assistance, rather than the

activities of public cartels like OPEC, where government

officials are directly involved in operating the cartel.[94]

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[92] Most cartels are organized and 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 an episode. The
reasons for analyzing episodes rather than one cartelized market
over time are fairly straightforward. Each time a new collusive
episode begins, chances are that the methods and membership
composition have changed. Moreover, pauses between episodes are
often quite lengthy. Because the agreement and the players are
different, a new cartel is deemed to have been launched.

[93]   A few of the included cartels were merely registered with
government ministries or were state owned entities operating as
private firms.

[94] However, it is not always simple to decide whether a cartel is
purely "public" or "private". Some cartels unquestionably are
private and illegal. Others, however, especially cartels that
operate completely outside the United States, are more difficult
to classify. Some countries outlawed cartels but rarely if ever
prosecuted them. Other countries sometimes did prosecute
cartels, but the penalties were so inconsequential that one
reasonable can infer a national policy tantamount to implicit
legality.

Out survey's general approach has been to be inclusive, but we
excluded results for cartels we believe were likely to have been
established or maintained by governmental action. We have,
however, included some cartels whose legality is more

Our catholic approach to data-gathering may create concerns in the minds of some readers about the reliability of the reported overcharges. We agree that substantial variation in the quality of the price data, the methods used, and the professional orientation of the sources will result in substantial variation in the actual or perceived reliability of the results.[95] Moreover, many economists trust results published in refereed journals more than other publication outlets that receive less peer scrutiny, prefer modern quantitative methods to deep historical case studies, or express skepticism about the analyses of economists writing before the Age of Game Theory. To contend with the disparate preferences of our readers, we have chosen to cast our nets widely, but look across the sources for evidence of systematic variation.[96] Moreover, we have separately

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questionable. For example, some of the overseas cartels might or might have been in violation of a law in one or more of the countries in which they operated, often depending upon a number of legal requirements. We erred on the side of including surveys of price effects of these more questionable cartels. For comparison, however, we note that the sample of cartels in Table Z contains only cartels that unquestionably would be prosecuted as per se violations under today's U.S. antitrust laws.

[95] However, it does not follow that differences in analytical quality will affect the average overcharge reported. This also is true for the studies contained in the survey articles that were reported in the last section.

[96] Indeed, the analysis of our data by source, time period, or method may provide useful insights in itself.

analyzed a sample of peer reviewed economics journal studies,

<u>infra</u> Section III(C)2.

A. <u>The Cartel Episodes</u>

We found 724 useful estimates of cartel overcharges or

undercharges in 173 publications[97] that analyze cartels that

operated in 204 markets.[98] Of these markets, 40% were cartelized

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[97] Overcharge estimates for identical episodes sometimes appear
in multiple publications. We are counting the total number of
books, articles, and reports containing one or more estimates.
See Price Fixing Overcharges, <u>supra </u>note ___ ,Table 5.

[98] If one group of sellers decided to fix prices for one product in one
geographical region and another group colluded on the same product in a
separate geographical region, these will be viewed as two markets (e.g., if
the U.S. and Canadian cartels involving the same product were separate, they
were counted as 2 observations. If one cartel extended throughout North
America, however, it was counted only once.) The 194 markets were affected by
a total of 498 episodes. However, three overcharge estimates were for groups
of episodes (e.g., 40 U.K. manufacturing cartels in the 1950s.) Collapsing
these three to single "episodes" reduces the total number of episodes to 295.

Table 2. Average Overcharge Observations, by Type of Cartel

Type	Number	Percent
International membership	341	58.2
National or regional	245	41.8
Bid-rigging schemes	157	26.8
Classic cartels	429	73.2
Cartel found guilty or liable	340	58.0
No record of sanctions ("legal")	240	41.0
Currently under investigation	6	1.0
Total	586	100.0
Source: Price fixing overcharges: Appendix table 1		

by international agreements,[99] and the remaining 60% of the

cartelized markets were national or less in scope.[100] Almost one-

third of the markets were affected by bid-rigging cartels.[101]

This could be significant because many believe that bid rigging

leads to higher overcharges than otherwise identical

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[99] "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 was
international in both senses.

[100] A few markets were cartelized by both national and
international cartels. Typically, a domestic cartel was expanded
to respond to foreign competition. The potash cartel is one
example. In this category we count some purely national cartels
that were formed for the sole purpose of controlling a nation's
export sales; in the United States, these are called Webb-
Pomerene Associations. In addition, some domestic cartels had
agreements with international cartels that often protected their
domestic market from exports from the international cartel's
members. See Price Fixing Overcharges, supra note 4. Counting
episodes instead of markets, 58% are international and 42%
domestic.

[101] In Europe, bid rigging is generally referred to as collusion
involving "tenders." Although most cartels have some sales to
government entities or industrial customers that purchase by
tenders, the cartels we have classified as bid rigging are only
those explicitly indicated by their researchers to have
substantially or exclusively engaged in bid rigging. This means
that the proportion we classify as bid rigging is an
underestimate because our sources did not always provide enough
detail on the cartels to be certain of the degree of bid
rigging. The proportion of bid rigging was 26%. See Table X,
infra.

conspiracies.[102] Finally, roughly 60% of the cartels were found

guilty or liable by a court or commission.

Two kinds of cartel mark-up data are available. First,

researchers usually report the *average* price increases over the

whole episode. We have collected 587 of these estimates (Table

2).[103] Some of these overcharge estimates actually were

characterized in the studies as "minimum" estimates. To be

conservative, however, we counted these minimums as averages.[104]

Second, 175 of the overcharge figures we assembled are *peak*

price effects,[105] which we excluded from our average estimates.[106]

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[102] See Cohen & Scheffman, supra note ___ at ___, and the USSC
Guidelines, discusses supra at ____, which add a plus factor if
bid rigging is involved.

[103] In some cases, the averages are carefully weighted by the
sales in each year or month of the episode, but in most cases
the authors give equal weights to the price changes in each sub
period during the total affected period. Sometimes it is not
clear from the source whether the averages are weighted or
unweighted; if the conspiracy period is marked by steady slow
market growth, it matters little which is reported.

[104] In addition, a few overcharges are given as narrow ranges,
and we have preserved these ranges in some tables, but because
the ranges are small we have shown the midpoints of the ranges
in most tables.

[105] Peak price changes indicate the potential for maximum harm
when a cartel is at its most disciplined phase or point.
Classifying a particular estimate as an average or peak figure
in a few cases required judgment on our part due to imprecise
underlying information. If the original source is unclear about
which type of estimate is being presented, in order to be
conservative we assumed that it is a peak figure.

Although we have collected data on 204 cartelized markets,

we found multiple overcharge estimates for a large minority of

the markets. There are more estimates than cartelized markets

for two reasons. First, about half of the markets experienced

multiple distinct phases or "episodes" [107] across which the price

effects differed.[108] Second, for a few episodes, more than one

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In some cases the peak price was reached for only one day during
a cartel period of several years; in other cases, the peak may
be the highest year of a lengthy cartel.

[106] Generally speaking, the peaks were at least 50% higher and
typically were more than double the average price enhancement
achieved. The pattern of peak overcharges is similar to that for
the average overcharges. In almost all time periods,
international cartels were able to reach higher levels of price
effectiveness than the domestic or "national" cartels – on
average 50% higher. Peak mark-ups were not consistently related
to whether the cartel was prosecuted, except during 1891-1945
when prosecuted cartels exhibited lower peak price changes.
And, consistent with our earlier findings, cartels that fixed
prices or production levels were significantly more harmful than
bid-rigging agreements. For a more extensive analysis of the
peak results see Price Fixing Overcharges, supra note ___.

[107] If a cartel had more than one episode, each episode typically
had changes in membership composition, the terms of the
collusive agreement, method of management, geographic focus,
and/or other major factors. We have identified a total of 300 to
503 episodes, depending on how they are counted.

Under current anticartel enforcement standards each episode is
potentially an actionable offense. However, many legal systems
treat a string of closely related episodes as one cartel.
Moreover, some cartels prosecuted for fixing prices in multiple
product markets can be viewed as a single offense for legal
purposes, but as several cartels from an economic perspective.

[108] In other words, when a cartel is distinctly re-formed, it
enters a new phase. The aluminum market, for example, went
through six distinct phases that sometimes were adjacent in time

study has been published.[109] Further, for a given episode,

multiple methods of estimation are sometimes available.

B. Results Of The Survey

The overcharge estimates are presented in Table 3, divided

into periods that roughly distinguish different antitrust

regimes in the United States and abroad. The era up to 1890 is

an obvious choice because of the enactment of the Sherman Act.

The next break, 1919 was chosen because it represents the end of

a period of U.S. antitrust activism and, because of World War I,

a date by which most international cartels, many of them with

U.S. corporate members, had ceased operating.[110]

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and sometimes were several years apart. This heavily researched
cartel has 28 overcharge observations. See Connor and Lande,
supra note ___, Appendix table 2. Another study from which we
obtained a dozen observations summarized the results of 109
price-fixing convictions in the fluid milk markets of the
Southeastern United States within a few years. Robert F.
Lanzillotti, "The Great School Milk Conspiracies of the 1980s.
11 *Review of Industrial Organization 413-58* (1996). We count
each conviction as an episode. However, other studies that we
cite incorporate multiple temporal phases.

[109] For example, for the various aluminum cartels we drew on nine
studies written by eight authors.

[110] Many of the prewar cartels were re-established after 1919,
but in the majority of instances without the active
participation of U.S. firms in price- or quota-setting. In
addition, scores of U.S. criminal prosecutions of international
cartels during 1940-1945 clarified the illegality of many more
subtle forms of cartel participation, such as patent pools and
cross-licensing of technologies.

The post-World War II era is divided into three sub-periods; 1946 to 1974, 1974 to 1991, and 1991 to the present.[111] This division was made because one milestone in U.S. anticartel legislation was the 1974 law that made price fixing a felony, thereby lengthening maximum individual prison sentences and strengthening the bargaining power of the DOJ.[112] In addition, the period 1991 to the present constitutes the modern era. By 1990 all the present criminal sanctions available to the U.S. government were in place. In 1990, penalties for corporations rose from $1 million to $10 million. Moreover, the 1989 U.S.

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[111] The transition years 1945-1973 correspond with several important relevant changes in anticartel enforcement. First, the antitrust idea became firmly implanted in the laws of countries outside North America for the first time: Germany and Japan in 1947, the United Kingdom in 1956, and the European Economic Community (EEC) in 1958. Christopher Harding & Julian Joshua, *Regulating Cartels in Europe: A Study of Legal Control of Corporate Delinquency Chapter IV* Oxford University Press (2003). Second, European Commission (EC), the administrative arm of the EEC, successfully prosecuted its first cartel in 1969. Id. Third, U.S. price-fixing enforcement penalties became significantly more severe at the end of this period. Beginning around 1961, the DOJ began seeking guilty pleas from defendants, rather than allowing them to plea *nolo contendere,* which eased the burden of proof for plaintiffs in civil treble-damage suits. See John M. Connor, *"Global Price Fixing: "Our Customers are the Enemy*." Kluwer Academic (2001) at 61-62.

[112] Although the prosecution of price-fixing of domestic conspiracies was at a high level in 1974-1990, the DOJ did not give a high priority to investigating international cartels. Nor did it have any success in the courtroom in the few cases it did pursue. See Connor, id.

Sentencing Guidelines for corporations[113] enabled the DOJ to impose fines above the $10-million statutory cap. These and other policy changes made in the early 1990s were in some cases adopted by the EU and other antitrust authorities, which significantly improved the investigation and prosecution of international cartels.[114]

Several features of our data set are apparent from Table 3. There is an overall upward trend in number of observations per year[115]. The primary factor that explains the trend is the growth in the number international cartels with usable data. The proportion of international schemes is especially high during the interwar period and after 1990 and especially low during 1946-1990. The large number of overcharges available for our data set in the 1990s is mainly due to the launching of a historically high number of international cartel cases since the early 1990s.

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[113] See ____ supra.

[114] Final Report of the International Competition Policy Advisory Committee to the Attorney General. U.S. Department of Justice (2000).

[115] The interwar period 1920-1945 is well above the trend, while the 1946-1990 periods are below it.

Table 3. Number of Average Overcharge Observations by Year and
        Type

Cartel Episode End Date	Membership		Legal Status		Bid Rigging	
	National	Inter-national[a]	Found Guilty[b]	Legal or Unknown	Primary Conduct	Other
	Number					
1780–1890	52	4	9	47	0	56
1891 – 1919	43	33	29	47	0	76
1920 – 1945	8	142	44	106	1	149
1946 – 1973	68	19	61	26	39	48
1974 – 1990	10	46 (1 EU)	44	12	34	22
1991 – 2003	28	133 (11 EU)	153	8	83	78
Total	209	377	340	246	157	429

Source: Connor and Lande (2004: Appendix Tables 1 and 2).
[a] Cartels with corporate members from two or more countries. Those with all members from the EU shown separately.
[b] At least one member of the cartel pleaded guilty, was found guilty at trial, paid civil antitrust fines, or made a monetary settlement with plaintiffs in a private suit.

A second important trend is that most cartel data now arise

from prosecuted cartels. Prior to 1946 less than 30% of our

observations refer to cartels known to have been prosecuted.

Until the early 1970s national and international cartels

comprised of European companies could form cartels subject only to registration requirements in most European countries (and the EEC after 1960). The European Commission began imposing fines on unregistered cartels that affected EEC trade beginning in 1969.[116] During 1974-1990, U.S. corporate sanctions on cartels became significantly harsher, and the European Union's prosecutions moved in the same direction.[117] After 1990, virtually all the observed cartels in our sample were studied after they 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.[118]

A third trend manifest in Table 3 is the prominence of estimates derived from bid-rigging conspiracies since 1945. In

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[116] See Christopher Harding, & Julian Joshua, *Regulating Cartels in Europe: A Study of Legal Control of Corporate Delinquency.* Oxford University Press at 121 (2003).

[117] Both jurisdictions imposed historically unprecedented penalties on international cartels beginning in the late 1990s. See John M. Connor, *Private International Cartels: Effectiveness, Welfare, and Anticartel Enforcement, Staff Paper 03-12,* Dept. of Agricultural Econ., Purdue U.(November 2003).

[118] In the last decade, announcements of probes, guilty pleas, and fines on cartelists are more and more to be found in convenient internet sites and through internet search engines than formerly.

1946-1973, 45% of the episodes in our sample were primarily bid-rigging conspiracies; the majority of the episodes that ended after 1973 rigged bids, many of them local milk or construction conspiracies in the United States, were bid rigging. Most of the immediate victims of most bid-rigging conspiracies were governments. Relatively few international cartels rely primarily of rigging auctions or tenders for public projects.[119]

1. Trends in Average Overcharges over Time

Table 4 displays the medians of all average overcharges reported, distinguished by the same time periods and types shown in Table 3. We choose to show the median overcharge percentages rather than the mean overcharge percentages because a few very high overcharges in any particular category can overwhelm a mean calculated using the larger number of low-to-medium percentage overcharges.[120]

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[119] What may seem like a surge in this practice may in fact be a reflection of changes in data availability. Most of the articles we have found on bid rigging have drawn on public records of state or federal agencies that have been the objects of these conspiracies. It is possible that the increase in bid-rigging cases seen in our data is simply due to the advent of open-records laws at the state and municipal levels similar to the federal Freedom of Information Act.

[120] In such situations the means are larger than the medians, and the median is a better representation of central tendency. Means, medians, and standard deviations are shown in Appendix Table 3.

The median cartel overcharge for all types and time periods (a median that includes a significant number of zeros) is about 25%.[121] There are no strong overall trends in cartel mark-ups over time, but among the successful cartels there seems to be a modest decline in overcharges among the cartels ending after 1945.[122] The decline in average overcharges after 1990 is most evident among international cartels.

It is difficult to know what to make of the weak downtrends in profitability for most types of cartels. The influence of the spread of effective anticartel enforcement is perhaps the most obvious explanation.[123] Moreover, because the most recent periods contain a higher proportion of cartels that were caught by antitrust authorities, the more recent estimates may be drawn from a population of cartels that is relatively incompetent in

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[121]   The successful cartels (those with non-zero overcharges) had average 28-29% overcharges.

[122] The mark-ups are relatively high for all types of cartels that ended during 1920-1945 and relatively low during 1945-1973. Other periods hew fairly close to the average for all periods.

[123] There are also other possibilities. Perhaps the application of more sophisticated quantitative methods by researchers in recent decades systematically yield lower estimates of price effects than the earlier studies that relied on simpler before-and-after comparisons. Perhaps expected profit rates in cartelized industries have declined as an effect of globalization, and those companies that join cartels are satisfied with smaller percentage increases from collusion. Industry mix also could provide an explanation. The sample drawn from the earlier periods tends to contain more minerals and metals conspiracies, whereas the later estimates have a higher proportion of chemical, construction, and services firms represented.

hiding their activities. Alternatively, the greater antitrust scrutiny in the United States from 1940 and from Europe since the 1960s could prompt cartelists to refrain from full monopoly pricing increases so as to reduce the chances of detection. Some of these hypotheses will be investigated below.

2. *Average Overcharges Across Types: International, Bid Rigging*

A second pattern that emerges in Table 4 is that in every period since 1890 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.[124] 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

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[124] These are cartels that fixed prices in one country and export cartels comprised of firms from single countries. In three periods, international cartels were *twice* as profitable.

Table 4. 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						
Before 1891	23	41	32	22	--	24	24
1891 - 1919	24	48	24	41	--	35	35
1920 - 1945	17	37-38	35	45	34	37	37
1946 - 1973	13	24	13	21	13	14-15	14
1974 - 1990	19-20	41-43	22	37	22	29-31	25
1991 - 2003	16-17	25	22-25	21	22	21-25	23
ALL YEARS	17-19	31-33	22-24	30	21	27-30	25

Source: Price Fixing Overcharges, Appendix Table 3.
[a] Medians of the lower bounds or the upper bounds of ranges, where appropriate. Includes many zero estimates.
-- = Not available

run afoul 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.[125]

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[125] Also, international cartels are more likely to deal with internationally tradable commodities with relatively low long-distance transportation costs.

A third pattern noted in Table 4 is the inferior price effects of bid-rigging cartels compared to conventional conspiracies that set selling prices or allocated market shares. Bid rigging cartels often were organized to exploit tenders for government public-works projects. Relatively few international cartels engage in bid rigging, whereas bid rigging occurs mostly in national or local conspiracies, so this distinction may be confounded with the geographic types just discussed above. Nevertheless, this finding directly contradicts prior economic conclusions[126] and the U.S. Sentencing Guidelines that impose higher penalties for bid rigging.[127] It also challenges a rationale of the U.S. Government's overt policy shift in the 1980s that made bid rigging conspiracies a higher priority.[128]

Another interesting statistic concerns the low number of overcharges by unsuccessful cartels. Only about 6% of the data we collected indicated that a cartel episode was unsuccessful in controlling prices significantly.[129] We did, of course, include these observations in the calculations that appear in Table 4.

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[126] See Cohen & Scheffman, supra note ____.

[127] See note ____, supra.

[128] See Connor (2001) at 67.

[129] We do not want to make too much of this statistic, however, because it may reflect selection bias by the authors of the studies that were published. Injurious cartels might be more noteworthy or interesting than incompetent cartels.

3. *Overcharges and Market Size*

A commentary in the USSC's Guidelines asserts that there is an inverse relationship between the size of affected sales and the height in percent of the overcharges achieved by cartels.[130] The commentary, however, presents no conceptual or empirical justification for this assertion. We are aware of no study of cartels available to the Commission that analyzed this relationship or provided an empirical or theoretical reason for this conclusion.[131]

Nevertheless, we decided to attempt to examine whether this hypothesis might be valid. The only source of appropriate data of which we are aware is a working paper by Connor which developed affected sales and overcharge data for a group of modern international cartels.[132] This paper contains 92 useful observations, and we were able to calculate correlation statistics for a number of subsamples. The first sample of 50 cartels examined the largest geographic market for each cartel;

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[130] See 15 U.S.C. 1 Application Note 4: "Another consideration in setting the fine is that the average level of mark-up due to price-fixing may tend to decline with the volume of commerce involved."

[131] See the studies mentioned in notes ___ supra.

[132] See John M. Connor, "*Private International Cartels: Effectiveness, Welfare, and Anticartel Enforcement,*" *Staff Paper 03-12*.Dept. of Agricultural Economics, Purdue University (November 2003).

the coefficient was not significantly different from zero.[133] We

also examined geographic sub groups of the cartels: global,

U.S., EU and other single national markets. The correlations for

these four samples varied from -0.17 to +0.24, but none were

statistically significant. The data therefore suggest that

there is no support for the Guidelines' size-overcharge

connection. The policy implication is that there is no

justification for going easy on the largest cartels discovered

in recent years, such as the vitamins cartel.

 4. *Size Distribution of Overcharges*

     Given our interest in the foundations of the U.S.

Sentencing Guidelines it is logical to examine the size

distribution of our estimates. Table 5 classifies our average

estimates into nine size categories. Because the Guidelines are

predicated on the assumption that the average cartel has a 10%

overcharge, that break point is of special interest.

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[133] The correlation coefficient r = -0.105. To see whether
extreme observations might unduly affect the result, we repeated
the experiment but dropped first all cartels with $5 billion in
sales or more and second all cartels with overcharges of 65% or
higher; in both cases r became closer to zero (-0.065 and
+0.019, respectively), which indicates that extreme observations
do not affect the low correlation we have found.

Table 5. Average Overcharges by Size Category

Percentage Range[a]	Number of Observations	Distribution of Observations		
		Mean	Total	Non-Zero
	Number		*Percent*	
Zero or less[b]	41	0	7	0
0.1 – 9.9	71[c]	6.3	13	14
10.0 – 19.9	106	13.9	19	21
20.0 – 39.9	158	28.7	29	31
40.0 – 59.9	88[d]	47.9	16	17
60.0 – 79.9	38	68.2	7	7
80.0 – 99.9	11	88.6	2	2
100.0 – 199.9	22	127.9	4	4
200 or greater	14	338.0	2	3
Total	549	39.7[e]	100	100

Source: Appendix Table 2
[a] Overcharges of 10% or higher are rounded to the nearest whole number. Midpoints of ranges.
[b] Four negative numbers are converted to zero.
[c] Four estimates of "weak cartels" are assumed to be 1% overcharges.
[d] Fifteen estimates of 50% are from Eckbo (1976).
[e] Excluding zeros, the mean is 43.1%.

Perhaps the most striking result from Table 5 is that 80% were above the 10% presumption that is the cornerstone of the Sentencing Guidelines. Indeed, 60% of the cartel episodes had overcharges above 20%. The mean overcharge of the episodes in the two lowest size ranges (0.1 to 19.9) is 10.9%. Perhaps these were the cartels imagined to be typical by the creators of the

U.S. Sentencing Guidelines? By contrast, the cartel episodes

with overcharges of 20% or higher have a mean overcharge of

60.0%, six times the level assumed by the Guidelines'

authors. If the Guidelines were examined from the perspective of

whether they are likely to deter recidivism, fines building upon

a 10% presumption would underdeter the vast majority of

cartels.[134]

C. Reliability of Studies

   Many readers will have prior beliefs about the most

appropriate data and methods to be used to derive estimates of

the price effects of cartels. Our task in the remainder of this

section is to learn whether the various overcharge estimates we

have gathered are sensitive to the methods, data sources, time

periods, or disciplines of the authors. We will do this

reliability check using three approaches.

1. Sensitivity to Study Publication Dates

   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 advances in analytical

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[134] Moreover, the cartels that did not succeed in raising prices
are less likely to be prosecuted by the enforcement authorities.
By including these cartels in our calculations we are probably
underestimating the expected harms from the type of cartels that
the enforcers are likely to prosecute.

techniques. The intuition here is that the authors of more

recent empirical studies of cartels have learned to avoid the

methodological pitfalls of their predecessors.[135] Among the

economic studies that dominate our sample, there is an

undeniable trend from story-like historical case studies

sometimes embellished with simple graphical illustrations,

towards more formal statistical modeling.[136] Because in previous

sections we observed differences in average overcharges over

time, we also disaggregate the data by the cartels' termination

dates.

The results of this temporal analysis are displayed in

Table 6. The publications are classified according to four

periods that correspond roughly to milestones in social-science

analysis of cartels. The era prior to 1946 is marked by studies

that betray a relatively undeveloped understanding of oligopoly

theory, some confusion about essential nature of private

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[135] Alternatively, one might infer that analysts may have
increasingly employed techniques that have won court approval as
forensically reliable. See John M. Connor, Global Cartels Redux:
The Amino Acid Lysine Antitrust Litigation (1996), in John E.
Kwoka and Lawrence White (eds), *The Antitrust Revolution (Fourth
Edition) Oxfo*rd University Press (2004).

[136] Moreover, there also is a trend away from evaluating cartels
from the point of view of the theory of pure monopoly to a more
sophisticated and nuanced view informed by game theory and other
conceptual advances in oligopoly theory (cite Werden 2004 in
ALJ).

cartels, and the absence of statistical methods of analysis.[137]

In 1946, with the appearance of the landmark studies of Stocking and Watkins, cartel studies moved to a higher level of analytical rigor.[138] By the 1970s and 1980s, further advances in oligopoly theory were being made, the "Chicago School" of economics was having a significant impact on the field, and quantitative statistical methods first came into widespread use by economists and economic historians.[139] By about 1990 or so, knowledge of game theory pervaded the modeling efforts and empirical research of professional economists; moreover, a reassessment of the Chicago-School challenge had asserted itself.[140]

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[137] Various authors would confuse cartels with "combinations" (mergers and acquisitions), unified firms with monopoly power, and large diversified or multinational corporations – categories now viewed as distinct economic phenomena. In the earlier years when antitrust enforcement was weak or nonexistent, many writers failed to see the necessity of distinguishing voluntary agreements to restrict trade from wholly compulsory arrangements. On the other hand, the earlier scholars examining cartels frequently had access to written contracts and the well kept archives of legal organizations.

[138] They published their first work in 1946. See George W. Stocking, & Myron W. Watkins, *Cartels in Action*.(Twentieth Century Fund (1946).

[139] Although an article published by Joe Bain in 1951 is usually credited as the first statistical study in industrial economics, such methods were uncommon in cartel studies until the very late 1960s. See ___

[140] See ___

Table 6 demonstrates some interesting trends, but provides no evidence for concluding that overcharge estimates vary systematically with time. Looking at the first row for example, in the case of cartels that ended in the pre-antitrust era, the earliest authors arrived at relative modest estimates of cartel price effects -- a median estimate of 22.6%. Studies published in the 1970s and 1980s found a lower median price effects for the pre-antitrust cartels. However, as the methods of scholarship presumably improved, the estimated price effects of cartels active in the most laissez-faire of economic environments actually rose to a median of 30%[141]. One thing that analysts of all eras seem to agree upon is that overcharges were relatively high for those cartels that terminated between 1945 and 1970 (that is, the medians in the second row are the highest in all four of the table's columns). Finally, scanning across the top three rows shows that reappraisals of cartels falling into any particular time period generally result in higher median overcharges than those estimated by writers that were contemporary with the cartels.

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[141] Note that the mean does not fluctuate over time for the earliest group of cartels, but we regard the mean as less indicative of central tendency than the median. The standard deviation of the estimates (a measure of dispersion in the estimates) declined, which may suggest that modern analysts are more consistent (perhaps less uncertain) in their estimates than are the earliest ones.

Table 6. Average Overcharge Estimates by Dates, All Cartels

Cartel Episode End Date	Publication Date of Study			
	Before 1945	1945 - 1970	1971 - 1989	1990 - 2003
			Median percent *Mean percent*	
Before 1891	22.6[33] 26.6	-- --	20.9[6] 24.8	30.0[13] 30.4
1891 - 1945	25.0[77] 49.1	45.0[74] 74.2	39.0[34] 42.8	34.0[25] 43.3
1946 - 1990	– –	12.5[23] 20.7	20.0[71] 29.6	23.0[40] 26.6
1991 - 2003	– –	– –	– –	23.0[150] 32.3

Source: Connor and Lande (2004: Appendix table 2).
Note: Superscripts indicate sample size in cell. The second cell of the first row is omitted because only two observations are available.

The analysis presented in Tables 6 is suggestive but has many shortcomings, principally because many other things could have changed over time besides the analytical approaches of various writers. For example, the composition of the cartel sample changes as the publication periods change. To remedy this potential defects we present a second analysis of the sensitivity of overcharge estimates to analytical approach.

2. Peer Reviewed Estimates

We examined whether the average overcharge estimates appeared in "peer-reviewed" sources are different from those

that did not.[142] Furthermore, to allow for improvements in analytical rigor over time, we distinguish three time periods separated by the years 1945-1946 and 1973-1974.[143] Finally, we divide the observations into those cartels that are known to have been legally sanctioned and those not sanctioned.

The results are shown in Table 7. Peer review does not systematically produce lower estimates of overcharges. In fact, among cartels that operated unafraid of prosecution, peer review tends to result in slightly higher estimate than other sorts of studies. However, in the case of convicted cartels, peer-reviewed studies display lower average overcharges; for example, the median overcharge of convicted cartels from peer-reviewed publications since 1973 was 22%; from other type of publications, the median was 36%. We note that the differences in overcharges between peer-reviewed and other types of studies narrowed over time.[144]

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[142] We defined "peer reviewed" sources to include academic journals, dissertations, and reports issued by the OECD. This is a restrictive concept of peer review, because doubtless some of the books and chapters from conference proceedings were also peer reviewed.

[143] These are the same demarcations discussed supra at ___.

[144] Looking only at peer-reviewed studies of discovered cartels, there is one finding that is either a bizarre coincidence or a highly revealing hint about the source of the "10% rule." Among the estimates drawn from 1946-1973 peer-reviewed publications, the median overcharge is exactly 10%. If the Sentencing Guidelines were based upon these studies, they could be

Perhaps the strongest pattern that emerges from Table 7 is
the contrast between convicted and other cartels. Comparing the
two columns of peer-reviewed studies, the undiscovered and
presumptively legal cartels consistently generated higher price
mark-ups. This finding has significant implications for
anticartel policy because it suggests that, *ceteris paribus*,
less effective cartels are the most likely to be caught and
sanctioned. It also suggests that there is a large social payoff
from increasing the probability of cartel detection.

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considered to have had a perfectly rational foundation. However,
after 1974, peer-reviewed studies of convicted cartels tended to
have average overcharges that were 120% higher. It is likely
that the sample of studies published during 1946-1973 was biased
toward bid-rigging cartels, which we have shown were less
destructive schemes than the classic or international cartels
that would be studied after 1973.

Table 7. Average percentage Cartel overcharges, by Legal Status
          and Type of Study

Date of Publication	Convicted Cartels [a]		Legal and Undiscovered Cartels	
	Peer Reviewed [b]	Other	Peer Reviewed [b]	Other
		Median		
Before 1946	16	26	23	26
1946–1973	10	35	65	39
1974–2004	22	36	31	24

[a] At least one closely related episode was subject to an adverse decision of a court, commission, or antitrust authority.
[b] Peer review academic journals ,dissertations, court and commission decisions, and OECD reports.

3. Approach Used In the Analysis

A final check on reliability of estimates across various analytical methods controls for changes in the composition of the sample by focusing on one cartel episode at a time. Recall that a cartel episode refers to a single market, time period, and form of cartel organization. This check on reliability requires us to examine only those episodes that have two or more estimates derived from at least two of the seven different

methods that were used.[145] Only 91 episodes (about one-third of the total) were analyzed using more than one approach.

We have identified four general methods of estimation, all of which have been sanctioned by U.S. courts for determining damages in price-fixing trials.[146] The most widely used is the so-called before-and-after method in which the average price during the episode is compared to one of three "but-for" or base prices.[147] The second most popular method is statistical modeling,[148] while the yardstick[149] and cost-based[150] are the least

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[145] In a small number of cases, a particular study may offer more than one approach to the study of a cartel episode, but in the vast majority of cases the estimate being compared are taken from studies by different authors typically writing at widely separated times.

[146] Connor 2004, supra note ___.

[147] There are 148 such estimates shown in Table 8. The base prices refer to periods before the cartel began its operation, after the cartel ceased its activity, or a period during the affected period when there was a brief breakdown (a disciplinary price war perhaps) in full collusion. The base periods require judgment on the part of the analyst, because the but-for period ought to be as free from demand or supply conditions not observed during the collusive period as possible.

[148] For a definition of this term see Connor 2004, supra note ___. This method shows up 57 times in the table.

[149] For a definition of this term see id. This method had 39 observations.

[150] For a definition of this term see id. This method had 15 observations.

frequently employed. Finally, there are estimates given by

writers that did not explain their methods.[151]

Table 8 summarizes the data. We have a total of 133 pairs

of estimates to compare.[152] Each entry in the cell is constructed

by taking the estimate of the method listed in the left side and

dividing that number by the corresponding estimate that used the

method in the heading of the table. All possible ratios are

calculated with the median ratio shown.[153] Thus, a median ratio

of 1.00 indicates that there is no difference between methods on

average.[154] Several of the median ratios are drawn from such

small sub samples that we refrain from drawing any conclusions.

Nevertheless, there are four results that are interesting.

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[151] These 33 unspecified estimates are mostly from archival
sources studied by economic historians, from legal-economic
studies by antitrust specialists, or from books written by
journalists that summarize estimates provided by anonymous
sources close to a lawsuit involving a cartel. In general, these
unspecified estimates are produced by non-economists writing
without the benefit of anonymous peer review, whereas the other
five methods are studies written by professional economists.

[152] The 133 pairs hold the episode constant, but the two methods
being compared are often made by different authors.

[153] We also tried the mean ratio, but the ratios were highly
skewed, making the mean an inferior measure of central tendency.
We also examined the absolute percentage differences between
corresponding percentage estimates, but this approach provided
similar results to those in Table 8.

[154] Not counting the 7 ratios on the diagonal (these are equal to
1.0 by construction), 85% of the ratios are between 0.5 and 2.0.
That is, most overcharge estimates are not terribly sensitive to
which method of estimation is employed.

First, the eclectic estimates that we have termed

unspecified are quite a bit higher than the before-and-after and

econometric methods.[155] This may be attributed to case-selection

bias by journalists and historians or to the absence of the

formal theoretical or quantitative skills common among

economists trained in the last 50 years or so.[156] Another likely

cause is a failure to distinguish peak price effects with the

longer-term effects of an entire episode. Nevertheless, it

seems wise to regard monographs that do not specify one of the

four economic, court-sanctioned methods with skepticism, or to

apply a hefty discount to such claims.[157]

Second, the overcharge estimates developed by comparing the

cartel-affected price with a *pre-cartel* price do not on average

differ from those constructed from a *post-cartel* price[158]. The

mean ratio is 1.06. This result is a bit surprising. Post-

cartel real prices are sometimes observed to be higher than the

pre- cartel price; speculation as to why has centered on

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[155] The unspecified methods are much smaller than the yardstick
method, a result for which we have no explanation.

[156] Of course, many of the economic studies may suffer from their
own form of case-selection bias, namely, an eagerness to focus
on cartels with superior price data of a kind needed to test
novel quantitative models.

[157] A fifth method, predictions made from theoretical oligopoly
models, had too few examples to be included in Table 8.
[158] These results are not shown in Table 8, but can be found in
Price fixing overcharges.

Table 8. Median Ratios of Estimates for Same Episodes but Different Methods

Numerator Method	Denominator Method				
	Unspecified	Before and After [a]	Cost Based	Yard-stick	Econometric Model
	Median ratio[b]				
Unspecified method	1.00[65]	1.66[30]	0.78[2]	0.25[11]	1.84[23]
Before and after	0.78[30]	1.00 [269]	0.49[11]	0.41[21]	1.03[25]
Cost based	1.28[2]	2.05[11]	1.00[16]	2.29[2]	2.13[4]
Yardstick	4.00[11]	2.41[21]	0.44[2]	1.00[54]	0.70[4]
Econometric model	0.54[23]	0.97[25]	0.47[4]	1.43[4]	1.00[108]

Source: Price Fixing Overcharges (2004) Appendix Table 2

- - = No pairs available
  [a] Comparison of effective cartel price to base period below.

institutional features of markets (e.g., long-term supply
contracts) that cause price declines to lag or on the
possibility that the learning involved in cartel cooperation
translates into more effective tacit cooperation after a cartel
is dissolved[159]. Other scholars have noted the incentive that
former cartelists have to keep their prices high during the
post-conspiracy period when they are negotiating a settlement
for private damages.[160] On the other hand, post-cartel prices

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[159] See Connor (2001), supra note ___..

[160] See Joseph E. Harrington, "Post-Cartel Pricing during
Litigation. *Journal of industrial Economics* (forthcoming 2004).

have sometimes been lower than pre-cartel prices because the end

of the cartel caused a reversion to more aggressive share-

building behavior than prior to the cartel. Moreover, it is

possible that each of these scenarios applies at times, and

these two effects are self canceling in our sample.

Third, another pregnant result is that the before-and-after

method produces cartel-overcharge estimates that are on average

the same as econometric models applied to the same data. In

principal, econometric models are simply more formal and precise

ways of applying the before-and-after method. Econometric

techniques offer the opportunity to the analyst to make explicit

allowances for several sources of shifts in demand and supply,

for seasonality, for trends in technology, and for feedback

effects. If in fact econometric techniques are the most

accurate, what this result seems to suggest is that authors of

traditional before-and-after analyses are generally adjusting in

an implicit manner for all the competitive factors that might

drive up the competitive benchmark price. An example of such a

situation is when a cartel's formation is preceded by a

predatory price war that forces the pre-cartel price to

unsustainably low, sub competitive levels.[161] The before-and-

after method does not lend itself easily to adjustments for such

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[161]   See Connor 2004.

subtle influences as seasonal demand and currency exchange rates.

Fourth, compared with the before-and-after and econometric methods, the cost-based technique is seldom used, because internal production data for cartel participants are rarely available, even in forensic settings. However, a casual scan of Table 8 gives the impression that the cost-based method yields uniformly higher estimates other methods. The yardstick approach also yields relatively high estimates. Most of the yardsticks are prices in regions in which the cartel did not attempt to fix prices or are prices for "comparable" non-cartelized products. This result suggests that identifying appropriate yardsticks is more difficult than most analysts anticipate.

In summary, there appear to be good reasons why those estimating cartel overcharges employ the before-and-after or econometric methods more commonly than any others.[162] Besides the question of data availability, they typically yield estimates that are internally consistent. Moreover, more often than not, the alternative estimation methods seem to produce overcharges that are higher than the two most tested methods.[163]

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[162] In our sample, 74% of the average estimates were of these types.

[163] If true, this suggests that to protect defendants' rights the cost-based and yardstick methods ought to be treated with healthy skepticism in forensic proceedings. On the other hand,

IV. Survey of Final Verdicts in Cartel Cases

   In theory we should be able to determine how high cartels

raise prices by a straightforward examination of a statistically

significant sample of the many antitrust cases that involved

cartels. However, the amount that prices changed, or even

whether prices were affected at all, is not relevant to the

issue of whether a cartel violated the antitrust laws.[164] It

therefore is unnecessary for the court in criminal antitrust

cases to calculate the extent of any overcharges or

undercharges.[165] In civil cases, however, the damages awarded to

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we recognize that our finding of consistency is not proof that
the before-and-after or econometric methods are not necessarily
more accurate representations of the true overcharges.

[164] See the discussion in Lawrence A. Sullivan & Warren S.
Grimes, The Law of Antitrust: An Integrated Handbook 165-233
(2000). This shows that in per se cases the plaintiff does not
have to prove whether prices rose (or even whether defendants
had market power. The issue of whether prices rose can be an
element of a rule of reason case, but rule of reason cases do
not give rise to criminal fines, so are not the subject of this
article.

[165] 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.

The first time in which the federal government attempted to
prove the size of cartel overcharges was United States v.
Andreas, in which defendants were convicted of conspiring to fix
the price and allocate the sales of lysine. 1999 U.S. Dist.
LEXIS 9655, *2 (D. Ill. 1999). The Department of Justice ("DOJ")
recommended that the court apply the alternative sentencing

a successful plaintiff are equal to three times the overcharges,[166] so in these cases plaintiff must demonstrate how much prices increased or decreased due to the actions of the cartel.

The necessary research has proven to be extremely difficult to undertake, however, because almost every private antitrust suit for damages 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[167] calculated

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provisions of 18 U.S.C. § 3571(d). *Id. at *3.* The court conditionally denied the defendants' motion to reject the sentencing provisions, and granted the parties' motion for an evidentiary hearing to present economic evidence regarding the gains or losses attributable to the conspiracy. *Id.*

DOJ retained the expert opinion of an economist, who based his estimate of the defendants' gains on a hypothetical "but-for" price. *Id.* at *4. When the defendants requested more time to research and respond to the expert's opinion, the court ordered DOJ to assist the defendants to obtain the necessary sales, price, and volume information from other lysine producers. *Id.* at *7. The court later found, however, that DOJ's production of economic data was insufficient, and therefore granted the defendants' motion to bar imposition of the alternative fine provision. *Id.* at **9-14.

[166] 15 U.S.C. Section 15 (Supp 1992). The Statute also provides that successful plaintiff will recover reasonable attorney's fees and expenses. Id.

[167] Although there have been cases where its staff entered into agreements with defendants over the size of the illegal overcharges, we know of no cases where the Federal Trade Commission calculated the actual size of a cartel overcharge.

an overcharge are surprisingly rare. As an example of their

scarcity, there apparently has never been even a single final

verdict in a damages case involving indirect purchasers, even

though this is a very actively litigated area of antitrust law

where more than 100 cases have been filed against a single

defendant.[168]

   The reasons for this high settlement rate are not

completely clear.[169] One reason is because the litigation is so

risky and expensive that settlement often is the most logical

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[168] See the discussions in Robert H. Lande, Why Antitrust Damage
Levels Should Be Raised, 16 Loy. Consumer L. Rev. 329 (2004);
Remarks of Michael L. Denger, ABA Section of Antitrust Law
Spring Meeting, Chair's Program, April 24-26, 2002, "A New
Approach To Cartel Enforcement Remedies Is Needed." For example,
a very reliable source reported that in recent years at least
137 antitrust cases alleging overcharges were filed against
Microsoft alone, involving both Sherman Act Section 1 and
Sherman Act Section 2 allegations. As of July 2004 almost all
had been dismissed or settled, and there have been no final
verdicts. See Jonathan Groner**, "**Chalk up a few wins for
Microsoft The National Law Journal October 2, 2000 Pg. A4.

[169] Most civil cases of all types settle or are dismissed. We
have no information as to whether cartel cases are more likely
to settle or be dismissed than are other types of antitrust or
non-antitrust cases. However, the fact that we have been able to
find so few final cartel verdicts suggests that it may be lower.

Unfortunately, these settlements virtually always provide little
public information that would be useful for our purposes.
Bentson in Salop and White, supra note ___ at 318 notes that the
most ambitious empirical study of private antitrust cases
yielded too little publicly available information on settlement
amounts to justify analysis.

alternative for both parties.[170] Rather than incurring

substantial litigation expenses,[171] risking personal and

corporate time, expenses, and disruption for clients,[172] and face

an uncertain probability of an uncertain magnitude of gains (or

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[170]   This type of complex litigation that goes to final judgment
has sometimes colloquially been termed a "mutual suicide pact"
because of the ardor involved for all concerned.

171 Steven C. Salop & Lawrence J. White, Private Antitrust
Litigation: Introduction and Framework, in PRIVATE ANTITRUST
LITIGATION 13 (Lawrence White ed., 1988) calculated that
attorneys' fees average 30-50% of the overcharge amount. Kenneth
G. Elzinga & William C. Wood, The Costs of the Legal System in
Private Antitrust Enforcement, in PRIVATE ANTITRUST LITIGATION,
id, calculate attorneys fees as being 58%-102% of the
overcharge.

[172] The cost of this disruption to the affected firms can be
tremendous. See the discussion in Lande, supra note ___ at 142-
144. James T. Halverson was reported to have recommended "that a
defendant take exhaustive discovery, particularly if it has an
advantage over the plaintiff in terms of resources. Halverson
also suggested that any defendant show the plaintiff that it is
not costless to sue. Thus a defendant should counterclaim.
Halverson bluntly suggested that private plaintiffs look at
their pocketbooks rather than the so-called "public interest,"
so defendants should make plaintiffs worry about their
pocketbooks. He also suggested that if more than one private
suit is filed, the defendant should get the weak suit to trial
first....[After] the plaintiff's board of directors has seen
months of attorneys' fees and corporate disruption, the
plaintiff's board will work in the defendant's favor and nudge
its lawyers toward a compromise.... In sum, he stated, settle
strong cases and try the weak cases, always while delaying the
Government." Reported in Antitrust and Trade Reg. Rep. No. 792,
Dec. 12, 1976, p. A-2).

a total loss[173]), counsel for all parties often recommend and negotiate a compromise.

It might instead be useful to ask why some cartel cases do not settle. One possibility is that the non-settling cases are most likely to be those where the parties have different beliefs as to the likelihood of victory. Settlement is very difficult if plaintiffs are optimistic that they will prevail and the award will be large, while defendants believe the opposite. For this reason non-settling cases might be those in which liability and damages are least susceptible to prediction, and in which the expected likelihood or magnitude of liability cannot be predicted with even a small amount of confidence.[174]

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[173] Both parties have a special incentive to settle cases that, if plaintiff prevails, would bankrupt defendant.

[174] Other factors could include lawyer or client stubbornness, irrationality or denial of the likely impending reality of the court's verdict. Another possibility is the unethical resistance by counsel to accept a settlement that would be good for their clients but would generate fewer legal fees than litigation. This could be especially likely to occur in class action cases since class members cannot effectively supervise their attorneys. It also is possible that as a case develops, plaintiffs are more likely to settle to the extent they come to believe that its potential rewards are likely to be less than the expected payoff. However, since the costs of litigation are automatically recovered by prevailing plaintiffs (See 15 USC Section 15 (1992)) this factor is less important than in other fields. The extreme example of a large ratio of attorneys' fees to recovery surely is that of United States Football League v. National Football League, 887 F.2d 408 (2d Cir. 1989), cert. denied, 493 U.S. 1071 (1990). Although plaintiff received only $1.00 before trebling, their attorneys received over $5,000,000 in fees.

Since most cartel cases settle, it might be desirable to survey settlements as one way of determining the size of the cartel overcharges.[175] However, settlement amounts are too frequently an extremely unreliable guide as to the size of the underlying cases' overcharges. Settlements are by no means likely to be compromises for half of the overcharges.[176] A risk-

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[175] One might believe, for example, that a settlement represents the lower bound on the expected recovery if the case would 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 roughly usually cancel one another. We have no evidence as to whether this is the way that plaintiff and defendants, or their attorneys, typically behave. We have, however, heard trustworthy plaintiff and defendant attorneys tell us, anecdotally, they have settled cartel cases for single damages.

[176] 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 chances of prevailing. Suppose, for example, that difficult class action certification problems reduced plaintiffs' chances of winning to 25%. And, even if defendants really did raise prices by 30%, this often can be very difficult for plaintiff to prove. If plaintiff only has 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.

averse plaintiff with a strong case might settle for very little

if it needs the money quickly and consequently is in a weak

bargaining position.[177] Conversely, a risk-averse defendant with

a strong case might settle for what might seem like a 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.[178] The authors have heard such a wide

Moreover, publicly available settlements typically contain very
little usable data. Often they do not even include the size of
the affected commerce, making the calculation of the overcharge
percentage highly speculative.

[177] Plaintiffs' counsel typically asserts that defense counsel
are able to find barely ethical ways to delay meritorious claims
for years. Since antitrust awards do not contain pre-judgment
interest (15 USC Section 15), and plaintiffs often need the
money in the short term, these delays harm plaintiffs'
bargaining position significantly. Plaintiffs' counsel also
asserts 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. See also the views
of James Halverson, supra note ___.

[178] The authors have heard variations on this theme many times.
Attorneys for Defendants in cases that have settled for 8
figures appear to believe, well after the cases were over and
after there was any threat of further liability, that their
clients never affected prices. Defendant 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.

One of the authors of this article once worked for a client who
went to jail for rigging the bid for an extremely complex
product. The author believes, after spending a considerable time
trying to determine the relevant costs, that this client

variety of claims from both plaintiffs and defendants[179] as to

settlement motivations[180] that we do not believe that analysis

based upon average settlements would be very meaningful.[181]

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inadvertently fixed the price at too low a level. Their
intention was of course to bid higher than the competitive price
(but not so high as to attract suspicion). But the firm
underestimated how costly the item was to make, so apparently it
actually lost money.

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. See Denger, supra note
___ at 10. 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. Defendant might
be forced to settle for a significant amount even if it did not
cause prices to be elevated.

[179] Interestingly, defendants sometimes assert that unscrupulous
plaintiff attorneys often only have an interest in the size of
their legal fees, rather then the amount they recover for their
clients. If true, this gives rise to the possibility that
plaintiff attorneys, especially in consumer class action cases,
might settle for unduly low amounts solely to secure generous
legal fees for themselves. The Courts are supposed to prevent
this from happening, but judges sometimes are too busy to do so
optimally.

[180] One of the most unusual settlement stories came from a very
reliable defense counsel who is among the most honest members of
the bar. His client settled generously despite winning numerous
preliminary motions and discovering that the facts were
developing more and more favorably to their position. The
client unexpectedly instructed counsel to settle on any terms
possible before the end of the calendar year. The company had
decided to change to a profit sharing arrangement for the
following calendar year, and its executives preferred to pay
large damages before the end of the calendar year rather than
risk even a small probability of paying modest damages, and
certain legal fees, the following calendar year. Needless to
say, the size of this settlement was unrelated to the actual
overcharges (which in this case probably did not exist).

1. Sample and Results

We instead attempted to obtain the largest possible sample of verdicts in collusion cases. We searched for final decisions in United States antitrust cases involving horizontal collusion, broadly defined to include bid rigging and related practices, where a judge, jury, or commission calculated the damages.[182] We found cases by the use of computer assisted searches of data bases,[183] by searching through a large number of articles and treatises on cartels and on antitrust damages, and by asking groups of knowledgeable antitrust professionals for any examples they knew of that might contain useful information.[184] We

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[181] We are not asserting that it would be impossible to derive insights from an analysis of settlements. We only believe that it would be difficult. We could imagine, for example, a study of settlements based upon candid interviews with the participants that could yield a great deal of important information. Anonymous questionnaires about past cases are another possible research method. See Salop & White, supra note ____.

[182] We excluded cases that were overturned on appeal.

[183] Computerized searches were not, with only a few exceptions, particularly helpful. Most searches turned up hundreds of useless citations, including our searches for "price fixing" or "bid rigging" and "verdict", "amount of overcharge", "overcharge" and "percent", "auction" and "conspiracy" w/in "antitrust", "collusion" and "dollars" or "cents". We never were able to design a successful focused computerized case search.

[184] For example, inquiries were made on the antitrust listserves of the ABA Antitrust Section, the National Association of Attorneys' General, and of the American Antitrust Institute.

include every qualifying final collusion verdict we were able to

find. However, many of the verdicts that we did find were only

expressed in dollar amounts which we were unable to translate

into percentages, so we reluctantly had to omit these cases.[185]

One example will illustrate the difficulties of engaging in

this type of research. United States v. Anderson[186] involved a

conviction for bid rigging USAID contracts. The Circuit Court

Opinion said that the winning bid on the wastewater treatment

facility was $107,017,000, the engineers estimated the cost

would be $60,000,000, and the defendant's profit was

$50,639,000. Thus, the illegal overcharge might have been

47%. The problem with using this figure, however, is that the

winning bidder certainly might have made some profit in a

competitive market.[187] So 47% represents something like the

maximum that the illegal overcharge could have been.

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[185] See, e.g., Bigelow v. RKO Radio Pictures, Inc., 150 F.2d 877, 884, 327 US 251, Chattanooga Foundry & Pipe Works v. Atlanta, 203 U.S. 390 (1906), Transnor (Bermuda) Ltd. v. B.P. North America Petroleum, 736 F. Supp. 511 (S.D.N.Y. 1990), Phillips v. Crown Cent. Petroleum Corp., 602 F.2d 616 (1979).

[186] 326 F.3d 1319 (11th Cir. 2003).

[187] Economists often define "cost" to include a normal rate of return or a normal profit, but we are unsure whether the Court was using the term this way. Moreover, in a competitive market risky construction projects sometimes make a considerable profit, but sometimes result in a loss.

However, the Opinion also said that the winning bidder agreed to pay 2 co-conspirators $5.35 million and $2.2 million for bidding so high that they would not be awarded the contract.[188] This totals 7.1% of the contract price, and means that the overcharge must have been at least this much. Since the true overcharge probably was between 7.1% and 47%, we used 7.1% when we computed our overall average.

The vast majority of the cases we found settled or were dismissed.[189] This left a disappointingly small sample size to analyze. However, we know of no reason to believe that our sample is biased in any particular direction; see the discussion in Section B supra. Moreover, our sample of 24 observations is roughly as large as the sample size of those in the prior surveys that we reported in Table 1 (which were 5-7, 12, 12, 13, 22, and 38 in number, respectively). Nevertheless, this sample is disappointingly small compared to the number of economic observations we were able to collect. Due to its small size these results should be interpreted with caution. They should

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[188] Id. Defendant also agreed to give them other considerations, such as a $25 million subcontract, which probably had a substantial profit built into it, and the designation to win another contract. Id.

[189] We surely found only a small percentage of final verdicts, and would be grateful if readers of this article could inform us of final verdicts that we inadvertently omitted.

be considered only as additional data worthy of analysis and discussion, not as definitive material.

The results of our survey of final verdicts in collusion cases are that the 24 collusion episodes had a median average overcharge of 20.2% and a mean average overcharge of 29.5%. The 9 cases that reported peak overcharges produce a median peak overcharge of 71.4% and a mean peak overcharge of 130%. All but 5 found that the cartel had raised prices by more than the USSC's 10% benchmark. Due to the small number of final verdicts it would not be meaningful to analyze these verdicts in even smaller groups -i.e., we could only find 8 final verdicts involving bid rigging episodes, so it does not seem worthwhile for this article separately to report the median or mean figures for bid rigging cartels.

B. Reliability and possible Biases

How useful are the decisions of judges and juries in answering the question of how high cartels raise prices? Their verdicts are of course based on the opinions of the competing expert witnesses, who come to radically different conclusions about the size of the damages involved.[190] Both sides make their

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[190] It is extremely unlikely that there has ever been even a single antitrust case where experts for opposing sides agreed upon the amount of damages. Why do "neutral" experts who work

presentations and the finders of fact decide which expert is more believable on particular issues (with plaintiff having the burden of proof).[191]

This may or may not be the best way to determine which expert witness's conclusions are more accurate since many skills besides facts and economic reasoning can play a role in the judge or jury determination.[192] While the common law system of jury and judge verdicts is far from perfect, it is the system our nation has chosen to use in a wide variety of life and death decisions affecting our society.[193] Since the United States long

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for plaintiffs always calculate significant larger amounts than do those who work for defendants?

Similarly, although we find no evidence for the allegation, the economic studies reported elsewhere in this article are open to the charge that some of the authors' and their methodology are biased.

[191] Moreover, the likelihood and size of damages also will depend upon the absolute and relative abilities of the defending and prosecuting counsel. We know of no evidence, however, as to whether defendants or plaintiff are likely to have the best legal representation on average.

[192] Author Connor has been an expert witness and author Lande has worked with expert witnesses in antitrust cases. They have seen firsthand the truth of the conventional wisdom that presentation skills can be as crucial as economic and factual knowledge.

[193] While it may be true that some juries and trial or appellate judges juries are not objective, the burden of proof should be on those who would assert that the overall system, including its appeals, has a systematic bias, or that an alternative approach to answering the question of how high cartels raise prices would be superior.

has continued to use this system,[194] 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. Neither sample is perfect: each has it strong and weak points. But since the question of how high cartels raise prices is an important one that deserves as reliable an answer as we can ascertain, we are using this method as an additional one that deserves consideration.[195] And, since our two major approaches reinforce one another, the credibility of both is strengthened.

Further, since such a large percentage of cases settle, one reasonably might ask whether the few that do not settle are in some manner different from those that do. Since the motivations for settling and not settling are so varied, one can only speculate as to the biases involved.

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[194] In other nations with admirable judicial systems, judges or judicial panels are the vehicles of decisionmaking in antitrust cases, which are typically are civil matters. See, e.g., the discussion of the EU approach in Marc Van der Woude and Christopher Jones, EC Competition Law Handbook 2002/2003 Edition at 593-629 (2003), Sweet & Maxwell, London,.

[195] We welcome a healthy debate over the significance of this article's methods, and encourage other authors to find and employ alternate methods to ascertain cartel overcharges.

Are there likely to be any significant systematic differences between cases that settle and those that do not? Is there reason to believe that classes of cases for which settlement will be less likely - such as in cases where the parties have different expectations as to what the outcome is likely to be - when the overcharge percentage is especially high? As examples we will present two contrasting possibilities. First, it certainly is possible that for cases when the cartel overcharged by a large percentage the defendants might reason that plaintiff is likely to be able to prove at least some overcharges to the fact finder's satisfaction. Defendant might be more likely to settle these cases.[196] Alternatively, it could be true that a small overcharge percentage - less than 5% - might be too small for plaintiff successfully to distinguish from purely random movements in prices. If plaintiffs believed that defendant had increased price by 4%, but knew that it would be extremely difficult to prove this, they would be less likely to sue.[197] As these examples illustrate, we can speculate as to

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[196] Some cases with large overcharges settle, while some smaller ones do go to trial.

[197] Further, it might be less likely that plaintiff would even file a civil case unless it believed that damages were likely to be high. However, this article is examining overcharge percentages, not total recoveries, and it focuses on medial percentages. Aren't plaintiffs likely to file cases with large expected total payoffs, regardless what overcharge percentage that constitutes? What difference does it make to plaintiffs or

why a survey of verdicts could be biased in either direction and yield results that are higher or lower than the actual mean or median cartel overcharge. While we certainly acknowledge this method's potential flaws, we know of no reason to believe that it is either systematically biased or unreliable, or why this unreliability would shift the results in a particular direction.

VI Conclusions

Our survey identified about 450 serious social-science studies of cartels which contained 549 observations of "average" overcharges.[198] Our primary finding is that the median[199] cartel overcharge for all types of cartels over all time periods has been 27%; 20-21% for domestic cartels, and 33-34% for international cartels.[200] Thus, in general international cartels have been about 50% more effective in raising prices than domestic cartels. Cartel overcharges are skewed to the high

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their attorneys if they prove a 1% overcharge on $1 Billion in sales, 10% on $100 million, or 100% on $10 million? In all three examples the amount of the expected overcharge would be identical.

[198] Average overcharges are those calculated from an entire cartel episode, not just a peak or isolated result.

[199] All figures presented in this Section incorporate all relevant zero estimates and omit peak results.

[200] This study found results for 247 international cartels and 198 domestic cartels.

side, pushing the mean overcharge for all types of cartels over all time periods to 36.2%. These results are generally consistent with the few, more limited, previously published works that survey cartel overcharges. 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.

In our sample of scholarly evaluations of 549 observations, 79% were higher than the 10% presumption contained in the USSC Guidelines; 61% were above 20%. Perhaps surprisingly, bid rigging was no more injurious than other forms of collusion. If anything, our data suggests that bid rigging is slightly less injurious. These results suggest that the USSC should amend its Guidelines, which currently treat bid rigging more harshly than other forms of collusion. Nor is there any empirical basis for the Guideline's statement that cartels are less dangerous when they are formed in larger markets.

There are no strong trends in cartel mark-ups over time, except for the period after 1990, when anticartel sanctions have been the highest.[201] Since 1990 the average overcharges of

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[201] The fact that cartel overcharge estimates do not change systematically over the past century (except as noted above) provides a rough indication that progress in theories and empirical methods has not totally invalidated cartel case studies published in the early years of cartel scholarship. We also ascertained that median overcharges are not sensitive to

discovered cartels fell to 15-16% for domestic cartels, and to

25% for international cartels.[202] Since the post-1990 era has

been the period with by far the highest level of fines imposed,

this decrease is consistent with the theory of optimal

deterrence discussed in Section I supra.[203] It also suggests that

the recent worldwide trend towards the intensification of cartel

penalties has been desirable. If we can make our system of

criminal fines correspond more closely to the actual levels of

cartel overcharges, sanctions against price fixing will more

closely provide optimal deterrence.

The results of the survey of final verdicts in decided U.S.

collusion cases, only three of which were international cartels,

show an average median overcharge of 20.2% and an average mean

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whether or not a study was subject to formal peer review.
However, in an analysis of finely matched cartel episodes, we
did find that econometric approaches typically produced lower
estimates than did application of the before-and after method.

[202] There were 93 international cartels analyzed for this period
and 18 domestic.

[203] There has been a great deal of speculation about how price
fixers behave and what signals they do or do not respond to. We
cannot in any meaningful way truly psychoanalyze them and use
these results to set up a system likely to provide them with
optimal incentives. Nevertheless, the data suggests that the
relevant corporate officials do respond to the incentives that
have been created by the existing system of criminal penalties.
This suggests that the current system of cartel fines has been a
very successful program, that for the first time in history they
are large enough so that they have started to have a significant
effect on corporate behavior.

overcharge of 29.5%.[204] Thus, the 24 decisions produce average

overcharges that are quite comparable to the results of the much

larger set of economic estimates. All but five of the reported

decisions found that the cartel had raised prices by more than

the USSC's 10% benchmark. Because of the relatively small number

of verdicts,[205] however, we think it improper to place much

weight on sub-groups of these data.[206]

This article's introduction noted that there is a view

among some antitrust writers that there is little evidence that

cartels raise prices significantly for a period long enough to

justify extant anticartel laws and, especially, extant cartel

penalties. Consequently, they argue for the repeal or scaling

back of the fines or damages that result from collusion. Even

some who recognize that a significant number of cartels are

harmful believe that the U.S. Sentencing Commission's

presumption that cartels raise prices by 10% is too large. Our

results, which are based upon an extraordinarily large amount of

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[204] In addition, the 9 cases that reported peak overcharges produce a median peak overcharge of 71.4% and a mean peak overcharge of 130%.

[205] However, the other overcharge studies that we reported in Table 1, supra, had samples of 5-7, 12, 12, 13, 22, and 38 estimates, respectively. Our legal sample of 23 fits comfortably with these in terms of sample size.

[206] For example, we could only find eight reported verdicts that involved bid rigging, so it does not seem worthwhile for this article to report the median or mean figures for bid rigging verdicts.

data spanning a broad swath of history of all types of private cartels, sharply contradict these views.

In fact, the data suggest the opposite. Median overcharges are in fact two or three times as high as the level presumed by the U.S. Sentencing Commission. Moreover, the great majority of the overcharge estimates – those with overcharges above 20% -- have a mean overcharge of 55.3%, more than 5 times the Guidelines' presumption. Base fines of 20% of cartelists' affected commerce, even when adjusted by significant culpability multipliers,[207] will do little to deter most of these cartels.

The Guideline's 10% overcharge presumption was, moreover, based upon the estimate that "the average gain from price-fixing is 10 percent of the selling price."[208] The Guidelines "average" is the equivalent of our mean, not our median.[209] The correct comparisons are therefore not between the Guideline's figure of 10% and our medians of 27% for the economic studies and 22% for the case verdicts. Rather, the truer comparison would be to our

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[207] For a variety of factors, however, very few firms actually pay a fine amounting to 20% of the amount of commerce affected. Most violators have their fines reduced for a variety of reasons. See note ___, supra.

[208] 15 U.S.C. 1 Application Note 3.

[209] The inclusion of a few highly successful cartels in a sample implies that the sample's mean is significantly higher than its median. The mean will also be higher than the median because overcharges cannot be less than zero.

mean figures of 36% and 27% respectively. We are agnostic on the question of whether, from the perspective of optimal deterrence, mean or median figures should be used as the basis of the U.S. Sentencing Commission's presumption. We simply note that our decision to focus on the median figures has been a conservative one.

There is another respect in which this article has been conservative. We have 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 non-price harms to quality and variety, etc. Yet, we have not taken these harms into account. Nor have we adjusted our results for inflation.[210] Admittedly, many or most of these factors are extremely difficult to measure, especially in a litigation context. While the Guidelines seem to have doubled the 10% presumption to account for its omission of these factors,[211] we believe that this doubling also has been conservative.[212]

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[210] Suppose a cartel overcharges in years 1 through 7, followed by discovery and another 3 years of litigation. The penalties would be assessed in year 10. The overcharges from year 1 really should be adjusted for 9-10 years of inflation, but we have not done this. This omission means that our penalty recommendations are too low.

[211] See Section I supra, at ___.

For all of these reasons, if the U.S. Sentencing Commission

decides to re-examine whether 10% is the right overcharge

presumption,[213] it should consider raising the presumption to 15%

for domestic cartels and 25% for international cartels.[214] This

is a conservative and modest proposal in light of this article's

demonstration that cartels typically generate at least two or

three times the harms presumed by the current Sentencing

Guidelines.

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[212] See Section I <u>supra,</u> at ___.

[213] This article's introduction observed that it was possible
that <u>Blakely v Washington</u> could mean that the 10% presumption
will be declared unconstitutional or employed less often.
Instead, defendants may litigate the actual overcharges. If this
happens, most of the 79% of cartels that overcharged more than
10% should acquiesce to the government's use of the 10%
presumption. Only the 21% of cartels that overcharged less than
10% should be likely to contest this. However, these fines have
no prejudgment interest, so defendants benefit from the delay
that comes from litigation.

However, a key issue is whether cartels usually know in advance
of litigation roughly how much they overcharged. Could most
cartels predict in advance of litigation, for example, that a
Court will find that it overcharged 5%, as opposed to 15%? How
risk averse are they, in light of the probability that lengthy,
protracted litigation could result in a much higher result? We
believe that cartels often are risk seekers and often will be
able to make this prediction with a fair degree of accuracy.

[214] If the policymakers decide that it would be unwise to make
this differentiation, however, a 20% overall presumption would
be appropriate.

Appendix

FINAL JUDGMENTS IN COLLUSION CASES

Name and Type of Case	Overcharge	
	Average	Peak
1. Addyston Pipe & Steel Co. v. U. S., 175 U.S. 211 (1899) (conspiracy to allocate customers via secret bidding pool)(Court provided a typical result, but not an average figure[215])	34.7-42.6%+	
2. Armco Steel Corp. v. North Dakota, 376 F.2d 206 (U.S. App. 1967) (highway construction bidding conspiracy[216])	18.5%	

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[215] "The cost of producing pipe at Chattanooga, together with a reasonable profit, did not exceed $ 15 a ton. It could have been delivered at Atlanta at $ 17 to $ 18 a ton, and yet the lowest price which that foundry was permitted by the rules of the association to bid was $ 24.25. The same thing was true all through 'pay' territory to a greater or less degree, and especially at 'reserved' cities."

This means that the typical price increase was at least $24.25 – 18 = 6.25/18 = 34.7% And, 24.25 – 17 = $7.25/17 = 42.6%

[216] "We have no difficulty whatever in holding that there was adequate basis... proximate injury in the amount of $258,355, on the extent of the artificiality involved in the fixed prices and its ingrediency in the $1,396,500 list-price aggregate ... which had entered into the construction projects let during the conspiracy period, and in the $2,000 quantity of direct purchases made by the State." If $258,355 of the $1,396,500 was an overcharge, then the overcharge would have been 22.7% of the base figure of $1,138,145.

3. Armco Steel Corp. v. Adams County,   17.3-20.3%
376 F. 2d 212 (1967)(highway construction
bidding conspiracy) (same defendants as
previous case but different victims)

4. FTC v. Superior Court Trial Lawyers   16.7%[217]   75%
Association, 493 U.S. 411 (1990) (legal
aid attorneys conspired to raise fees[218])

5. Freeman v. San Diego Ass'n. of   150%
Retailers, 322 F. 3d 1133 (2003)(conspiracy
to standardize subscription charges[219])

6. Greenhaw v. Lubbock County Beverage   7.74%
Ass'n., 721 F. ed 1019 (5th Cir. 1983)
(conspiracy to fix retail price of liquor
for 4 ½ years[220])

7. Homewood Theatre v. Loew's,   6.3%
110 F. Supp. 398 (D. Minn. 1952)
(conspiracy involving first run films[221])

8. Kruman v. Christies' Intern. PLC,   50 %   150%
284 F. 3d 384, 390 (C.A. 2 2002)[222]

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[217]   The increase was 16.7% for in court time and 75% for out of
court time, but it was not possible to compute the average.

[218] Legal aid attorney conspired to raise fees. Cartel/boycott
by Washington DC lawyers (public defenders) that demanded (&
received) a price increase from $30 hr court time and $20 hr non
court time to $35 hr for both in the span of a week. They would
later seek and obtain a price increase to $55 hr court time &
$45 hr non court time (without a boycott).

[219]   Group of realtor associations combined and standardized
their charges. Some raised subscription price from $10 up to
$25, others lowered them. Judge Kozinski called this "price
fixing," but did not state how much the average fee increased.

[220]   Jury decided amount of overcharge and appellate court
upheld. Id at 1026-27.

[221] $39,432.67 loss on sales of $625,763.78.

[222] "On November 2, 1992, Sotheby's announced it would increase
its buyer's premiums from 10% to 15% for the first $ 50,000.00

(fine art auction cartel)

9. New York v. Hendrickson Bros.   3.7%
840 F.2d 1065 (2d. Cir. 1988[223])   12.0%
bid rigging on state construction   66.0%
contracts - three distinct episodes)

9. New York v. Cedar Park Concrete Corp,   5.87%
85 Civ 1887 (2001) (construction bid rigging
during 7 year period[224])

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of the purchase price. On December 22, 1992, Christie's declared
an identical increase in its buyer's premiums. The defendants
allegedly agreed not to reduce these premiums. The defendants
also agreed to set their seller's commissions at identical
levels. Prior to March 1995, the defendants would permit clients
to negotiate smaller seller's commissions. On or about March 10,
1995, Christie's announced it would implement a fixed schedule
of non-negotiable seller's commissions ranging between 2% and
10% depending on the value of the item to be sold. On April 13,
1995, Sotheby's stated it would implement a fixed schedule of
non-negotiable seller's commissions substantially identical to
the schedule set by Christie's." Id at 390.

For the items covered by the agreement, buyers' commissions rose
by 50%, from 10% to 15%. In addition, the new sellers'
commissions means that total commissions had increased from 10%
up to as much as 25% - a 150% increase.

[223] Jury determined that contract overcharges were $338,000 on an
$860,000 contract (a 66.0% markup), $67,000 on a $1,790,000
contract, $644,000 on a $2,648,000 contract (3.7%), and
$1,113,000 on a $9,300,000 contract (12.0%).

Most of the economic analysis we surveyed would have called
these different episodes or sub-cartels, and analyzed them
separately, even though legally they wee treated together. This
clearly is a judgment call that reasonable people could differ
on. If they were treated as one larger conspiracy, the
overcharges would total $2,162,000 on a base of (14,598,000 –
2,162,000) = $12,436,000) = 17.4% overall. Alternatively the
average of the three computed overcharges is 27.2%

[224] The conspiracy was organized personally by Paul Castellano, on
behalf of "the governing body of New York's five organized crime
families". Yet the Court only found that it raised prices by
5.87%.

10. North Texas Producers Ass'n v. Young,   36%
308 F. 2d. 235 (5th Cir. 1962) (conspiracy to
exclude low cost milk seller[225]).

11. Ohio Valley Electric Corp. v. General   10.9%
Electric Co., 244 F. Supp. 914 (SDNY 1965)
(electrical equipment manufacturing price
fixing conspiracy[226])

12. Palmer v BRG of Georgia, 498 U.S. 46,47   167%
(1990)(naked division of market for Bar
Review courses[227])

13. Pease v. Jasper Wyman & Son, 2004 ME   21.6%   32.8%[228]
29 (2004) (conspiracy to suppress prices
paid for wild blueberries[229])

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[225] This involved a horizontal conspiracy to exclude a low-priced
milk seller that would have sold milk for 69 cents instead of 96
cents. He was awarded $100,000 in lost profit damages for the
period at issues. The important point for our study, however,
is the Court's conclusion that that the horizontal competitors
caused the price of the milk that plaintiff would have sold to
consumers at 69 cents to be sold to them at 96 cents instead.
The conspiracy prevented a 36% price drop. Id at 237.

[226] "This overcharge of $5,624,401 is slightly under eleven per
cent of the total final order price for all units ($52,027,785)
and slightly under ten per cent of the total final billed price,
including escalation ($57,116,819). Page 947 This totals 10.92%
of the pre-collusive amount.

[227] This case involved an agreement by the only 2 Bar Review
preparation companies in Georgia. They entered into a naked
division of markets, after which the price of a Bar Review
course in Georgia went from $150 to "over $400." Id. at 47. We
will conservatively assume that the price only went up to $400,
an increase of $167%.

[228] For 1997.

[229] This was a four year average, calculated from Solow exhibit
10, "Underpayment to Growers", whose figures were accepted by
the jury. A $56 million judgment was upheld.

14. Story Parchment Co. v Patterson   27.7%
Parchment Paper Co., 282 U.S. 555 (1931)
(conspiracy to monopolize and destroy
plaintiff's business[230])

15. Strobl v. N. Y. Mercantile Exchange,   48.6%
582 F. Supp. 770 (1984) (conspiracy to
lower the price of potato futures[231])

16. Union Carbide & Carbon Corp. v.   22.5%   38-47.5%
Nisley, 300 F.2d 561 (10th Cir. 1961)
(1938-48 conspiracy to reduce prices
paid for vanadium ore[232])

17. United Nuclear Corp. v. General   567%
Atomic Co., 629 P. 2d 231 (N.M/ 1980)
(uranium cartel[233])

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[230] Conspiracy to monopolize and destroy plaintiff's business.
Jury verdict of $65,000, before trebling. Property that cost
$235,000 allegedly reduced in value to $75,000. So damages must
have been 65/235 = 27.7%.

[231] Strobl v. New York Mercantile Exchange, 582 F. Supp. 770
(S.D.N.Y. 1984), motion to reduce award denied 590 F. Supp. 875
(S.D.N.Y. 1984), aff'd 768 F.2d 22 (2d Cir. 1985). "The
$460,000 figure reached by the jury, therefore, was the
equivalent of a finding that the price of the May potato futures
contract would have been approximately $18.00, instead of $9.25,
had the market been operating solely on the basis of supply and
demand...The jury could have concluded from the evidence of low
supply that the price of Maine potato futures was artificially
low during the conspiracy period." Id. at 779. Price therefore
was depressed 48.6%.

[232] "In these circumstances, we cannot say that the jury's
finding to the effect that the free market price of 2 percent
vanadium ore for the period October 1938 through March 1948 was
40 cents per pound instead of 31 cents was clearly erroneous."

[233] United Nuclear Corp. v. General Atomic Co., 629 P.2d 231,
242 (N.M. 1980) "Fourth, between 1972, when the cartel
apparently began, and 1975, when this suit was filed, the price
of uranium in the United States increased from approximately
$6.00 per pound to approximately $ 40.00 per pound." The Court
concluded that the price of Uranium had increased by 566% during

18. U.S. v. Anderson, 326 F.3d 1319   7.1-47%
11th Cir. 2003)(bid rigging on USAID
contract[234])

19. United States v. Andreas, 216 F.3d   71.4%
645 (2000) (conspiracy to raise Lysine
prices[235])

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the period of the conspiracy but did not say that all of this
increase was due to the activity of the cartel. For this reason
this cartel's increase has been put in the maximum column, not
the average column.

[234] The Opinion says that the winning bid on the wastewater
treatment facility was $107,017,000, the engineers estimated the
cost would be $60,000,000, and that their profit was
$50,639,000. Thus, the overcharge might have been 47%. The
problem with using this figure, however, is that the winning
bidder might have made some profit in a competitive market (this
question depends upon how you define "cost." Economists define
it to include a normal rate of return, but we are unsure whether
the Court was using the term this way). So 47% represents
something like the maximum that the overcharge could have been.

However, the Opinion also said that the winning bidder agreed to
pay 2 other firms, for bidding high, $5.35 million and $2.2
million (plus other considerations, such as a $25 million
subcontract, which surely had a lot of profit built into it, and
the designation to win another contract), which totals 7.1% of
the contract price. Therefore a very conservative estimate of
the overcharges would be 7.1%, which we will use when we compute
the overall average.

[235] "The meeting ended without a sales volume allocation
agreement, but two months later, at the recommendation of
Whitacre, the cartel raised prices anyway, and prices rose from
$ .70 to $ 1.05 per pound. ... [Much later] The producers also
agreed on a new price of $ 1.20 for the United States market."
Id at 652-53

The Court inferred that at least one sale took place at $1.20,
so its maximum increase was (1.20-.70)/.70 = 71.4%. As is
typical, this Court was not perfectly clear as to what caused
the price to rise. But the plain meaning of the quotation is
that the Court found that, as a maximum, the cartel raised the
price of Lysine by 71.4%.

20. United States v. Dynalectric Co., 859 F.2d 1559 (11th Cir. 1988) (Bid Rigging on public works project[236])	34%	
21. U. S. v. Foley, 598 F. 2d 1323, 1327 (C.A. Md., 1979[237]) (real estate companies agreed to raise their commissions on houses)	16.7%	16.7%
22. In Re Vitamins Antitrust Litigation, Animal Science Products v. Chinook Group, Misc. No. 99-0197 TFA, M.D.L. No. 1285 (choline chloride cartel jury verdict[238])	38%	
23. Wall Products v. National Gypsum, 357 F. Supp. 832 (N.D. Calif. 1973) (Conspiracy over price of gypsum wallboard[239])	27%	

In fact this would be a modest conclusion because the Court also wrote: "Together, the three parent companies produced all of the world's lysine until the 1990s, presenting an obvious opportunity for collusive behavior. Indeed the Asian cartel periodically agreed to fix prices, which at times reached as high as $3.00 per pound." This would mean that the maximum increase was roughly (3.00-.70)/.70 = 329%

[236] 7. United States v. Dynalectric Co., 859 F.2d 1559 A $1.7 million profit on a $5 million contract is a profit of 34%.
[237] On Sept. 5, 1975, competing real estate executives agreed to raise their commission from 6% to 7%. "Within the following months each of the corporate defendants substantially adopted a seven percent commission rate." Id. at 1327. Since almost all, but not 100% of the sales were at a 7% Commission, 16.7% actually overstates the average actual rise somewhat.

[238] The jury verdict was $49.54 million "before trebling and credit for prior settlements". On page 6 Plaintiff's expert gives total U.S. sales in the industry of $130.85 million. So this one jury verdict was 38% of total industry sales, which means that the markup by defendant had to be significantly more than 38%. Surely 38% is a conservative estimate of the markup involved, despite the fact that the total industry sales came from the plaintiff's expert.

24. Webb v. Utah Tour Brokers Ass.,   5%
568 F. 2d 670 (1977)(conspiracy by
tour brokers to deny plaintiffs
entry boycott, etc.[240])

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[239] Wall Products Co. v. National Gypsum Co., 357 F. Supp.
832 conspired among themselves and with others, to stabilize and
maintain the price level of gypsum wallboard   27%

[240] Webb v. Utah Tour Brokers Ass., 568 F. 2d 670, 676-77(1977).
"They had been able to obtain the same transportation service
for 70 cents per mile from the other licensed brokers. However,
with Greyhound they were obliged to pay a Special Operations Bus
Order tariff of three and one-half cents per person per mile. Of
the eleven tours operated they had to pay this higher rate for
eight tours. Plaintiffs calculated that they suffered a total
loss of $10,165 as a result of having to pay the higher tariff
for the tours that they took." 3.5/70 equals 5%.