Does Crime Pay?
Cartel Penalties and Profits

BY JOHN M. CONNOR AND ROBERT H. LANDE

THIS ARTICLE SEEKS TO ANSWER a fundamental antitrust question: does crime pay? In other words, do the current overall levels of U.S. cartel sanctions (including civil damages) adequately discourage firms from engaging in illegal collusion? Seven years ago,[1] the unfortunate answer was plainly, "Criminal cartels usually pay!" The sum of expected costs (in criminal penalties, civil damages, and other cartel-related expenses) was significantly less than the sum of expected gains to the company and the individual decision-makers. Sadly, the most recent data re-affirm this conclusion.

Why does crime pay, and what can be done to reduce or eliminate that profitability? Answering these questions requires an understanding of the legal-economic theory of optimal deterrence and the basic psychology of cartelists. Empirical data can be used to determine the optimality of the actual level of currently-imposed cartel sanctions. Indeed, there is an extensive literature on overall median and mean of the average[2] levels of cartel overcharge rates, as well as our own study comparing the actual levels of overcharges by 75 cartels with the actual levels of cartel sanctions imposed in these cases.[3] Our analysis shows that current cartel sanctions are far too low, and that optimal penalties should be increased fivefold. Even if this optimal level cannot be reached, we propose five specific steps that, together, would substantially reduce the billions of dollars that consumers and businesses pay each year in cartel overcharges.

Economics, Cartelists' Psychology, and Optimal Deterrence

Suppose you were the head of the widget division at a large company, that your division's profits were down, and that you were at risk of being fired. Would you consider fixing prices? Sure, your company has a compliance program installed by a reputable law firm that urges you never to fix prices and warns you about getting caught and going to

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prison—in fact, you heard these same things at your old company. But throughout your career you have succeeded because you were a risk taker—and you know that you are much smarter than the idiots who fixed prices and got caught. Surely you could figure out how to raise your division's profitability by several times its historical earnings, with at most only a small risk of getting caught and convicted. After all, price fixing is extremely difficult to prove unless someone is foolish enough to write down what they are doing.

The Standard Model. How should the legal system help keep you from succumbing to this temptation to advance your career through undetected price fixing? The standard model of optimal deterrence—originated by Nobel Laureate Gary Becker[4] and refined by leading legal-economic scholars over the last four decades[5]—assumes that potential cartelists very roughly assess the expected costs of and rewards from collusion and that they also consider in a rough fashion the risks of apprehension and conviction.[6] The optimal deterrence approach also assumes that the decision makers are risk-neutral and that they and their companies have the same incentives.[7] Under this approach, if the expected sanctions are larger than the expected rewards, the illegal behavior would be deterred.[8]

Problems with the Standard Model. Unfortunately, most of the assumptions and implicit conditions underlying the standard optimal deterrence model are questionable or unverifiable. We cannot determine with certainty either the optimal sanctions floor (below which the penalties under-deter) or ceiling (above which the penalties deter pro-competitive conduct). For example, it seems impossible that many would-be cartelists would have more than a vague notion of the information needed to perform the analysis. The antitrust field knows very little—in general and especially for each category or individual case of potential price fixing—about what the individual decision makers and their companies as a whole expect their rewards from price fixing to be, how likely they believe they are to be caught, and what they expect will happen if they are caught.[9] But their antitrust counsel can help fill in the missing information at least very roughly—that is, enough so the decision makers know that price fixing is a serious crime with serious potential penalties. In short, we use the standard optimal deterrence approach—a general

deterrence approach—because we have no empirical reason to believe that it is biased or seriously wrong (or, perhaps more importantly, that a better approach exists).

By analogy, we know a great deal about competitive markets and even about how monopolies are likely to behave. But cartels? Almost anything is possible, depending upon a large number of alternative market-structure or participant-behavior assumptions that might apply to a particular market of interest.[10] Similarly, deviating from the standard optimal deterrence approach could markedly influence a determination of the appropriate level of cartel sanctions. For example, we could plausibly posit that would-be cartelists are extreme risk seekers and that the sanctions necessary to prevent them from attempting to form a cartel, or to defect from existing cartels, should be much higher than those calculated using the standard risk-neutral approach. Conversely, we could posit that cartelists are often ready and willing to turn state's evidence on their fellow cartelists (and thereby escape prison, although not the inevitable private treble damage suits).[11] If this were often true, then significantly lower sanctions could suffice to dissolve, although not to prevent, cartels.[12]

We could ask other questions about the upper end of the required sanction range: at what sanction level does over-deterrence become plausible or likely? As an extreme example, the death penalty for cartelization surely would lead honest businesspeople to refrain from engaging in procompetitive conduct. More realistically, is there any reason to believe that the sanctions calculated using the standard approach would lead to over-deterrence? Even if a large percentage of cartelists are eager to turn in their fellow cartelists, couldn't these additional sanctions be unnecessary but harmless?

Practical Optimality of Standard Model. Since we do not know the amount by which sanctions could be less than the optimal amount and still dissolve most cartels promptly and effectively, and since there is no reason to believe that honest business people commonly are, for example, forgoing procompetitive joint ventures that are often mistaken for price fixing, we believe that the levels of sanctions calculated using the standard optimal deterrence approach are optimal. Although it is easy to posit theoretical considerations that cut in a variety of directions, we know of no empirical data suggesting any reason to deviate from the standard optimal deterrence approach. And, although theoretical possibilities cut in offsetting directions, we know of no empirical reason to believe that standard optimal deterrence approach on the whole is biased in any direction.

General vs. Specific Deterrence

Why should highways have specific speed limits, and specified fines for specified violation of speed limits? Why not in each case instead calculate the actual damages—if any—caused by that speeder, and then adjust the possible sanction by a multiplier that took into account the probability the specific speeder would be detected and convicted? Moreover, if a speeder did not actually hit anyone or anything, or they could demonstrate that their ex ante probability of causing any damage was very low and so their decision to speed was reasonable, why shouldn't we accept their argument that they should only receive a token speeding ticket, or none at all?

These questions help explain why the U.S. Sentencing Guidelines for antitrust violations are framed in terms of general deterrence (i.e., deterrence directed generally at firms considering price fixing) instead of specific deterrence (i.e., deterrence that focuses on the motivations and effects of each specific party that fixed prices).[13] A specific deterrence approach would require considering a host of factors relevant to each cartel. Although this fact-intensive analysis (or at least the economists' part) would be technically feasible,[14] it would be very poor public policy. The process would quickly become expensive, overly subjective, non-transparent, and unpredictable, and it would be a drain on judicial resources. One could imagine, for example, testimony from competing psychologists about risk-seeking or risk-aversion personalities, competing game theory experts explaining the Prisoners' Dilemma and the relative likelihood of any participant's informing on their fellow cartelists, and self-serving and unverifiable testimony from the colluding executives about their own states of mind. Testimony about overdeterrence issues would be similarly complicated. In short, a specific deterrence approach would add dramatically to the complexity and cost of litigation and enforcement. Without a commensurate budget increase, the DOJ would be forced to make different choices as to which cases to litigate and which to settle (or not even bring).

More fundamentally, an individualistic process would be much less likely to deter cartels effectively because it would no longer send an even somewhat clear signal to would-be cartelists about the costs and risks of their contemplated behavior. Society's primary purpose in prohibiting cartels and cartelists is not to punish the lawbreakers, or even to deprive them of their ill-gotten gains.[15] Rather, the primary goal is to deter future crimes. Antitrust enforcement can only do this by establishing a clear system of sanctions, one that is relatively predictable and is based upon the best available information. Given the broad consensus that horizontal collusion is the "supreme evil of antitrust,"[16] the legal system's single-clearest signal to businesspeople should be: "Don't collude. Don't fix prices. If you do, the costs will exceed the gains."

Economic Framework for Optimal Penalties

The optimal penalty for collusion is the expected losses caused by the illegal conduct (which is roughly equal to the overcharges paid by the cartel's direct customers) divided by the cartelists' expected probability of being detected and punished.[17] Other measures—such as focusing on the cartel's expected gains—are usually considered less likely to lead to optimal deterrence. Even this simplified description of the optimal penalty makes a great many conventional assump-

Table 1. Median Average Overcharges, by Period and Type

Cartel End Date	Membership		Legal Status		Bid Rigging	Classic Price Fixing	Buyers' Cartels	ALL TYPES
	National	International	Found Guilty	Legal				
Median percent[a]								
1990–1999	16.65	25.00	24.60	20.75	19.00	24.90	22.05	24.00
2000–2018	24.00	20.00	20.00	27.50	17.05	24.00	17.00	20.10
1990–2018	20.70	22.50	22.20	25.60	17.95	24.25	16.90	22.30
ALL YEARS	18.30	25.00	22.00	27.50	18.30	25.00	18.10	23.00

Source: J.M. Connor, Price-Fixing Overcharges Master Data Set, a spreadsheet dated December 4, 2018.

a) Medians of the point estimates or, where appropriate, of the midpoint of range estimates. Excludes hundreds of "peak" overcharge estimates that refer to maximal price effects over brief periods of time, rather than an entire, usually multi-year episode of collusion. Includes 93 zero estimates.

tions (including that cartelists are risk neutral and rational calculating profit maximizers).[18]

Probability of Detection and Conviction. One of the variables in the optimal penalty calculation is the probability of detection and conviction (more precisely, the cartelists' perception of those probabilities). Many sources place the actual probability of detecting hidden cartels at 10 percent to 30 percent,[19] and the chance of conviction at above 90 percent.[20] To be conservative about the size of optimal penalties, we will assume in our analysis a 25 percent to 30 percent probability that hidden cartels will be discovered and convicted. If cartelists on the whole are risk seekers, however, then this formula will understate the optimal penalties.

Penalties. Optimal-deterrence principles require consideration of harm to victims, and the penalties must be relatively measurable. There are three penalties for which fairly precise money metrics are publicly available:

(1) *Fines* imposed by U.S. courts on both companies and on individuals. Since this article is concerned only with effects within the United States, we consider only fines based on U.S. commerce.

(2) *Settlements* paid as a result of private damages suits in the U.S. We have analyzed collusion cases for which these figures are in the public record and verifiable. These often can be significant; in a sample of 71 U.S. cartel cases, the median average of the settlements was 37 percent of single damages and the unweighted mean average was 65 percent.[21]

(3) *Disutility from imprisonment or house arrest* for culpable executives. After an extensive analysis of analogous situations, we assigned a (dis)value of $6 million per year of imprisonment or house arrest.[22]

Costs Not Reflected in Penalties. There are other costs of collusion that, as a practical matter, outsiders usually cannot measure. These include: legal costs of defendants (which only rarely are publicly disclosed); managerial costs of coordination of the legal defense and of dealing with public/investor relations and other corporate distractions;[23] opt-out settlements (which, if small individually, may not be publicly disclosed—unlike large settlements that are material and therefore disclosed in public filings, and unlike class settle-

ments that are disclosed in settlement-approval proceedings); and reputational losses.[24] If the measurable penalties are smaller than the actual total penalties and costs associated with collusion, then our computations will lead to an optimal penalty higher than it needs to be. We believe, however, that these non-measured costs of collusion are usually relatively small and transitory compared to the three that we list above, but we know no way of proving their relative magnitudes.[25]

On the other hand, cartels also cause damages that only rarely can be measured and even more rarely be recouped by victims. These harms include deadweight losses, umbrella effects,[26] and the time value of money. Deadweight losses (the allocative inefficiency effects of cartel pricing) can reach up to 50 percent of the overcharge, although our best estimate is that these losses usually are only about 10 to 20 percent of the overcharge.[27] Because fines and payments to injured parties usually are made many years after the collusive period ended, all of these penalties ought to be restated in constant dollars to reflect general inflation and the time value of money. The victims lose the earnings that they could have made on the money illegally confiscated by cartelists (who get to keep such additional profits themselves). The adjustments necessary to compensate for the absence of prejudgment interest can be significant. We are unaware, however, of the costs of deadweight losses, umbrella effects, or prejudgment interest ever being awarded in an antitrust case.[28] In short, cartels inflict total harms on society that are larger than the overcharges paid by direct purchasers.[29]

Measuring Cartel Overcharges. Generally speaking, the median cartel overcharge is in the range of 18 to 25 percent above the prices that would prevail if there were no cartel. The median percentage overcharges of cartels that ended their collusion between January 1990 and December 2018 are summarized, by type of cartel, in the top three rows of Table 1.[30] The third row summarizes 1,024 overcharges of cartels ending during the years 1990–2018. The "All Years" row summarizes 1,705 overcharges calculated for every estimate available for the entire time period (the years 1700 to 2018). Using a median average overcharge figure

helps adjust for a high degree of statistical skewness in each cell of Table 1.

Several general patterns can be observed in the data. First, international cartels tend to show larger overcharge rates than purely domestic cartels.[31] Second, "legal" cartels—many of them operating openly (like registered export cartels)—generally have slightly higher overcharges than clandestine cartels that are later detected and punished. Third, bid-rigging schemes and buyers' cartels have distinctly lower overcharges than classic price-fixing cartels. Fourth, the cartel's industry does not appear to be a significant explanatory variable of the variations in overcharge percentages. Fifth, the data source (courts or other sources) and the method of analysis employed do not appear to have a significant effect on overcharge percentages.[32]

The median overcharge for all types of cartels is 23 percent.[33] If one generously assumes a 25 to 30 percent chance a cartel will be detected, then (all else being equal) the optimal total penalties on cartels ought to be within the range of 55.5 to 110 percent of affected commerce, depending on the type of cartel and time period being examined.[34]

Table 1 reports *medians* of the overcharge calculations, not the more familiar mean of cartel overcharges. Mean overcharges are invariably higher than medians because in every category a few cartels overcharge by extremely large amounts. The mean overcharge by domestic cartels up to 2013 was 35 percent, and the mean was 56 percent for international cartels. The overall figure was 49 percent.[35] Which is the better metric for enforcement policies aimed at optimal deterrence? We do not know of a clear answer as to whether means or medians are better.[36]

Which Is Larger? Cartel Profits or Cartel Penalties?[37]

A crude first step in assessing the deterrence power of sanctions levied on cartels is to examine the disgorgement of cartel profits. This can be measured by "recovery ratios," defined as the ratio of all monetary penalties (including payouts in private cases) imposed on members of a cartel, divided by the best estimate of that cartel's profits from collusion. If there is full disgorgement of a cartel's illegal profits, the recovery ratio would be 100 percent. If the combined sanctions are half of the supracompetitive profits, the recovery ratio would be 50 percent.

Recovery Ratios and Sanctions. A study prepared for the OECD calculated recovery ratios for scores of cartels around the world for different data sets.[38] The highest median average recovery ratios were 44 percent for global cartels and less than half of that level for non-global cartels.[39] As noted above, for a sample of 71 U.S. cartel cases, the median average settlement (the recovery ratio) was 37 percent of single damages and the unweighted mean was 65 percent of single damages.[40]

We have undertaken such an empirical analysis for every U.S.-sanctioned cartel for which we have been able to ascer-

But because so few cartels are detected, optimal deterrence of illegal collusion (and not just disgorgement of profits in the particular case) is usually the primary goal of antitrust enforcement.

tain the necessary data, using the methodology summarized in the previous section.[41] The overall results for a sample of 75 cartels[42] show that on average the value of the imposed U.S. sanctions has been much less than they should have been for society to obtain optimal deterrence against cartelization. If means of overcharge figures are used, the total value of the imposed sanctions are only 16 to 21 percent of their optimal level. If median figures are used, the imposed sanctions averaged only 9 to 12 percent of optimality.[43] We found only one unusual cartel (out of the 75 for which we could assemble the necessary information) for which the totality of sanctions was possibly larger than optimal.[44] A second cartel was probably optimally sanctioned.[45] The other 73 cartels, however, were sub-optimally sanctioned, and most of them substantially under-sanctioned (half were sanctioned less than 10 percent of optimality).[46]

But because so few cartels are detected, optimal deterrence of illegal collusion (and not just disgorgement of profits in the particular case) is usually the primary goal of antitrust enforcement. As noted, under the optimal deterrence approach, cartel sanctions should be slightly larger than their "net harms to others" ÷ (the probability of detection x the probability of conviction). From a deterrence perspective, would-be cartelists are unlikely to form their expectations about detection and possible penalties from outliers rather than the norm. They are much more likely to be guided by what happened on average to the vast majority of cartels that affected the roughly $1 trillion in affected sales (about $2 trillion in 2018 dollars) in the cases covered by our study.[47] Furthermore (as discussed above), cartel sanctions should be set for general deterrence purposes, not with a focus on particular cartels.

Disutility of Imprisonment. One of the more innovative aspects of our analysis was the value that we assigned to the deterrence effects of a year in prison or under house arrest. We used $6 million as the average deterrence-equivalent figure for both. We readily admit that other researchers may develop alternative methods that could result in a different amount. While preliminary, our assigned value is not arbitrary.

To arrive at our estimate we analyzed five different measures of the value of time in prison, and believe that $6 million is significantly more than the average a year of confinement should be valued at.[48] Nevertheless, one could argue that we should be using a significantly higher figure, in light

of how hard people try to avoid prison, how much defendants spend in legal fees to avoid prison, how wealthy many price fixers are, and how time spent in prison might lower individuals' future income and social status. However, increasing the assumed $6 million value of a year in confinement to $12 million or even $60 million would not change our conclusions significantly. Changes in the value of a year in prison would have to be vastly greater (to the equivalent of an outlandish $4.4 billion to $6.3 billion fine) to make collusion unprofitable.[49]

Policy Recommendations

The great majority of companies participating in illegal cartels make a profit even after they pay all the penalties. This is true both for cartels that operate purely within the United States and for international cartels.[50] Since the current level of sanctions is only 9 to 21 percent of optimality, it follows that current overall sanction levels should be quintupled. To move even modestly in this direction, we propose five specific recommendations.[51] Only the first and possibly the last would require new legislation.

First, new legislation should add prejudgment interest to both private treble damage actions and criminal fines.[52] This would increase the effective size of these sanctions substantially,[53] especially for durable cartels and for cartelists that use delaying tactics during plea bargaining or litigation. Even though any legislation that increased sanctions is likely to face strong opposition, this change should be intuitively attractive as reasonable to many people, including such antitrust stalwarts as Judge Frank Easterbrook[54] and retired Judge Richard Posner.[55]

Second, the U.S. Sentencing Commission should double its current presumption that cartels raise prices by an average of 10 percent.[56] This presumption is a key feature of the federal Sentencing Guidelines, which are the basis of nearly all U.S. cartel fines. However, hundreds of independent estimates show that the median cartel overcharge since 1990 has averaged 23 percent, the mean overcharge has been more than 35 percent for domestic cartels, and 56 percent for international cartels. Doubling the presumption would substantially improve deterrence.[57]

Third, the budget of the Antitrust Division should be increased significantly, and this increase should be earmarked for cartel enforcement. Enabling the Division to pursue more investigations would surely permit it to detect and prove more cartels.[58]

Fourth, as Judge Douglas Ginsburg and others have recommended, the DOJ should insist, in its plea bargaining negotiations, on several provisions that would increase the expected cost of cartel violations to corporate employees: the corporate defendant must agree not to hire or re-hire anyone who has been convicted of price fixing for a specified (and long) period, should not pay the fines of their convicted employees, and should not compensate them in any way for serving time.[59]

Finally, the United States should implement a whistleblower reward or bounty system for individuals who turn in cartels, and perhaps even for corporations.[60] Bounty programs have the potential to enhance cartel detection and to destabilize cartels even more than leniency and amnesty programs.[61] The bounties could be introduced gradually, and initially could be limited to individuals. But if necessary, a bounty might be awarded to corporations that turn in cartels, even if they had once been a member of the cartel. Perhaps amnesty recipients could be given 10 percent of other cartel participants' fines, and if 10 percent is insufficient, it could be increased.[62]

Implementing these policy proposals would help to deter illegal collusion without any significant risk of overdeterrence. Together, these proposals are very likely to save victimized consumers and businesses from paying billions of dollars per year in cartel overcharges. ■

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[1] For an extended discussion of the different individual and corporate incentives and perspectives and what this should mean for sanctions generally and for optimal sanctions specifically, see John M. Connor & Robert H. Lande, *Cartels as Rational Business Strategy: Crime Pays*, 34 Cardozo L. Rev. 428, 435–47 (2012) [hereinafter Connor & Lande, Cardozo].

[2] Most cartel overcharges can be averaged over time. Empirical studies of historical cartels often summarize their price effects using the *mean* average (that is, the sum of all the overcharges divided by the number of overcharges collected in the sample). An alternative measure is the *median* average (the number in the middle of the overcharges when ranked from highest to lowest). When the mean and median are different, the sample is skewed (or asymmetric). The median average is a better measure of centrality when samples are skewed.

[3] Connor & Lande, Cardozo, *supra* note 1, at 455–57. We included only objective third-party measures of cartel overcharges, not plaintiff allegations. For discussion of other methodological issues, *see id.*

[4] Gary S. Becker, *Crime and Punishment: An Economic Approach*, *in* Essays in the Economics of Crime and Punishment 1 (Nat'l Bureau of Econ. Research Gary S. Becker & William M. Landes eds., 1974).

[5] *See, e.g.*, William M. Landes, *Optimal Sanctions for Antitrust Violations*, 50 U. Chi. L. Rev. 652, 656 (1983). In his survey of legal-economic theories of deterrence, Keith Hylton refers to our preferred approach as the Classical model of deterrence. *See* Keith N. Hylton, *Whom Should We Punish, and How? Rational Incentives and Criminal Justice Reform: The Wythe Lecture*, 59 Wm. & Mary L. Rev. 2513, 2519–23 (2018).

[6] Of course, in reality both the expected gains and losses from collusion should be thought of as probabilities that various events would occur—an X% probability that the cartel would be able to raise prices at all, a Y% chance it would be able to raise prices by 10%, etc.

[7] *See* Connor & Lande, Cardozo, *supra* note 1, at 435–36.

[8] Excessive sanctions could lead to over-deterrence. For example, if price fixing were a capital crime, business people might well refrain from tough but procompetitive activity that could be mistaken for collusion. (Of course, the death penalty for price fixing would be ineffective if courts and juries refused to impose it.) Optimal sanctions therefore should fall within a range: they should be at least as large as the expected value of the gains, but not so large as to lead to over-deterrence.

[9] For the best analysis of these issues, see D. Daniel Sokol, *Cartels, Compliance, and What Practitioners Really Think About Enforcement*, 78 Antitrust L.J. 201 (2012).

[10] By "anything is possible," we mean that a wide range of degrees of market

power might be observed, depending on the details of the model. *See, e.g.,* Alan A. Fisher & Robert H. Lande, *Price Effects of Horizontal Mergers*, 77 Cᴀʟ. L. Rᴇᴠ. 777, 896–910 (1988).

[11] One could also posit either that (a) many cartels have anticipated that their weakest or most risk-averse members might sacrifice the other cartel members, and so the cartels have established punishment mechanisms to discourage this from occurring, or (b) that most cartelists are not very rational or that they have a short-term perspective, so they do not take these precautions. *See, e.g.,* Niall E. Lynch, *Does Crime Pay? Not If You Are Caught Up in a Grand Jury Investigation by the United States Department of Justice Antitrust Division*, Eᴄᴏɴ. Cᴏᴍᴍ. Nᴇᴡsʟ. (ABA Section of Antitrust Law, Econ. Comm.), Spring 2018, at 27 (forcefully rejecting any notion of cartel rationality).

[12] This is one of the appealing characteristics of the Dissuasion Model of cartel penalties, which assumes that the sole public-policy goal is to dissolve existing cartels. Only the weakest, least committed participant needs to be targeted by leniency programs. How long would most cartels usually operate before we were able to target and persuade one of the weakest members to turn in the cartel? Since cartels eventually crumble on their own, how much more quickly would dissuasive policies cause most cartels to fold? For example, suppose dissuasive sanctions on average shorten cartels' effectiveness from 10 years down to 7 years. Should we be satisfied with a 30% reduction in harm?

[13] For the current U.S. Sentencing Guidelines for cartel offenses, see United States Sentencing Commission, *Guidelines Manual* § 2R1.1 (Nov. 2016).

[14] Modern methods of analysis sometimes can make the calculation of part of this type of occurrence-specific penalties feasible. In opt-out cartel damages cases with one plaintiff and one or a few suppliers, for example, these are exactly the issues that must be presented to the factfinder. Oftentimes a complex reduced-form statistical model with numerous market-, time-, geographic-, and company-specific factors is built, using a dense set of transactions data to explain price or profit enhancements due to the specific collusive conduct exhibited. *See* Daniel L. Rubinfeld, *Quantitative Methods in Antitrust*, *in* 1 Issᴜᴇs ɪɴ Cᴏᴍᴘᴇᴛɪᴛɪᴏɴ Lᴀᴡ ᴀɴᴅ Pᴏʟɪᴄʏ 723, 724 (ABA Section of Antitrust Law 2008).

[15] Many people do believe, however, that compensation of victims is also a crucial goal of antitrust. *See generally* Robert H. Lande, *Wealth Transfers as the Original and Primary Concern of Antitrust: The Efficiency Interpretation Challenged*, 34 Hᴀsᴛɪɴɢs L.J. 65 (1982).

[16] Verizon Commc'ns, Inc. v. Law Offices of Curtis V. Trinko LLP, 540 U.S. 398, 408 (2004). *See generally* Richard A. Posner, *Optimal Sentences for White Collar Criminals*, 17 Aᴍ. Cʀɪᴍ. L. Rᴇᴠ. 409 (1980). The actual economic profits from cartelization are typically lower than the theoretical monopoly profits because of friction within the cartel, i.e., there often is some degree of cheating on the cartel agreement. But it is probable that some cartelists take a tolerable amount of cheating into their expectations about actual collusive profits. In any case, the proxy measure of monopoly profits, actual overcharges, are nearly equal to actual economic profits.

[17] *See* Landes, *supra* note 5, at 656.

[18] *Id.*

[19] *See* Douglas H. Ginsburg & Joshua D. Wright, *Who Should Be the Target of Cartel Sanctions?: Antitrust Sanctions*, 6 Cᴏᴍᴘᴇᴛɪᴛɪᴏɴ Pᴏʟ'ʏ Iɴᴛ'ʟ 3 (2010).

[20] Connor & Lande, Cardozo, *supra* note 1, at 466–68.

[21] *See* John M. Connor & Robert H. Lande, *Not Treble Damages: Cartel Recoveries Are Mostly Less Than Single Damages*, 100 Iᴏᴡᴀ L. Rᴇᴠ. 1997, 1997 (2015) [hereinafter Connor & Lande, *Not Treble Damages*].

[22] *See* Connor & Lande, Cardozo, *supra* note 1, at 449–54, for the methodology used.

[23] Lynch, *supra* note 11, has a more extensive numerical list of publicly unmeasurable costs, such as operational disruptions due to search warrants and FBI interviews, document production, and collateral litigation (such as securities lawsuits). We believe that the three factors that we are able to measure amount to the lion's share of intra-jurisdictional costs associated with prosecution.

[24] Studies using stock market prices, however, show no long-lasting effects after two years. *See* Cindy R. Alexander, *On the Nature of the Reputational Penalty for Corporate Crime: Evidence*, 42 J.L. & Eᴄᴏɴ. 489, 508 (1999) (showing the average stock-price movements of less than −1% due to announcements of antitrust price-fixing fines).

[25] Our computations also do not include the costs of operating the cartel. These are typically negligible relative to cartel profits, because preserving secrecy of the cartel requires that the number of managers be kept to a minimum. Often each corporate member contributes only two or three executives who meet and communicate sporadically. Thus, overcharges are likely to be nearly equivalent to the aggregate monopoly profits from cartel conduct, and the quotas or profit-sharing rules of the cartel determine the monopoly profits of each corporate cartelist.

[26] For a definition and analysis of umbrella effects, see Connor & Lande, Cardozo, *supra* note 1, at 461–62.

[27] *See id.* at 457–61.

[28] Our results might, moreover, be too high for another methodological reason—that many of our sales figures might be overly small. Correct data (if sales are higher) would tend to lower the calculated ratios. The sales data that the DOJ uses tends to be lower than data that can otherwise be derived from reliable sources. There may be quite defensible reasons for this (such as the high degree of evidentiary reliability needed to convict corporations). On the other hand, prosecutors sometimes may uncritically accept arguments made by defendants that diminish the scope of the affected market because of time pressures in settling guilty plea agreements or because the government lacks the resources necessary to disprove defendant assertions. For example, in *In re Ready-Mixed Concrete Antitrust Litigation*, 261 F.R.D. 154 (S.D. Ind. 2009), local press reported (based on trial testimony) that the seven colluding firms had sales of $680 million, but the DOJ used a much lower figure (as well as a smaller geographic market definition than civil plaintiffs)—$391 million. The DOJ's total affected sales is as much as 40% lower than the affected sales proven by the private litigants. *See* E-mail from John Connor to Robert Lande (Aug. 24, 2011) (on file with authors).

[29] We are not considering harms to indirect purchasers. Since cartel overcharges can be marked up before being passed along in the distribution chain, this omission could be significant.

[30] These numbers are updated and slightly revised from those shown in Table 5 of John M. Connor, *Cartel Overcharges*, *in* 26 Tʜᴇ Lᴀᴡ ᴀɴᴅ Eᴄᴏɴᴏᴍɪᴄs ᴏꜰ Cʟᴀss Aᴄᴛɪᴏɴs, Rᴇsᴇᴀʀᴄʜ ɪɴ Lᴀᴡ ᴀɴᴅ Eᴄᴏɴᴏᴍɪᴄs 249 (James Langenfeld ed., 2014). Note that 93 (or 5.5%) "ineffective" (zero overcharge) episodes are included.

[31] The 2000–2018 period is an interesting exception that is attributable primarily to a large number of U.S. pay-for-delay pharmaceutical cases. For details on these cases, see John M. Connor, *Antitrust Developments in Food and Pharma*, 7 Aɴɴ. Rᴇᴠ. Rᴇsᴏᴜʀᴄᴇ Eᴄᴏɴ. 375, at tbl. (2015).

[32] Readers especially interested in these issues are urged to consult more formal statistical analyses, such as John M. Connor & Yuliya Bolotova, *Cartel Overcharges: Survey and Meta-Analysis*, 24 Iɴᴛ'ʟ J. Iɴᴅᴜs. Oʀɢ. 1109 (2006) or John M. Connor & Dan P. Werner, *Variation in Bid-Rigging Cartels' Overcharges: An Exploratory Study* (Oct. 27, 2018), https://ssrn.com/abstract=3273988.

[33] The results of verdicts in private cartel overcharge cases are similar. We searched for every cartel overcharge we could find in a final verdict in a U.S. antitrust cases. We found 25. They yielded an average cartel overcharge of 31% and a median overcharge of 22%. *See* John M. Connor & Robert H. Lande, *How High Do Cartels Raise Prices? Implications for Optimal Cartel Fines*, 80 Tᴜʟᴀɴᴇ L. Rᴇᴠ. 515, 515, 551–59 (2005).

[34] The smallest median overcharge in the top two rows of Table 1 is 16.65%, which if divided by .30 (a high estimate of the probability that the cartel will be detected and convicted) equals 55.5%. Similarly, the largest median overcharge is for illegal cartels in 2000–2018, 27.5%, which if divided by 0.25 (the lower estimate) equals 110%.

[35] *See* Connor, *supra* note 30, at 294 tbl. 7 top row.

[36] Well-executed antitrust enforcement focused on general deterrence is designed to cope with the "typical" cartel and the injuries such a cartel generates. Penalty guidelines often begin with penalties for the "average" cartel infringement and make rather minor adjustments for aggravating and mit-

igating circumstances, but the guidelines are imprecise about which concept of average the agency has in mind.

A related issue is whether deterrence should be based upon the expected harms generated by *effective* cartels or the expected harms generated by *all* cartels? We included all cartels in our sample, even though approximately 5.5% failed to raise prices at all. If, for policy purposes, one should focus only on discouraging cartels that succeeded in raising prices, cartels with zero overcharges should be omitted from our sample. This would raise both the median and mean results. *Id.* at third row.

[37] In this section we summarize the empirical results of an analysis of optimal deterrence explored in great detail in Connor & Lande, Cardozo, *supra* note 1.

[38] John M. Connor, *Global Enforcement Directed at International Cartels: A Concise Introduction and Summary*, Presentation at Session IV of the OECD's Global Forum on Competition, "Sanctions in Antitrust Cases" ¶ 24 (Dec. 2, 2016), https://one.oecd.org/document/DAF/COMP/GF(2016)9/en/pdf.

[39] *Id.*

[40] *See* Connor & Lande, *supra* note 21, at 1997.

[41] For links to the data employed and the calculations used, see Connor & Lande, Cardozo, *supra* note 1, at 474–77.

[42] The sample represents approximately half of all international cartels that were convicted in the United States from 1990 to 2005 and for which data were complete.

[43] We can only speculate why current cartel sanctions are so low relative to cartel profits. Possibilities include: (1) The Federal Sentencing Guidelines are based on atypically low overcharge assumptions—i.e., they are based upon a 10% presumption (see Connor & Lande, Cardozo, *supra* note 1, at 516–26), a figure that the data presented in this article shows should be doubled; (2) The government sometimes chooses cases to prosecute in a way that tends to avoid trials (i.e., they sometimes prefer the easily winnable cases); alternatively, the burden of proof is so high in criminal cases that prosecutors habitually trim the size of affected commerce or harm when computing penalties; (3) Prosecutors are resource constrained; (4) The plea-bargaining process is non-transparent and may sometimes be a rush to judgment; (5) "Cooperation" discounts sometimes could be overly generous to late-arriving cartelists and unjustified, subjective, and unpredictable; (6) Judicial oversight is inadequate: "Clear my docket" could be the main objective of many judges; (7) The DOJ sometimes engages in self-justification, rather than re-examination of, its past practices, and the defense bar naturally claims that fines are "high"; (8) Thoughtful analysts focus too much on recent fine levels and trends (there is a clear upward trend in cartel fines up to 2016, but the overall level is still well below optimal); (9) Plaintiffs, their counsel in class actions, and in opt-out actions, also benefit from low fines because low fines leave more assets available for private settlements; (10) Some plaintiffs' counsel might settle for too little rather than undertake additional extremely difficult and uncertain work; (11) The DOJ may negotiate low fines expecting or hoping that high private settlements in follow-on cases will provide most of the necessary deterrence.

[44] *See* Connor & Lande, Cardozo, *supra* note 1, at 474, for discussion of the E-Rate Federal Internet Program cartel, computed to be 125–175% of optimality.

[45] *See id.* (discussing the PVC Window coverings cartel, computed to be 88% to 124% of optimality).

[46] In addition, some individual firms within a given cartel do appear to have been sanctioned more than the amount calculated under the overall optimal deterrence approach. This could have been due to a number of factors that make the sanctions not actually excessive. For example, every firm in a cartel is jointly responsible for the entirety of the cartel's overcharges. For this reason, it would be reasonable to attribute the entirety of a cartel's overcharges to an individual cartel member before carrying out the optimal deterrence calculations (although we have not done this). Only if this were done and the optimal deterrence calculations still showed that the sanctions were excessive could there be true over-deterrence.

Moreover, the alleged over-deterrence could result from a cartel not producing profits as high as its instigators had hoped. Perhaps if the cartel had been as profitable as its planners had hoped, the overall penalty level might have been too low. Further, we used reported or provable affected sales in our calculations. As noted *supra* note 28, reported or provable sales often are lower than the true amounts.

[47] One interesting factor that helped drive these conclusions is the relatively small effect of prison sentences (i.e., they usually only constituted a modest portion of the imposed sanctions). Their mean value per case was a relatively modest $13.6 million, or 17% of the average fine (the median is zero because for the majority of the cartels in the sample (48 out of 75) there was no imprisonment. *See* Connor & Lande, Cardozo, *supra* note 1, at 475 n.239. Even though we valued the deterrence from a 3-year sentence at $18 million (which is more than most estimates of the value of an entire life), this pales in comparison to the possible rewards from cartelization. *Id.* Nevertheless, the absence of a criminal sanction correlates with an exceedingly small overall sanction. Almost all of the 15 cartels with actual sanctions that were less than 2% of optimal penalties had no criminal sanctions imposed. *Id.* The absence of a prior criminal conviction means that obtaining optimal sanctions in private damages actions is hampered by having to prove the fact of collusion. By contrast, the unusual *E-Rate* cartel case involved 626 months of prison, which constituted 85% of the sanctions in that case. *Id.*

[48] *See id.* at 451–54.

[49] *See id.* at 477–78.

[50] International and global cartels have their own special deterrence challenges. A global cartel can be severely sanctioned in the United States and yet prove profitable overall because of weaker antitrust regimes abroad. However, the prevalence of non-U.S. cartel fines is on the rise, as is the introduction of individual criminal penalties and effective leniency programs.

[51] For a more extensive analysis and discussion of these policy recommendations, see Connor & Lande, Cardozo, *supra* note 1, at 476–84.

[52] For a discussion of the absence of prejudgment interest in antitrust and its effects on the effective sanctions level, see Robert H. Lande, *Are Antitrust "Treble" Damages Really Single Damages?*, 54 Ohio St. L.J. 115, 130–36 (1993).

[53] *Id.*

[54] Fishman v. Estate of Wirtz, 807 F.2d 520, 583–84 (7th Cir. 1986) (Easterbrook, J., dissenting) ("[T]he time value of money works in defendants' favor. Antitrust cases can be long-lived affairs. This one has lasted 14 years, 2½ of which passed between the finding of liability and the award of damages. During all of the time, the defendants held the stakes and earned interest. . . . To deny prejudgment interest is to allow the defendants to profit from their wrong, and because 14 years is a long time the profit may be substantial."). Virtually the entire profession of financial economists would agree with these principles.

[55] *See* Patton v. Mid-Continent Sys., Inc., 841 F.2d 742, 751 (7th Cir. 1988) (Posner, J.) ("[T]he major inadequacies being that pre- and post-judgment interest rates are frequently below market levels.") (discussing the appropriateness of contact damages).

[56] *See* Connor & Lande, Cardozo, *supra* note 1, at 481.

[57] In addition, the DOJ should change its administrative practice of awarding fine discounts from the bottom of the Guidelines' range and start instead from the top of the range. We expect that this change would also result in average corporate fines that are much larger than their current levels. *See id.* at 481. Moreover, the Antitrust Division already has a "Wall of Shame" on its webpage—a list of every company that has paid more than $10 million in antitrust fines. *Id.* This should be expanded to include individuals for several years after their conviction. The DOJ could host, for example, a webpage containing the names and photos of people given sentences of at least 6 months in prison. Further, the DOJ could require stricter corporate compliance programs. Some observers have advocated the use of corporate monitors for convicted defendants. *See id.* at 481–82. Currently, the DOJ does not require those admitted into the leniency program to have or to implement compliance programs, and it certainly is possible that the widespread use of corporate monitors could help deter collusion.

[58] In addition, the DOJ will have the resources to prosecute smaller members of discovered international cartels, along with cartels that affected only a small amount of commerce—defendants that it now declines to attempt to pursue.

59 *See* Albert Foer, Douglas H. Ginsburg, Robert H. Lande & Joshua Wright, *DOJ Has the Power to Crush Price Fixers: Column*, USA TODAY, May 29, 2015, at 11A. The authors also note: "Such recompense is probably already illegal, but corporations are more likely to comply if they explicitly agree; breach of an agreement with DOJ would make them easier to prosecute." *Id.* Our previous work showed (albeit through a modest and highly imperfect survey) that approximately half of those who served a prison sentence for their antitrust violation subsequently found employment with their previous employer or another employer in the same industry. Too often the corporate attitude towards price-fixing felons has been that they "took a bullet for the team" and should be rewarded. Such felons ought to be stigmatized, not awarded a badge of honor. *See* the discussion in Connor & Lande, Cardozo, *supra* note 1, at 480.

60 *See* Giancarlo Spagnolo, *Leniency and Whistleblowers in Antitrust*, *in* HAND-BOOK OF ANTITRUST ECONOMICS 259 (Paolo Buccirossi ed., 2008). Cartel-bounty policies have already proven effective in Korea, Brazil, and other juris-dictions.

61 *See* William E. Kovacic, *Private Participation in the Enforcement of Public Competition Laws*, *in* 2 CURRENT COMPETITION LAW 167, 173–75 (Mads Andenas et al. eds., 2004).

62 The bounty system could be limited to egregiously harmful cases, such as where affected sales exceed $1 billion, or where the cartel members were recidivists.