Cartel & Criminal Practice

Committee Newsletter

Spring 2017

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Message from the Chair

By Mark Rosman

The Cartel and Criminal Practice Committee is pleased to publish its Spring 2017 Newsletter. On behalf of the Committee, we thank our contributing authors for their work on this edition. In addition, we thank Daniel Oakes, Casey Lucier, Dan Shulak, Martino DeStefano, Greg McLean and Takeyoshi Ikeda for their assistance with the newsletter. This edition of our newsletter offers articles on topics relevant to criminal antitrust practice in the United States and abroad. In this issue, we are fortunate to be able to bring you a discussion between Brent Snyder, the Deputy Assistant Attorney General for Criminal Enforcement at the Antitrust Division and Mark Rosman about recent revisions to the Division's Leniency Program and how those revisions provide greater clarity to the public and to counsel. Lauren Briggerman, reviews the U.S. DOJ's cartel investigations in 2016 to consider what to expect in U.S. cartel enforcement over the next year. She finds a significant decline in corporate fines in DOJ cartel investigations, as the global auto parts investigation slowed and that for the first time in a decade, DOJ's Antitrust Division does not have a major, cross-border cartel investigation that will dominate its agenda. As a result, the Antitrust Division has shifted its focus to pursuing domestic investigations, including into the generic drug and canned seafood industries. These smaller investigations that are not global in nature are unlikely to achieve the record fines of several years ago when the auto parts and financial services investigations reaped billions of dollars for DOJ. William Dillon and Gillian Fishman report on the allegations of price fixing in the generic pharmaceutical industry. The investigation began starting in 2014, about two years after prices for generic drugs began rising at an unusual rate. The state of Connecticut began investigating the rise in July of 2014, culminating in Connecticut filing suit in December of 2016 against six major pharmaceutical companies: Teva Pharmaceuticals, Mylan, Aurobindo Pharma, Citron Pharma, Mayne Pharma, and—at the center of the investigation—Heritage Pharmaceuticals. The Department of Justice has only begun to uncover the reaches of

corruption in the generic drug industry. Abdullah Hussain and Arjun Nihal Singh address the recent disagreements between the Appellate Tribunal and the Competition Commission in India regarding fines assessed on individuals. The Appellate Tribunal has overturned the Competition Commission for due process reasons on a number of matters including those related to the cement cartel, the jute cartel, and Coal India cases. Michelle Burtis and Bruce Kobayashi analyze, from an economic perspective, the relationship between cartel fines imposed by the U.S. DOJ and harm-based optimal penalties, as described in economic literature. The authors find that under certain conditions, the DOJ fines are consistent with optimal fines when the multiplier used in setting the fine is at its minimum. José Carlos Berardo provides an overview of the current fining practices of the Brazilian competition authority (the Administrative Council for Economic Defense, or simply CADE) in cartel investigations. The overview is of particular interest in light of the recent and heated debates of some Commissioners of CADE who argue that the benefits obtained from the infringement must be taken into consideration when calculating the amount of the penalties. The debates suggest that CADE could be on the verge of increasing the current level of penalties for hard-core cartel cases, in particular if there is reliable data to estimate the benefits to cartelists obtained through the infringement. Finally, Steve Squeri provides case developments in criminal law and procedure, primarily in non-antitrust cases (and therefore generally not reported in the various antitrust reporters and publications), which might have relevance in antitrust prosecutions.

Also, the Cartel and Criminal Practice Committee reminds members that the sixth installment of "Ask Me Anything About…" a forum for Section members to submit substantive and practical questions about antitrust law and cartel practice and receive answers from established leaders in the field will be held on March 3, 2017. Full details regarding the program appear at the end of the newsletter.

Upcoming Programs and Events

Ask Me Anything About... Cartel Investigations in Asia – Featuring Winston & Strawn LLP's Molly Donovan

Friday, March 3, 2017 • 12:00PM to 1:00PM. Register here

Please email your questions to StupidCartelQuestions@gmail.com by February 17, 2017.

Cartels and Intellectual Property

Wed., March 8, 2017 • 3:00PM to 4:00PM ET. Register here

Invitations to Collude: A Brown Bag Panel

Tuesday, April 11, 2017 • 12:00PM to 1:00PM ET. Register here

Cartel and Criminal Practice Bi-Monthly Monthly Update

Learn more about recent Antitrust Division enforcement actions and international developments, with a Q&A period at the end.

Next Program: Monday, February 27, 2017, 1:30 to 2:30 PM

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Registration Information for Committee programs can be found on the Antitrust Section's Events Page, at http://shop.americanbar.org/eBus/ABAEventsCalendar.aspx

Committee events are posted on the Antitrust Section's Connect Page, at http://connect.abaantitrust.org/events/calendar

Regarding the Optimality of Cartel Fines

By Michelle M. Burtis and Bruce H. Kobayashi[83]

Michelle M. Burtis

Bruce H. Kobayashi

Economic approaches to determining criminal sanctions focus on harm-based "optimal" penalties. In this note, we examine the extent to which the criminal fines for organizations convicted of price fixing contained in the United States Sentencing Commission Guidelines (USSG) and relied on by the U.S. Department of Justice ("US DOJ") for criminal price fixing fines are consistent with the economic principles of harm-based "optimal" penalties.[84] We first describe the economic approach to optimal criminal sanctions in price fixing cases and the approach contained in the USSG. We then reconcile the two approaches and illustrate the conditions under which the approaches are consistent.[85] The article uses a simple economic model where the probability of detection is assumed to be one and there are no enforcement costs, and shows the optimal, harm-based penalty coincides with the minimum possible penalty advised by the Sentencing Guidelines. The model then is used to examine the relationship between the probability of detection and the range of penalties prescribed in the Guidelines.

Economics of Optimal Penalties for Price Fixing Cartels

The economics of optimal penalties is based on the recognition that there are both costs and benefits to law enforcement, including antitrust law enforcement.[86] The theory of optimal penalties assumes that rational firms and their agents will decide whether to engage in a conspiracy based on the expected costs and benefits to them. The purpose of optimal penalties is to deter behavior that produces net harm to society and to provide appropriate incentives for firms to invest in monitoring and compliance. Optimal penalties achieve both goals by imposing an expected sanction equal to the harm that would be caused by such behavior and forcing both the firm and its agents to fully internalize the costs of their actions. Harm-based penalties are preferable to gain-based penalties for at least two reasons. First, both harm and gain are typically difficult to measure, including in price-fixing cases. Given that harm is generally greater than gain, and is so as explained below in

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[83] Michelle Burtis is a Vice-President at Charles River Associates International in Washington D.C. and Bruce Kobayashi is an Associate Dean for Research and Faculty Development and Professor of Law at Antonin Scalia Law School, George Mason University. The opinions expressed are the author's and do not reflect the views of CRA or any of its respective affiliates. We would like to thank Martino DeStefano for helpful comments on an earlier draft.

[84] Here we attempt to determine under what conditions the fines as set out in the Guidelines, based on assumptions used in the Guidelines are consistent with harm-based, optimal fines. Other analyses have considered the level of fines necessary to deter cartels using various assumptions regarding the overcharge amount, the durability of the cartel, the probability of detection, and other factors. See for example, Gregory J. Werden, *Sanctioning Cartel Activity: Let the Punishment Fit the Crime*, 5 European Comp. J. 19 (2009); M. Motta, *On Cartel Deterrence and Fines in the European Union*, 29 Euro. Comp. L. Rev 218 (2008).

[85] This assumes that the criminal fine is the only sanction placed on the organization. It is not unusual for direct buyers, under federal antitrust law, as well as indirect purchasers, under certain state antitrust laws, to bring private litigation against cartel members in addition to the US DOJ criminal fines. See for example, Bill Baer, Ass't Att'y Gen., Antitrust Div. Public and Private Antirust Enforcement in the United States, Remarks as Prepared for Delivery to European Competition Forum 2014, (February 11, 2014), https://www.justice.gov/atr/file/517756/download
(Noting that "the Justice Department's cartel prosecutions facilitate success in follow-on private damages actions.") Penalties or damages in private litigation are generally found as overcharge amounts, trebled. These other sources of penalties would be included in an optimal penalty.

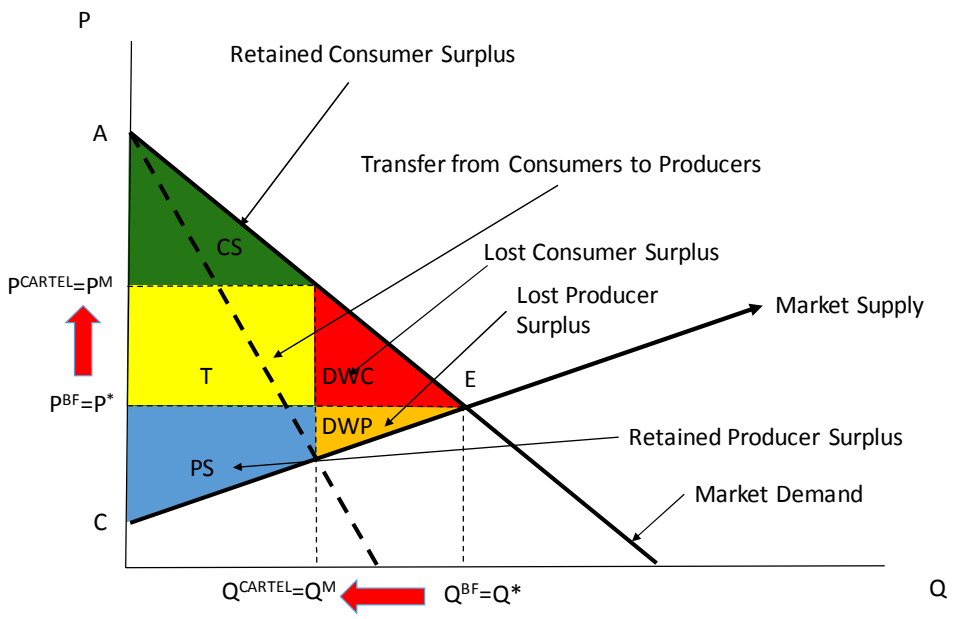
[86] Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. Pol. Econ. 169 (1968) and William M. Landes, *Optimal Sanctions for Antitrust Violations*, 50 U. Chi. L. Rev. 652 (1983).

price-fixing cases, setting the penalty equal to harm provides greater assurance of deterrence. That is, there is some probability that measurement of either a gain-based penalty or a harm-based penalty will understate actual gain or harm. Given that harm is greater than gain, a harm-based penalty, even with some amount of underestimate, will be more likely to produce a fine that will appropriately serve as a deterrent. Second, forcing an organization to internalize harm, rather than simply taking away the gain, will provide appropriate incentives to invest in the monitoring and compliance programs required when agents, rather than owners engage in the price-fixing conduct.

The first task in determining optimal penalties is to determine the harm caused by the activity. In cartel cases, the principal harm associated with cartels, from the perspective of economics, is the misallocation of resources that reduces total welfare.[87] Cartels benefit by transferring some of the gains from exchange from consumers to the members of the cartel by raising prices. However, the cartel must reduce output to raise price. This reduction in output causes the cartel not to produce or sell units that are valued by consumers in excess of their marginal cost of production. The result is a reduction in welfare, called a "deadweight loss."

Figure 1 illustrates these concepts. The figure shows a downward sloping demand curve and an upward sloping market supply curve. At the intersection of the demand and supply curve is the price charged to consumers absent the cartel; this price is commonly referred to as the "but-for" price. In the figure, the but-for price is equal to the competitive price, i.e., $P^{BF} = P^*$. This price will result in Q* units produced and sold, and total welfare equal to the area of the triangle AEC. Total welfare is composed of consumer surplus (AEP*) and producer surplus (P*EC).

Figure 1 – Cartel Activity and Consumer Harm



The cartel increases its profits by reducing output to Q^{CARTEL} and charging a price P^{CARTEL}. The Figure assumes that this price/output pair is equal to the price and quantity that would be set by a monopolist (P^M, Q^M). As a result of the higher cartel price, surplus is transferred from consumers to the cartel. This transfer (the area T in Figure 1) is the overcharge (the difference between the cartel price (P^{CARTEL}) and the but-for price in the absence of the cartel (P^{BF})) multiplied by the number of units purchased at the higher cartel price (Q^{CARTEL}):

$$(1) \qquad T = (P^{CARTEL} - P^{BF}) \times Q^{CARTEL}$$

[87] In this context, total welfare is the sum of the value of each unit sold minus the marginal cost of producing that unit.

The higher price and lower output tranfers surplus from consumers to the cartel and generates deadweight losses. The areas DWC (the red triangle) and DWP (the orange triangle) in Figure 1 represent the lost consumer and producer surplus, respectively generated when the cartel reduces output from Q^{BF} to Q^{CARTEL}.[88]

If enforcement costs are zero and the probability of detection is one, then the optimal penalty for price fixing is equal to the harm to consumers.

An optimal penalty seeks to deter the formation of cartels and avoid the generation of such deadweight losses.[89] In order to deter a profit-maximizing firm from participating in a cartel, the expected costs from such participation, including the optimal penalty, must be greater than the expected benefits.

If enforcement costs are zero and the probability of detection and punishment (p) is one, the optimal penalty for price fixing will equal the harm to consumers (H) which is the sum of the transfer T and the deadweight loss DWC:

$$(2) \qquad H = T + DWC = (P^{CARTEL} - P^{BF}) \times Q^{CARTEL} + (P^{CARTEL} - P^{BF}) \times (Q^{BF} - Q^{CARTEL})/2$$

$$= (P^{CARTEL} - P^{BF}) \times (Q^{BF} + Q^{CARTEL})/2$$

The expression in (2) demonstrates that the harm to consumers is greater than the transfer because it includes the deadweight consumer loss. In addition, the net gain to the cartel is less than the transfer.[90] That is, the cartel charges a higher price but sells fewer units and must forego the revenue (and profit) associated with those lost units. The cartel must bear some of the welfare costs generated by the output restriction (the area DWP in Figure 1). In the absence of sanctions for price fixing behavior, the cartel's net gain is given by

$$(3) \qquad G = T - DWP \leq T.$$

The relationship between the harm to consumers (H), the transfer (T), and the gain to the cartel (G) is shown in (4) and demonstrates that the harm to consumers is greater than the gain to the cartel:

$$(4) \qquad H = T + DWC > T \geq G$$

Because the harm to consumers is greater than the gain to the cartel, cartel activity will be deterred if sanctions on price-fixers force them to internalize the harm imposed from such activity on consumers. If the penalty were based instead on gain, small errors (e.g., overestimates of the gain from participating in the cartel by its member or underestimates of the gain based penalty) would cause cartels to appear to be profitable and would not serve to deter cartels and the deadweight losses they generate.[91] In addition, optimal penalties imposed on organizations that result in the full internalization of consumer harm also generate appropriate incentives for firms to invest in compliance, monitoring and prevention,[92] and complement imposition of fines and imprisonment of individuals.[93] A penalty that

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[88] The lost consumer and producer surplus occur because transactions involving goods valued in excess of their marginal cost of production do not occur because of the cartel's restriction of output.

[89] Landes, *supra* note 4 at p. 653.

[90] The cartel's gain takes into account that the cartel loses sales when it charges the higher, collusive price. The amount lost due to the lost sales is the triangle DWP in Figure 1.

[91] A. Mitchell Polinsky & Steven Shavell, *Should Liability Be Based on the Harm to the Victim or the Gain to the Injurer?* 10 J. L. Econ. & Org. 427 (1994).

[92] See Bruce H. Kobayashi, *Antitrust Agency and Amnesty: An Economic Analysis of the Criminal Enforcement of the Antitrust Laws Against Corporations*, 69 Geo. Wash. L. Rev. 715, 736 (2001); Daniel R. Fischel & Alan O. Sykes, *Corporate Crime*, 25 J. Leg. Stud. 319 (1996).

exceeds the harm to consumers will lead the firm to incur excess avoidance costs, for example, costly compliance programs to educate and monitor employees.[94]

To see this, suppose that e denotes expenditures on compliance training for employees, and these expenditures reduce the probability (ϕ) that employees will engage in price fixing, so that $\phi = \phi(e)$ and $\partial\phi(e)/\partial e$ is negative. The firm's increase in expected profit from price fixing net of an expected fine equal to harm H and the cost of compliance expenditures equals:

(5) $\Delta = \phi(e) \times [G - H] - e,$

Using G from equation (3) and H from equation (4) yields:

(6) $\Delta = \phi(e) \times [(T - DWP) - (T + DWC)] - e$

$= -\phi(e) \times [DWP + DWC] - e.$

A firm will choose a level of e that satisfies the condition:

(7) $\partial\Delta/\partial e = 0$, or equivalently:

(8) $-[\partial\phi(e)/\partial e] \times [DWP + DWC] = 1.$

Because the harm to consumers is greater than the gain to the cartel, cartel activity will be deterred if sanctions on price-fixers force them to internalize the harm imposed from such activity on consumers.

The term on the left-hand side of equation (8) is the marginal reduction in the expected deadweight loss from cartel activity. This is set equal to the marginal cost of an additional unit of compliance expenditures. Thus, an expected fine equal to the harm from price fixing induces the firm to incur compliance expenditures if the marginal reduction in social costs from cartel activity are greater than the marginal cost of the expenditures. Expected fines lower (higher) than harm will produce an under (over) investment in the level of expenditures

If the assumptions of zero enforcement costs and perfect detection are relaxed, the optimal penalty must include the costs of the enforcement and be adjusted by the probability of detection and punishment (p). If the probability of detection and punishment is less than 100%, then the cartel member will internalize only a fraction of the harm. If for example, p is low, say only one time out of ten, then the expected penalty faced by the price fixer would be 10% of the harm to consumers. If the penalty is only one-tenth of the harm and is lower than the gain to the cartel, price fixing will generate positive net benefits and will not be deterred.

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[93] The analysis in this article does not consider penalties placed on individual agents of the organization. For a discussion of this issue, and how organizational penalties should be adjusted when individuals are also punished, *see* A. Mitchell Polinsky & Steven Shavell, *Should Employees Be Subject to Fines and Imprisonment Given the Existence of Corporate Liability*, 13 Int. Rev. L. & Econ. 239 (1993), Douglas H. Ginsburg & Joshua D. Wright, *Antitrust Sanctions*, 6 Comp. Pol'y. Int. 3 (2010) and Keith N. Hylton, *Deterrence and Antitrust Punishment: Firms Versus Agents*, 100 Iowa L. Rev. 2069 (2015)

[94] That is, it is possible for penalties associated with cartel conduct to be too high. Imposing excessive penalties on firms for the conduct of errant employee conduct for example, could induce a firm to adopt more centralized but less efficient pricing strategies or to implement costly programs to monitor employees with price-setting responsibility. In the case of public companies, extreme penalties placed on shareholders unconnected to the theory of optimal penalties reduce welfare by inducing excessive investments in monitoring, prevention, and compliance expenditures. *See* Jennifer Arlen, *The Failure of Organizational Sentencing Guidelines*, 66 U. Miami L. Rev. 321 (2012); Fischel & Sykes, *supra* note 92; Kobayashi, *supra* note 10. Note that these considerations are different from the point that it is not possible to risk over deterrence because sanctioning cartels does not chill any legitimate, procompetitive conduct. *See, e.g.,* Werden, *supra* note 2.

When the probability of detection and punishment is less than one and there are positive enforcement costs, the optimal penalty will be equal to H/p. H will include the costs of detection and enforcement as well as the costs discussed above. If, for example, if p = 10%, then the optimal penalty will be equal to ten times the harm and the harm will include not only the transfer and deadweight consumer loss, but also the costs of detection and enforcement. Adjusting harm based penalties by a multiplier m = 1/p produces an expected penalty to equal to harm H when detection and punishment are not certain, so that a potential criminal will fully internalize the harm caused to others by his criminal actions or the criminal actions of economic agents.[95]

The USSC Cartel Fine Methodology

Guidelines for criminal antitrust fines for organizations are set out in the U.S. Sentencing Commission ("USSC") Sentencing Guidelines.[96] The USSC Sentencing Guidelines ("Guidelines") were developed to further the "basic purposes of criminal punishment: deterrence, incapacitation, just punishment, and rehabilitation."[97] While it is no longer mandatory that federal judges impose guidelines sentences,[98] they are still influential and widely followed by judges.[99] In addition, the U.S. DOJ also follows the approach contained in the Guidelines to determine criminal fines for organizations convicted of criminal violation of the antitrust laws.[100]

In general, the Guidelines' fine for an organization is determined by calculating a base fine. For criminal antitrust violations, the Guidelines contain a special rule for calculating the base fine. The base fine for antitrust violations is 20% of the volume of affected commerce ("VAC"), or 20% "of commerce done by [the cartel participant] in goods or services that were affected by the violation."[101] According to Commentary associated with the Guidelines' fines for price-fixing, the base fine is predicated on an assumption that the average gain to a cartel participant is 10% of price, or a 10% overcharge.[102] The USSC also acknowledges that its purpose in prescribing a fixed percentage for the base fine is to avoid the costs of determining the actual gain or loss.[103] The base fine is then adjusted with minimum and maximum "multipliers," denoted as "m" here, that depend on a set of culpability factors. Thus the minimum and maximum guidelines fine range equals:

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[95] Enforcement decisions too are assumed to balance the benefits of deterring cartels with the costs of detection and punishment. The benefits to enforcing the law include the restoration and maintenance of a competitive market and an efficient allocation of resources as well as the transfer of gains from the offender back to the victim. The costs include the costs of enforcement and the costs associated with making errors in enforcement.

[96] United States Sentencing Commission, Guidelines Manual, (Nov. 2015) ("USSC Manual"), §2R1.1.

[97] USSC Manual, Introduction and Authority, 1.2.

[98] *United States v. Booker*, 543 U.S. 220 (2005), Timothy A. Johnson, *Sentencing Organizations After* Booker, 116 Yale L. J. 116 (2006).

[99] Report on the Continuing Impact of United States v. Booker on Federal Sentencing, USSC Report (2012), available at http://www.ussc.gov/sites/default/files/pdf/news/congressional-testimony-and-reports/booker-reports/2012-booker/Part_A.pdf,

[100] See Letter to the United States Sentencing Commission from the U.S. Department of Justice, Criminal Division, July 29, 2014 available at https://www.justice.gov/sites/default/files/criminal/legacy/2014/08/01/2014annual-letter-final-072814.pdf (DOJ Letter) and also, for example, United States of America v. British Airways PLC, Plea Agreement, August 23, 2007 available at https://www.justice.gov/atr/case-document/file/489846/download, Graciela M Rodriguez, Wendy H. Waszmer, and Alan R. Dial, U.S. Corporate and Individual Cartel Investigations: Navigating the Intersection of Antitrust and White Collar Enforcement, 31 Antitrust Mag. 96, 99 (Fall 2016).

[101] USSC Manual, §2R1.1.d.1. In terms of the diagram in Figure 1, the VAC equals $P^{CARTEL} \times Q^{CARTEL}$

[102] The accuracy of the 10% average overcharge presumption has been challenged, with both the DOJ and academic critics suggesting that the typical overcharge is greater than 10%. *See* DOJ Letter, *supra* note 18 at 24-5. *See generally* John M. Connor, Price Fixing Overcharges, Revised 3rd Edition (2014), available at http://ssrn.com/abstract=2400780. For purposes of this article, we use the 10% for illustrative purposes, and do not assume the accuracy of the presumption.

[103] USSG §2R1, Commentary at 3.

(9) $GL^{MIN} = .2 \times VAC \times m^{MIN}$

$GL^{MAX} = .2 \times VAC \times m^{MAX}$

The range of minimum multipliers is .05 to 2.0, with a special floor of .75 for criminal antitrust violations.[104] The maximum multiplier is twice the minimum multiplier, again with a floor of .75 for criminal antitrust violations. As illustrated in Table 1, pplying this set of multipliers produces a minimum range of fines for price fixing from 15% to 40% of the volume of commerce, and a maximum range of fines for price fixing equal to 15% to 80% of volume of commerce.

Table 1 – Guidelines Fines for Organizations Convicted of Criminal Antitrust Violations.

Culpability Score	Minimum Multiplier	GL^{MIN}	Maximum Multiplier	GL^{MAX}
10 or more	2.00	40% VAC	4.00	80% VAC
9	1.80	36% VAC	3.60	72% VAC
8	1.60	32% VAC	3.20	64% VAC
7	1.40	28% VAC	2.80	56% VAC
6	1.20	24% VAC	2.40	48% VAC
5	1.00	20% VAC	2.00	40% VAC
4	.80	16% VAC	1.60	32% VAC
3	.75*	15% VAC	1.20	24% VAC
2	.75*	15% VAC	.80	16% VAC
1	.75*	15% VAC	.75*	15% VAC
0 or less	.75*	15% VAC	.75*	15% VAC

(*) Denotes special floor for criminal antitrust violation.

Optimal Penalties and Guidelines Penalties

A simple economic model can be used to understand if, or when, the method for determining cartel penalties contained in the Guidelines produce an optimal economic penalty. As noted above, the gain to a cartel member is lower than the harm to consumers. Thus, if the Guidelines' fine is to be consistent with harm based penalties, the fine should reflect not only the transfer T to the cartel members from its customers but the additional harm inflicted on

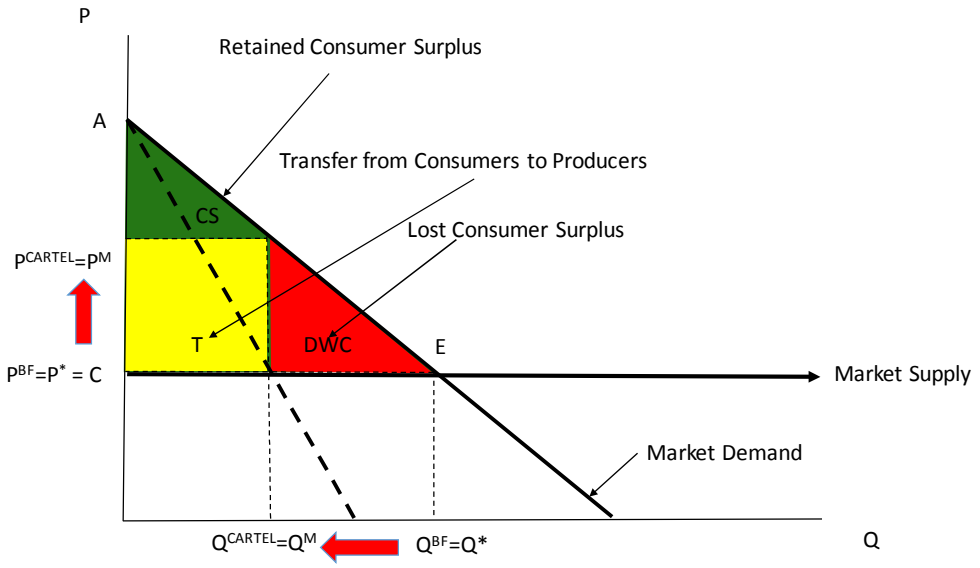
[104] USSG at §2R1.d and §8C2.6

those customers when the customers adjust their purchases because of the overcharge. It should also adjust for the probability of detection and punishment.

Linear Demand, Linear Marginal Cost (Supply), and Competition to Monopoly

To examine the extent to which the Guidelines fine is consistent with a harm based penalty, we consider an example, depicted in Figure 2, where the cartel successfully cartelizes a previously competitive industry. The only difference between Figure 2 and Figure 1 is that the industry supply curve in Figure 2 is assumed to be horizontal at C whereas that supply curve was upward sloping in Figure 2.

Figure 2.



As described above, if cartels can be detected always and without cost, the optimal penalty is a harm based penalty equal to the sum of the transfer from the buyer to the cartel member plus the deadweight loss. In Figure 2 this is shown by the combination of the yellow rectangle and the red triangle; it is also given by equation (2) above. When, $P^{CARTEL} = P^{M}$ and $P^{BF} = P^{*}$, (2) can be rewritten as:

(2') $$H = T + DWC = (P^{M} - P^{*}) \times (Q^{*} + Q^{M})/2$$

The assumptions that marginal cost is linear (or constant) and that the cartel price is equal to the monopoly price, allow us to simplify the expression for H (harm) further. In particular, $Q^{*} = 2Q^{M}$, so H becomes:

(2") $$H = [3/2] \times [(P^{M} - P^{*})/P^{M}] \times [P^{M}Q^{M}]$$

$$H = 1.5 \times [\%\text{Price Overcharge}] \times [\text{VAC}]$$

The last expression shows that under our assumptions harm is equal to 1.5 times the percentage overcharge times the volume of affected commerce.

The formula shown above for total consumer harm, expressed as a function of the price overcharge and the volume of affected commerce can be used to determine when cartel fines as set forth in the Guidelines measure consumer harm. As discussed above, the Guidelines set cartel fines as 20% of the volume of affected commerce multiplied by a multiplier (m) corresponding to a culpability score. According to the USSC Commentary regarding the fines, the

methodology is predicated on an average price overcharge of 10%.[105] Adopting this percentage price overcharge, and further assuming that the cartel's marginal costs are constant and demand for the cartel's product is linear, consumer harm (H) is equal to 1.5*(10%)*VAC or 15% of the volume of affected commerce. That amount, 15% of the volume of affected commerce occurs when the Guidelines minimum multiple, 0.75 is applied.[106] That is, when m = .75, the minimum Guidelines' penalty will be equal to harm.

$$(10) \qquad GL^{MIN} = .75 \times [.20 \times VAC] = .15 \times VAC = H$$

There are cases in which the use of the Guidelines minimum possible penalty would generate the optimal penalty. Consider the case where the firm has a culpability score of 0 or 1. Such a culpability score is consistent with a firm having no history of antitrust violations, an effective compliance program, and no high-level involvement who discovers, reports, and accepts responsibility for the antitrust violation by an agent in the firm.[107] In this case, the probability of detection and punishment is likely to be close to 1, and the optimal penalty will equal to the transfer plus the consumer dead weight loss. In such a case, both the minimum and maximum Guidelines fine, as well as the optimal penalty will equal 15% × VAC.

Of course, in cases where the percentage price overcharge is greater than 10%, the harm to consumers will exceed 15% of the VAC and the minimum Guidelines fine. The Guidelines suggest that in such cases, the fine should be set above the minimum of the Guidelines range. In the case of the self-reporting firm with a culpability score of 0 or 1, both the minimum and maximum Guidelines range will equal 15% of VAC, and the Guidelines fine, unadjusted for the higher overcharge, will be lower than the optimal penalty.

Imperfect Competition, Cartel Cheating

Relaxing certain of the assumptions in the model above affects the results and causes a divergence between the minimum Guidelines fine and total consumer harm.

First, the example above assumes that the probability of detection is equal to 1; that is, all cartels are detected. As described, the optimal penalty considers the probability of detection. If the probability of detection is only 10%, for example, the optimal penalty would be the harm multiplied by ten (the inverse of 1/10). The Guidelines, in certain ways also take into account the probability of detection. For example, the only way to obtain the lowest culpability scores of 1 or 0, and thus obtain the minimum multiplier, is for the organization to self-report.

More generally, to be consistent with optimal penalties, higher culpability scores and thus higher multipliers must be associated with lower probability of detection.[108] Those multipliers, as shown in Table 1, can rise to 40% (the highest minimum level) to 80% (the highest maximum level) of VAC. Maintaining our other assumptions (most notably, the 10% overcharge), those multipliers correspond to 2.67 and 5.33 times the harm to consumers. Assuming the multiples associated with the higher culpability scores track the inverse of the probability of detection (p),[109] and no

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[105] See note 21 *supra*.

[106] See Table 1, *supra*.

[107] USSG at §8C2.5C

[108] See, Arlen, *supra* note 94; Polinsky and Shavell, *Punitive Damages: An Economic Analysis*, 111 Harv. L. Rev. 869, 898 (1998).

[109] To be consistent with optimal penalties, the culpability factors should be inversely related to the probability of detection. *See*, *e.g.*, Polinsky and Shavell, *supra* note 108 at 900. While some of the factors used to determine an organizations culpability score are related to the probability of detection, many are not. *See* Arlen, *supra* note 94 at 338.

other fines or damages are imposed on the organization,[110] such penalties would be consistent with optimal penalties when the probability of detection and punishment is between 38% and 19%.

The assumption that the but-for price is equal to the competitive price can also be relaxed. Suppose instead the but-for price is greater than the competitive price. Economic models of, for example, Cournot behavior result in prices that are not collusive but are higher than the price that would exist in competition.[111] In a Cournot model with two firms in the relevant market, the equilibrium, non-collusive level of output, Q^{BF}, will be 4/3 of the monopoly (or cartel) output.[112] Using equation (2) yields:

(2''') $H = 1.17 \times [\%\text{Price Overcharge}] \times [\text{VAC}]$

Using a 10% price overcharge, harm will equal 11.7% of the VAC. Thus, the global minimum guideline fine of 15% of VAC is slightly higher than this level of harm. A similar result occurs if the assumption that the cartel successfully maintains the monopoly price is relaxed or if the assumption that marginal cost is constant is relaxed.

Conclusion

The USSC Guidelines, used by Federal Judges and the US DOJ to set criminal fines for organizations involved in price fixing, are consistent with harm based optimal fines under certain conditions. A simple economic model using assumptions that the but-for price is the competitive price, the cartel price is the monopoly price, constant marginal cost, and probability of detection equal to one results in an optimal fine and harm both equal to 15% of the volume of affected commerce. That level of fine is the lowest possible fine set out in the Guidelines. Economic based optimal fines would require that Guidelines culpability scores and multipliers track the probability of detection so that higher the Guidelines fine reflect lower probabilities of detection. For example, an organization with a culpability score of 10 or more faces the highest possible guidelines fine range, between 40% and 80% of the VAC. A total fine in this range would be consistent with optimal fines for probabilities of detection and punishment between 37.5% and 18.75% when harm equal 15% of the VAC. Importantly, an optimal fine, as it is considered in the economics literature is one that takes into account the entire penalty paid by an organization, not just a government fine when there are also other jurisdictions or private litigants who may also recover damages or fines from the organization based on the same conduct. Nonetheless, the results can be used to provide some awareness of the level of fines compared to the level of harm-based, optimal fines.

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[110] As noted above, the optimal penalty would include all sources of fines imposed on an organization, including expected treble damages from private antitrust actions, and criminal and civil fines imposed by other jurisdictions for the same conduct, and would also reflect offsets for sanctions and fines imposed on individuals working for the organization.

[111] Cournot models are sometimes used to model oligopolies where the few firms in the market recognize their interdependence. That recognition leads to the result that equilibrium prices are higher than the competitive price but lower than the monopoly price. *See, e.g.*, Carlton and Perloff, Modern Industrial Organization, at pp. 261-269.

[112] Let n be the number of firms. The equilibrium quantity in a Cournot non-cooperative equilibrium equals $2Q^{M}*n/(n+1)$. *See* Jean Tirole, The Theory of Industrial Organization, MIT Press (1988) at 220.