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Private Recoveries In International Cartel Cases Worldwide: What Do The Data Show?

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I. INTRODUCTION

Despite being around for more than a century in the United States, the role played by "treble-damages suits" in cartel enforcement is controversial.[2] Some think of them as exemplars of a hyper-litigious society, while others perceive them as essential elements in a rational cartel-enforcement program. In the European Union and other jurisdictions outside the United States, the desirability and ideal design of private rights of action are currently matters of intense debates.[3]

The purpose of this article is to examine the size and role played by private damages recoveries[4] in antitrust suits directed at contemporary hard-core international price-fixing cartels.[5] After discussing the data source for this article, I then describe the amounts and trends in U.S. settlements in private antitrust suits since 1990, the dominance of U.S. cases in the world, the extent to which private suits follow government investigations, and the severity of private recoveries relative to affected sales and to damages caused by the cartels. The last ratios can be used to judge the *ex post* deterrence power of current monetary cartel penalties.[6] This article elaborates and extends a book chapter by the author.[7,8]

II. DATA SOURCE

The data that are analyzed in this article are derived from the Private International Cartels ("PIC") data set. In terms of affected commerce, almost all of the larger cartels discovered and punished worldwide since 1990 are international in membership. Because some of the

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[2] THE INTERNATIONAL HANDBOOK ON PRIVATE ENFORCEMENT OF COMPETITION LAW (Albert Foer et al. eds., 2010) at xii ("Foer et al. 2010").

[3] Albert Foer & Jonathan W. Cuneo, *Towards an Effective System of Private Enforcement*, THE INTERNATIONAL HANDBOOK ON PRIVATE ENFORCEMENT OF COMPETITION LAW, Ch. 38 (2010). ("Foer and Cuneo").

[4] All but a very few of the recoveries were settlements.

[5] For a fine introduction to the issues addressed herein, *see* Terry Calvani & Torello H. Calvani, *Cartel Sanctions and Deterrence*, 56 ANTITRUST BULL. 185-234 (summer 2011).

[6] The orthodox legal-economic *ex ante* concept of deterrence examines the minimum penalties necessary to prevent the formation of cartels; the size of these optimal penalties depends inversely on the conspirators' expectations of being detected and punished, *see* John M. Connor & Robert H. Lande, *Optimal Cartel Deterrence: An Empirical Comparison of Sanctions to Overcharges,* (unpublished, 2011) ("Connor & Lande 2012"). However, if one assumes that the cartel has already been caught (i.e., the probability of detection is 100 percent), then the *ex post* optimal penalties are much lower, approximately equal to the monopoly profits made by the cartel.

[7] John M. Connor, *The Impact of International Cartels*, Ch. 2, pp. 12-26 in THE INTERNATIONAL HANDBOOK ON PRIVATE ENFORCEMENT OF COMPETITION LAW, (Albert Foer & Jonathan Cuneo, eds., 2010), draft *available at* http://ssrn.com/abstract=1694156]. ("Connor 2010a").

[8] Readers are directed to a handbook containing the most comprehensive collection of papers on every conceivable legal-economic aspect of private antitrust litigation (*supra* note 2).

defendants' assets, executives, and documentary evidence are abroad, international cartels are more difficult to prosecute.

The author of this article began collecting publicly available economic and legal information on all formally investigated international cartels more than ten years ago. Investigations in criminal jurisdictions begin when suspected price-fixers are served Civil Investigative Demands, a grand jury is empanelled, subpoenas are served, search warrants are exercised (a/k/a "a raid"), or a private antitrust damages case is filed in court. Some of these actions are kept secret or go unnoticed by the press until indictments or convictions are announced. In other jurisdictions with civil administrative competition-law commissions, investigations begin with raids that used to be quiet affairs but are now mostly announced by the commissions. While some of these alleged violations turn out to be incorrect or unprovable, roughly 95 percent of all cartel investigations result in consent decrees, fines, prison sentences, damages awards, or other legal sanctions against at least some of the suspects. Appeals of these adverse rulings can take ten years or more to be resolved.

This article focuses on *private international hard-core cartels*. Private cartels are voluntary associations of legal entities—usually large multinational corporations—that explicitly collude on the control of market prices or output with the aim of increasing joint profits of its members. Many government-sponsored international commodity agreements, such as OPEC, are not classified as private collusive schemes. Moreover, mandatory price-fixing arrangements, like USDA marketing orders, do not qualify as private cartels. Because private cartels (typically comprised of corporations or corporate associations) are not protected by sovereign treaties, they are subject to price-fixing sanctions under the antitrust laws now adopted in over 100 nations.

"International" cartels are those with members headquartered in two or more nations. Thus, international is a membership concept and not necessarily a geographic concept. International cartels tend to be larger, better publicized, more injurious to markets, and geographically more widespread than the many more numerous local cartels. Many international cartels are virtually global in their operations.

"Hard-core" describes agreements that are knowingly made through some sort of direct communication among the cartelists about controlling market prices or reducing industry output.[9] In many jurisdictions cartel formation is a conspiracy.[10] Before cartels were made illegal, the association would be established by a written contract that in many nations were enforceable by courts; historical cartels often had a secretariat registered in Switzerland, London, or some other convenient business center. The business press of the day would follow developments of cartels and report on them. Nowadays, cartels generally are founded through face-to-face

[9] Cartels are one type of horizontal restraints of trade. Only cartels that overtly agree to control prices, output, or both are "naked" or "hard-core" violations. An agreement that, for example, illegally restricted access to a trademark would not be considered a serious, hard-core violation. In some jurisdictions, cartels are criminal violations, whereas other types of restraint of trade are civil violations.

[10] Both the United States and the European Union have adopted the conspiracy theory of cartel infringement. As such, it is the agreement that is the violation, not whether the market or customers were injured. Agreements usually involve verbal conversations (containing the words "agree," "deal," "let's do it," "contract," or other synonyms) or handshakes, but may include more subtle body language.

meetings, make solely oral contracts, and keep their existences secret. Operational decisions are handled by a management committee[11] that meets at least annually, and disputes are resolved through frequent telephone calls, faxes, or emails in between meetings.[12]

The sample includes all international cartels which were either formally investigated by an antitrust authority or were the subject of a complaint filed between January 1990 and August 2012. Much of the information on the composition, duration, size, and cartel sanctions comes from the press releases and decisions of the prosecuting antitrust authority (or plaintiffs' Complaints if they win in court). Supplementary information on affected sales is garnered from industry trade journals and reports by business consulting companies. Overcharge estimates are from publications by uninvolved economists, statements of antitrust authorities, judicial or commission opinions, or crude but conservative estimates prepared by the author from good quality market price data; in no case is an overcharge figure based only upon assertions by parties to the case.[13]

The lion's share of U.S. recoveries is the result of federal multidistrict litigation ("class-action" suits) and related damages actions in State courts. Opt-out suits are included whenever publicly reported, but recoveries from such suits that are kept confidential are underreported in this article.[14] The dollar amounts of the recoveries are cash values claimed by plaintiffs in settlement documents approved by a supervising judge.[15] Non-cash distributions such as coupons or injunctive relief are excluded. A relatively small amount of recovery is in the form of court-ordered restitution; often the victims are governments.[16]

III. RECOVERIES ARE LARGE AND GROWING

I found 130 settlements involving international cartels, of which 120 were U.S. court cases. The number of U.S. settlements over the 22.5 years averaged about five per year and ranged from zero to 22 each year.[17] The numbers peaked in 2002-2008.

The 50 largest U.S. settlements are listed in Table 1, of which 49 are international conspiracies. These 49 comprise 97 percent of the dollar recoveries in the sample employed in this article.

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[11] Highly elaborate global cartels have as many as three layers of management committees.

[12] These activities then leave a paper or electronic trail that is later used by prosecutors.

[13] Inquiries about sources of information or computational methods on specific cases can be retrieved from the author's files upon request.

[14] For the difficulties involved in evaluating coupons and in-kind recovery, *see* Robert H. Lande & Joshua P. Davis, *Comparative Deterrence from Private Enforcement and Criminal Enforcement of the U.S. Antitrust Laws,* BRIGHAM YOUNG UNIV. L. REV. (forthcoming), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1565693] ("Lande & Davis, 2012"). Because these scholars have labored to refine the dollar values of several recoveries involving international cartels, I have substituted their (lower) amounts when available.

[15] Where public, some opt-out recoveries are included.

[16] John M. Connor, *Governments as Cartel Victims: AAI Working Paper No. 09-03*. (May 21, 2009), *available at* http://ssrn.com/abstract=1412463, ("Connor 2009").

[17] John M. Connor *Private Recoveries in International Cartel Cases Worldwide: What Do the Data Show*? AAI Working Paper No. 12-03. (October 15, 2012), *available at* http://www.antitrustinstitute.org/~antitrust/sites/default/files/WorkingPaperNo12-03.pdf] ("Connor 2012").

Table 1. Fifty Largest Private Cartel Damages January 1990-July 2012 ($ mil.) [#]								
Cartel/Market Name, Place	US Direct	US Indi-rect	Can-ada	Other nations	**Total**	**Total / sales**	Date Set-tled	**Total**
	Nominal $ million					*Per-cent*	*Year*	*$2012*
Bank cards' transaction fees 3 ("Merchant Discount"), US	7,800	0	0	0	**7,800**	2.4	2012	**7800**
Bank cards' transaction fees 2 ("AMEX & Discover"), US	6650	0	0	0	**6,650**	11.7	2008	**6775**
Bank cards' transaction fees 1 ("Wal-Mart" case), US	3383	0	0	0	**3,383**	1.2	2003	**4752**
Tobacco Leaf, auctions, US	1850	0	0	0	**1,850**	11.9	2000	**2839**
Vitamin E, Global *	1467.0	140.83	21.30	0.0	**1,629**	34.40	2005	**2143**
Natural Gas, California ("El Paso"), US [a]	1427.0	0.00	0.00	0.0	**1,427**	NA	2003	**2005**
Vitamin Premixes, Global *	1024.0	86.40	33.50	0.0	**1,144**	16.00	2005	**1899**
LCDs (Liquid Crystal Displays), TFP (thin film) type, Global	825.62	796.7	NA	20	**1,642**	0.34	2010	**1793**
Securities, NASDAQ market makers, US	1027	0	0	0	**1,027**	3.12	1998	**1663**
Vitamin C, Global *	772.0	74.11	13.80	0.0	**860**	23.00	2005	**1131**
Graphite Electrodes, Global	676	NA	NA	0	**676**	10.7	1999	**1097**
Hydrogen Peroxide, other industrial bleaches, Global	79.4	2.1	20.5	835	**937**	6.8	2009	**1040**
Vitamin A, Global *	688	66.05	11.2	0	**765**	25	2005	**1006**
Auction houses, art, buyers' & sellers' fees, Global	592	0	40	0	**632**	73	2000	**975**
DRAMs (digital random access memory chips), Global	492.9	253.3	NA	0	**746**	2.6	2006	**894**
High Fructose Corn Syrup, US	531	80	0	0	**611**	5	2004	**804**
Airlines, cargo, fuel surcharge, Global	495	NA	72	NA	**567**	0.3	2006	**679**
Diamonds, Industrial, Global	30.35	250	NA	0	**280**	7.2	2000	**660**
Methionine, Global	439		4.2	0	**443**	5.6	2003	**622**
Currency conversion fees, charge cards, US	385.5	17	0	0	**403**	0.63	2006	**542**
Digital telephone switches, Israel	0	0	0	389	**389**	45	2004	**512**
Vitamins: Beta Carotene, Global	317.0	34.14	4.60	0.0	**356**	29.90	2005	**468**
Airlines, passenger, fuel surcharge, Transatlantic Routes, Global	196.4	NA	72	174	**442**	0.017	2008	**450**
Buspirone anti-anxiety drug, US	220	93	0	0	**313**	232	2003	**440**
Rubber Processing Chemicals, Global	319.9	NA	NA	0	**320**	4	2006	**384**
Orthopedic devices, US	311	0	0	0	**311**	5.9	2007	**360**
EPDM synthetic rubber, Global	270.2	0	3.4	0	**274**	10.9	2005	**360**
Linerboard, US	254.5	0	0	0	**255**	4.3	2003	**358**
Diamonds, rough gem quality,	22.5	272.5	NA	0	**295**	0.1	2006	**354**

Global								
Gasoline trading, unleaded, US	303	0	0	0	**303**	NA	2007	**351**
Citric Acid, Global	175	25	5.4	0.918	**206**	4.3	2002	**321**
Lease oil, US	193.5	0	0	0	**194**	0.87	1999	**315**
Cardizem CD hypertension drug, US	110	80	0	0	**190**	9.2	2002	**296**
Anti-anxiety drugs, US	132.29	77	0	0	**209**	134	2003	**294**
Cosmetics, "prestige," U.S.	199	0	0	0	**199**	0.34	2003	**278**
MSG and Nucleotides (IMP, GMP), Global	169.5	76.6	4.9	0	**251**	1.5	2003	**253**
Choline chloride (vitamin B4), North America	158.7	13	11.7	0	**183**	28.7	2004	**242**
Vitamin B4 (choline chloride), Global	154.0	15.65	7.70	0.0	**177**	12.10	2004	**233**
Vitamin B5, Global	150.0	15.50	2.10	0.0	**168**	29.10	2005	**221**
Municipal Bond Derivatives, US	58	134	0	0	**192**	0.024	2010	**211**
Vitamin H (Biotin), Global	128.0	13.74	0.40	0.0	**142**	29.60	2005	**187**
Explosives mfg., commercial, Texas Group, US	114.4	0	0	0	**114**	8.2	1998	**185**
Sorbates, Global	95.5	21.4	3.1	0	**120**	5.9	2000	**184**
Vitamin B2, Global	124.0	12.40	2.10	0.0	**139**	29.10	2005	**183**
Glass, flat 1, Global	122.6	0	0	0	**123**	0.7	2005	**162**
Polyester staple, US and CA	107	0.975	0	0	**108**	7.4	2005	**142**
Terazocine hydrochloride drug, US	72.5	30.7	0	0	**103.2**	35.1	2005	**136**
Wood, oriented strand board, US + CA	120.71	9.94	0	0	**131**	1.1	2008	**133**
Vitamin B3 (niacin), US+CA	90.0	9.0	1.53	0	**100.5**	12.8	2005	**132**
Automotive Refinishing Paint, Global	105.75	NA	NA	0	**106**	0.27	2007	**123**
MEAN AVERAGE of 50 Cases	700	66	6	49	**809**	18	2004	**1002**
MEDIAN AVERAGE of 50	198	16	0	0	**312**	6	2005	**412**
TOTAL U.S. Domestic Cases	1,427	0.00	0.00	0.0	**1,427**	NA	NA	**1,427**
TOTAL U.S. International Cases	33,595	2,713	262	2,449	**39,019**	NA	NA	**48,667**

Includes only cases in which horizontal price fixing (including bid rigging and market allocation) was the principal or important illegal conduct proven; one close call is the class action *Brand Name Prescription Drugs Antitrust Litigation* case settled for more than $717 million, but had vertical price discrimination as the principal conduct. Some cases are only partially settled.

a) This is the sole domestic cartel in the top 50.

NA = Not available or not applicable

* = Part of an overarching conspiracy in several bulk vitamins.

Sources: John M. Connor, *Private International Cartels Spreadsheet* (July 2012); Joshua P. Davis & Robert H. Lande. *Towards an Empirical and Theoretical Assessment of Private Antitrust Enforcement: Univ. of San Francisco Law Research Paper No. 2012-17* at note 14 (September 2012), *available at* SSRN: http://ssrn.com/abstract=2132981; and comments from the Advisory Board of the American Antitrust Institute.

Private damages recoveries worldwide between January 1990 and August 2012 totaled $41.8 billion (in nominal dollars), of which $38.7 billion (or 93 percent) were settlements in the United States (Figure 2).[18] Converted to 2011 dollars, the world and U.S. totals are approximately $52 and $48 billion, respectively.

The pattern of U.S. settlement amounts over time is quite uneven because of a few very large settlements. Settlements rose very slowly at first, reaching a cumulative total of $300 million in 1997. Recoveries accelerated sharply after 1997.[19] The year 1998 was the first time that recoveries reached $1 billion in one year; records were broken again in 2000, 2002, 2003, 2008, and 2012. The catalyst for the record in 1998 was the *NASDAQ Market-Makers* case. That record was broken in 2000 largely because of the large *Leaf Tobacco* case (2.8 billion 2011 dollars). The bump in 2005 is attributable to the collectively huge *Bulk Vitamins* cases ($5 to $8 billion).[20] The final three record years (2003, 2008, and 2012) were the result of three bankcards' cases. They are known as the "*Wal-Mart*" ($3.4 billion in recoveries), "*AMEX and Discover*" ($6.7 billion), and "*Merchant Discount*" ($7.8 billion) cases.

Annual recoveries are rising exponentially.[21] If present trends continue, average annual cartel settlements will likely be about $16 billion by 2017. However, accumulated recoveries are smoother over time and more accurately predicted (Figure 3). This trend line predicts that the total 1990-2017 recoveries will be $60 billion in 2017 (about $75 billion 2011 dollars).

Settlement patterns are sensitive to the dates employed. In Figure 1 the data are arranged according to the year in which settlements were announced (usually the date of preliminary court approval). We are looking backward in time. However, because of the longer gestation period for such cases compared to criminal investigations, scores of current follow-on private cases are likely to be settled in the next few years. If the settlement amounts are arranged either by the year the first cartel member is fined anywhere in the world,[22] or by the date the damages case was first filed,[23] the temporal pattern is quite different. By looking forward in time, the settlements seem to peak and fall, but this is a distorted view created by these lengthy suits.

Although time-consuming, settlements in international cartel cases appear to be taking shorter times to resolve in recent years (Figure 2). Prior to 1990, the average treble-damages case

[18] Many of the remaining $2.9 billion in reported recoveries are judgments announced in jurisdictions where the payouts may not be enforceable and information on litigation is difficult to access from the United States.

[19] Settlement amounts are classified according to the year in which the first company agrees to pay; sometimes every defendant agrees to pay in the same year, but more commonly these dates are staggered.

[20] Sixteen vitamins' and provitamins' markets were cartelized by 22 companies during 1988-1999. All but one of these 16 markets had successful private damages suits, of which ten are listed among the top 50 recoveries in Table 1.

[21] The exponential function fits the best of several other functional forms fitted to these data, but it explains only about 32 percent of the annual variance (Connor 2012, Fig. 6, *supra* note 17). Cumulative amounts of recoveries smooth the data much better resulting in a nearly perfect fit of 98 percent (Figure 3).

[22] *Id.* Figure 3.

[23] *Id*. Figure 4.

took 11 years between the filing date and the date the first firm settled. In the 1990s, that lag dropped to a little more than five years, and in the early 2000s it was merely 3 years.[24]

Recoveries in North America are overwhelmingly awarded to direct purchasers, which are most commonly manufacturers. Available information suggests that 91 percent of recoveries go to direct buyers and the remaining 9 percent to indirect buyers. Settlements by indirect purchasers are typically smaller companies that distribute the cartelized products or are households. Indirect-purchaser suits are typically filed in state courts.[25] Economic theory generally posits that the majority of price-fixing overcharges are passed on to final consumers. Whether the low portion received by indirect buyers means that indirect purchaser cases are more difficult to litigate (because of pass-on issues perhaps) or whether indirect awards are systematically underreported, I cannot say.

Recoveries in private settlements in the United States are much larger than the fines imposed by the U.S. Department of Justice ("DOJ").[26] International cartel fines imposed by the DOJ totaled $11 billion and penalties imposed by the State AGs and other government agencies $4.8 billion. Settlements announced by private plaintiffs in North America total $41.8 billion—roughly 2.6 times penalties levied by government entities in North America. Because there are few private suits outside North America, it is premature to compare them to government fines for the same cartels; however, because these jurisdictions are constrained by single damages awards, private settlements are likely to be smaller relative to fines for the foreseeable future.

IV. PRIVATE ACTIONS ARE CONCENTRATED IN NORTH AMERICA

With a few notable exceptions and measured several ways, private international cartel damages suits have historically been highly concentrated in North America; over 90 percent of worldwide cartel settlements are collected in the United States.[27] In Canada, nearly all private suits filed against international cartelists run in parallel to U.S. suits. Only ten of the 130 sample recoveries were solely non-U.S. actions.

Besides private suits, the U.S. government has the power to seek treble damages for price-fixing overcharges incurred by federal, state, and municipal governments. However, traditionally it and the state attorneys general seek only restitution for single damages. A case study of the sprawling and little-known U.S. federal *E-Rate* price-fixing cases is described in Appendix B.

Measured by publicly announced nominal settlement and restitution amounts, the United States is the leader with 93 percent of the worldwide total. Canada accounts for 1 percent and the rest of the world 6 percent.

[24] Data in the late 200s are too few to generalize with confidence.

[25] Approximately 30 percent of the U.S. population lives in states where such suits are not permitted (Foer & Cuneo, *supra* note 3 at 101).

[26] Connor 2012, *supra* note 17.

[27] Most cartels have multiple complaints filed in several courts by different plaintiffs; these are consolidated into one federal class action or a few state actions. Some larger buyers may opt not to join the consolidated suits and either settle out of court or file a separate "opt-out" complaint.

V. PRIVATE ANTITRUST SUITS OUTSIDE NORTH AMERICA

Although the private damages scene outside of North America is often characterized as moribund, there are stirrings of such activity in a few EU national courts and some notable successes.[28] First, courts in some jurisdictions have the authority to impose restitution requirements on cartels over and above fines incurred. For example, the *Hydro-Electric Power Equipment* cartel punished in Norway was fined $2.6 million and later ordered to pay $7.2 million in additional restitution payments. Unfortunately, such cases are often confined to bid-rigging in which the government is the victim.[29] A second example is the *District Heating Pipes* cartel. This cartel was heavily fined by the EC, and a few years later several Danish municipalities successfully sued for damages in Denmark's first-ever private antitrust suit.[30] In other jurisdictions in low income countries with new antitrust laws, restitution orders are so large that they appear to be uncollectable; moreover, they appear to be directed at foreign investors who may be recalcitrant followers of authoritarian governments. Such an example appeared in Kazakhstan in 2005, where a subsidiary of the China National Oil Co. was ordered to pay $730 million in antitrust restitution to resolve price-fixing allegations.[31]

Second, in Europe especially, the frequency of private damages actions may be underestimated because of the difficulty of locating public records about such suits. In the United Kingdom, for example, Rodger[32] found a surprisingly large number of private price-fixing suits when he queried law firms rather than relying on press reporting or court records. In any case, there are some potentially large awards expected from private single-damages suits currently being decided in Belgian and German courts. The European Commission itself has brought suit in a Belgian court for compensation from members of the cartel that installed and maintained elevators and escalators in Commission buildings. In Germany, a private compensatory suit against members of a fined EU-wide cement cartel has survived many legal challenges.

Third, in jurisdictions with Common Law foundations, substantial progress has been made in launching the first direct purchaser suits. A few years ago, Australian farmers benefitted from a successful suit that paid out damages from the bulk vitamins cartel; consumers and other indirect purchasers have not fared so well. A large number of compensatory suits have been launched in South Africa, but notable successes have not yet surfaced publicly. The U.K.'s National Health Service was awarded damages when generic drug suppliers colluded on tenders. More recently, an antitrust settlement was announced for U.K. direct buyers of marine hose. Several successful private suits were concluded in Israel.[33]

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[28] *See* the country chapters in Foer & Cuneo, *supra* note 3 at 277- 571.

[29] On this phenomenon, *see* Connor 2009, *supra* note 16.

[30] Peter Møllgaard, *Assessment of Damages in the District Heating Pipe Cartel: Working Paper 10-2006,* (2006), *available at* http://openarchive.cbs.dk/bitstream/handle/10398/7553/wp10-2006.pdf?sequence=1.

[31] *Court Upholds US$730-million Fine for PetroKazakhstan "Monopoly Profits,"*World Markets: Research Centre at App. A (December 6, 2005).

[32] B. J. Rodger, *Private Enforcement of Competition Law, the Hidden Story: Competition Litigation Settlements in the UK, 2000-2005*, unpublished Ms. (2009).

[33] Israel has no constitution, so its judiciary seems to borrow legal principles from multiple legal traditions, including the United States.

VI. TO FOLLOW ON OR NOT TO FOLLOW ON?

Critics of the U.S. treble-damages system of litigation suggest that private plaintiffs are free riders. That is, the work of plaintiffs' counsel is made easy because the difficult tasks of uncovering these hidden crimes, and assembling the proof necessary for the facts of damages, are carried out by U.S. government prosecutors. These are the proto-typical follow-on cases in private litigation. However, the law does not require private plaintiffs to wait for the completion of the government's cases; indeed a large share of private cartel cases are not follow-on lawsuits. In this section, I examine the followership status of private cartel cases filed in U.S. courts and whether the length of private litigation is affected by followership status.

There are three followership categories (Figure 4). First, *U.S. follow-on* cases are the most common type.[34] The proportion of private cases following earlier U.S. government sanctions is 51 percent of the total private actions in the sample. Looked at in a different way, of the 52 international cartels that were fined by the DOJ during 1990-2005, 100 percent were followed up with private damages actions (Figure 5).[35]

Second, a somewhat unappreciated fact is that 8 percent of U.S. private actions are filed after fines by the EC or other non-U.S. antitrust authorities (Figure 4). I will dub these the *non-U.S. follow-on* cases. Examples include two of the smaller bulk *Vitamins* products (B12 and Canthaxanthin),[36] *Methionine, Acrylic Glass,* and *Flat Glass.* All but one of these cases is a global cartel. In some instances, the DOJ investigated the cartel but chose not to indict, while in other instances there is no public information that the DOJ formally investigated the cartel.[37]

Third, 41 percent of the treble-damages cases were *non-follow-on.* That is, they were not preceded by any known government sanctions in either the United States or elsewhere; a few may follow investigations by antitrust authorities that were ultimately closed.[38] Examples are three bulk *Vitamins* (folic acid, B1, and B9), *Sulfuric Acid, SRAMS, High Fructose Corn Syrup, Carbon Black,* and many others. Almost one-third of the non-follower cases are global cartels.

[34] All follow-on cases are filed after a plaintiff or plaintiffs' counsel knows about an investigation. Nearly all U.S. follow-on cases follow upon one or more criminal guilty pleas negotiated by the DOJ; a few settle prior to the first guilty plea; and fewer still follow investigations by the U.S. FTC, SEC, or other federal agencies. Follow-on cases benefit from factual evidence of guilt contained in web-published guilty pleas, "informations," sentencing memoranda, or government complaints submitted to appeals courts.

[35] I stop at 2005 simply to allow enough time to elapse for all private actions to be completed.

[36] These two small cartels were prosecuted by either the Canadian or EU competition authorities.

[37] It is possible that a grand jury was empanelled to consider indictments but was disbanded without public notice. In the case of the six *Vitamins* cartels, it appears that the DOJ made a conscious decision to prosecute the nine bulk vitamins with the largest U.S. affected sales and to omit prosecuting the six vitamins with the smallest affected sales. JOHN M. CONNOR, GLOBAL PRICE-FIXING, 2nd paperback ed., (2008), ("Connor 2008"). Each of the six products generated less than $150 million in sales during the collusive period (*Id.* at 370-374). Perhaps dropping charges related to these six products was offered as an incentive to plead guilty.

[38] Private plaintiffs must generate factual evidence of guilt largely on their own. Evidence obtained during criminal investigations—those involving subpoenas, searches, or grand juries—are usually kept secret by the government and the targets of the investigation. Evidence contained from leniency applications is normally not available to private plaintiffs (unless the leniency recipient voluntarily shares the leniency submission with plaintiffs). Other evidence obtained by the government in criminal investigations is usually not handed to plaintiffs for years after it is obtained. Even the fact that a criminal investigation was closed by U.S. authorities is usually not announced by the agencies, but may be revealed by the corporate targets.

One might expect that the latter two types of private actions would be more costly to prosecute, and more difficult to win, in part because plaintiffs must develop all their own inculpatory evidence.

The paragraph above measures the relative size of the three types of U.S. private actions by counting the *numbers* of such cases. An alternative metric is to use the monetary size of the recoveries. In terms of publicly reported *dollar settlements*, the U.S. follow-on cases garnered only 26 percent, the non-U.S. follow-ons a shrunken 2 percent, and the non-follow-ons an impressive 72 percent of the $39 billion total (Figure 6).[39] However, the reader must be cautioned that the non-follow-on category is strongly affected by the bankcard cases.

One indicator related to the size of prosecutorial costs of private plaintiffs is the length of the damages proceedings. While many alternative dates are available, I measure the length from the date that the first private suit is filed to the date that the first cartelist agrees to settle.[40] The length of domestic follow-on cases averages 45.6 months and the non-U.S. follow-ons 44.9 months,[41] whereas for non-follow-on actions the average length is 55.6 months.[42] The non-follow-on suits take almost a year longer (about 25 percent longer) to prosecute than both types of follow-on private suits. Thus, it appears that plaintiffs' in non-follow-on suits have informational disadvantages that typically prolong litigation.

VII. AWARDS ARE MODEST RELATIVE TO AFFECTED SALES

In this section, I discuss the *severity* of cartel sanctions (private recoveries and government fines), that is, the size of sanctions relative to a jurisdiction's affected commerce. Recall that all the cartels in this article's sample are "international," a DOJ concept that refers to the *membership composition* of the conspiracies; all of these cartels are relatively large in terms of affected sales or fines.[43] However, many of these international cartels were geographically local operations in the sense that they operated inside one jurisdiction.[44] A large minority of the sample was geographically widespread: cartels that operated across two or more continents are

[39] Federal class actions are fairly well reported in the press or in internet postings, state class actions less so. Joint suits by State attorneys general are fully reported by the National Association of Attorneys General. The settlements of many opt-out private suits are missing, though the largest ones tend to be picked up by the business press, especially when the recipient is a publicly listed company. For this reason, the total settlements reported are less than the actual payouts. On the other hand, the dollar totals may be inflated because of exaggerated values placed on in-kind product distributions or coupon values. Whether these two contradictory forces affect the *distribution* of settlement amounts is unknown.

[40] Connor 2012, *supra* note 17, Figure 12.

[41] The range is quite wide, from 5.5 to 173 months. The median numbers of months for the U.S. and non-U.S. follow-ons are 40.7 and 26.0, respectively.

[42] The median is 54.4 months. Therefore, the median non-follow-on suits last approximately 40 percent longer than the median follow-on suits.

[43] The purely domestic price-fixing cases prosecuted by the DOJ involve markets for products sold in one or a few adjacent states. Examples are ready-mix concrete, magazine wholesale distributors, scrap metal recycling, and plastic pilings for piers.

[44] To be more precise, only one jurisdiction succeeded in convicting a cartel and the decisions of the antitrust authorities did not contain facts or language suggesting a wider geographic conspiracy. DOJ plea agreements are fairly consistent in describing the geographic area of a cartel as either "in the United States" or "in the United States and elsewhere." It is possible that some local cartels unbeknownst to the authorities in fact had activities outside the jurisdiction.

termed "global." Because global cartels are different[45] in many respects from more localized cartels, I discuss each type separately. Moreover, I choose to report *median* average severities, because the distribution of severities contains a small number of very large ratios that bloat the mean averages, making them inaccurate measures of central tendency.

For the non-global cartels, there are 294 severity ratios available. The denominators are affected sales only within the jurisdiction, and sometimes only sub regions of those jurisdictions. For example, the EC fines may cover violations for the entire European Economic Space (the European Union and the associated EFTA nations) or for conduct within just a few of the Member States. U.S., Canadian, and Rest of the World ("ROW") severities generally refer to national or sub-national geographic areas. The "World" severities I report generally refer to all of the above.[46]

For non-global international cartels, the fines imposed by the DOJ and EC tend to be equally severe, both averaging about 4 percent of affected sales (Figure 7). Canada, by contrast, has a long-standing policy of imposing fines that are about 20 percent of Canadian affected sales and then rewarding a couple of early confessors small discounts; the median Canadian fine severity is almost 15 percent. The Member States of the EU (the "NCAs") and competition authorities in the ROW nations are relatively timid in assessing fines; their averages are below 0.3 percent of sales. Private settlements average 3 percent of affected commerce, which is not far from the world median severity of 2.7 percent.[47] (The "world" ratios divide all types of sanctions by affected sales in the appropriate jurisdictions).

The fines impose on global cartels are somewhat higher (Figure 8). Canada again leads the pack with median fines of 17.5 percent, but U.S. fines (13.2 percent) and EC (8.7 percent) fines are not far below. There are relatively few examples of fines on global cartels by EU Member States or authorities in ROW, but the median averages are very low (0.3 percent). As in the case of non-global cartels, median settlements' severity for global conspiracies is about the same (3.9 percent) as that of the 191 "world" ratios (4 percent).[48] (Note that the denominator for almost all the settlements is North American sales, whereas for the world ratios total worldwide sales are used when available; total sales might be restricted to a sub-national region.)

Discussion of averages for long periods of time might obscure important temporal changes. With 21 years of data available, it is possible to examine trends in penalty severities.[49] Trend analyses show that EC fine severities have had a distinctly upward trend since 1990, whereas U.S. fines appear to have peaked in severity around the year 2000. U.S. policy has, since about 2000, tended to emphasize individual penalties as a substitute for corporate penalties.[50] The mean average severities of U.S. private settlements are about 22 percent, the median 4.7 percent.

[45] Global cartels are more durable, have larger affected sales, and higher percentage overcharges than non-global international cartels, Connor 2008, *supra* note 37.

[46] However, most of the ratios sum U.S. and Canadian settlements for the numerator and use sales in the U.S. and Canada for the denominator.

[47] Note that mean average severities for private and world are much higher, 54 percent and 36 percent, respectively.

[48] Mean severities for private and world are much higher, 23 percent and 11.5 percent, respectively.

[49] Connor 2012, *supra* note 17, Figure 16.

[50] *Id.*

Severity rose from 1990 to about 1996 (when the trend peaked at 40 percent) but has since slid to a nadir in 2008, from close to zero in the 1990s to about 17 percent in the late 2000s. However, time alone explains only a very small percentage of the variability in settlement variation.

VIII. DETERRENCE POWER OF PRIVATE ACTIONS

Severities of sanctions have limited value for assessing the deterrence power of cartel penalties. More relevant are the sizes of sanctions relative to the injuries caused. These injuries tend to be about as large as the cartel's illegal, monopoly profits, so the ratios of sanctions to overcharges also reveal the extent to which *ex post* profits were disgorged through legal actions. Full disgorgement is also called restitutive. Reliable estimates of overcharges are hard to come by, so sample sizes are lower than for severities.[51]

Nevertheless, penalty/damages ratios are available in sufficient numbers for the most common forms of cartel sanctions to say something about price-fixing deterrence. For example, there are 45 international cartels that were fined by the U.S. Government for which both overcharge estimates could be obtained.[52] The median average overcharge for these 45 cartels was 20 percent of affected commerce. Dividing U.S. fines by single damages in the jurisdiction results in a 42 percent ratio.[53] Put another way, U.S. fines alone disgorged at most about 42 percent of the cartels' illegal U.S. monopoly profits.

However, in the data set all fined cartels and others that were not fined paid private damages in North America. Information on settlement amounts and damages are available for only 33 international cartels. For this small sample, the average overcharges were a bit higher—about 25 percent of sales—and the reported settlement awards were 30 percent of those damages.[54] The distribution of the private recoveries/damages ratio is quite dispersed. Ten of the cases (31 percent) recouped less than 10 percent of the overcharges, and six (19 percent) recouped more than 50 percent.[55] The remaining half was in the 10 to 49 percent range.

For deterrence purposes, it is legitimate to sum the corporate fines and private settlements imposed in North America. We conclude that on average about 90 percent or less of the monopoly profits international cartels doing business in the United States were disgorged as antitrust penalties (Figure 9).

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[51] For a discussion of sources and methods of calculating overcharges, *see* John M. Connor, *Price Fixing Overcharges: Revised 2nd Edition: SSRN Working Paper* (April 27, 2010), *available at* http://ssrn.com/abstract=1610262].

[52] *Id.*, Figure 17.

[53] All figures are in nominal dollars (i.e., expressed in dollar values during the collusive period for overcharges and on the day the guilty pleas were announced). Typically, cartels last about six years and extracting guilty pleas occurs at least two years after collusion ended. So, the denominator of the ratio (overcharges) lags by about five years the time of the numerator of the ratio (the fines). If one were to adjust for the time value of money, the proper ratios would be 20 to 40 percent lower than the unadjusted ratios.

[54] The mean and median averages were 33 percent and 25 percent, respectively. As in the case of fines/damages ratios, the settlement/damages ratios are also inflated by monetary depreciation, but because the lags are even longer, the settlements/damages ratios are even more overstated. Thus, the deterrence effects of corporate sanctions are weaker than these ratios suggest.

[55] Only two recouped a bit more than 100 percent.

Average EC fines imposed on cartels operating in the European Union historically are less intense than those in the United States, and cartelists there have little fear from private actions. For a sample of 55 cartels, the average ratio of EC fines to damages is also about 42 percent.[56] However, suppose that a global cartel was caught in the snares of both U.S. courts and the EC. Then, this unlucky cartel might well have to disgorge some of its illegal gains in two non-overlapping jurisdictions. In this instance, the sanctions are *not* additive from a deterrence perspective, because the sanctions/damages ratios are calculated on a strictly jurisdictional basis. So, roughly speaking, the typical global cartel gets to retain at least 10 percent of its North American illegal gains plus about 58 percent of its EU-based illegal profits—not to mention *all* of its ROW profits. And the limited deterrence power of contemporary antitrust sanctions is not merely an artifact of averaging: I show that deterrence was illusory in the specific case of the *Vitamins* cartels, which is widely regarded as the most heavily sanctioned global cartel in history.[57]

The analysis above is a snapshot of a 21-year period. Are trends during 1990-2010 favorable to improved deterrence in the future? Regrettably, trends in the cartel penalties/damages ratios are not all favorable. For example, in the United States, the average ratio declined by 40 percent during 2000-2010 compared to 1990-1999. The trends in the EU are more favorable, with the ratio rising by 25 percent—but from such a low level that future increases will have to be impossibly rapid to achieve full disgorgement. Sanctions in the rest of the world are likewise rising rapidly but from a low base.

Keep in mind that the analysis so far has been entirely *ex post*. That is, it is looking backwards from known fines and achieved cartel overcharges. However, deterrence concepts are inherently prospective—looking forward to possible but uncertain future sanctions from the vantage point of the day on which a cartel agreement is first reached. This *ex ante* view is the appropriate one for deterrence of future conspiracies, and it turns mightily upon the chances that hidden illegal cartels will be discovered and punished. Most observers believe that discovery rates are rising, but are nowhere near even 50 percent. As is the case with most property crimes, it appears that the probability of discovery of price-fixing schemes is most likely around 15 percent to 25 percent. If this is correct, then to deter cartel formation, penalty/damages ratios must exceed 400 percent.

IX. WHAT WE DO NOT KNOW

Corporate fines are usually fully reported on the websites of the world's antitrust authorities, though occasionally smaller firms are offered confidentiality. Federal class-action settlements are generally well reported in the press or on special Web sites in North America, but

[56] Under the EC's new 2006 fining guidelines, the rise in the severity of EC fines has indeed been extraordinary, *see* John M. Connor, *Has the European Commission Become More Severe in Punishing Cartels? Effects of the 2006 Guidelines*, 1 (11) EUR. COMPETITION L. REV., 27-36 (December 2010), *available at* http://ssrn.com/abstract=1737885.

[57] John M. Connor & Darren Bush, *How to Block Cartel Formation and Price Fixing: Using Extraterritorial Application of the Antitrust Laws as a Deterrent*, 122 PA. STATE UNIV. L. REV. 813-855 (Winter 2007), *available at* http://ssrn.com/abstract=1156469. Connor & Bush show that taking into account the absence of monetary sanctions in most jurisdictions in which the cartels operated, general inflation, and the pre-judgment time value of money, only about one-third of the monopoly profits were disgorged.

the outcomes of state-level indirect suits are often unreported. Following class-action or representative-action developments elsewhere is quite challenging. Each year hundreds of opt-out suits are concluded without fanfare. Thus, unlike government-imposed sanctions, there is a significant amount of under-reporting of private settlement amounts, and under-reporting may grow more severe as private suits become more common abroad.

APPENDIX A: PETROKAZAKHSTAN

In the aftermath of the dismantling of the Soviet Union, newly independent oil-rich Kazakhstan began to attract foreign investment in its petroleum sector. In 1996, for $120 million a small Canadian company, called Hurricane Hydrocarbons at the time, somehow became the winning bidder for a 650-million-barrel oil field and a refinery in southern Kazakhstan.[58] Hurricane, renamed PetroKazakhstan Inc. ("PetroKaz"), became the second largest producer in the country on its way to becoming the fifth largest oil producer on earth.

By the middle of the 2000s world oil prices were high and the country's authoritarian leader Nursultan Nazarabayev had second thoughts about having sold these assets at what, in retrospect, seemed like a sweetheart deal. In 2003, he gave a speech in which he praised Russia's President Putin for attempting to re-nationalize the Yukos petroleum company. In that year a new law was passed that required the state-owned petroleum company to own 50 percent of all new petroleum ventures.

The government kicked off a campaign of legal harassment against PetroKaz. The weapon of choice was the nation's new criminal antitrust laws, which are administered by the Kazakhstan Anti-Monopoly Office (*Calgary Herald*, October 4, 2003). Blaming PetroKaz for a spike in fuel price in southern Kazakhstan, it levied a $6.3 million antitrust fine. After a decision of the Supreme Court in January 2004, PetroKaz paid a $3.6 million fine. A second criminal investigation was launched by the Financial Police and the Anti-Monopoly Office in December 2003; PetroKaz was charged with making monopoly profits of $96 million on domestic fuel sales. After an appeal, it paid a second fine of $35 million. A third investigation in July 2004 charged PetroKaz with orchestrating a scheme to raise fuel prices by $96 million for a few months in late 2003. PetroKaz paid a third fine of $91 million in February 2004. In April 2005, two top Canadian executives of PetroKaz were charged with criminal price-fixing and a civil damages claim of about $96 million was filed against PetroKaz. By October the damages claim had risen to $530 million and by December a court ordered PetroKaz to pay $720 million.

PetroKaz had been a profitable company, making more than $100 million in quarterly profits in mid-2004, but its owners threw in the towel in the summer of 2005. It was courted by Russian, Indian, and Chinese oil companies. In October 2005, PetroKaz agreed to be sold to the China National Oil Co. ("CNOC") for $4.2 billion. CNOC soon agreed to sell 33 percent of its stock to the Kazakhstan government oil company. A fourth antitrust fine of $57 million was paid by CNOC in February 2006. CNOC was liable for the $720 million for civil restitution, but there is no public record of it having been paid.

APPENDIX B: CASE STUDY

The E-Rate Program Cartel

The E-Rate Program was created by Congress in 1996 and administered by the Federal Communications Commission ("FCC") to accelerate the adoption of computer equipment at the nation's neediest K-12 schools. In recent years, funding has been at the level of $2.25 billion

[58] Mark MacKinnon, *Was Calgary Firm's Deal in Kazakhstan Oil Patch Just too Sweet?* THE GLOBE AND MAIL (Canada), B1 (September 6, 2004).

annually. Schools and school districts with the most impoverished student bodies have paid as little as 10 percent of the cost of equipment, software, and services purchased. Many schools hired educational consultants to assist them in designing a system, preparing applications, and ordering the equipment. These consultants were required and did promise schools to obtain several competitive bids from equipment suppliers, but in fact rigged those bids and inflated the invoices in collusion with the supplier(s) or by bribing school officials. Other consultants were hired by equipment manufacturers to pretend to be advisors to schools while in reality acting as corrupt sales agents for the manufacturers.

News of a DOJ investigation was first made public in an August 2003 press release announcing the guilty plea of an individual for bid-rigging against West Fresno public schools.[59] Up to June 2011, 33 individuals and nine companies[60] have been indicted or pled guilty in connection with *E-Rate* conspiracies in at least eight states. The first company to plead guilty was NEC-Business Network Solutions, a subsidiary of Japanese manufacturer NEC (f/k/a Nippon Electric Corp.). It agreed to pay $20.66 million in criminal fines and restitution worth at least $66.9 million to the San Francisco School System; NEC admitted rigging many E-Rate bids through two sham consultants in its employ.[61] Eight other companies have been indicted or pleaded guilty.[62] Total corporate fines and court-ordered corporate restitution now totals $40.3 million.

In addition, fines and restitution have been paid by 20 individuals that so far total $15.3 million.[63] The number and length of prison sentences handed down in the E-Rate case are records in the annals of the history of price-fixing. As is true in some previous cases, additional charges for bribery and fraud have amplified these sentences. No less than 20 guilty consultants and a few school officials have been incarcerated. They have been sentenced to a total of 961 months in prison, including a record high antitrust incarceration of 90 months by Judy N. Green, who lost her case at trial.[64]

What is somewhat unusual about this case is the great difficulty we have had in tracing the affected sales of these highly local and often times poorly reported events. However, we have

[59] This investigation was preceded by a *qui tam* suit by the City of San Francisco filed in 2002. Some school officials have been indicted for bribery, fraud, and conspiracy.

[60] In addition, most of the consultants operated one or more proprietorships or partnerships with virtually no assets. Thus, the DOJ has mostly focused on seeking fines, restitution, and long prison sentences for the consultants. The nine companies sold computer equipment of electrical contracting services.

[61] Details of this *E-Rate* episode can be found in Congressional testimony by George M. Cothran, Investigator for the City Attorney of the City and County of San Francisco. He testified that the cost of the computerization project was inflated by 103 percent after the sham consultants rejected lower-cost bids, *see* Testimony of George M. Cothran in Problems With The E-Rate Program: Waste, Fraud, And Abuse Concerns In The Wiring Of Our Nation's Schools To The Internet, Part 2: Hearing Before The Subcommittee On Oversight And Investigations Of The Committee On Energy And Commerce, House Of Representatives: Serial No. 108-103, pp. 17-55, (July 22, 2004), *available at* http://www.gpo.gov/fdsys/pkg/CHRG-108hhrg95461/html/CHRG-108hhrg95461.htm.

[62] Three companies had charges dropped because they were liquidated by charged consultants who owned them, and one company's sentencing is pending in late 2011.

[63] Eight individuals were awaiting sentencing and four were imprisoned with no monetary penalties as of June 2011.

[64] Her husband and business partner Allen Green was sentenced to 36 months, which was later converted to supervised probation.

been able to obtain affected sales from the posted plea agreements of most of the indicted companies and individuals.[65] Our estimate—surely on the low side—is $442 million. Note that, as is conventional in bid-rigging cases, the values of a few tenders that were not won by the conspirators are included as affected sales.

Finally, 12 sentencing documents contain provable or minimum losses. These data permit overcharges to be computed for nine of the bid-rigging schemes. The range is from 4.8 percent to 51.7 percent of affected sales. The mean is 22 percent, and the median is 16.7 percent. If we use the median estimate and apply it to the conservative affected sales of $442 million, then the dollar overcharges were $73.8 million. Therefore, total monetary sanctions amount to at most 75.3 percent of the overcharges.

What about incarceration? Can it be boiled down to a monetary value? While hard to do, economists would argue that jailed executives (or their employers, if legal) have subjective values that they would be willing to pay to "get out of jail free" These amounts might vary by age, salary, and wealth. The highest such actual payment of which I am aware involved the middle-aged CEO of a large German manufacturer convicted of criminal price-fixing in the graphite electrodes market; the company paid $10 million to the U.S. Government to help him escape a probable six-month sentence in a low security U.S. federal prison. I believe that $1.67 million per month is a bit too generous an amount for the opportunity cost of prison for most CEOs, not to mention lower level employees.

Connor & Lande[66] considered six different ways of evaluating the costs to executives of incarceration. The highest disvalue figure was $1.5 million per year. To be conservative they adopted $2 million per year and then trebled that to allow for other costs besides incarceration *per se*. Suppose we apply this generous incarceration-equivalent value to all the E-Rate incarcerations. That is, at a rate of $500,000 million per month times the 961 months imposed to the 20 imprisoned E-Rate executives, the possible monetary value is an impressive $480.5 million. When the total penalties of $536 million are compared to the $73.8 million in overcharges, we seem to have a clear case of over-deterrence. However, if the executives' (subjective) probability of being apprehended was less than 14 percent, then these penalties may well be optimal. Most surveys and studies of the probability of detection place it well below 30 percent.

[65] Because some individuals rigged bids together, we have tried to be careful to eliminate double counting of the bids.

[66] Connor & Lande 2011, *supra* note 6.

Figures

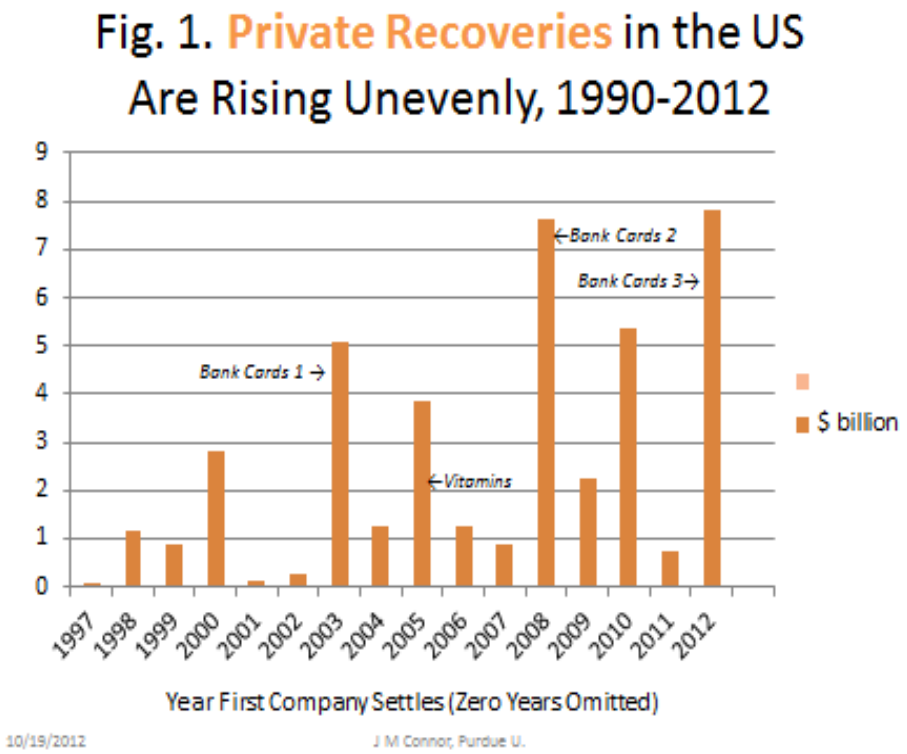
Fig. 1. Private Recoveries in the US Are Rising Unevenly, 1990-2012
9
8
7
6
5
4
3
2
1
0
Bank Cards 1 →
←Vitamins
←Bank Cards 2
Bank Cards 3→
$ billion
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
Year First Company Settles (Zero Years Omitted)
10/19/2012
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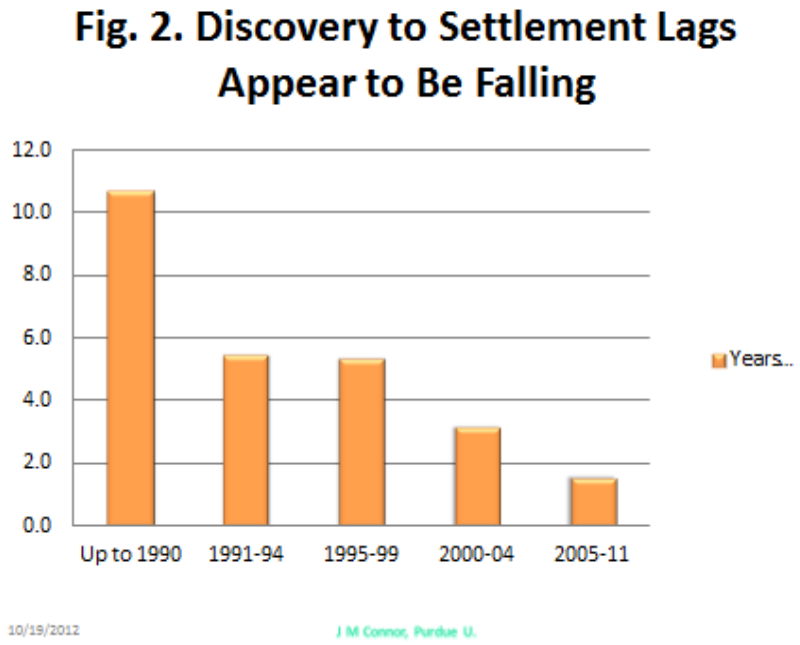
Fig. 2. Discovery to Settlement Lags Appear to Be Falling
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Years...
Up to 1990
1991-94
1995-99
2000-04
2005-11
10/19/2012
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Fig. 3. U.S. Private Actions, International Cartels (1990-2012)

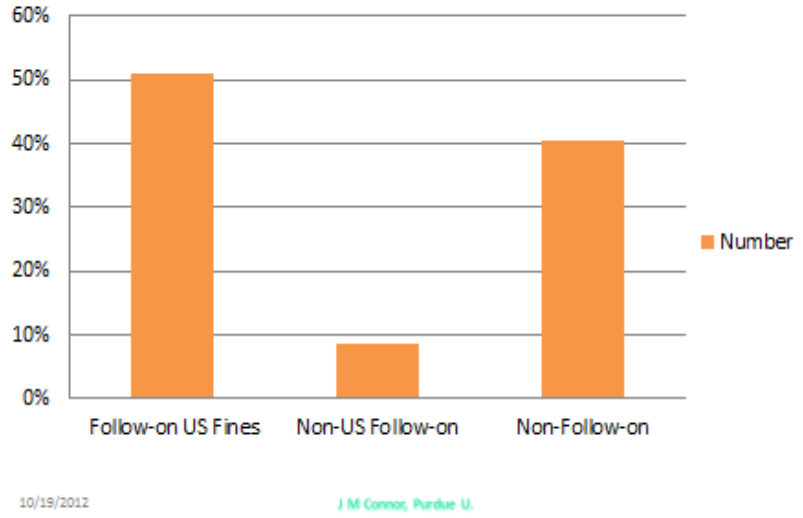

Fig. 4. U.S. Private Actions on International Cartels (1990-2012)

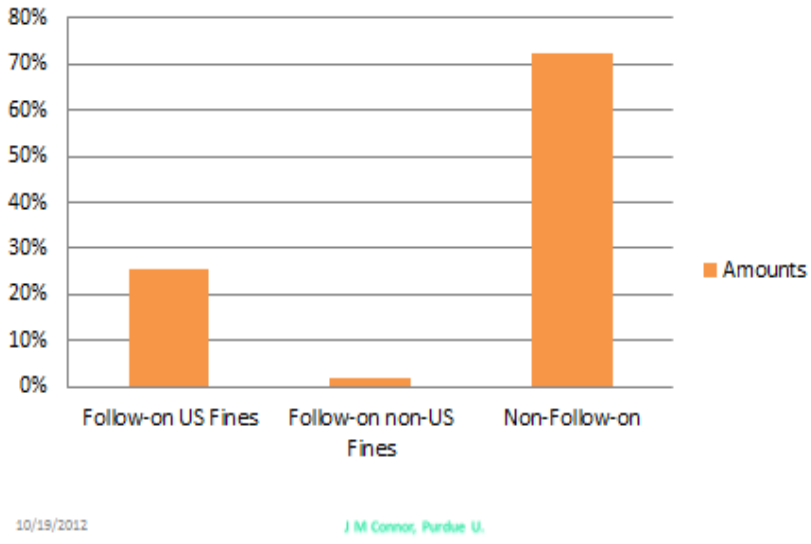

Fig. 5. U.S. Private Actions, International Cartels (1990-2012)

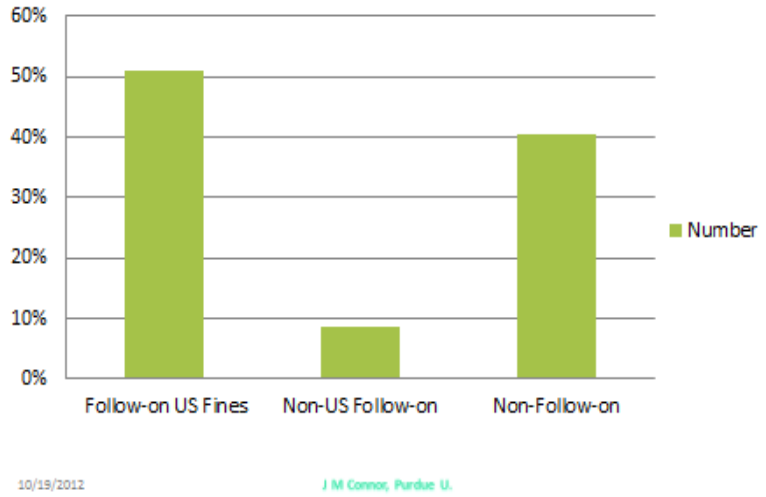

Fig. 6. U.S. Private Actions on International Cartels (1990-2012)

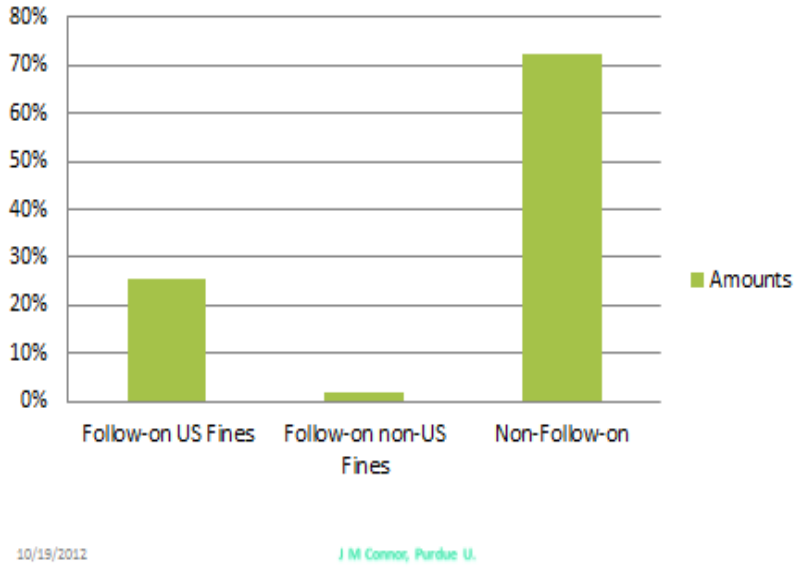

Fig. 7. Severity of Penalties on Non-Global Cartels, 1990-2010

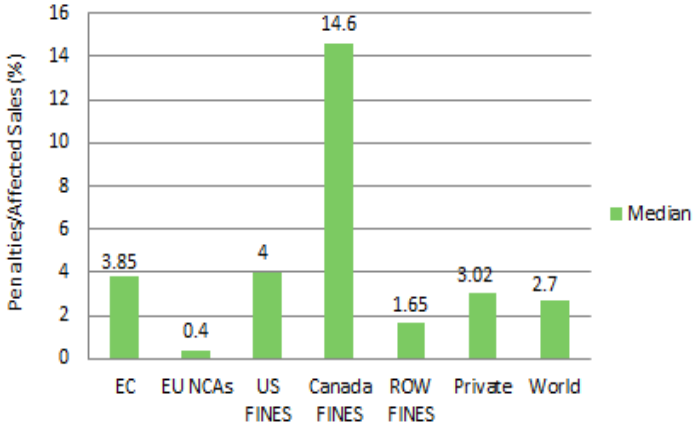

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Fig. 8. Severity of Penalties on Global International Cartels, 1990-2010

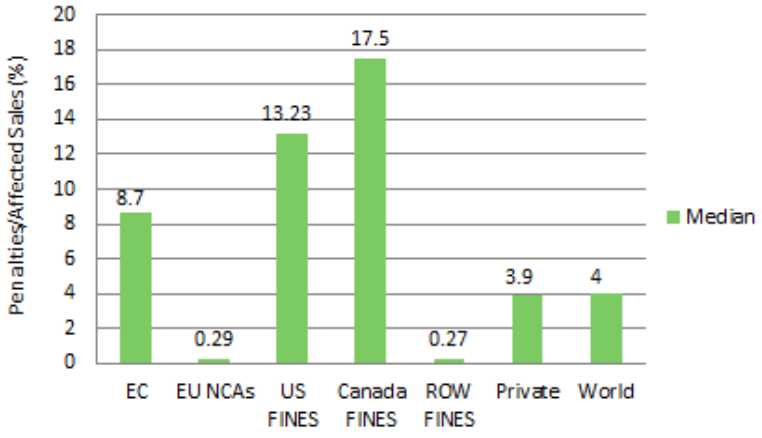

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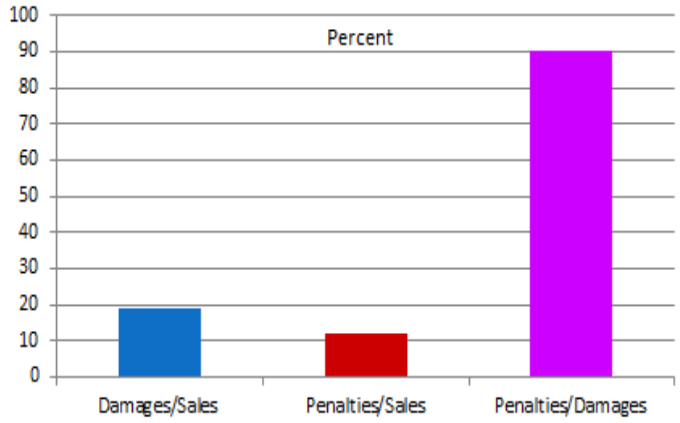
Fig. 9. Overcharges, Total Penalties, and Total Penalties/Damages Ratio



Note: A 100% ratio means full disgorgement of profits.

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