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A Critique of Partial Leniency for Cartels by the U.S. Department of Justice

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ABSTRACT

This paper models a key outcome of secret negotiations: “partial-lenieny” fine discounts from plea bargaining in criminal price-fixing cases. Models tested explain up to 52% of variation in percentage discounts. A minor portion is explained by such defendants’ characteristics as the defendant’s rank in queue and delay in settling. Most variation is explained by cartel characteristics. International conspiracies, global cartels, and bid-rigging schemes are granted lower percentage than domestic price-fixing. Discounts were higher in the Bush II than in the Clinton administration. Participants in durable conspiracies are rewarded with larger discounts, but more severe treatment of recidivists cannot be detected.

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Summary

This paper models a key outcome of a secret prosecutorial process: plea bargaining in criminal price-fixing cases. It surveys declared Department of Justice (DOJ) policies on *cooperation discounts* on fines for guilty, non-amnestied corporations, hypothesizes other possible unwritten policies, and develops and tests a statistical model to explain the variation in cartel-fine discounting practices. Percentage discounts are figured relative to the ranges mandated by the U.S. Sentencing Guidelines. Regression analyses are performed using a sample of 86 sentencing agreements by corporations that were fined for hard-core cartel behavior between 1994 and 2007. The mean average partial-leniency discount from the maximum Guidelines' fine is 70%.

Models tested explain as much as 52% of variation in leniency discounts. A minor portion is explained by defendants' characteristics. As promised in DOJ policy statements, the second-in, third-in, and successive firms that agree to plead guilty obtain progressively smaller cooperation discounts. Furthermore, irrespective of rank in queue, the longer it takes to negotiate a deal, the lower a defendant's cooperation discount. There is no evidence that firms causing the largest harm are punished more severely.

However, most of the variation in cooperation discounts is explained by the characteristics of the defendants' *cartel*. Although these characteristics are arguably related to cartels with greater harm, none of these factors is explicitly included in DOJ policy statements. Participants in international conspiracies, in geographically global cartels, or in bid-rigging schemes receive far lower percentage discounts than participants in domestic price-fixing violations. Partial leniency discounts were higher in the Bush II than in the Clinton administration.

Other findings are inconsistent with official policy. Participants in durable conspiracies are rewarded with larger discounts; more severe treatment of recidivists cannot be detected; a prior confession by an amnesty recipient makes no difference in the discounts granted to subsequent co-conspirators; and this study finds no evidence of substitution between corporate fines and penalties imposed on the company's employees. The DOJ and the U.S. Sentencing Commission should re-examine the guidelines and toughen the fines for defendants from durable cartels and with histories of recidivism.

This study has implications for cartel deterrence. It is likely that the overall level of U.S. fines contributes to under-deterrence and that partial leniency policies further contribute to under-deterrence by building in expectations by would-be cartelists for excessive cooperation discounts and by reducing the monetary value of early cooperation.

Key words: antitrust, cartel, price fixing, deterrence, penalties, fines, leniency, Department of Justice, Antitrust Division

JEL Codes: K21, K14, L41, L44, L65, L11, L13, N60

“...prosecutors have reinvented torture with the ubiquitous plea bargain”
(Roberts and Stratton 2000: Abstract).

1. Introduction

In the United States, convictions for criminal cartel conduct are resolved almost entirely through secret plea negotiations. Trials of corporations that violate Section 1 of the Sherman Act are rare. Apart from a growing number of cartelists that are granted immunity from criminal sanctions, the vast majority of companies that are formally investigated by grand juries sign guilty plea agreements. These agreements obligate the guilty party to offer full and continuing cooperation with the government’s prosecution of the other members of the conspiracy. In return for that information, prosecutors offer a reduction in the fine specified by published sentencing guidelines. Except for the size of the fine reduction, the terms of criminal cartel plea agreements are fairly standardized.¹ That is, the focus of plea bargaining is on the size of the discount: the goal of defendants is to obtain the largest possible discount for their inculpatory information and the goal for prosecutors is offer the smallest discount that will result in a quickly signed agreement consistent with the judicial principle of proportionality.

The purpose of this paper is to analyze the outcomes of partial leniency negotiations in hard-core cartel cases by the Antitrust Division of the U.S. Department of Justice (DOJ). It surveys declared DOJ policies on *cooperation discounts* on fines for guilty, non-amnestied corporations, hypothesizes other possible unwritten policies, and develops and tests a statistical model to explain the variation in cartel-fine discounting practices. The results suggest that variation in fine discounts can be predicted from a set of measureable case-specific factors that are known to both sides prior to the conclusion of a deal. These determinants are shown to reflect in part the stated policies of the DOJ and in part other unwritten rules on discounting practices.

Importance of the Topic

Among many other legal scholars, Posner (2001) regards the suppression of cartels due to price-fixing enforcement as the single greatest accomplishment of America’s antitrust laws. The Antitrust Division of the U.S. Department of Justice (DOJ) is the unique enforcer of the Sherman Act’s criminal price-fixing prohibitions. The DOJ has been widely extolled, including by the present author, for its visible and energetic campaign against cartels that took off in the mid 1990s (Klawiter 2001; Connor 2004, 2007a, and 2007c).² It has adopted more aggressive

¹ Exceptions to standard features are noted below.

² In international opinion surveys of antitrust enforcement, the DOJ almost always ranks at or near the top in the admiration of antitrust lawyers. See also Hoj (2007). However, to some extent, the DOJ’s ranking depends on the

investigatory techniques, increased the severity of corporate and individual sanctions, and developed methods for cooperating with dozens of antitrust authorities around the world. Perhaps most important, it has increased the detection of secret cartels because of implementation of the revised 1993 Corporate Leniency Program.

The DOJ's current Corporate Leniency Program offers immunity from prosecution for only the first member of a cartel that applies and that meets a few criteria.³ Leniency applicants that are accepted into the program receive *full leniency*, i.e., a 100% reduction in the criminal fine that they would otherwise have had to pay. Less well known is the DOJ policy of *partial leniency*, i.e., negotiated promises of fine reductions of less than 100% in return a signed guilty plea agreement.⁴ This agreement is tantamount to a criminal prosecution.

The effectiveness of full leniency programs in turn depends on balanced partial leniency policies. Immunity from prosecution will be attractive to cartelists only if the failure to be first to win the "race to the courthouse door" results in painfully higher penalties. As Harding and Joshua (2003: 216) put it, the message to would-be leniency applicants must be "cooperate or else – remember it hurts to come in second."

The DOJ and the European Commission (EC) have been faced with a flood of cartel cases since the late 1990s, and most cartel discoveries have been initiated by leniency applications (Connor 2004). The idea of granting a successful leniency applicant a 100% reduction in its potential cartel fine is well accepted. Game-theory models of the Prisoner's Dilemma show that under a wide array of conditions full leniency reduces cartel stability (i.e., it induces members of functioning cartels to defect by confessing to antitrust authorities) (Aubert *et al.* 2006, Spagnolo 2007). Repeated game models of collusion that allow for cartels to alter their price paths confirm the effect of cartel destabilization when maximal leniency⁵ is offered (Chen and Harrington 2007). Studies attribute to corporate leniency programs an improvement in detection of secret cartels (Spratling and Arp 2005). However, the design of the program is critical. The first EU leniency program instituted in 1996, since revised, appears to have had no effects on deterrence (Brenner 2005).

measures employed. In terms of the harshness of cartel fines as a proportion of affected sales or damages, the DOJ ranks second to Canada's Competition Bureau (Connor 2007c).

³ The main criteria are that the applicant must not be the initiator or "ringleader" of the cartel and that the application must be made before the DOJ has begun an investigation of the cartel. The main reason for the success of the 1993 revisions is that applicants can almost always be assured in advance that they will qualify.

⁴ Others refer to partial leniency as "alternative amnesty" or "post-investigation leniency" (Harding and Joshua 2003: 214). DOJ officials often speak about "rewards" for second-in cooperating firms. I prefer the term partial leniency fine discounts because "rewards" includes non-fine benefits and because the DOJ's "Amnesty Plus" program is also post-investigation.

⁵ Maximal leniency is defined as a policy that abrogates all monetary penalties for which a guilty firm is liable, which describes U.S. law for criminal antitrust violations committed after July 2004. Partial leniency forgives less than 100% of all possible monetary penalties.

A much debated but unresolved issue in cartel enforcement is the nature of the trade-off between the conservation of constrained prosecutorial resources and the size of corporate cartel fines. On the one hand, more rapid acceptance of guilty pleas can be induced by offering relatively large discounts from recommended cartel fines (OECD 2008: 9-10). Large discounts will permit an antitrust authority to pursue more cases that involve difficult proof of guilt. Deterrence is improved. On the other hand, a deep discounting policy will lead to fewer amnesty applications and a greater number of cartel formations. Deterrence is hobbled. It is precisely in the presence of such trade-offs that an empirical study will be of assistance in assessing in choosing the right balance.

A topic that has received little if any empirical attention⁶ is the DOJ's widespread practice of granting large "downward departures" from the Nation's sentencing guidelines⁷ to later arrivals in line⁸ for guilty pleas.⁹ The DOJ has had a long-standing and widespread practice of negotiating downward departures¹⁰ from mandatory or suggested fines in order to persuade alleged violators to plead guilty. Nearly all of the hundreds of cartel convictions in the United States have been secured through guilty pleas that are the result of plea negotiations (Hammond 2006b:1).¹¹ Yet, little is known outside the Antitrust Division about the frequency of granting

⁶ There are a few empirical studies explaining the *levels* of criminal corporate fines, many of them focusing on the role of the judiciary (see Alexander *et al.* 1999 and studies cited therein). This paper focuses on sentencing agreements that are the result of plea bargaining between the DOJ and defendants; the judiciary plays a *pro forma* role. Cooter and Rubinfeld (1989: 1082) note that the "... decision to assert a legal claim is difficult to investigate empirically..." because of the absence of public records (*ibid.*). Indeed they cite only one empirical study, an examination of medical malpractice claims that shows that 50% of the claims are settled prior to filing a complaint.

⁷ This term is meant to include both the U.S. Sentencing Guidelines (<http://www.ussc.gov/guidelin.htm>) (USSGs) and the alternative sentencing provision (18USC §3571 (a) and (d)).

⁸ When cartel members formally apply for leniency, counsel representing the firm brings a proffer letter to the DOJ outlining what it has to offer by way of information on the illegal activity. When the letter is submitted, the applicant receives a "marker" that essentially informs the applicant of its place in the queue. The first applicant that fully qualifies receives amnesty (or immunity). The next applicant is called second-in, the next third-in, and so forth.

⁹ A reasonably thorough search of legal news publications and law reviews found no empirical studies of the DOJ's sentencing policies in the context of criminal price fixing. **The more formal term used by the DOJ is "substantial assistance departure" (OECD 2008: 163).**

¹⁰ In this paper, a "downward departure" refers to any one of the many possible monetary rewards that can affect the calculations of corporate criminal fines in ways that are favorable to defendants. The practice is also termed a "substantial assistance departure" or a "cooperation discount" (Hammond 2006b: 14). These practices include shaving time from the true conspiracy period, reducing the scope of products known to have been cartelized, keeping the number of counts to a smaller number than the maximum possible, and offering a cooperation discount from the maximum specified by the Guidelines. It is not just the percentage reduction that is at issue, but also whether the discount will be applied to the upper end of the Guidelines' range or -- more advantageously for defendants -- in the middle or at the lower end.

¹¹ Adams *et al.* (2008) finds that 314 companies were charged and 271 paid fines for criminal price fixing from 1995 to 2007. Yet, excluding four or five small family-operated firms, *only two* large corporations were convicted at trial for price fixing since 1994 – Mrs. Baird's Bakery in 1996 and Mitsubishi in 2001. **An official submission by the United States to the OECD says that "...over the last twenty years, over 90 percent of the corporate defendants charged with [a criminal] antitrust offense have entered into plea agreements..." (OECD 2008: 149).**

downward departures, how the administrative standards¹² are employed in practice, or the effects of fine discounting on cartel deterrence.¹³ One reason this topic is of importance is that the DOJ's recommended downward departures on cartel fines are almost always accepted after brief, *pro forma* judicial hearings. The most common type of sentencing agreement is binding upon the court (OECD 2008: 156). That is, judges rarely question the negotiated plea agreements, and defendants know this.¹⁴

The proper level of such discounts is important because inadequate discounting might overwhelm DOJ resources for trials, whereas excessive discounting could contribute to under deterrence.¹⁵ On the other hand, the expectation of unjustifiably large discounts can easily undermine amnesty programs. In the extreme, if all leniency applicants can reasonably expect to receive discounts close to 100%, there is little advantage to be had by being the first to apply. Discounts of 50%, 60%, or higher also undermine the effectiveness of leniency programs, simply to a lesser degree.

Monetary penalties for price fixing violations have strong effects on deterrence (Posner 2001, Wils 2006).¹⁶ The size of expected monetary penalties affects both the probability of detection and the rate of cartel formation. If expected fines are low, the incentive for applying for leniency is low, cartel defections slow, and the likelihood of detection is lowered. Therefore, increasing penalties will make cartels more fragile and increase detection rates. Assuming that the benefits of overt collusion derive from exogenous market characteristics, up to some point higher penalties efficiently discourage the formation of cartels.

Information about average cartel discounts and their sources of variation is also important because of its potential for affecting cartel deterrence. Optimal deterrence theory is couched in terms of the *expectations* of the founders and managers of cartels. Individual expectations about cartel penalties are formed on the basis of historical experience, that of the firm itself, its legal advisors, and of other firms that were defendants in comparable price-fixing litigation. Given that the U.S. Sentencing Guidelines are transparent and yield a precise recommended starting point for the fine, forming expectations about discounts is perhaps the most important source of variation in a violator's expectation about the size of a future cartel penalty.

¹² The guidelines for entering into plea-bargaining negotiations are found in DOJ (1997: §9-27.420). [http://www.usdoj.gov/usao/eousa/foia_reading_room/usam/title9/27mcrm.htm#9-27.420]. These guidelines exist to "...ensure that plea agreements entered into by federal prosecutors do not bargain away justice" (Hammond 2006b: 5).

¹³ In a recent interview concerning leniency policies generally, the EU Competition Commissioner in her fourth year in the job stated her belief that the DOJ had no policy for partial leniency ("...after all, the U.S. provides comfort only to the first company to report a cartel and provide evidence." (Kroes 2008: 53)).

¹⁴ Connor (2007) notes only one case in which a supervising judge challenged the DOJ. **A DOJ-authored report confirms that only one instance of judicial refusal occurred between 1997 and 2007 (OECD 2008: 156-157).**

¹⁵ Preparation, court time, and appeals can easily exceed 20 or 30 person-years. Perhaps as a result, the number of corporate cartel cases resolved by trials is extremely limited.

¹⁶ The balance of academic opinion seems to favor an assessment that current levels of price-fixing sanctions under deter (Wils 2006, Connor 2007d). Cartel studies that have documented high levels of recidivism among cartelists in the years since rigorous enforcement began also support under-deterrence (Connor and Helmers 2006).

The DOJ takes the public position that agreeing to discounts from recommended fine ranges for cooperation in cartel cases is the exception to the rule: “The government *must* recommend a Guidelines sentence *unless* a downward departure...is warranted” (*ibid.* p.13, emphasis added). In fact, this study shows that more than 90% of all fines are below the upper end of the range and at least three-quarters are below the minimum of the range. Moreover, DOJ officials believe that the practice of plea negotiations and attendant discount recommendations to the courts are uncontroversial.¹⁷ It is true that critical assessments of this practice cannot be found. Finally, the DOJ takes the position that it must retain the flexibility to impose *individualized* penalties.¹⁸ All these positions cry out for empirical verification.

It is apparent that many non-U.S. antitrust authorities regard the anti-cartel policies and procedures long employed by the DOJ as exemplars. The EU, Brazil, Korea, Canada, and other jurisdictions have tended to adopt many features of the Division’s anticartel policies. The European Commission (EC), the world’s principal alternative template for effective anti-cartel enforcement, is visibly moving toward convergence on many features of U.S. enforcement practices.¹⁹ The Member States of the EU have in turn replicated most of the EC’s anti-cartel enforcement practices.²⁰ Understanding the details of U.S. anti-cartel policies and procedures can be relevant to developing effective multi-lateral antidotes to international price fixing.

Knowledge about the effects of plea bargaining involving non-amnestied cartels is also important because the practice is about to spread to antitrust authorities in other jurisdictions. Plea bargaining in criminal cases with prosecutors is a long-established practice in common-law nations, and in the United States the vast majority of criminal cases are resolved by means of a deal in which a guilty plea is obtained in return for a promise of a reduced sentence (Fisher 2003).²¹ However, in civil-law systems, plea bargaining is practically impossible. Nevertheless, a recent OECD (2008) report on plea bargaining assesses the practice from a global enforcement perspective, ultimately judging it to be a net benefit for most jurisdictions with substantial sanctions. Moreover, the huge backlogs of cartel prosecutions in several civil-law

¹⁷ “The [Antitrust] Division’s experience of using negotiated plea agreements in cartel cases has very few, if any, detractors...” (Hammond 2006b:2). The absence of criticism could be due to lack of information about the levels and efficacy of proffered discounts. Offering sweetheart deals to *individuals* can be controversial, in the sense that juries are known to dismiss the testimony of witnesses as unreliable.

¹⁸ On p. 16 of an appeals court brief in *U.S. v. Rattoballi*, the Justice Department cited the Supreme Court’s decision in *Booker* that subject to primacy of the Sentencing Guidelines and proportionality, individualized sentences are warranted in price-fixing cases. [see <http://www.usdoj.gov/atr/cases/f223400/223440.pdf>]

¹⁹ Among those changes are the adoption of a conspiracy theory of cartel violations (Joshua and Jordan 2004), the use of unannounced raids (Harding and Joshua 2004), fines based on affected commerce (EC 2006, Wils 2007), the encouragement of antitrust private rights of action (EC 2005), and possible criminalization of the EU’s competition law (Wils 2005).

²⁰ Hammond (2006b) makes the case that the system of negotiated guilty-plea agreements has not yet been adopted by most other antitrust authorities, but urges that it should be; indeed, he comes close to rebuking the EU and other authorities that promise specific percentage discounts to second-in cartelists (*ibid.* p.2).

²¹ In England and Wales, bargaining is not used to reduce a sentence, only to drop some charges.

jurisdictions are prompting antitrust authorities to adopt “settlement” procedures very similar to DOJ plea bargaining. In 2007 the European Commission’s Directorate General for Competition (DG-COMP) began seeking public comment on its proposed “direct settlement” policy (International Herald Tribune 2006). A May 2007 amendment to Brazil’s competition law permits “direct settlements” in antitrust litigation, and already by November 2007 two cartelists had agreed to reduced fines in return for cooperation with prosecutors (*Latin American News Digest* Nov. 29, 2007; *Business News Americas* Nov. 29, 2007). Top officials admit that the Brazilian policy change was inspired by the DOJ model.²²

This paper focuses on the rationale for granting cartel fine “cooperation discounts” for non-amnestied defendants. However, it should be recognized that there are other concessions that may be negotiated by defendants besides cooperation discounts. The DOJ may agree to a narrower product market definition or a shorter conspiracy period that could be proven at trial.²³ Such concessions will have the effect of reducing the value of affected commerce and, consequently, the size of the fine range specified under the USSGs. Discount levels may also be affected by factors unrelated to the degree of a defendant’s cooperation. The quantitative analysis below incorporates a couple of non-discount rewards as control variables.

Organization

The paper is organized as follows. First, I assemble a few general DOJ policy statements about the critical relationship of appropriately harsh fines to serve deterrence. Second, I describe the U.S. statutes and methods employed to ascertain a guilty firm’s maximum fine liability. Third, I expand on the rationales for offering fine discounts. Fourth, I examine the DOJ policy with respect to discounts for second-in firms, which are fairly well explained by DOJ policy documents. However, I determine that there are no clear guidelines for the third-or-later arrivals. The fifth section is an original empirical study of DOJ cartel-discounting practice; it explains the data sources, displays data means and ranges, and interprets a multiple regression analysis explaining variation in discounts.

2. DOJ Policy Statements on Fines and Deterrence

²² “Plea-bargaining has been a long-standing and successful practice in the US, and, we were of course, inspired by its system...” (Martinez 2007). Ana Paula Martinez is Director of the Competition Department of the Secretariat of Economic Law, one of the three units of Brazil’s antitrust authority.

²³ There are many examples of private plaintiffs in follow-on actions that successfully *expand* the government’s concept of product definition or time period. Hammond (2006: Section II) gives one of the few discussions a scope-narrowing concessions that I have been able to find. Section 1B1.8(b) of the U.S. Sentencing Guidelines allows the DOJ to formulate a plea agreement that does not incorporate self-incriminating information. If the first-in firm is uncertain about when the conspiracy began or the breadth of the market included, compared to the true dimensions that are subsequently established, the second-in firm’s plea agreement may be framed using a shorter time period or narrower market definition than are applied to subsequent plea agreements. Thus, the second-in defendant can have its fine range computed on the basis of smaller affected sales. Downward departures of this kind are “not uncommon.”

In their major policy speeches and Congressional testimonies, DOJ officials habitually verify the success of the agency by sprinkling anecdotes and statistics about cartel fines.²⁴ These pronouncements often emphasize the high and rising monetary penalties imposed on convicted corporate price-fixers as a particularly important cartel deterrence factor.²⁵ Deputy Assistant Attorney General Gary Spratling ended a 1997 speech by quoting from the federal judge who heard ADM's guilty plea in the lysine and citric acid cartels and who imposed the then record fine of \$100 million:

“I believe that the [ADM] fine certainly serves as a deterrent to any company that might still be out there thinking that [price-fixing] behavior is acceptable.” (Spratling 1997: 8)

A year later Spratling lamented the fact that the DOJ was compelled to agree to six \$10-million fines that could have been higher and was advocating²⁶ raising the Sherman Act fine limit to \$100 million because:

“The end result is that for the largest, most harmful antitrust conspiracies -- typically those involving international cartels and foreign corporations -- the methodology adopted by the Sentencing Commission for calculating antitrust fines is mooted in favor of a fine calculation that tends to be considerably more lenient towards the offender. The current statutory scheme thereby provides less deterrent effect for firms doing the greatest injury to U.S. businesses and consumers -- an inherently incongruous result. This problem is particularly acute with foreign-based firms because, unlike domestic firms, generally there is little prospect of jail time for individuals as a substantial added deterrent to engaging in antitrust offenses... Therefore, heavy fines may be the only meaningful deterrent to prevent foreign-based firms from victimizing American businesses and consumers.” (Spratling 1998:15)

In a speech before the heads of several foreign antitrust authorities, DAAG Scott Hammond identified four conditions necessary for effective cartel deterrence. Among the four is “the threat of severe sanctions”:

“...[I]t is axiomatic that cartel activity will not be adequately deterred nor reported if the potential penalties are perceived by firms and their executives as outweighed by the potential rewards. How punitive do the fines need to be to induce amnesty applications? ...In the United States, companies that fail to provide timely cooperation often pay fines

²⁴ The audiences to which these speeches are directed are largely antitrust professionals, fellow prosecutors, and Congressional oversight committees. These speeches serve the purpose of warning would-be cartelists, corporate and individual, to consider seriously the potential liability of their actions; of instilling pride among its employees in the DOJ's accomplishments; and of lobbying those that control the Agency's purse for continued support. Balanced self criticism is left for internal discussions and not for public consumption.

²⁵ In this paper, I ignore the salutary effects of individual penalties and private damages actions.

²⁶ This speech contains few references to imprisonment and emphasizes the difficulties of using the alternative sentencing statute.

that amount to 30 percent or more of the revenue generated by the sale of the price-fixed product or service during the entire duration of the conspiracy. Fines in Canada are similar in magnitude. In Europe, latecomers can expect to pay much more. In terms of deterrence, that makes absolute sense....Fines must be sufficiently punitive that they will not be viewed simply as a tax or a cost of doing business.” (Hammond 2004:7-8)

In a later speech, DAAG Hammond (2006a) identified six benefits of the DOJ’s system of guilty-plea agreements coupled with negotiated sentences for anti-cartel enforcement.²⁷ These benefits (to the prosecuting agency or the defendants) are a high level of transparency of the plea-negotiation process, proportionality between similarly situated defendants, minimal uncertainty about eventual sentences, expediency, the assistance to prosecutors and rewards to defendants from cooperation, and a major step toward finality for defendants. Hammond’s speech was quickly transmitted to clients by major antitrust law firms (e.g., Baer *et al.* 2007).

At the same time, DOJ officials have been careful to recognize the limits of corporate fines alone to successfully deter cartel formation. Indeed, they often opine that imprisonment is a more effective deterrent. For example:

“Corporate fines alone are simply not sufficient to deter many would-be offenders. For example, in some cartels, such as the graphite electrode cartel, individuals personally pocketed millions of dollars as a direct result of their criminal activity. A corporate fine alone, no matter how punitive, is unlikely to deter such individuals” (Hammond 2000).

3. Three Methods for Fining Cartels

There are two statutes governing the setting of criminal antitrust fines under the Sherman Act by U.S. courts. First, beginning in 1987 the U.S. Sentencing Guidelines for Organizations (USSGs) specified the calculation of a range of fines within which the courts, upon the recommendation of the DOJ, were to approve a specific corporate fine. In early 2005 the Supreme Court’s decision in *Booker* rendered the use of the USSGs advisory rather than mandatory, but it is evident that federal judges continue to be guided by them. Second, from the time that hard-core price fixing became a felony crime in 1974, courts were given the latitude to apply an “alternative fine statute”, namely, 18USC §3571. The courts are instructed to apply whichever statute results in the largest fine.

²⁷ The context of Hammond’s speech at the OECD was the overwhelming response to the revised 2002 Leniency Notice of the European Commission. By late 2005, the EC had received more than 167 applications, which implies that the applicants believed they had knowledge of scores of hitherto undiscovered secret cartels (Kroes 2005: 3). Based on the rate of previously approved applications, 100 to 120 new cartels will have to be investigated. As the Competition Directorate of the EC (DG-COMP) can only decide on five to ten cartel cases per year under its traditional cumbersome administrative procedures, it was searching for new, more expeditious methods possibly modeled on DOJ plea bargaining to clear the backlog (*ibid.* p. 5).

One difference between the two fining methods is that fines imposed under the authority of the USSGs are subject to an absolute statutory limit, whereas there is no such limit under the alternative fining method. The statutory cap from July 1990 to July 2004 was a corporate fine of \$10 million. For illegal conduct occurring after July 2004, the Antitrust Criminal Penalty Enhancement and Reform Act raised the cap \$100 million. Therefore, if, as is increasingly the case, the DOJ wishes to recommend a fine above the statutory limit, it must appeal to the alternative fine statute.²⁸

The first method depends on the USSGs. The mechanics of applying the USSGs can seem rather complicated and require three steps. First, on the assumption that the typical cartel achieves a 10% collusive mark-up, that percentage is doubled and multiplied by the *company's* affected commerce; this is termed the base fine. If there is evidence that the overcharge is substantially different from 10%, the multiplier may be smaller or larger than 20%.²⁹ Second, the DOJ computes a total culpability score, which is the sum of a base score³⁰ plus aggravating factors³¹ and minus mitigating factors.³² Using a table, the total is converted into a culpability multiplier range that can start from as low as 0.75 to as high as 4.0 on the upper end.³³ The top multiplier is always double the bottom multiplier; for most defendants it is usually between 2.4 and 4.0. Third, the base fine is multiplied by the two culpability multipliers to yield a fine range. Most cartel defendants face maximum fines in the range of 50% to 80% of their affected sales. The minimum of the range is half the maximum.

The second method under the alternative felony statute simply doubles the economic harm inflicted on direct purchasers *by each defendant*.³⁴ There are no culpability adjustments; rather, the overcharge alone summarizes the degree of culpability. Consequently, the recommended fine is a single number, not a range. Assuming that evidence points to uniform pricing across cartel participants (the usual case), a reasonable method would estimate a total U.S. overcharge and simply partition it according to the defendant's share of the cartel's sales. Proving economic damages "beyond a reasonable doubt," which has been required since early 2005, would be

²⁸ The first breach in the \$10-million cap occurred in August 1995 when Norwegian manufacturer Dyno-Nobel was fined, after agreeing to plead guilty, slightly more than \$10 million for its role in the *Explosives* cartel (Connor 2007:7). Since then dozens of fines above \$10 million have been imposed on corporate cartel members. Moreover, since mid 2004, several fines above \$100 million have been approved.

²⁹ I know of no cases that have deviated from the 10% presumption.

³⁰ The base score for hard-core price fixing is 5.

³¹ The most common ones in cartel cases are (1) "involvement in or tolerance of" the crime by employees of the corporate defendant (an increase in the culpability score of from +1 for the smallest responsible unit of 10 to 19 employees up to +5 for units with 5000 or more employees) and (2) recidivism (+2 for conviction on similar misconduct within the past five years or +1 if six to ten years previously) (USSC 2005: §8C2.5(b) to §8C2.5(e)).

³² They are (1) an effective internal compliance or ethics program (a score reduction of 3 points, but rarely applied in cartel cases) and (2) "self reporting, cooperation, and acceptance of responsibility" for the crime (a reduction of from 1 to 5 points, with 2 points the standard level for a guilty plea) (USSC 2005: §8C2.5(f) to §8C2.5(g)).

³³ The total score is multiplied by 0.2 for the minimum multiplier and by 0.4 for the maximum multiplier. Thus, for example, a score of 5 implies multipliers of 1.0 and 2.0, and a score of 10 or higher becomes 2.0 and 4.0.

³⁴ That is, as it is conventionally applied by the DOJ, the alternative fine statute does not apply the legal principle of joint and several liability.

challenging to prosecutors in a trial setting, so what the DOJ has done so far has been to negotiate by mutual agreement with the defendant an overcharge figure that will serve as the basis of the fine calculation.³⁵ The defendant agrees not to contest this negotiated overcharge figure.

In most plea agreements, both the USSGs and the alternative fine provision are cited as the legal bases of the negotiated fine. The double-the-harm/double-the-gain statute is cited in all plea agreements where the agreed fine exceeds the maximum penalty allowed by the Sherman Act (\$10 million from 1990 to July 2004 and \$100 million since then). In joint sentencing memoranda, the two parties stipulate that the unspecified amount of the defendant's overcharge "would be sufficient to justify" a particular fine; that is, the defendant's U.S. overcharges are at least half as large as the fine. In a few memoranda a specific overcharge amount is cited as the sole basis for a fine.

The double-the-harm approach could be used as the sole basis for punishing members of high overcharge cartels. Given that historically most culpability multipliers have been between 2.4 and 4.0, it follows that if the overcharge rate is from 24% to 40%, the double-the-harm method will result in a proposed fine that is the same as the *maximum* fine under the USSG approach. When a cartel overcharge is above 40%, doubling the harm results in a larger fine. Because the DOJ customarily employs the *minimum* of the Guidelines range as the starting point for fine negotiations, the double-the-harm method will result in a higher proposed fine if the overcharge is above 20% of affected sales. As Connor and Lande (2005: Table 5) have demonstrated, 64% of all effective³⁶ hard-core cartels raised prices by at least 20%. Thus, for well over half of all cartels, the alternative fine statute will place prosecutors in a position to demand larger fines than under the USSGs.

A third method of cartel-fine calculation would invoke the principle of joint and several liability when calculating a damages-based fine under the alternative fine statute. That is, each putative member of the cartel would be assessed a starting-point liability equal to double the entire market overcharge, less any fines already paid by defendants that pleaded guilty earlier. As happens in private litigation, it is the cartel members with the smaller cartel-market shares that would be the most threatened by this method of calculation, which provides a stronger incentive to cooperate than fines based on company-specific overcharges. While this method is not commonly used, it appears to be consistent with the language of the alternative fine statute.³⁷ Official testimony by the Deputy Assistant Attorney General for Antitrust strongly supports the

³⁵ The processes used to develop overcharge estimates are not public. The agreed overcharge amount may be the result of a quantitative analysis developed by either party and approved by DOJ economists. On the other hand, the agreed overcharge may be about midway between the DOJ's estimate and the defendant's preferred number.

³⁶ That is, cartels that raised prices by even minimal amounts. Counting all cartel episodes, the proportion that raised prices by 20% or more is 60%.

³⁷ I have come across only one sentencing memorandum that uses the language of joint and several liability.

idea that joint and several liability is to be the basis for calculating the loss or gain under the alternative sentencing provision (Hammond 2005: 10-12).³⁸

The first method is the one used most often by the DOJ for figuring *initial* fine ranges, primarily because of the relative straightforward formula that depends on affected sales. Sales figures are not usually contested facts. The other two methods require the government to prove the amount of damages to direct customers of the cartel. While reasonable estimates of damages can be calculated using a number of methods, the econometric methods likely to be needed for a contested prosecution might require a year to produce (Connor 2007d). Whichever fine statute is used, the recommended fines are only the starting point for negotiations about the final terms of the sentence upon which prosecutors and defendants will ultimately agree. The last step in determining a fine is the negotiations over discounts from the recommended fine.

4. Rationales for Partial Fine Discounts

There are three reasons for granting a discount below the fine specified by U.S. fining guidelines: full amnesty for an applicant for the Corporate Leniency Program, for an inability to pay, or for “cooperation” with prosecutors after a cartel is exposed. Discounts (“partial leniency”) for cooperating second-in firms are not part of the DOJ Leniency Program,³⁹ but DOJ policy calls for the size of the discount to be affected by whether amnesty has been awarded and by how much information the amnestied firm is able to supply to prosecutors (Hammond 2006b: 2).

Administering Corporate Leniency Programs

Leniency programs for cartel prosecutions have a long history in the United States and have spread quickly to other jurisdictions since the mid 1990s (Spratling and Arp 2005). The EU itself and more than half of the member states of the EU have such programs (Wils 2007a). Leniency may involve a partial reduction of penalties or, for the first qualified applicant, a full waiver of all government penalties.⁴⁰ Full leniency is also called amnesty or immunity.⁴¹ If

³⁸ Hammond quotes from the “plain language” of 18 USC §3571(d), which states that the “gain” is pecuniary gain derived by “any person” from the offense. The “loss” he defines as the “cumulative loss to all the victims of a conspiracy caused by all the coconspirators” (p.11). He also supports this interpretation by citing the 1984 and 1987 legislative history of the statute. Finally, he cites the 1999 court decision in *United States v. Andreas* (1999 WL 116218 (N.D. Ill.)) that supports the joint-and-several-liability interpretation of an individual guilty of cartel conduct.

³⁹ The EU’s cartel leniency notice provides for both partial leniency discounts and up to one full leniency recipient (Veljanovsky 2006).

⁴⁰ A 2004 law in the United States goes one step farther. The Antitrust Criminal Penalty Enhancement and Reform Act of 2002 reduces civil liability from treble to single damages for amnesty recipients.

⁴¹ Indeed, the EU’s leniency program is translated as immunity, whether full or partial forgiveness of fines.

granted amnesty, a corporate cartel member has criminal indictment waived; moreover, all indictable corporate officers of that firm receive immunity so long as they continue to provide satisfactory cooperation with prosecutors.⁴²

The legal-economic rationale for full discounts for the first-in leniency applicant that is qualified for amnesty is well established (Spagnolo 2007, Wils 2007a). The idea is to increase the distrust in a cartel by creating incentives for cartelists to defect from the cartel agreement. The purpose is to make a first firm break ranks, race to be first to confess to prosecutors, and give help to ensure prosecution of the rest of the conspiracy. Amnesty is offered only if prosecutors have no investigation of the cartel in progress.

In addition, the “Amnesty Plus” program seems to be sound. Amnesty Plus is a modest refinement on the basic corporate leniency policy; it offers especially large discounts for applicants that do not qualify for amnesty in one market if they are able to qualify for amnesty by offering information about a cartel in a second market.⁴³

Ability to Pay

A second well accepted reason for discounting cartel fines arises from a defendant’s ability to pay. Because most cartels arise in concentrated industries, the exit of even one company can raise concentration to heights nearly guaranteed to cause a high degree of market power to be exercised. Thus, prosecutors are loath to propose and courts are unlikely to accept fines high enough to cause a defendant’s bankruptcy. In addition, prosecutors are urged as a matter of policy to consider compensation of victims; fines that are too large may impair a defendant’s ability to contribute to single damages in private suits.

The frequency of genuine ability-to-pay constraints on fines is difficult to gauge. Fined cartelists are rarely observed being forced to dispose of capital investments in order to finance antitrust sanctions, though it does happen once in a while.⁴⁴ There appears to be a presumption that ability to pay ought to be associated with a firm’s cash flow. At least one study suggests that financial principles rarely find imposed fines high enough to endanger a firm’s survival (Craycraft *et al.* 1997). Thus, ability to pay is in practice rarely an issue when evaluated in light of modern principles of corporate finance. Ability to pay may be a rather slippery concept to apply in actual plea negotiations. Most corporate defendants in modern criminal price-fixing cases are large, diversified, multinational entities. Price fixing typically occurs within some minor branch of such firms, so fines at the high end of the guidelines range tend to be small

⁴² Only one amnesty recipient has had its leniency agreement revoked by the DOJ. Stolt-Nielsen, the Norwegian-British operator of parcel chemical tankers, was accused by the DOJ of continuing to collude for several months beyond the agreement’s signing date, and a U.S. appeals court agreed with the DOJ.

⁴³ “Penalty Plus” is a DOJ policy that threatens fines at the upper end of the Guidelines range for a company that is later found to have knowingly failed to apply for Amnesty Plus.

⁴⁴ Crompton Chemical Co. (now Chemtura) was caught up in several international cartels beginning with *Rubber processing chemicals*. Although it was an amnesty recipient, the large antitrust liability faced by Crompton seems to have been one reason it subsequently divested itself of some of its manufacturing assets.

portions of the parent organization's cash on hand. Defendants also have the option of requesting that payments be spread over installments over five years. However, inability to pay – even though the DOJ is dealing with defendants that by and large had made extraordinary monopoly profits for several years prior to conviction – may well be a rather widespread factor in granting discounts.

Cooperation Discounts

Discounts for cooperation are normally granted after one member of a cartel qualifies for amnesty in the DOJ's Corporate Leniency Program. Arriving at a mutually satisfactory discount is governed by procedures contained in the DOJ's *Grand Jury Manual* (DOJ 1991). Under the USSGs for organizations a court may, upon the recommendation of prosecutors, depart below the Guidelines' range if a company offers "...substantial assistance in the investigation or prosecution of another organization that has committed an offense..." (USSC 2005:§8C4.1(a)).⁴⁵

One of the earliest formal analyses of plea bargaining appears in Adelstein (1978).⁴⁶ In his dynamic model, the passage of time lowers the value of a given punishment (because of deteriorating memories of witnesses or of the possibility of losing evidence) and simultaneously changes as the prosecutor observes the "concession rate" at which a defendant moves toward confession relative to the prosecutor's historical experience. The defendant's optimization problem is symmetric. Both parties have initial offers, which change as they alter their concession rates. Ultimately, Adelstein's model turns out to have the same characteristics as bilateral monopoly and, therefore, no stable equilibrium.

Cooter and Rubinfeld (1989) synthesize the formal legal-economic literature on dispute resolution, in which plea bargaining and filing charges (both are part of "assertion of a legal claim") is modeled as the first of three stages of litigation. The decision of a rational prosecutor – one driven by self-interest -- to assert a claim is the outcome of an evaluation of the net benefits of doing so. In general, benefits⁴⁷ are high when the prosecutor's subjective conjecture about winning at trial is high and when the costs of bargaining and litigating are low (*ibid.* p. 1082). There are two cases. If prosecutors have superior access to information about these three factors, the general result applies. However, if both the prosecutor and the defendant are equally well informed about costs and trial outcomes, then the decision to assert a claim depends only

⁴⁵ The term "organization" refers to proprietorships, partnerships, corporations, trusts, or any other business entity. The size of the reduction is based upon the court's evaluation of the significance, usefulness, nature, extent and timeliness of the assistance (USSC 2005: §8C4.1(b)). A downward departure may also be granted for a company's assistance in investigating or prosecuting an individual that is not affiliated with the company rendering assistance.

⁴⁶ I ignore stage I of the model, which addresses the decision of whether to bargain, since all U.S. cartel defendants appear to do so.

⁴⁷ Measurement of the benefit is straightforward in privately initiated cases (it is the expected net settlement value), but in public prosecutions the benefit (general deterrence) is difficult to measure because it is a public good. In the context of contemporary cartel enforcement, the benefit may be the amount of publicity generated by a plea (or all pleas associated with one conspiracy), which is likely to be correlated with the size of the fines and prison sentences.

on the benefit net of trial costs only; bargaining costs and trial outcome probabilities are irrelevant (*ibid.* p. 1083). While these theoretical modeling results are a useful beginning, they are of limited applicability to cartel crimes because of the assumption that there is one prosecutor and one defendant and no budget constraint on prosecutors.

Kobayashi (1992) develops a formal game-theoretic model that has assumptions that better fit cartel plea bargaining. That is, it incorporates simultaneous plea-bargaining between a prosecutor (who is maximizing total penalties) and several defendants that have been detected engaging in a single crime and allows one defendant to offer inculpatory information about other defendants to the prosecutor. Unlike some previous models, the penalty facing any defendant is exogenous (which is consistent with the Sentencing Guidelines). This model predicts that the size of penalties from plea bargaining is positively related to the defendant's (1) *ex ante* chance of conviction and (2) value of information for convicting the remaining co-conspirators.

When a firm requests to begin negotiations for a criminal guilty plea, the starting point for the DOJ is normally the *minimum* fine in the Guidelines range. The upper point in the range is double the lower end. That is, without special circumstances, a typical defendant is granted a downward departure of 50% from the maximum liability under the Guidelines even before negotiations begin.⁴⁸ Depending in the defendant's degree of culpability, a cartel's fine will be below 40% of affected sales (if the firm displays high culpability) or below 15% (low culpability). Obviously, starting at the low end of the Guidelines' range gives defendants the benefit of the doubt. The origin of this customary practice is unknown.

“Cooperation” or “assistance” is the principal reason for consideration for a discount. Cooperation is in essence the divulging of secret information about the cartel's collusive conduct. In particular it refers to information held by one member of a cartel and divulged about other members.⁴⁹ The specific types of cooperation expected from firms that have admitted their guilt comprises a rather short list (Spratling 1999:4-9):

- Producing all information, wherever located, that the DOJ requests
- Permit all relevant information to be shared with foreign authorities
- Secure the cooperation of all employees for interviews or testimony
- Immediate cessation of collusion

Clearly the major benefit to prosecutors of cooperation is the ability to assemble testimony (eyewitness accounts of meetings and communications among the conspirators), written documents (such as memoranda of meetings or scorecards), other indisputable records

⁴⁸ The two exceptions are when a defendant is not qualified for full amnesty because it was a ringleader or it failed to reveal its participation in a second cartel, which then causes the DOJ to consider imposing a “Penalty Plus” fine close to the Guideline's maximum. All defendants deposed by the DOJ are asked the “Omnibus Question” that requires revealing possible additional cartels.

⁴⁹ Cooperation discounts under this section of the USSGs do not apply to self-incriminating facts. “Self-reporting, cooperation, and acceptance of responsibility” are mitigating circumstances rewarded by reductions in the defendant's culpability score under §8C2.5(g) of the Guidelines.

(telephone logs, travel receipts, and the like), and electronic recordings⁵⁰ of cartel activity – all of which would add up to an airtight case against all the defendants should the case go to trial. The first qualifying amnesty applicant may be able to supply sufficient evidence to convict all of the remaining participants.⁵¹

In a criminal antitrust system, prosecutors have many reasons to prefer resolving convictions through guilty-plea negotiations to a trial. Trials take years of preparation and months of courtroom time. Often prosecutors face defendants' legal-economic teams that are many times larger, better financed, and more experienced.⁵² “The rewards for second-in firms are not uniform, because the value of a second-in corporation can vary dramatically from case to case” (Hammond 2006b: 4). The need for prosecutorial discretion is justified by ignorance about the *incremental inculpatory information* that the second firm can give up and by the overriding concern for proportionality.

When a second firm offers to cooperate, the proffered assistance may be uniquely valuable, but is more likely to be largely duplicative of what the first firm has already offered. Nevertheless, even duplicative information available from additional witnesses may be valuable to the prosecution. For example, the amnestied firm's cooperating witnesses may have limited English-language capability.⁵³

The rationales for discounting fines for third-in and later firms are more obscure. They seem to have arisen from practical prosecutorial experiences rather than any well developed reasoning consistent with economic game theory. Indeed, it is the DOJ's view that discounts for second-in firms are highly individualized, which means that the discounts are *ex ante* unpredictable.

Members of cartels that do not qualify for amnesty overwhelmingly enter into plea agreements with the DOJ. The “Model Annotated Corporate Plea Agreement” provides insights into the DOJ's discounting policy (see box).⁵⁴ While this model plea agreement promotes transparency, it preserves a great deal of discretion for prosecutors. There is no definition of the phrase “substantial assistance” or how high the risk of bankruptcy must be. Moreover, the model

⁵⁰ Individual participants employed by an amnesty applicant may be required to make secret, consensual tape recordings during a face-to-face cartel meeting.

⁵¹ The applicant may be required to gather electronic evidence of meetings in the period before search warrants are served to the other alleged cartelists.

⁵² In late 1994, the DOJ's prosecution of General Electric and DeBeers Consolidated for price fixing in the global market for industrial diamonds was dismissed after the prosecution presented its case. Commentary cited the overwhelming legal resources of General Electric relative to the Government's resources as a major factor in this defeat (Connor 2007a: 75).

⁵³ The DOJ's loss in its trial of Appleton Papers in the *Thermal Fax Paper* cartel case is one example (*ibid.* pp. 76-77).

⁵⁴ This model agreement can be found posted on the DOJ's Web site at <http://www.usdoj.gov/atr/public/guidelines/220671.pdf>. This version is current as of December 19, 2006.

language on the size of the gain suggests that it is a conservative number that was the result of negotiation rather than a formal modeling exercise by DOJ experts.⁵⁵

Model Annotated Corporate Plea Agreement

The relevant section is paragraph 9, which carries the following annotation:

“If the recommended fine is below the recommended Guidelines range, insert one of the listed explanatory paragraphs, either an agreement to make a downward departure for substantial assistance or an inability-to-pay determination.”

The key phrases in the first alternative of paragraph 9 are:

“...the United States agrees that it will make a motion, pursuant to U.S.S.G. §8C4.1, for a downward departure from the Guidelines fine range...because of the defendant’s substantial assistance in the government’s investigation and prosecutions of violation of federal criminal law...”

Paragraph 9 does not apply to fines calculated from the double-the-harm statute 18 U.S.C. §3571(d). Instead, paragraph 8(e) of the model plea agreement suggests inserting the following language:

“The United States contends that had this case gone to trial, the United States would have presented evidence to prove that the gain derived from of the loss resulting from the charged offense is sufficient to justify the recommended sentence...For the purposes of this plea and sentencing only, the defendant wives it rights to contest this calculation.”

The second alternative laid out in paragraph 9 offers two alternative key sentences:

“The United States and the defendant further agree that the recommended fine is appropriate...due to the inability of the defendant to pay a fine greater than that recommended without impairing its ability to make restitution to victims...” OR “...due to the inability of the defendant to pay a fine greater than that recommended without substantially jeopardizing its continued viability.”

Source: www.usdoj.gov/atr

There is at least one factor that may lead to an upward departure – a negative discount -- in a cartel fine.⁵⁶ Spratling (1998) argues that applying the USSGs when there are large foreign

⁵⁵ The model language in paragraph 8(e) says that the DOJ is prepared to *prove* the size of the monopoly gain. Proof beyond a reasonable doubt is inconsistent with the regression techniques typically employed to calculate overcharges in civil cases.

affected sales offers one possibility, particularly when a defendant's U.S. sales are a small portion of its foreign sales. The DOJ may either use a company's world-wide affected sales to compute the base fine, or it may simply consider it an aggravating factor. The use of large foreign sales as an aggravating factor has occurred at least twice, in the *sodium gluconate* and *marine construction* cases; the upward departures were 102% and 69%, respectively (Spratling 1998:11).

5. Discounting Policy for Partial Leniency Applicants

Second-Firm-In Fining Policy⁵⁷

Given that the DOJ's manpower is limited, the conservation of prosecutorial (*a fortiori* judicial) resources is wise public policy. The DOJ is typically eager to resolve probable price-fixing infractions through the negotiation of guilty pleas rather than pursuing litigation that proceeds to trial. Trials are both more costly and more uncertain in their outcome than guilty-plea deals. The vast majority of cartels have three or more members. Because the chances of prevailing at trial are enhanced by representatives of two cooperating defendants with consistent stories than one only, it behooves prosecutors to offer greater incentives to agree to a guilty plea to the second-in firm than later arrivals. Therefore plea agreements and sentencing memoranda⁵⁸ often request downward departures in fines because of the "substantial assistance," production of relevant documents, numerous employee interviews, and prospects of "continuing assistance" that promise to advance the Government's investigation.

Beginning with speeches in the late 1990s, the DOJ has endeavored to explain the advantages to being the second firm to plead guilty. Gary Spratling (2000, 2001) was among the first to explain the DOJ's second-firm fining policy.⁵⁹ He emphasized that, while the biggest prizes went to the first member of a cartel to apply, it was not a winner-take-all situation. There are huge rewards ("consolation prizes") for second-in firms to cooperate relative to later-arriving firms. He asserts that there are many factors used to determine downward departures, that these are "not subject to precise calculation", and that the DOJ is carefully tracking the discounts to

⁵⁶ An upward departure from the Guidelines' range may also be justified by "exceptional organizational culpability", which is signaled by a culpability score of 10 or higher (USSC 2005: §8C4.11). The maximum possible score is 17. Mitsubishi, convicted in the *graphite electrodes* cartel case, had a culpability score of 10 [www.usdoj atr/cases/f8200/8204.htm], but received no upward departure.

⁵⁷ These remarks assume there is an amnesty applicant that has first been granted full (if conditional) immunity, but also apply with almost equal force to the first-in guilty party where no amnesty was granted.

⁵⁸ Plea agreements (written and signed a prosecutor and the defendant) are almost always presented to a federal judge at a sentencing hearing in open court (Hammond 2006b: 6). Most courts keep them available for public viewing, and many are available at www.usdoj.gov/atr. They specify the Sentencing Guidelines employed to formulate a recommended sentence (*ibid.* p. 12-15). A smattering of separate corporate sentencing memoranda with greater detail on the fine calculation (affected sales or damages, culpability factors, fine payment schedules, etc.) are also available at www.usdoj.gov/atr.

⁵⁹ He had recently moved to private practice, so these two publications are not official pronouncements.

ensure proportionality within and across cartel prosecutions. Besides ability to pay, factors⁶⁰ used to place a monetary value on the size of a downward departure include (direction of effect in parentheses):

- Delay in guilty-plea cooperation (-)
- Rank of the firm in the queue of cooperating firms (-)
- Number of firms in the cartel (-)
- Significance of the information provided (+)
- Amnesty Plus cooperation (+)
- Length of the conspiracy (-)
- Use of coercive tactics (-)
- Brazenness of top management (-)
- Tolerance of collusion by top management (-)
- Size of the overcharge (-)

Some of these factors are objective and measurable, while others appear to be largely discretionary. In particular, the inculpatory value of information, brazenness, and coerciveness of tactics require prosecutorial judgment. Cooperation meriting Amnesty Plus cannot be determined from public information. Rank in queue, number of participants, delay, cartel duration, and overcharge are objectively measurable, though not always publicly available.

In the context of large international cartels, Spratling provides some rough ranges of fines as a percentage of affected sales that a third or fourth firm will likely pay, namely, 25 to 35% below the minimum of the Guidelines range.⁶¹ A second-in firm can expect a fine in the 10 to 20% of affected sales range after partial leniency. That is, the second firm to agree to cooperate will typically receive a fine 40 to 60% relative to the most severely fined members of a cartel.

Spratling (2001) chose to cite the *graphite electrodes* and *vitamins* cartels as examples of the benefits of being second to plea (Table 1). Hammond (2002, 2004) illustrated his speeches with the Mitsubishi case and *rubber chemicals*. As is usually the case, he prefers to express the discounts from the *minimum* recommended fine (the lower end of the Guideline's fine range) rather than the maximum liability facing a defendant. Another characteristic of DOJ fine discussions is a tendency to compare second-in fines with the harshest fines meted out. This practice has the effect of masking total discounts, because the harshest fines often are also discounted generously from the maximum possible fines (and typically from the lower end of the range as well).

⁶⁰ In a few instances, I have slightly altered Spratling's terminology to be compatible with the explanatory factors incorporated into the regression model discussed below.

⁶¹ As the USSG base fine is 20% of affected sales, barring extraordinary leniency circumstances, Spratling is implicitly assuming either that the culpability score is between 1.2 and 1.75 with no cooperation discount or that the most culpable and most harshly treated cartelists will normally receive cooperation discounts of 50 to 60%. The latter scenario seems more likely.

Table 1. DOJ Exemplars of the Benefits of Being the Second Cartelist to Plead Guilty				
Market	Firm	Rank/ Total	Fine/Sales Ratio	Discount from Late Arrivals
			<i>Percent</i>	
Vitamins, major:	Rhone-Poulenc	1/7	0	100
	Roche	2/7	Approx. 15	42 ^a
	BASF	2/7	Approx. 15	42 ^a
	Daiichi	4/7	26	0
	Takeda	4/7	Approx. 20	0
Graphite Electrodes:	Showa Denko	2/8	10	67
	SGL	4/8 ^b	30	0
	Mitsubishi	8/8	76.4	0
Rubber chemicals:	Flexsys/Akzo Nobel	1/3	0	100
	Crompton	2/3	10 ^c	unknown
	Bayer	3/3	25-35?	unknown
Parcel chemical tankers	Odfjell	2/3	7-11	30% from min.
	Jo Tankers	3/3	?	?
Sources: Spratling (2001: 802-805) and Hammond (2002, 2006).				
a) Compared to Daiichi because Takeda received an “Amnesty Plus” discount.				
b) Spratling erroneously identifies SGL as the last firm to agree to plead guilty. Three more firms later pleaded, and an eighth firm (Mitsubishi) was found guilty at trial.				
c) Estimated from the known Guidelines range.				

More recently, Spratling’s successor, Scott Hammond (2006a, 2006b), has restated and elaborated upon the second-firm discounting policy. He explains the DOJ’s discount for substantial cooperation in the following terms:

“Second-in companies that provide cooperation that substantially advances an investigation can expect ... a substantial assistance departure... Cooperation discounts for second-in firms are, on average, in the range of 30% to 35% off of the bottom⁶² of the Guidelines fine range” (Hammond 2006a: 5).

Most of the details of the DOJ’s second-in policy have remained unchanged since the late 1990s, but two additional features of sentencing policy are noted. First, Hammond (2006a) reveals that the fine calculation can be reduced by understating the size of affected sales for sentencing purposes. For example, the length of the collusive period can be foreshortened; alternatively, the product definition of the affected market can be restricted. The logic of this practice is rooted in §1B1.8 of the USSGs, which states that the courts are not required to use

⁶² This corresponds to a discount of 65 to 68% off of the top of the Guidelines range.

self-incriminating information when applying the Guidelines. A scenario permitting a reduction in the affected sales may involve an amnesty recipient that joined a cartel years after it began functioning; even with full cooperation offered by the amnestied defendant, the firm might underestimate the beginning year of the cartel.⁶³ When a second-in firm agrees to cooperate, it may have superior information about the early years of a cartel's formation. However, the DOJ may at its discretion concede to calculate affected sales for the second-in firm by using a later collusion-initiation date from the first-in firm. An example of such a deal is in a 2004 plea agreement with Bayer in the *rubber chemicals* cartel (DOJ 2004b). The agreement states that collusion began in July 1995, whereas the EU found that it commenced 18 months earlier, and U.S. civil plaintiffs allege that it started in the 1970s. This DOJ practice may disadvantage private plaintiffs in follow-on damages suits.⁶⁴

Second, cooperation discounting will be reduced in the case of "Penalty Plus" situations (Hammond 2006a:11). If a firm is guilty of price fixing in a second market, but was not aware of the offense at the time a plea was being negotiated for a first offense, then a consideration for a cooperation discount will be computed from the *middle* of the Guidelines range rather than the usual lower end of the range. For a company that is highly culpable, that amounts to a fine enhancement of 20% of affected sales.⁶⁵ A more serious penalty is applied if the DOJ learns that a convicted defendant was fully aware of the second violation but did not seek Amnesty Plus for it. Then the DOJ will seek "...a fine...at or above the Guidelines range" (*ibid.*).

Third-or-Fourth-Firm-In Fining Policy

The rationale for cooperation discounts for later arriving cartel participants seems to be similar to the reasons for rewarding second-in guilty pleaders. The DOJ policy is to award successively smaller percentage cooperation discounts to the third, fourth, and fifth firms in queue for leniency. That is, RANK, a firm's rank in the queue of guilty pleaders, ought to be negatively correlated with the percentage size of the cooperation discount. However, there are no specific percentage discounts mentioned in DOJ policy statements for these late arrivals.

For a cartel with few members, the proportion of all secrets that could be divulged to prosecutors declines sharply after the first firm confesses and tells all it knows. By the time prosecutors have two actively cooperating cartel members, they should be able to supply well over half of all discoverable facts about the cartel. Of course, a few cartels have only two members; those with three are more common; and those with four or five most common (Connor and Helmers 2006). Besides a company's rank in queue, the total number of price-fixing perpetrators is taken into account. This is reasonable, because a third-in firm is on

⁶³ This scenario may be fairly common, because the ringleader(s) of a cartel are not qualified for amnesty, and it is a ringleader that is most likely to have knowledge of the early years.

⁶⁴ The guilty pleas and sentencing memoranda ought to be regarded as *prima facie* evidence for civil litigation, but information about conspiracy dates, affected sales, or overcharges may be systematically understated, thus requiring plaintiffs to engage in more extensive discovery than otherwise would have been the case.

⁶⁵ If the culpability score is minimal, then the enhancement can be as low as 5% of affected sales.

average much less likely to add as much probative *new* inculpatory facts when the cartel consists of three members compared to, say, six members. Therefore, if there are N members of a cartel, the size of cooperation discounts should be more strongly negatively correlated with the ratio RANK/N than with RANK alone.⁶⁶

The principle of joint and several liability, which is crucial in private rights of damage, appears not to apply to criminal sanctions derived from the U.S. Sentencing Guidelines, which state that “[t]he volume of commerce attributable to an individual participant in a conspiracy is the volume of commerce done by him or his principal in goods or services that were affected by the violation”(USSC 2005). This is the first method of calculation fines mentioned above.

Whether joint liability might apply to fines imposed using the second method (based on damages) is another matter. Spratling gave an official speech that examined the DOJ’s procedures when determining ADM’s lysine fine. ADM was the third firm to agree to plead guilty in the lysine cartel and one of its ringleaders. Spratling says that the agency examined both the USSG fine range (\$54 to \$108 million) and the estimated loss suffered by victims to arrive at an appropriate fine. Rather than depend on a damages estimate prepared by DOJ experts, it used the treble-damages settlement that had been secured by the federal class about two months before ADM’s fine was announced. Moreover, the DOJ “...looked at the \$45-million civil settlement ...as an approximation of single damages caused by ADM and its co-conspirators” (Spratling 1997:6, emphasis in original). Note that the damages considered were not twice ADM’s share of the civil settlement of \$25 million, but rather followed the principle of joint and several liability. According to Spratling, the alternative fine statute led to a fine of \$70 million.⁶⁷

Spratling’s account is odd on several levels. First, huge defections by opt-outs had reduced the remaining class to a mere rump of its former self. Settlements including opt-outs were much higher. Second, the doubling of trebled damages seems both arbitrary and inconsistent with the statute’s plain language; in effect the doubling indicates that the DOJ had little confidence in the estimate of overcharges.⁶⁸ Third, the settlement covered only three of the five conspirators; the last two paid \$5 million more. Finally, Spratling indicates that the resulting fine is reasonable because it is larger than the fines paid by the first two co-conspirators to plead guilty; but these two had far smaller U.S. affected sales than did ADM.

⁶⁶ The variable RANK takes a value of 1 for an amnesty recipient and has a maximum value of N. For example, according to DOJ policy, RANK/N = 1/N will confer a large discount of up to 100%, 2/8 a discount of 40 to 60%, 2/2 a discount of around 30%, 3/8 less than 30%, and n/N close to zero

⁶⁷ Eichenwald (2000) and Lieber (2000) tell a rather different story about ADM’s fine determination. At first, the DOJ spoke publicly about demanding a \$400-million fine (and indicting five ADM executives). Williams and Connelly, ADM’s counsel, initially offered to pay a fine well below \$70 million (and no individual indictments). Over a period of a few weeks, it was pure horse-trading, with the final fine (and three ADM executives indicted) simply the result of convergence.

⁶⁸ The best estimate of U.S. overcharges is around \$80 million, not the \$15 million implied by the settlement (Connor 2007a). Thus under the joint and several principle, the fine ought to have been \$160 million.

Unwritten Determinants

The specific factors cited in DOJ policy statements as governing partial leniency may not exhaust the factors actually applied in practice. These unwritten rules may not be articulated because they are obvious applications of more general enforcement principles, because they are part of a long-standing tradition, or because prosecutors are inculcated into a pervasive culture and are unaware of how the culture impinges on their quotidian decision making.

A general goal of antitrust is specific or general deterrence. Specific deterrence suggests that those factors that contribute to high cartel overcharges or longevity should be positively correlated to the severity of fines. Thus, cartels with international membership or widespread geographic impacts outside the United States ought to receive smaller fine discounts (Connor and Bolotova 2006). Although cartel research does not support it, the DOJ for decades has singled out bid rigging for harsher treatment, especially when the victim is the federal government. An oft-mentioned principle of sentencing is that fines should be proportional to the seriousness of a crime. By implication, fines should not be affected by a defendant's national origin. Finally, it should be recognized that plea negotiations for corporations and their most culpable managers proceed simultaneously and may be jointly determined. Counsel representing corporate cartelists may consider agreeing to more executive carve-outs and greater penalties if prosecutors are willing to reduce corporate fines.

Other Jurisdictions

While this paper focuses on U.S. policies and procedures, it is worth noting that other antitrust authorities have partial leniency programs for cartel conduct violations.

Canada has had no written cartel fining guidelines, but prosecutors in Canada's Ministry of Justice evolved a fining policy that was applied consistently to a large number of price-fixing schemes since at least the mid 1990s. The first firm to agree to plead guilty may apply for "immunity".⁶⁹ If the first-in firm wants to cooperate but does not qualify for full immunity, it is

⁶⁹ "The [Canadian Competition] Bureau's information bulletin entitled 'Immunity Programme Under the Competition Act' sets out the Commissioner's policy with respect to the granting of prosecutorial immunity in exchange for cooperation in the investigation and prosecution of criminal activities under the Act... [T]he Bulletin, while binding on neither the Commissioner nor the Attorney General, is a useful indication of the Commissioner's actual practice with respect to immunity recommendations. The Bulletin states that the Commissioner will recommend to the Attorney General that immunity be granted to a party where the Bureau is unaware of an offence and the party is the first to disclose it or where the Bureau is aware of an offence and the party is the first to come forward before there is sufficient evidence to warrant a referral of the matter to the Attorney General, so long as (in either case) the party meets the following requirements: the party must take effective steps to terminate its participation in the illegal activity and the party must not have been the instigator or the leader of the illegal activity, nor the sole beneficiary of the activity in Canada; throughout the course of the Bureau's investigation and subsequent prosecutions, the party must provide complete and timely cooperation; where possible, the party must make restitution for the illegal activity; and if the first party fails to meet the requirements, a subsequent party that does meet the requirements may be recommended for immunity...Firms that are first in with evidence of a

likely to receive a fine of from 10% to 13% of Canadian affected sales; the second-in cooperator is likely to have a fine of 20%; and the third and later firms will likely pay fines of about 30% (Connor 2007: 80). That is, compared to late-arriving or uncooperative firms, the discount for being the first to cooperate will range from 55 to 100%, and the second-in firm can expect a 33% reduction.

Since at least 1994, the EC has offered partial leniency to cooperative cartel suspects for inculpatory information on the rest of the cartel (Harding and Joshua 1993: 169, footnote 72). The EU first issued a Leniency Policy in 1996 that attracted a moderate number of applicants. A revised leniency policy that emulated the parallel U.S. program was introduced in early 2002⁷⁰ and has been a great success.⁷¹ Successful applicants receive from 10% to 100% waivers of their fines.⁷² In addition, a notice about fining practices was issued in 1998 and significantly revised in late 2006 (Wils 2007b).⁷³ The Commission first figures the fine to be assessed, then considers a reduction required by its 10%-of-sales cap, and finally considers whether further cooperation discounts ought to be applied (*ibid.* p.39).

Concessions that might be granted to second-in or later violators under the 2006 Guidelines are handled by the EU's Leniency Notice (Wils 2007a: 31). Minimal cooperation, such as ceasing the violation as soon as the EU investigation begins, is worth at least a 10% reduction. The second firm to apply successfully for leniency is normally awarded a 30% to 50% fine discount, the third applicant a 20% to 30% discount, and subsequent applicants a 0% to 20% discount. The exact discount within these ranges is at the discretion of the Commission and depends on the degree of valuable additional probative information supplied to prosecutors. A thorough analysis of 1998-2007 EU decisions found that 61% of all cartelists received leniency reductions that on average reduced their fines by 38%; 21 firms (7.8%) got full immunity and 144 (53.5%) partial immunity that on average reduced their fines by 26.5% (Veljanovski 2007). Thus, the proportion of cartelists receiving partial leniency and the size of the discounts is far smaller in the EU than in the United States.

In 2007, the Korean Fair Trade Commission (KFTC) amended its discount policy for the second firm to confess and cooperate (KFTC 2008). It was raised from 30% to 50% of the stipulated

conspiracy where the Bureau does not have a provable case can expect full immunity. Subsequent firms are likely to be offered fine settlements of approximately 13%, 20% and 27% of the relevant volume of commerce, depending upon their position in the queue as well as other aggravating or mitigating factors.”(*Mondaq Business Briefing*, February 21, 2006).

⁷⁰ Harding and Joshua (2003: 165) note the U.S.-EU connection in amnesty policies. The Commission's 2002 *Leniency Notice* (EC 2002) was slightly revised in 2006 (EC 2006).

⁷¹ Indeed, it has resulted in an *embarrass de richesse*; during the program's first three years 2002-2005, 167 applications had been received, more than double the total number during 1996-2001 (Kroes 2006:3). This flood of confessions has called into question whether the EC's normal decision-making process will have to be abandoned in favor of an accelerated system of negotiated guilty pleas (Wils 2007a: fn 51).

⁷² Contrary to U.S. practice of declining to prosecute, EU amnesty recipients are cited in the EC's cartel decision, as are the reasons for granting amnesty.

⁷³ The 1994 and 1998 notices for cartel fines were issued to encapsulate practices already being followed by the EC for some time, but the other two were issued to announce major changes in fining practices.

administrative surcharge. Thus, a large manufacturer that is the second to apply for leniency and is otherwise qualified will pay 5% of the company's affected sales during the last three years of the cartel's operation instead of the normal 10% surcharge. There is no mention made of reductions for third-in firms.

6. Confronting the Data

Data Sources

Data were collected on cooperation discounts for 129 companies that were found guilty of fixing prices in 37 markets (see Tables A.1 and A.2). The aim of data collection was to find as many cases of reasonably precise fine discounts as possible. One definition of the fine discount D is

$$([1] D = ((MAX - Fine)/MAX))*100\%),$$

where MAX is the fine found at the upper end of the USSG fine range. Sufficient information was available to calculate 86 discounts below 100%. For alternative discount definitions, MIN (the lower end of the fine range) or double the overcharge can be substituted for MAX as the numeraire.

Two sources of information were employed. First, I combed the DOJ's Web site (www.doj.gov/atr) for all references to sentencing of indicted or convicted cartel members.⁷⁴ For the great majority of the sample, guilty-plea agreements are published. Most of these agreements contain information about the rationale for the DOJ's recommended sentence. In many cases, both guilty-plea agreements and separate sentencing memoranda were available. In a few cases sentencing details were mentioned in DOJ press releases or addresses by DOJ officials.⁷⁵ These documents reveal information on the dates of guilty-plea agreements, the *agreed* corporate affected commerce, *agreed* U.S. overcharges, the company's culpability score, or the USSG fine range.⁷⁶

⁷⁴ Most of this search was carried out in 2007. However, I found that the plea or sentencing agreements previously posted for several fined companies had been removed from the DOJ's Web site before 2007. For example, in September 2005 I had downloaded the informative 1995 plea agreement of Mine Equipment & Mill Supply, Inc., a member of the *Explosives* cartel, for a previous research project.

⁷⁵ Another *Explosives* case defendant was ICI; details on its sentencing were extracted from a September 8, 1995 speech by DOJ official Gary Spratling.

⁷⁶ By *agreed* sales or overcharge, I mean the figures that were stipulated by both parties as the result of negotiation between the defendant and the DOJ and that were used for sentencing purposes. Under some circumstances, the agreed figures may be less than the actual affected sales or overcharges; in other cases they are the same. Occasionally, the total cartel affected commerce may differ across members of the same cartel.

The DOJ's Web site posts documents dated as early as 1984, but the earliest sentencing memoranda date from 1995.⁷⁷ When a firm is convicted as a result of a guilty plea or by trial, courts place either a plea agreement or a sentencing agreement (or both) alongside its sentencing order in the case record, thus making it a public document. Posting may be delayed until sometime after the signing date until sentencing recommendations are finalized. For uncompleted conspiracy cases, guilty plea agreements of cooperating companies will await submission to the court until all guilty parties have pleaded guilty or received final judgment at trial.

It is likely that not all sentencing agreements are posted. One plausible explanation for missing memoranda is that the DOJ chooses to make easily accessible sentencing memoranda of defendants in high-profile cartels or in cases with precedential value. Less likely is the possibility that it chooses not to reproduce memoranda that are nonconforming or idiosyncratic relative to its own stated fine-discount guidelines. A third explanation is offered by a DOJ researcher. He suggests that the DOJ prepares a Probation Report for each convicted cartel, and these may be confidential because some of them contain information that is protected by privacy laws (e.g., the financial health of an entity or grand jury deliberations). Fourth, there appears to be some variation in public-posting practices across the regional offices of the DOJ. The San Francisco, Dallas, and Chicago offices appear to be more assiduous in posting than are the other regional offices. Finally, it is possible that *all* written sentencing memoranda that are posted; many courts do not require a separate sentencing document when a plea agreement is entered into the court's record.

During 1995-2007, 129 sentencing memoranda referring to companies guilty of criminal cartel conduct were posted on the DOJ's Web site (DOJ 2007).⁷⁸ During the same period, the DOJ filed Sherman Act Section 1 cases against 314 companies (DOJ 2007).⁷⁹ Thus, the sample of 129 agreements represents at least 41% of all price-fixing cases won by the DOJ since 1994.⁸⁰

Second, I supplemented information in the memoranda with data from a comprehensive sample of private international cartels (PICs) that has been developed over the past five years; details of

⁷⁷ The section of the DOJ Web site that contains the most plea agreements is titled "Antitrust Case Filings" (<http://www.usdoj.gov/atr/cases.html>). An Introduction to the list of documents states: "This section contains electronic versions of selected documents filed by the Division since December 1994." In other cases, I located additional plea agreements or sentencing memoranda outside this section using the DOJ Web site's search engine. For many corporate convicted price fixers, the Web site only reproduces an "Information," which is a skimpy document with no sentencing facts except the date of an indictment or plea agreement.

⁷⁸ Sentencing memoranda and plea agreements are usually published separately, but in some cases sentencing information is included in the plea agreement. I count the latter as sentencing memoranda. Variation in publication is determined by the preferences of particular courts, which is probably a random process.

⁷⁹ None of these sentences were imposed on cartels that were subject to the higher penalties contained in the 2004 amendment to the Sherman Act.

⁸⁰ The number of cases won in 1995-2007 is derived from the Antitrust Division's annual *Workload Statistics* (Connor 2008: Table 1). About 9% of these cases were civil indictments, leaving about 286 corporate criminal cases won. On the other hand, this paper's sample includes 13 amnesty recipients; it is not clear if such firms are counted by the DOJ as cases won.

the construction and content of the PICs data may be seen in Connor and Helmers (2006).⁸¹ This second data source was helpful in identifying total affected sales, total cartel overcharges, dates of guilty-plea agreements (rank order), defendants' market shares, penalties imposed on cartel managers, and identification of amnestied firms.⁸² For a few domestic conspiracies, similar data were collected with a search using the LexisNexis search engine.

A high proportion of the sample (83%) consists of *international* cartels (Table A3).⁸³ That is, for a given cartel, two or more of the corporate defendants were domiciled in different nations.⁸⁴ Indeed, a large proportion of the sample (76%) consists of members of *global* cartels, a term that encompasses international cartels that fixed prices both in North America and in at least one other continent. Global cartels are revealed by decisions of a competent non-U.S. antitrust authority, such as the European Commission, to fine or otherwise sanction⁸⁵ the same cartel.

Cartel Fine Discounts: Description of the Sample

A summary of the characteristics of the sample is shown in Table 2 (see Table A3 for ranges). All calculations are based on U.S. domestic affected sales.⁸⁶

To calculate the USSG discounts, one must have information on the culpability multiplier (see box). As precise information was missing for the majority of the observations, the author had to estimate the multipliers from information on the size and roles of the cartels participants. Most of these cartels and their U.S. prosecutions were widely publicized, which permitted fairly confident estimation of the recommended fine range. Table 2 shows that the average of the known multipliers and the estimated multipliers is quite close.

⁸¹ This publication ends with information collected up through mid 2005, whereas I was able to draw upon supplementary data entered up to 2007 that will eventually be published in a new edition of the 2006 working paper.

⁸² The DOJ does not reveal the identity of amnestied firms, unless the firms themselves make their amnesty status public. In many cases, a comparison of the list of defendants that were fined with the list of defendants in private antitrust damages cases makes the identity of amnesty recipients obvious.

⁸³ The DOJ does not reveal precisely this statistic. Since 1994, 84% of the convicted corporate price fixers with fines of at least \$10 million have been foreign companies, but most of the smaller defendants are not foreign (Connor 2008: Table 1).

⁸⁴ The DOJ classifies cartels as "foreign" or international if either one or more of the corporate defendants are from outside the United States or if one or more of the individual defendants indicted are non-U.S. citizens. The DOJ classifies the corporate recipients of fines of at least \$10 million according the country of the ultimate parent; from FY1990 to FY2007, 84% of these companies were foreign.

⁸⁵ Consent decrees or "warnings" are examples of non-monetary antitrust punishments.

⁸⁶ The plain language of the USSGs suggests that the DOJ has the authority to calculate fines on the basis of *global* affected sales rather than the current practice of employing only U.S. affected sales. Using the cartel member's global sales in the affected market rather than solely U.S. affected sales would multiply recommended fines of international conspiracies by a factor of three to ten.

Calculating Cartel Fine Discounts: Example of Odfjell Seachem's \$42.5 Million Fine

USSG Method 1

Affected sales (A/S) are \$217 million and base fine is 20% of A/S or \$43.4 million. The culpability score is 5 points for price fixing, plus 4 points for more than 1000 employees and involvement of high executives, and minus 2 points for full cooperation. A net score of 7 translates to minimum and maximum base-fine multipliers of 1.4 and 2.8. The USSG fine range is \$60.75 to \$121.5 million. Because of Odfjell's "substantial assistance" and second-in status, §8C4.1(b) warrants a leniency discount of \$18.25 million below the minimum (30%) or \$79 million from the maximum (65%) Guidelines' fine.

§3571 Method 2 (with no Joint and Several Liability)

Because the fine exceeds the then Sherman Act cap of \$10 million and because market A/S exceeds \$600 million, the DOJ and Odfjell "agreed that the double the gain or loss would exceed..." \$42.5 million. That is, the overcharge exceeds 9.8% of the company's A/S. The discount cannot be calculated until the true overcharge is known.

§3571 Method 3 (with Joint and Several Liability)

The cartel's overcharge exceeds \$21.25 million or 3.5% of the cartel's A/S. The discount cannot be calculated until the true overcharge is known.

Source: www.usdoj.gov/atr/cases/f201800/f201882.htm

Information is available on the sentencing of 129 corporate price fixers. Discounts can be calculated for 112 companies, of which 17 are amnestied (i.e., full leniency or 100% discounts) and the remaining 96 received partial leniency. The 129 companies were participants in 37 price-fixing schemes, ranging from the huge *Air Cargo* case to a case of bid-rigging on one contract for construction of a gas pipeline in Colorado in the early 2000s (Table A1). Total U.S. affected commerce was about \$80 billion.

The median overcharge of firms in the sample is 16 %, which is comparable to the median cartel overcharges since 1990 found in a larger sample (Connor and Lande 2005). Half of the convicted companies in the sample hailed from Europe or Asia and the other half from North America. Although most of the companies in this sample have never previously been caught engaging in price fixing, recidivism is rampant. Among the 47 recidivists, the mean number of cartel convictions is an extraordinary 8.5.⁸⁷ Fined companies can procrastinate in negotiating plea agreements. The median delay is 15 months from the date of the first-in firm.

⁸⁷ This number counts the number of cartels for which a company was judged by at least one antitrust authority in the world to be guilty of cartel behavior in 1990-2007; convictions by multiple authorities for the same product market are not double counted. The DOJ uses a more restrictive definition: it counts only U.S. convictions in the past ten years. The mean recidivism rate for the 41 companies meeting this more restrictive definition is 1.05.

Table 2. DOJ Partial Leniency: Summary Sample Description		
Number of cartels	37	
Cartels' U.S. affected sales (billion)	\$79.03 ^a	
Mean actual duration (months)	76.6	
Company observations:		
Total number of sentencing agreements:	129	
Amnesty recipients or no discount data	42	
Net number with partial leniency discounts	87	
Total U.S. affected market sales (billion), 116 obs.	\$25.1	
Median company affected sales (million), 118 obs.	\$62.5	
Total company U.S. overcharges (billion), 95 obs.	\$4.8	
Mean overcharge/affected sales (percent), 93 obs.	19.0%	
Median overcharge/affected sales (percent), 93 obs.	15.8%	
Continent of company headquarters (percent):		
Western Europe	39 (30%)	
Asia	27 (21%)	
United States and Canada	63 (49%)	
Mean maximum culpability score, 114 obs.	2.86	
Estimated by author, 74 obs.	3.04	
Exact (from sentencing memoranda), 40 obs.	2.53	
Mean plea delay from first-in (months) ^b	14.8	
Mean plea date from Jan. 1990 (months)	151.2	
Mean global recidivism score of 47 recidivists	8.5 ^d	
Mean "DOJ" recidivism score of 41 US recidivists	1.1	
Number of companies with officers carved out	56	
Mean number of officers carved out of 56 firms	2.44	
Mean prison, officers carved out, 30 firms (months)	17.8	
Median prison, officers carved out, 30 firms (months)	6.5	
Discounts within the Sentencing Guidelines range	17 (15%)	
Discounts below the minimum Guidelines range	86 (76%) ^e	
Discounts above the maximum Guidelines range ^f	10 (9%)	
Average discounts by method, excluding 100% and negative discounts:	<i>Mean</i>	<i>Median</i>
U.S. Sentencing Guidelines' minimum (N=69)	57.8%	61.5%
U.S. Sentencing Guidelines' maximum (N=113)	70.2%	77.0%
Alternative sentencing provision, no JSL ^c (N =57)	62.6%	70.5%
Alternative sentencing provision, with JSL ^c (N=70)	88.8%	93.8%

Average discount from the maximum USSG range by continent of ultimate parent excluding 100% and negative discounts:	<i>Mean</i>	<i>Median</i>
Asia	61.3%	63.3%
Europe	71.7%	78.4%
North America	74.5%	80.7%
a) Based on sub set of 32 cartels for which affected sales are known or estimated. b) In most cases the dates of the first firm to plead guilty are known exactly. For 12 of the cartels the first-in firm is the amnesty recipient, and in some of these cases the date of the amnesty must be inferred from the beginning of the grand jury investigation. c) JSL = joint and several liability d) For the entire sample of 129 companies, the mean is 3.0. e) Three observations are European companies that were members of the international choline chloride cartel; they were penalized in the EU, Canada, and by private plaintiffs but were not indicted by the DOJ; 13 were amnesty recipients. Omitting these 17 companies, there were 68 (or 73%) below the minimum. f) Excludes 17 instances of 100% discounts, of which 14 were amnesty recipients. Source: DOJ Cartel Fine Discounts spreadsheet dated 12-1-07.		

The average corporate fine discounts are of interest. Recall that a large positive discount is evidence of DOJ *leniency*, whereas small positive discounts or negative discounts are indicative of *relative severity* in cartel fines. Depending on the discount measure, negative discounts are observed for fines that exceed one end of the Guidelines' range; if a fine is inside the range, the discount calculated from the minimum of the range will be negative and the discount from the maximum end will be positive. If a fine exceeds the top end of the fine range, then both discounts will be negative numbers.⁸⁸

Of the 113 non-amnestied companies with data on fine discounts from the top of the range, only 15% received fines between the minimum and the maximum fine specified by the USSGs (Table 2). *More than three-quarters (76%) of the sample received cooperation discounts below the minimum specified by the Guidelines.* A relatively small number agreed to fines that exceeded the Guidelines maximum; a large majority of these cases are firms that were involved in bid rigging against the federal government and for which the "fine" includes substantial restitution. These exceptionally large penalties may reveal an unstated DOJ policy that applies particularly to bid rigging against the government.

Table 2 also shows the average discounts of up to 113 non-amnestied companies using four alternative bases of comparison. The most conservative calculation, based on the *minimum* of the Guidelines' range, median corporate discounts were about 62%. However, figured using the companies' *maximum* fine under the USSGs, the median discounts granted to these cartelists was 77%. Generally speaking, DOJ officials use the first measure when speaking about partial leniency.

⁸⁸ There are ten cases where the fine exceeds the upper end of the range.

Discounts can also be calculated using the “alternative sentencing provision,” also referred to as the double-the-harm standard. The size of the discount by this method was typically 71%. However, were the DOJ to apply the alternative sentencing statute allowing for *joint and several liability*, the average discount was 94%. Joint and several liability has the effect of prompting guilty parties to settle quickly, to pay larger penalties, and to increase cartel deterrence (Easterbrook 2005: 91, Easterbrook *et al.* 1980). If the principle of joint and several liability were to be applied in criminal fines, then the DOJ would calculate the base fine for a guilty party using the *cartel’s* entire affected commerce rather than the guilty party’s affected commerce. Because the typical price-fixing cartel⁸⁹ has five or six members, fines employing joint and several liability would be five or six times larger than current practice.

Also rather interesting is the national-origin pattern of discounting: as a group, Asian defendants on average received considerably smaller discounts than did European or North American firms. This finding will be explored in the statistical analysis below.

Besides companies, *individuals* were punished by the DOJ. Out of the 113 non-amnestied companies in the sample, 56 (50%) had one or more executives “carved out” of their guilty plea agreement; carved-out individuals do not receive immunity (Table 2). For those 56 companies, the average number of executives individually punished was 2.4.⁹⁰ The maximum number is seven for Samsung in the *DRAM* cartel case.

Of the 56 firms with carved-out employees, 30 were sentenced to prison. The maximum length of prison sentences is 99 months for three top officers of the Archer Daniels Midland Company, who were found guilty at trial in 1998 (Connor 2007a). The mean number of prison-months imposed per firm is 17.8, and the median is 6.5 months. For the remaining 26 companies with carve-outs, the indicted employees did not receive prison sentences. In some cases, the employees are fugitives abroad and will likely be imprisoned if apprehended (at least four cases), some are awaiting sentencing (four persons), and most of the rest were fined but not imprisoned. Many of employees fined but not imprisoned became cooperating witnesses for the DOJ.

Table 3 displays the cartel fine discounts by guilty-plea rank in queue (the independent variable RANK). As in Table 2, four alternative definitions of discounts are calculated. Discounts should decline as a firm’s guilty-plea rank increases. All of the qualified amnesty recipients were awarded full 100% discounts, and, as expected, the drop-off in discounts from first-in to second-in is quite large. However, a striking pattern is that the relationship between RANK and all four partial leniency discounts is not monotonic. For example, third-in firms receive higher discounts (greater leniency) than do the second-in defendants. The relationship of RANK to discounts will be analyzed statistically in the next section.

⁸⁹ The number of firms involved in bid-rigging schemes is generally much larger.

⁹⁰ The author has estimated the number of officers to be carved out for five defendants in *Air Cargo* and *Air Passenger* cases, based on press reports of executives fired from the airlines.

Table 3. Mean Discounts by Guilty-Plea Rank of Defendant (Excluding 100% and Negative Discounts)						
Discount Method:	Company Guilty-Plea Rank					
	1st, Full Amnesty	Partial Leniency (< 100% Discount)				
		1st	2nd	3rd	4th	5th+
<i>Percent</i>						
USSG minimum:	100	68.4	52.6	68.3	38.8	54.2
USSG maximum:	100	79.8	71.7	62.1	66.4	64.8
§3571, no JSL ^a	100	73.1	53.1	63.7	60.7	68.0
§3571, with JSL ^a	100	87.3	86.0	90.7	81.9	97.5
a) JSL = principle of joint and several liability applied, i.e., Guidelines are applied to U.S. <i>cartel</i> affected sales. NA = Not applicable Source: Spreadsheet dated April 2008						

A Basic Regression Model of Cartel Fine Discounts

Examining simple tabulations is a useful first step in understanding the factors that that explain some of the variation in DOJ fine-discounting policy. However, regression analysis is needed when multiple criteria are followed that result in a single numerical outcome. Regression analysis might explain why RANK is not consistently negatively related to cartel fine discounts. For example, across a sample of cartelists the variable RANK can only be high when N, the number of charged members, is also high. Because RANK and N are themselves are correlated, without regression techniques one cannot disentangle their independent effects.

Obviously, it is asking too much of a statistical model to explain a high degree of the variation in fine-discounting, because some explanatory factors are subjective or idiosyncratic (and, therefore must be omitted from the model), some are unmeasurable, and some objective factors can only be imperfectly measured (i.e., the model must use proxies for an ideal measure). Nevertheless, even a simple model may reveal whether DOJ practices are consistent with its stated policy or whether unstated policies may be operative.

Based on the review of DOJ explicitly stated policy in the sections above, the following general linear-additive model is to be used to attempt to explain the variation in percentage discounts D from the Guidelines maximum:

$$([2] D = a + b_1 \text{ RANK} + b_2 \text{ N} + b_3 \text{ DELAY} + b_4 \text{ DURATION} + b_5 \text{ OVERCHG} + b_6 \text{ RECIDIVISM} + b_6 \text{ PAY} + b_7 \text{ AMNESTY}), \text{ where}$$

RANK is the firm's rank order in the date of its guilty plea,

N is the number of guilty participants (ultimate parent groups only) in the cartel,

DELAY is the number of months a company delayed its plea beyond the first-in firm,

DURATION is the number of months the conspiracy lasted,⁹¹

OVERCHG is the cartel percentage,

RECIDIVISM is a continuous variable that counts the number of previously convicted cartels in which the company participated,

AMNESTY is a qualitative variable that takes a value of one if partial leniency was offered after amnesty was granted to another recipient of the cartel, and

PAY is a dummy variable that takes a value of one if the sentencing memorandum suggests that bankruptcy is possible or if it specifies permits installment payments.

The policy survey suggests the following hypotheses⁹² for the signs of the estimated regression coefficients (b_1 , b_2 , etc.). Recall that the impact of a factor that captures a harsh fining policy will be signaled by a smaller discount (i.e., a negative sign for that variable's regression coefficient) and vice-versa.

The value of a defendant's information and cooperation can be measured indirectly by its timeliness. A defendant's time rank in the queue of guilty plea agreements and the size of the cartel's membership are the factors most often cited in DOJ discounting policy statements. I expect the effects of **RANK** and **N** to be negative; alternatively, if RANK and N are positively correlated, then **RANK/N** will be substituted for RANK and N, with an expected negative sign. RANK/N has the disadvantage that the third-in in a three-member cartel gets the same score as the last to plea in an eight-member cartel.⁹³

In a sense, **DELAY** is a more precise version of RANK; it captures the degree of noncooperation with a cardinal measure of uncooperativeness rather than an ordinal measure. The range is wide: DELAY varies from zero (there are 18 first-in firms that are not amnesty

⁹¹ Sometimes the DOJ foreshortens the actual affected period in the plea agreements. At times I use a longer duration period contained in either adverse decisions of other antitrust authorities or in a U.S. damages suit that is decided favorably for plaintiffs (PIC 2007).

⁹² These are alternative hypotheses.

⁹³ Experiments with RANK*N and RANK*N squared in place of RANK/N were not fruitful.

recipients) to 120 months. DELAY ought to be negatively related to DOJ discounts because of the higher costs of investigating or negotiating with such firms.⁹⁴ Although the two variables are slightly different, it is likely that RANK and DELAY are close substitute measures and thus should not to be included simultaneously in a given regression.

The affected sales of defendants measured in nominal millions of dollars are the starting point for calculating *finés* under the USSGs (Connor and Lande 2005). Affected sales (A/S) is a loose proxy for the harm caused (OVERCHARGE) to buyers in the U.S. market. Nevertheless, the variable **CO A/S** may capture one of two countervailing *discounting* practices.⁹⁵ On the one hand, if the DOJ truly holds large, leading firms more culpable, then the coefficient of CO A/S will be negative; ringleaders and instigators tend to be the largest firms in the cartel. Heavier fines on the largest firms are consistent with the principle of general deterrence.⁹⁶ On the other hand, if the DOJ is reluctant or incapable of imposing record-shattering fines on the biggest cartelists, then the coefficient of CO A/S will be positive. The largest firms are likely to make the most formidable adversaries in trials. To obtain the cooperation of large and leading firms, the DOJ may habitually them with reward larger discounts.

RECIDIVISM is an aggravating factor that results in a two-point increase in the culpability multiplier; however, unlike the zero-one-two culpability score employed by the USSGs, the measure used here measures *degrees* of recidivism, goes back to the year 1990, and considers prosecutions made in the EU and other national jurisdictions.⁹⁷ A second more restrictive measure of RECIDIVISM was constructed that corresponds to the DOJ's stated policy of considering only U.S. convictions in the previous ten years. Of course, under either definition RECIDIVISM ought to be negatively related to awarded discounts figured under the USSGs (but possibly not under the other methods of fining).

DURATION of collusion ought to be negatively related to the size of cooperation discounts. However, it may be difficult to find an independent effect for DURATION, because fines are calculated either from a base fine that uses affected sales (A/S) or from the dollar overcharge. Under the USSG method, holding culpability constant, fines will positively correlated with DURATION; under the alternative fine statute, holding the percentage overcharge constant, fines will also be positively correlated with DURATION.

The presence of an **AMNESTY** recipient is a factor that diminishes the value of cooperation by all the subsequent partial leniency applicants. By definition, an amnesty recipient is the first-in firm to confess, and it must continue cooperating until the last remaining corporate participant has agreed to plea guilty or the case is closed. On average, prosecutors backed by an immunized

⁹⁴ Possibly companies may wish to delay resolving because the lack of prejudgment interest and time value of money reduces the real value of fines and settlements.

⁹⁵ These hypotheses also apply to the entire cartel's U.S. affected sales (MKT A/S), in billions of dollars.

⁹⁶ Preston and Connor (1992) determined that the DOJ followed this rule in antitrust enforcement generally.

⁹⁷ These data may be found in Connor and Helmers (2006). If a company is fined in two or more jurisdictions for the *same* cartel, the convictions are not double counted. That is, the recidivism variable counts the number of cartels in which a defendant has participated.

firm are in more powerful negotiating positions to extract high fines when they possess considerable inculpatory information about the later arrivals. Thus, the fact of amnesty has an expected negative effect on fine discounts.

A defendant's inability to **PAY** is a control variable for a policy that applies to all cartel fine decisions, not just cooperation discounts. It is a long-standing practice of courts to avoid causing bankruptcy or otherwise impairing a defendant's ability to remain a viable competitor after monetary sanctions are applied. This policy is particularly sensitive in the context of cartel cases, because the number of actual competitors is typically very small. To justify especially large discounts, sentencing memoranda usually have explicit language directed at the court about the ability to pay; many others permit installment payments for fines. In these two situations, **PAY** takes a value of one. Thus, **PAY** is a proxy for a constraint on prosecutors' ability to extract large fines from certain financially pressed defendants.

An Augmented Regression Model of Cartel Fine Discounts

Model 5.3 adds four explanatory to the mix. Here, a model is tested that includes additional factors not explicitly part of DOJ stated policy that might reasonably be expected to influence the fine discounts of corporate cartel violators. These variables test hypotheses from the legal-economic literature, from general theories of jurisprudence (such as proportionality in sentencing), or from policies that while not explicit are hinted at by DOJ practices. An augmented general model is shown as Equation [3]:

$$([3] D_i = a + b_1RANK/N + b_2ASIA + b_3EUR + b_4INTL + b_5BIDRIG + b_6TIME + b_8PRISON + b_7DELAY + b_9PAY + b_{10}DURATION),$$

where new variables include:

ASIA, a qualitative variable equal to unity if the defendant is Asia-based,

EUR, a qualitative variable equal to unity if the defendant is Europe-based,

INTL, a qualitative variable equal to unity if the cartel has members for multiple nations,

BIDRIG, a qualitative variable equal to unity if the cartel's conduct was principally bid rigging,

TIME, the date of the sentencing agreement in months after January 1990, and

PRISON, the number of months of prison imposed on executives employed by the corporate defendant during the affected period.

The geographic variables **ASIA** and **EUR** will test a notion proposed by British legal scholar V. Korah (1997), namely, that antitrust authorities would impose relatively harsher penalties

(smaller discounts) on firms headquartered outside their own jurisdictions.⁹⁸ Such a result could be observed if national favoritism is at work, if foreign companies or their counsel are less competent in dealing with antitrust rules (especially in knowing how to seek cooperation discounts), or if foreign companies as a class tend to be more culpable. Because North American companies are the reference group, if Korah's hypothesis is correct then one would expect either ASIA or EUR to display negative signs. An hypothesis contrary to Korah's would take into account the high standards of proof that are needed to convict alleged cartel members under the U.S. criminal-law regime and the enhanced difficulties of assembling extraterritorial documents and witnesses to prove guilt beyond a reasonable doubt. Thus, it is possible that the DOJ customarily offers greater incentives (larger discounts) to non-U.S. defendants that agree to cooperate with prosecutors.

The qualitative variables **INTL** and **BIDRIG** are inspired by evidence that international cartels have historically generated stronger price effects than domestic price conspiracies (Connor and Bolotova 2006). Since about 1993 (three years before the sample was drawn), greater emphasis in targeting international cartels became a stated policy of the DOJ (Connor 2007).⁹⁹ Similarly, antitrust officials in the 1980s were of the opinion that bid-rigging schemes were more harmful than ordinary price-fixing conduct, a belief that resulted in higher culpability scores in the USSGs for bid rigging cases (Connor and Lande 2005).¹⁰⁰ Therefore, for general deterrence purposes, DOJ prosecutors would be expected to be more resistant to granting larger discounts to defendants in these two types of cartels relative to the reference group (domestic, non-bid-rigging cartels).

TIME is a variable that ought to capture linear trends in DOJ discounting policies from January 1996 to December 2007. No policy changes can be detected in DOJ policy statements themselves, but there are numerous grounds for speculating that the general antitrust enforcement environment may have changed during these 12 years. The observations from 1994 to January 2001 fall within the Clinton Presidential administration, which developed a reputation for aggressive cartel enforcement. In January 2001, the new Bush II Administration took office and soon appointed several Antitrust Division officials to high policy-making positions. Political changes seem to have greater enforcement consequences in merger and monopoly enforcement than in cartels (Kovacic 2003). The negative effects of the attack of September 11, 2001 on Antitrust Division resources cannot be discounted (Adams *et al.* 2008). With more constrained resources, plea-bargain discounts might be expected to become more generous. To test for a shift between the two regimes, I create a qualitative variable **CLINTON**

⁹⁸ Korah's accusation was in fact directed to the EC, but it is plausible to extend the hypothesis to other antitrust authorities. Firms located in the antitrust authority's jurisdiction may be national champions, may have more political influence, may be more familiar with factors that earn clemency, or may be better advised by local counsel.

⁹⁹ A similar variable, **GLOBAL**, was tried in place of **INTL**. The former is based on whether the cartel operated across two or more continents. **GLOBAL** had a negative effect on **D**, but was weaker than **INTL**.

¹⁰⁰ Research that indicates that bid rigging is in fact less likely to generate above-average collusive price effects postdates this paper's sample (Connor and Bolotova 2006).

ADMIN for all plea dates after January 2001.¹⁰¹ Tougher enforcement would be revealed by a positive sign on **CLINTON**.

Finally, **PRISON** is included in order to test the possible trade-offs between corporate and individual cartel legal sanctions. As mentioned above, it is the DOJ's firm opinion that general deterrence is best served by lengthy prison sentences imposed on several of the top executives in a company that were the managers of the illegal cartel. Implicit in this view is the idea that for a given degree of cartel deterrence there is a trade-off between corporate monetary penalties and the number indicted employees and the severity of their individual penalties.¹⁰² In the context of actual partial-leniency plea negotiations, it is likely that counsel for corporate defendants place a subjective fine-equivalent value on each employee that the prosecutors initially indicate as candidates for carve-outs. There are two documented cases of corporate cartellists acting in just this way.¹⁰³ If it is correct that heavy prison sentences for company executives are rewarded with higher discounts for the employer, the sign on **PRISON** will be positive.

Regression Estimation Results: Discounts from the Guidelines' Maximum

The first set of regression estimates are shown in Table 5. These results ought to be of primary interest to defendants because they refer to the defendant's maximum liability. The sample tested is all 86 cartel members with no missing data that were recipients of partial leniency discounts.¹⁰⁴ Naturally, successful amnesty applicants are omitted because qualifying for amnesty is automatic; in a sense, other than monitoring compliance, there is no DOJ decision to be made.¹⁰⁵ Models 5.1 and 5.2 are runs of Equation [2], except that company affected sales dubs for **OVERCHARGE**.¹⁰⁶

Models 5.1 and 5.2 are constructed from the Basic Model (Equation 2). Model 5.1 poorly predicts discounts. **RANK** and **PAY** are highly significant variables and have the correct signs, but **DURATION** displays an incorrect sign. **RANK** is a better predictor than **N**.¹⁰⁷ **RECIDIVISM** displays a wrong sign but is insignificantly different from zero.

¹⁰¹ I am indebted to Larry White for this suggestion, made in his role as discussant at Session 60 of the 6th International Industrial Organization Conference.

¹⁰² In regression runs not shown, I substituted the number of employees carved-out in plea agreements for the prison-months variable. Neither was statistically significant.

¹⁰³ In the *Graphite Electrodes* case, a German ringleader firm paid a \$10-million personal fine for its CEO to stay out of perhaps 4 to 8 months of prison (Connor 2007a). In the *Lysine* cartel, the details of behind-the-scenes plea negotiations were reported by Eichenwald (2000: 508-511); defendant ADM traded away an additional \$65 million in order to save two executives (its Chairman and its President/CEO) from being indicted.

¹⁰⁴ Twenty companies were the first to plead guilty because there was no qualified amnesty applicant. The remaining 67 were the second-in or higher in plea rank.

¹⁰⁵ Only one amnesty awardee has had its amnesty status revoked by the DOJ in the history of the Program.

¹⁰⁶ There are missing observations for **OVERCHARGE**.

¹⁰⁷ When **N** is substituted for **RANK**, **N** is insignificant; when both are included, only **RANK** is negative and significant. **RANK/N** has the expected negative sign, but reduces the goodness of fit. **The non-significance of N**

Equation 5.2 is a full specification of all the measurable factors that constitute the DOJ’s written policy on partial leniency. The corrected coefficient improves slightly, but the variable RANK drops to insignificance. The estimated coefficient of the defendant’s affected sales has a significant, positive effect on discounts; oddly, larger companies receive higher discounts than do smaller ones, a result contrary to the what general deterrence would suggest. None of the remaining determinants (RECIDIVISM, DELAY, and AMNESTY) are statistically significant. Thus, it appears that recidivists do not receive lower fine discounts from guilty plea negotiations,¹⁰⁸ nor does delay in pleading guilty add to a defendant’s penalty. The idea that being second-in after an amnesty recipient is more or less valuable than being second-in after a partial-amnesty recipient is not supported. On the whole, the written DOJ policy explains at most 23% of the variation in discounts.

The regression results for the augmented policy model are shown as 5.3 in Table 5. The dependent variable is the fine discount from the maximum of the Guidelines’ range. The augmented model (Equation 3) has the same degrees of freedom as Model 5.2, yet its predictive ability is far better: 39% of the variation in discounts is explained. As in the Basic Model, RANK is negatively related to discount (RANK/N fits slightly better than RANK alone), and DURATION again displays a significant positive sign. PAY, however, drops to insignificance. Four new variables contribute more than half of the explained variation in discounts. As expected, defendants in international cartels and defendants in bid-rigging schemes receive significantly harsher sentences (lower discounts). For the unlucky few that participated in an international bid-rigging cartel, their discounts, *ceteris paribus*, were a breathtaking 42 percentage points lower than similarly situated defendants in classic domestic cartels.

Table 5. Estimation Results Explaining Discounts from Maximum USSG Fines

Model Number	5.1	5.2	5.3	
Explanatory Factors:	<i>Regression coefficient (standard error)</i>			
Intercept	69.40*** (5.92)	60.88*** (7.68)	98.06*** (10.16)	
RANK	-3.36** (1.54)	-1.989 (1.751)		
RANK/N			-15.71* (7.842)	
DURATION	0.078** (0.039)	0.076** (0.039)	0.078** (0.034)	
PAY	14.09**	13.29**	3.442	

may be attributable to the fact that it is positively correlated with BIDRIG, which is negatively related to cooperation discounts.

¹⁰⁸ The particular measure used is the DOJ’s own definition of recidivism (a U.S. price-fixing conviction within the past ten years). Substituting the “Global” measure (the number of convictions anywhere in the world) results in an even weaker fit.

	(6.81)	(6.891)	(6.149)	
RECIDIVISM	3.17	1.793		
	(4.71)	(4.897)		
DELAY		-0.117		
		(0.144)		
AMNESTY		-5.070		
		(5.680)		
LN CO. A/S		2.366**		
		(1.288)		
INTL			-28.29***	
			(7.112)	
BIDRIG			-13.507***	
			(5.543)	
ASIA			-14.243***	
			(5.266)	
CLINTON ADMIN			12.93***	
			(4.357)	
General Statistics:				
R ²	0.188	0.2325	0.3926	
Corrected R ²	0.148	0.1637	0.3381	
F	4.684***	3.376**	7.202***	
Durbin-Watson Stat.	1.748	1.883	1.984	
Observations ^d	86	86	86	
Note: superscripts ***, **, * represent statistical significance at the 1%, 5%, and 10% levels, respectively.				
d) Observations of all companies with less than full amnesty.				

In a regression not shown that is otherwise identical to Model 5.3, TIME (the date of the guilty plea) was significantly negative (at the 5% level). Because the sentencing memoranda span only two presidential administrations, I substituted an alternative measure of time called CLINTON ADMIN for plea agreements signed 1994-January 2001. This substitution greatly improves the predictive ability of the Augmented Model. CLINTON ADMIN is positive and significant at the 1% level or better; not only did the corrected coefficient of determination rise by three percentage points, but also the coefficients of all the other independent variables were unchanged. On average, the 34 sentencing agreements negotiated by Clinton officials resulted in fine discounts 15 percentage points higher than the 52 pleas concluded by the Bush II administration.

The significant negative coefficient on the ASIA dummy variable is discussed in the next section.

Regression Estimation Results: Discounts from the Guidelines' Minimum

Table 6 displays the regression estimate for three models that have fine discounts calculated from the *minimum* end of the Guidelines’ range. Public statements of DOJ officials about discounts are always framed with the low end as the reference point (see sources in Table 1).¹⁰⁹ The sample used for the regressions reported in Table 6 has 69 sentencing agreements with discounts below the minimum mandated fine and no missing data. In interpreting the size of the coefficients, keep in mind the fact that the mean discount calculated in this manner is only 59%, as compared to the mean discount of 70% from the maximum (Table 2).

Model 6.1 is a simple Basic Model corresponding to Model 5.1. As before, PAY is significantly positive and DURATION is inexplicably positive. RANK has the expected sign but is not significantly below zero. The explanatory power is poor. The addition of all seven of the explanatory factors in version 6.2 of the Basic Model improves nothing.

Augmented Models 6.3 and 6.4 (comparable to Basic Model 5.3) are in most respects the best regression results. These models explain more than half of the variation in discounts from the minimum of the Guidelines ranges, suggesting that the prosecutors’ vision of the appropriate starting point for negotiations prevails. As before, variation in the four or five “unwritten policy” factors (INTL, CLINTON ADMIN, GLOBAL TYPE, PRISON, and BIDRIG) collectively contribute more than half to the coefficient of variation. There are no signs of econometric estimation problems.

Consistent with overt DOJ policy statements, RANK in date of pleading has a large impact on a defendant’s fine discount. To illustrate from Model 6.3, let us compare a first-in firm that pleads guilty in a given cartel with the eighth-in: the former typically receives a discount that is 30.4 percentage points higher than the former. Recall that this difference is calculated from the

Model Number	6.1	6.2	6.3	6.4
Explanatory Factor:	<i>Regression coefficient (standard error)</i>			
Intercept	51.475*** (8.304)	53.87*** 12.734	73.00*** (9.438)	82.967*** (12.46)
RANK	-2.536 (2.239)	-2.234 (2.663)	-4.349** (1.954)	-3.970** (1.971)
DURATION	0.097** (0.053)	0.098** (0.054)	0.126*** (0.042)	0.113*** (0.044)
PAY	23.60*** (9.139)	24.81*** (9.426)	8.772 (7.773)	9.448 (7.762)
RECIDIVISM	0.029 (0.653)	0.222 (0.710)		
DELAY	12.464	0.095	0.429***	0.358**

¹⁰⁹ In private conversations I have had, the same tendency is exhibited.

	1.971	(0.207)	(0.170)	(0.179)
AMNESTY	0.044	-4.796		
	7.762	(8.338)		
LN CO. A/S		-0.737		
		(2.101)		
INTL			-29.897***	-32.34***
			(10.487)	(10.637)
CLINTON ADMIN			27.50***	23.96***
			(6.422)	(7.028)
GLOBAL TYPE			-12.054*	-14.71*
			(8.815)	(9.047)
PRISON			-0.116	-0.163
			(0.140)	(0.145)
BIDRIG				-10.191
				(8.731)
General Statistics:				
R ²	0.2101	0.2190	0.5094	0.5214
Corrected R ²	0.1607	0.1294	0.4440	0.4484
F	4.256**	2.444	7.787***	7.1424***
Durbin-Watson Stat.	1.702**	1.711**	1.847	1.854
Observations ^d	69	69	69	69
Note: superscripts ***, **, * represent statistical significance at the 1%, 5%, and 10% levels, respectively.				

minimum fine, not the twice-as-large maximum fine.¹¹⁰ Ability to pay (PAY) has the expected positive sign, but falls to insignificance in the Augmented Model.¹¹¹ As in all the alternative models, DURATION takes an unexpected positive sign. Oddly, participants of more durable cartels are rewarded with higher discounts.

The five variables included in the Augmented Models 6.3 and 6.4 are generally significant explanatory factors. Guilty members of international-membership cartels or globally-dispersed cartels are more heavily sanctioned than participants of domestic price-fixing conspiracies.¹¹² Clinton-era plea bargains resulted in considerably harsher fines. BIDRIG also has a negative effect on discounts, but due to collinearity with INTL and GLOGAL it is not statistically

¹¹⁰ Substitution of RANK/N for simple RANK in Model 6.3 in a regression not displayed causes the goodness of fit to decline slightly and the statistical significance of RANK/N to fall to 10% or better. Nevertheless, the change in the discount between the highest (1.00) and the lowest (0.1) values of RANK/N is 15.9 points.

¹¹¹ There may be collinearity introduced into Model 6.3 with the inclusion of INTL or GLOBAL, though the simple correlation coefficients do not indicate that it is severe (0.36 and 0.35, respectively).

¹¹² The variables INTL and GLOBAL are highly positively correlated (+0.72), which is not unexpected because global cartels are almost always also international cartels.

significant in Model 6.4. The variable PRISON has a negative sign and is on the borderline of 10% statistical significance.¹¹³ Had PRISON been significant, that would have meant that when corporate cartellists agree to carve out some of their managers to face prison sentences, their employer may actually face a *higher* fine. The complementarity of company and individual cartel sanctions is not intuitively reasonable.

In regressions explaining variation in discounts from the maximum fine, a qualitative variable representing Asian firms was significantly negative (Model 5.3). This finding is rather disconcerting. Proportionality demands that the nationality of criminals should have no effect on cooperation discounts. According to this result, the typical Asian price fixer obtains a 14-percentage-point *lower* discount than comparable U.S.; European firms receive the same treatment as North American defendants. However, the effect of ASIA on partial leniency is sensitive to the measurement of the dependent variable. When the dependent variable is the discount from the minimum Guidelines-mandated fine, ASIA is no longer significant.¹¹⁴ Inevitably, Asia-headquartered firms are members of international cartels with global geographic reach. Thus, according to Models 6.3 and 6.4 they are punished with 42% to 47% lower discounts by virtue of their membership in international and global cartel – but so are similarly situated North American or European firms.

Nevertheless, the strong negative sign of ASIA in Model 5.3 cannot be entirely dismissed, because the alternative discount measure is a plausible one. It is difficult to know from this result whether national-origin discrimination results from an unwritten DOJ policy or whether some characteristic of Asian defendants not already in the model tested may be responsible. Experts in business communication have detected significant differences between Asian and North American business negotiation styles (Yamada 1997).¹¹⁵ Asian firms are often characterized as operating in a domestic business culture that has not internalized or accepted the antitrust idea. To some degree one would expect that a disregard for the antitrust laws of the

¹¹³ Two other surrogates for the size of managerial sanctions that were tested are not significantly different from zero: the number of officers of the *company* indicted (“carved-out”) and the total number of individuals indicted that were employed by *all the companies* in the cartel.

¹¹⁴ ASIA was added to Models 6.3 and 6.4 but its coefficient was essentially zero.

¹¹⁵ For example, the following passage discusses the more informal relationships among Japanese businesses as compared to more formal contractual relationships among American businesses:

”...[I]n selecting their best business alliance, American companies do not necessarily rely on an established group of associated firms. Instead, an organization is selected from a larger pool of competitive proposals. What's more, when the term for the relationship expires, the process repeats itself so that unprofitable relationships are terminated and replaced by those that are more competitive...Japanese companies, on the other hand, are less likely to sever relatively unproductive relationships because of the belief that internal competition weakens and distracts, and is ultimately less cost-effective than relegating unproductive relationships to the back burner. In short, *erabi* [choice], often formally upheld in a business contract, defines an agreement among individuals to exercise their right to make choices. *Awase* [adapting], on the other hand, is a tacit agreement among Japanese adapters to match each other in an ensemble...[Japanese “contracts”] like a *mitsumorisho* [a written estimate] is often pro-forma. Instead of the negotiation of individual choices, the Japanese depend on each other or mutual adaptation in *awase*” (Yamada 1997: 39).

United States might show up in being relatively late to plead guilty or in a tendency to delay coming to terms with DOJ prosecutors, but these indicators are already accounted for in this paper's model. One must look for an explanation of the poor record of Asian defendants to wrest high discounts in factors omitted from the models tested. Perhaps Asian firms tend to choose legal counsel that are not the best equipped to handle antitrust matters, or perhaps their legal counselors are eminently well qualified but find it difficult to communicate effectively the dire consequences of rejecting good early offers of cooperation discounts from prosecutors. There may be other cultural gaps, such as discomfort with cooperating with prosecutors or an unreasonable fear of loss of proprietary business information, that cannot be captured by economic variables.

7. Summary and Policy Discussion

This paper models a key outcome of criminal plea bargaining in price-fixing cases. It determines U.S. Department of Justice policies on cooperation discounts on fines for corporate criminal price-fixing violations and develops and tests a statistical model to explain the variation in cartel-fine discounting practices of the DOJ. Discounts are figured relative to either the minimum or maximum liability mandated¹¹⁶ by the U.S. Sentencing Guidelines.

The sample consists of 129 corporations that were fined for hard-core cartel behavior between 1994 and 2007 and for which reasonably accurate data on recommended fines can be found. The mean average discounts from the minimum and maximum prescribed fines are 58% and 70%, respectively. Many of the firms in the sample are highlighted in speeches by DOJ officials as exemplars of successfully and fairly fined defendants. After excluding companies that received full amnesty, the sample employed for testing the multiple regression models consists of sentencing details on 86 criminally convicted companies. The best regression model explains 52% of the variation in partial-leniency discounts from the minimum; for discounts from the maximum liability, only 39% is explainable.

The principal findings are as follows. As one would expect from DOJ policy statements, the DOJ does reward the second-in, third-in, and successive firms that agree to plead guilty with progressively smaller cooperation discounts. Each drop in rank in queue results in a smaller discount of three to four percentage points. Furthermore, irrespective of rank in queue, the longer it takes to negotiate a deal, the lower a defendant's cooperation discount; ten month's delay after the first-in firm costs a firm about four percentage points in potential discounts. While DOJ fines are supposedly motivated by concerns for general deterrence, there is no evidence that firms causing the largest harm are punished more severely.¹¹⁷

¹¹⁶ In January 2005, a decision of the Supreme Court made the Guidelines advisory to judges, but it is DOJ policy to base its recommendations on the Guidelines. Only about 29% of this paper's sample is affected by this decision.

¹¹⁷ In one regression, the reverse was true.

Cooperation discounts are strongly related to certain characteristics that go beyond individual defendant features. Participants in international conspiracies, in geographically global cartels, or in bid-rigging schemes receive far lower discounts than participants in domestic price-fixing violations. Although these factors are believed to be related to cartels with greater harm, none of these factors is explicitly included in DOJ policy statements. Partial leniency discounts were higher in the Bush II than in the Clinton administration.

Other findings seem to point to an inconsistent application of the DOJ's public policy on rewarding cooperation of guilty cartel participants. First, participants in durable conspiracies seem to be rewarded with larger discounts. Second, more severe treatment of recidivists cannot be detected in the sample. Third, a prior confession by a successful amnesty applicant makes no difference in the discounts offered to subsequent co-conspirators. Fourth, there is some inconsistent evidence¹¹⁸ that Asian defendants receive lower cooperation discounts than corporate defendants from Europe or North America. Finally, DOJ officials frequently emphasize their conviction that individual penalties are more efficacious in deterring cartel formations than are corporate fines. One might infer that as more officers are carved out for criminal punishments or as their incarceration increases, their former employer's fines are less harsh. This study finds no evidence of substitution between corporate and individual penalties. Contrary to DOJ claims that cartel fine discounts are "individualized," partial leniency decisions are in fact mostly strongly predicted by timing and cartel-wide characteristics.¹¹⁹

Most evidence points to under deterrence of current penalties on cartels, particularly the international ones that comprise the bulk of this study's sample. It is likely that the level of U.S. fines contributes to under deterrence by building in expectations on the part of would-be cartelists for large cooperation discounts. Moreover, excessive discounting of cartel fines undermines the effectiveness of corporate partial leniency programs by reducing the monetary value of early cooperation. The DOJ and the U.S. Sentencing Commission should re-examine federal sentencing guidelines and at a minimum toughen the fines for defendants from durable cartels and with histories of recidivism.

¹¹⁸ This finding applies to discounts from the maximum, not from the minimum of the Guidelines' range.

¹¹⁹ A slightly more sophisticated phrasing of this argument is that cartel fines are wholly driven by the goal of general deterrence and very little by the goal of specific deterrence.

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APPENDIX TABLES

Table A1. Cartels Sampled					
<i>No.</i>	<i>Name</i>	<i>Geog. Scope</i>	<i>Member -ship</i>	<i>Bid Rigging</i>	<i>Affected Sales (\$mil.)</i>
1	Citric acid	GLOBAL	INTL		1465
3	Lysine	GLOBAL	INTL		495
14	Choline chloride (B4)	NO AM	INTL		529
19	Niacin/Vitamin B3	GLOBAL	INTL		254
27	Vitamins, major	GLOBAL	INTL		5971
64	Carbon cathode block	GLOBAL	INTL		20
65	Carbon Electrical Products	GLOBAL	INTL		600
70	Diamonds, industrial	GLOBAL	INTL		1495
71	DRAM to selected OEMs	GLOBAL	INTL		4748
75	Graphite Electrodes	GLOBAL	INTL		1750
77	Graphite, isostatic products	GLOBAL	INTL		425
82	Nitrile rubber	GLOBAL	INTL		86
83	Organic peroxides	GLOBAL	INTL		1200
87	Parcel chemical tankers	GLOBAL	INTL	X	600
90	Polychloroprene rubber	GLOBAL	INTL		826
91	Rubber chemicals	GLOBAL	INTL		2700
96	Stamp auctions 1	US	INTL	X	1744
116	Hydrogen Peroxide	GLOBAL	INTL		262
181	Construction, USAID in Egypt	AFRICA	INTL	X	300
192	Explosives Mfg., Texas Group	US	INTL	X	114
224	Moving & storage, Dept. of Defense	GLOBAL	INTL	X	28
237	Polyester Staple fiber	NO AM	INTL		1397
238	Construction, Gas Pipelines, Colorado	LOCAL	INTL	X	0.67
239	Polyols, polyether	NO AM	INTL		628
349	Air cargo	GLOBAL	INTL		50,286
350	Air passenger	GLOBAL	INTL		NA
457	E-Rate federal Internet program, 6 states	LOCAL	INTL	X	67.9
988	Construction, NASA rocket launch pads	US		X	3.77
989	Roofing, Albany, New York	LOCAL		X	1.49
991	Periodicals distribution, NY & PA	LOCAL	INTL		NA
992	Explosives, distributors in PA, OH, and AK	LOCAL	INTL	X	NA
993	Periodicals distribution, Texas	LOCAL			NA
994	Periodicals distribution, Puerto Rico etc.	LOCAL			NA
995	U.S. Postal Service auctions, Atlanta, GA	LOCAL		X	NA
996	Linen supply service, NYC Metro area	LOCAL		X	500
997	Scrap metal dealers, Northeast Ohio	LOCAL		X	100
999	Ready mixed concrete, Indianapolis	LOCAL		X	430

Total	Total	37	29	14	79,027

Table A2. Sentencing Memoranda Sampled (129)					
<i>No.</i>	<i>Company Name/Parent</i>	<i>HQ</i>	<i>Geog. Scope</i>	<i>Member -ship</i>	<i>Bid Rig- ing</i>
1.1	ADM	US	GLOBAL	INTL	0
1.2	Haarmann & Riemer/Bayer	DE	GLOBAL	INTL	0
1.3	Hoffmann-La Roche	CH	GLOBAL	INTL	0
1.4	Jungbunzlauer	DE	GLOBAL	INTL	0
1.5	Cerestar/Eridiana	FR	GLOBAL	INTL	0
3.1	ADM	US	GLOBAL	INTL	0
3.2	Ajinomoto	JP	GLOBAL	INTL	0
3.3	Kyowa Hakko	JP	GLOBAL	INTL	0
3.4	Sewon/Miwon	KO	GLOBAL	INTL	0
3.5	Cheil	KO	GLOBAL	INTL	0
14.1	Chinook Group	CA	NO AM	INTL	0
14.2	DuCoa	US	NO AM	INTL	0
14.3	Bioproducts/Mitsui	JP	NO AM	INTL	0
14.4	Akzo Nobel	NL	NO AM	INTL	0
14.5	BASF	DE	NO AM	INTL	0
14.6	UCB	BL	NO AM	INTL	0
19.1	Degussa-Huels	DE	GLOBAL	INTL	0
19.2	Nepera	US	GLOBAL	INTL	0
19.3	Reilly Industries	US	GLOBAL	INTL	0
19.4	Lonza	CH	GLOBAL	INTL	0
27.1	Hoffmann-La Roche	CH	GLOBAL	INTL	0
27.2	BASF	DE	GLOBAL	INTL	0
27.3	Takeda Chemicals	JP	GLOBAL	INTL	0
27.4	Eisai	JP	GLOBAL	INTL	0
27.5	Rhone-Poulenc/Aventis	FR	GLOBAL	INTL	0
27.6	Daiichi	JP	GLOBAL	INTL	0
27.7	E. Merck	DE	GLOBAL	INTL	0
64.1	Anchor Industrial Products	UK	GLOBAL	INTL	0
64.2	Nippon Electrode	JP	GLOBAL	INTL	0
64.3	Carbone Savoie/ Carbone-Lorraine	FR	GLOBAL	INTL	0
64.4	VAW Carbon	DE	GLOBAL	INTL	0
65.1	Morgan Crucible	UK	GLOBAL	INTL	0
70.1	De Beers Centenary Ltd.	ZA	GLOBAL	INTL	0
71.1	Infineon (formerly Siemens)	DE	GLOBAL	INTL	0
71.2	Nanya	TW	GLOBAL	INTL	0
71.3	Mitsubishi	JP	GLOBAL	INTL	0
71.4	Hynix	KO	GLOBAL	INTL	0

71.5	Samsung	KO	GLOBAL	INTL	0
71.6	Elpida	JP	GLOBAL	INTL	0
71.7	Micron	US	GLOBAL	INTL	0
75.1	Carbide Graphite	US	GLOBAL	INTL	0
75.2	Showa Denko	JP	GLOBAL	INTL	0
75.3	UCAR Intl.	US	GLOBAL	INTL	0
75.4	SGL AG	DE	GLOBAL	INTL	0
75.5	Tokai Carbon	JP	GLOBAL	INTL	0
75.6	SEC Corp.	JP	GLOBAL	INTL	0
75.7	Nippon Carbon	JP	GLOBAL	INTL	0
75.8	Mitsubishi	JP	GLOBAL	INTL	0
77.1	Carbone of America/Carbone-Lorraine	FR	GLOBAL	INTL	0
77.2	Toyo Tanso USA/Toyo Tanso	JP	GLOBAL	INTL	0
77.3	Ibiden	JP	GLOBAL	INTL	0
82.1	Crompton Corp	US	GLOBAL	INTL	0
82.2	Bayer AG	DE	GLOBAL	INTL	0
82.3	Zeon Chemicals	JP	GLOBAL	INTL	0
83.1	Crompton Corp.	US	GLOBAL	INTL	0
83.2	Degussa UK Holdings	DE	GLOBAL	INTL	0
83.3	Elf Atochem/Total SA	FR	GLOBAL	INTL	0
87.1	Stolt-Nielsen	UK	GLOBAL	INTL	1
87.2	Odfjell	NO	GLOBAL	INTL	1
87.3	Jo Tankers	NL	GLOBAL	INTL	1
90.1	DuPont Dow Elastomers	US	GLOBAL	INTL	0
90.2	Syndial/Enichem/ENI	IT	GLOBAL	INTL	0
90.3	Uniroyal/Crompton	US	GLOBAL	INTL	0
91.1	Crompton	US	GLOBAL	INTL	0
91.2	Flexsy/Akzo Nobel	NL	GLOBAL	INTL	0
91.3	Bayer	DE	GLOBAL	INTL	0
96.1	Earl P.L. Apfelbaum, Inc.	US	US	INTL	1
116.1	Akzo Nobel	NL	GLOBAL	INTL	0
116.2	Solvay	BL	GLOBAL	INTL	0
116.3	Anonymous/Degussa?	DE?	GLOBAL	INTL	0
181.1	American Intl. Contractors	US	AFRICA	INTL	1
181.2	Phillip Holtzmann AG	DE	AFRICA	INTL	1
181.3	ABB AG	CH/SW	AFRICA	INTL	1
192.1	ICI Explosives/ICI	UK	US	INTL	1
192.2	Dyno Nobel/Norsk Hydro	NO	US	INTL	1
192.3	Mine Equip. & Mill Supply/Norsk Hydro	NO	US	INTL	1
192.4	Explosive Technologies Intl.	US	US	INTL	1
192.5	Austin Powder Co./ICI	US	US	INTL	1
224.3	Cartwright International Van Lines	US	GLOBAL	INTL	1
224.4	Allied Freight Forwarding	US	GLOBAL	INTL	1
224.5	Executive Relocation International	US	GLOBAL	INTL	1
224.6	Ryan's World Inc.	US	GLOBAL	INTL	1
224.7	Air Van Lines International	US	GLOBAL	INTL	1
225.8	Lift Forwarders Inc.	US	GLOBAL	INTL	1
237.1	DAK/ Du Pont	US	NO AM	INTL	0
237.2	KoSa	LUX	NO AM	INTL	0
238.1	Flint Energy	CA	LOCAL	INTL	1

239.1	Bayer Corp./Bayer AG	DE	NO AM	INTL	0
349.1	Korean Airlines	KR	GLOBAL	INTL	0
349.2	British Airlines	UK	GLOBAL	INTL	0
349.3	Qantas Airways	AU	GLOBAL	INTL	0
350.1	Korean Airlines	KR	GLOBAL	INTL	0
350.2	British Airlines	UK	GLOBAL	INTL	0
457.1	NEC-Business Network Solutions	JP	LOCAL	INTL	1
457.2	Inter-Tel Tech./Mitel Networks	CA	LOCAL	INTL	1
457.3	NextiraOne/Black Box Corp.	US	LOCAL	INTL	1
457.4	Premio Inc.	US	LOCAL	INTL	1
457.5	Howe Electric, Inc.	US	LOCAL	INTL	1
457.6	ADJ Consultants:	US	LOCAL	INTL	1
988.1	Woodson & Associates	US	US		1
989.1	Weatherblock Roofing	US	LOCAL		1
991.1	Empire State News/Source Interlink.	US	LOCAL		0
991.2	New York Periodical Distributors Inc.	US	LOCAL		0
992.1	Amos L. Dolby Co.	US	LOCAL	INTL	1
992.2	D. C. Guelich Explosive Co.	US	LOCAL	INTL	1
992.3	Douglas Explosives, Inc.	US	LOCAL	INTL	1
992.4	Hilltop Energy, Inc.	US	LOCAL	INTL	1
992.5	Kesco, Inc.	US	LOCAL	INTL	1
992.6	LaRoche Industries Inc.	US	LOCAL	INTL	1
992.7	Nutrite Corp/Norsk Hydro.(1/96 on)	NO	LOCAL	INTL	1
992.8	Ren-Loi Inc.	US	LOCAL	INTL	1
993.1	Rack Shop	US	LOCAL		0
993.2	C & S News	US	LOCAL		0
994.1	Island Periodicals	US	LOCAL		0
995.1	Denny's Pay-Less Grocery	US	LOCAL		1
996.1	White Plains Coat and Apron	US	LOCAL		1
996.2	Cascade Coat and Linen	US	LOCAL		1
996.3	Polo Linen Supply	US	LOCAL		1
996.4	Sea Crest/Central Laundry Service	US	LOCAL		1
996.5	Best Metropolitan Towel and Linen	US	LOCAL		1
997.1	Bay Metal Inc.	US	LOCAL		1
997.2	Bluestar Metal Recycling Co.	US	LOCAL		1
997.3	M. Weingold & Harry Rock Asso.	US	LOCAL		1
999.1	Irving Materials	US	LOCAL		1
999.2	Builder's Concrete	US	LOCAL		1
999.3	Carmel Concrete	US	LOCAL		1
999.4	Beaver Materials a/k/a MA-RI-AL	US	LOCAL		1
999.5	Shelby Gravel	US	LOCAL		1
999.6	Larry L. Lee	US	LOCAL		1

Source: all price-fixing sentencing memoranda from 1990 to 2007 on www.usdoj.gov/atr, press reports, and PICs spreadsheets.

Variable	Mean	Min.	Max.	Sum
MIN USSG DISCOUNT (%) ⁶⁰	57.79	0.18	99.52	--
MAX USSG DISCOUNT (%) ⁴²	70.20	0.67	99.76	--
§3571 DISCOUNT no JSL (%) ⁷²	62.60	0	99.50	--
§3571 DISCOUNT with JSL (%) ⁵⁹	88.78	0	99.98	--
CO. A/S (\$ million) ¹³	216.0	0.01	3280	25,060
MARKET A/S (\$ million) ¹⁸	2557.2	0.7	50,286	283,852
ACTUAL FINE (\$ million) ⁶	29.3	0	500	3,602
PLEA RANK	2.55	1	8	--
N (no. participants)	6.33	2	30	--
PLEA RANK/N	0.48	0.07	1	--
ASIA	0.21	0	1	27
EUR	0.30	0	1	39
PLEA DELAY (months)	14.82	0	120	--
PLEA DATE	9/18/01	1/1/95	12/30/07	--
TRUE RECIDIVISM	3.03	0	26	--
DOJ RECIDIVISM	0.34	0	2	--
ACTUAL DURATION (months)	76.55	0	360	--
DOJ DURATION (months) ³	47.03	0	222	--
GLOBAL	0.76	0	1	76
INTL	0.83	0	1	107
BID RIG	0.39	0	1	50
INSTALLMENT PAYMENTS ¹³	1.66	0	16	--
ABILITY TO PAY PROBLEM ¹⁴	0.14	0	1	16
OFFICERS CARVED OUT	1.04	0	7	134
OFFICERS PRISON (MONTHS) ⁴	7.4	0	99	925
PERSONS INDICTED	5.09	0	18	--
<p>JSL = joint and several liability NB. Based on 129 observations, including 16 amnesty recipients, but some variables with missing data. Discounts positive only. Superscripts are number of observations with missing data, if any.</p>				

Variable	Mean	Min.	Max.	Sum
MIN USSG DISCOUNT (%)	38.78	-102	99.5	--
MAX USSG DISCOUNT (%)	69.39	0	99.7	--
§3571 DISCOUNT no JSL (%)¹²	19.93	-1030	99.5	--
§3571 DISCOUNT with JSL (%)¹⁴	80.17	-363.1	99.98	--
CO. A/S (\$ million)	238.2	0.40	3280.0	20,723.4
MARKET A/S (\$ million)⁴	3079.1	0	50,286.0	249,409.9
ACTUAL FINE (\$ million)	0.03	500.0	40.2	3499.4
PLEA RANK	2.69	1	8	--
N (no. participants)	6.55	2	30	--
PLEA RANK/N	0.522	0.0670	1	--
ASIA	0.25	0	1	22
EUR	0.55	0	1	29
PLEA DELAY (months)	15.15	0	120	--
PLEA DATE	4/26/02	9/6/95	11/27/07	--
TRUE RECIDIVISM	3.06	0	26	--
DOJ RECIDIVISM	0.38	0	2	--
ACTUAL DURATION (months)	78.11	7	360	--
DOJ DURATION (months)	55.26	6	222	--
GLOBAL	0.74	0	1	64
INTL	0.85	0	1	74
BID RIG	0.32	0	1	28
INSTALLMENT PAYMENTS	1.78	0	15	--
ABILITY TO PAY PROBLEM	0.16	0	1	--
OFFICERS CARVED OUT	1.44	0	7	--
OFFICERS PRISON (MONTHS)	9.53	0	99	--
PERSONS INDICTED	5.09	0	18	443
<p>JSL = joint and several liability NB. Based on 86 observations used in regression, except for missing data. Superscripts are number of observations with missing data, if any.</p>				