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Title: STATISTICS ON MODERN PRIVATE INTERNATIONAL CARTELS, 1990-2005

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Abstract:
This report explains the principal economic and legal features of a unique set of data on 283 modern private international cartels discovered anywhere in the world from January 1990 to the end of 2005. Measured in real 2005 money, aggregate cartel sales and overcharges totaled about $1.2 trillion and $300 billion, respectively. In the early 2000s, about 35 such cartels were discovered each year. We find that global cartels comprise more than half of the sample's affected sales and are larger, longer lasting, and more injurious than other types. In the early 2000s world-wide corporate penalties stabilized at or above $2 billion per year, one-thousand times penalties in the early 1990s. More than 40% of those penalties were from settlements in private suits, and most of the rest are fines imposed by U.S. and EU antitrust authorities.

Median penalties are low: from 1.4% to 4.9% of affected sales, depending on the type of prosecution. As a proportion of *damages*, median fines ranged from less than 1% for EU-wide cartels to 17.6% for Canada. Private plaintiffs obtained 38% of damages from international cartelists. World wide, median real cartel penalties of all types amounted to less than 21% of overcharges. [See Summary next page for more details]

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Summary

This report explains the principal economic and legal features of a unique set of data on 283 modern private international cartels discovered anywhere in the world from January 1990 to the end of 2005. Some of the main findings are:

- Approximately 47% were active only in Europe, 16% in North America, and 12% in nations of other continents. The remaining 25% of cartels were *global* cartels – those operating across two or more continents.
- For the cartels no longer under investigation, 86% were required to pay monetary penalties, 5% had received warnings, and the remaining 6% had seen their investigations closed without any known verbal or monetary sanctions.
- International-cartel discovery rates have been increasing since 1990, from four to six per year in the early 1990s to about 35 per year in 2003-2005. Since 2001 the majority of convictions have come from authorities other than the US or EU.
- Affected sales real 2005 U.S. dollars are about $2.1 trillion. Global cartels had the highest median sales ($2.6 billion), but those active only in Western Europe were not far behind. Seventy-nine percent of the sample's sales originated from cartels composed of manufacturers.
- The leading cartelized industries are in manufacturing (79% of sales), especially chemicals, nonmetallic minerals, paper, and electronic devices. Next are services (21%), and the least important are raw materials. Most cartelized goods are industrial intermediate inputs (62%).
- The mean cartel overcharge was $2.1 billion. Median overcharge rates for most kinds of cartels were 24% of affected sales, but the median for global types was 29% of sales. Thus, aggregate damages were over $300 billion (27%x1.2 trillion)
- Monetary sanctions imposed on international cartelists since 1989 have been the highest in antitrust history. Total penalties imposed were $25.4 billion in nominal terms and $13.5 billion in real 2005 U.S. dollars. Real penalties in the early 1990s totaled less than $2 million per year, accelerated quickly, and peaked at about $2 billion annually in 1998-2000.
- Widespread recidivism implies that present cartel sanctions are inadequate to deter cartel formation. More than 170 companies were price-fixing recidivists during 1990-2005, of which 11 companies fixed prices from 10 to 26 times.
- Penalties imposed on global cartels accounted for 56% of all real penalties, of which the 18 vitamins cartels were nearly half.
- Cartels caught in Europe accounted for 22% of the fines, North American cartels for 17% and the rest of the world only about 5%. Private damages suits in North America extracted at least 43% of the total penalties on international cartels.
- The median real penalty/sales ratio varied from 1.4 to 4.9%, depending on the type of prosecution. As a proportion of *damages*, median fines ranged from less than 4% for EU Member States' cartels to 17.6% for Canada. Private plaintiffs obtained 38% of damages from international cartelists. World wide, median real cartel penalties of all types amounted to less than 21% of overcharges.

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1. Introduction

Since the mid 1990s there has been a resurgence of interest in economic and legal studies of cartels, particularly cartels with international dimensions.[1] For the first time in decades, a review article was published in the American Economic Association's prestigious *Journal of Economic Literature* (Levenstein and Suslow 2006). A major collection of classic articles on cartels is about to be published (Salant and Levenstein 2007).

In part this renewal of interest represents an outgrowth of progress in game theoretic models of collusion and of auctions. Many recent economic studies are motivated by a desire to test the predictive power of new theoretical models. However, the principal driver of the post-1995 surge in cartel studies appears to be the increasing prevalence of discovered large-scale conspiracies by the antitrust authorities of North America and the European Union (EU). It is evident that the numbers of international cartels discovered by the antitrust authorities of Canada and the United States increased precipitously after 1995 (Connor 2003). Moreover, the government fines imposed on companies involved in international price fixing also escalated through about 2000, thereafter settling into a pattern of monetary sanctions that was much higher than that seen before 1995 (Connor 2004).[2]

Despite the renewed interest in international cartels, many authors bemoan the absence of appropriate data to engage in rigorous quantitative economic analysis. This is particularly true for "modern" cartels (those formed after World War II). While some researchers have had access to detailed economic data on a single cartel, the sparseness of cross-sectional data on modern cartels is particularly striking. This working paper attempts to close this gap by providing a methodical description of such a data set.[3]

These data can serve as a basis of several kinds of economic analyses of cartels. Empirical regularities can be used to identify "stylized facts" that guide the design of economic models of cartels. The economic dimensions of the newest international

[1] Connor (2006b) reviews the development of cartel studies from the 1880s to contemporary times. He identifies the 1890s, the late 1940s, and the late 1970s as peaks in numbers and quality of empirical studies by economists on cartels.

[2] Joshua (2006) points out that the trend toward markedly higher cartel fines in the EU had begun some ten years earlier. Although noted by scholars of European antitrust law, it is curious why economists did not turn their attention to cartel studies in response to the well documented international cartel decisions of the European Commission (EC). Perhaps it was because the *number* of EC cartel decisions did not increase much after the mid 1980s. Or perhaps it was the way in which the decisions were written: they typically focused on the conduct and internal organization of the sanctioned cartels but contained little information of the type that would permit economists to measure the effects on market performance or consumer welfare.

[3] The data presented in this report are current as of late 2005. Some of the figures on affected sales, overcharges, and monetary sanctions will be revised as new information comes to light. Moreover, new international cartels continued to be investigated and sanctioned in 2006. We hope to update this report in future years.

cartels can be compared to those active during the interwar period of 1920-1940; such a comparison may reveal insights about the influence of broad historical conditions (degree of globalization, rigor of anticartel regimes, etc.) on cartel formation or effectiveness. Other quantitative analyses can measure the determinants of cartel duration or overcharges.

Considerable effort has been devoted to collecting information on fines, settlements, and other cartel sanctions. These data are valuable simply as a way of charting the implementation of new antitrust policies, but are also useful as elements in a variety of legal-economic analyses. For example, one can evaluate the government-imposed and private antitrust sanctions relative to the economic harm caused by these cartels. This analysis has important implications for the deterrence power of antitrust sanctions (Connor 2006c). Moreover, one can use these data to analyze the pattern of cooperation discounts from the fines imposed by the world's major antitrust agencies, which some writers have criticized as arbitrary, opaque, and unpredictable.

Objective

This paper identifies and describes the members, markets, monetary sanctions, and other economic dimensions of all modern international cartels discovered by antitrust authorities since about January 1990. By members, we mean the names of the companies or their subsidiaries that were identified by prosecutors as participants in illegal price-fixing schemes. The markets are, of course, the products that were the objects of price fixing. We have attempted to collect or develop information on the "affected commerce" by the cartels; that is, for a large proportion of these markets we identify the revenues of the cartels during the collusive period. Monetary sanctions include both government fines and the settlements reached in private damages suits in North America. Finally, for a large minority of the cartels, we provide and analyze the market price effects (the "overcharge") of these cartels.[4]

Definitions

This paper focuses on private international "hard-core" cartels. A *cartel* is an association of legally independent firms that aims to raise their joint profits through explicit agreements. *Hard-core* cartels fashion agreements to control market prices or restrict industry supply (or both). We follow as far as possible the definition of *international price-fixing agreements* employed by the Antitrust Division of the U.S. Department of Justice (DOJ). That is, the term *international* describes a cartel's *membership composition.*[5] Therefore, an international cartel is a conspiracy in restraint of trade that

[4] The inclusion of price-fixing overcharges is an outgrowth of the senior author's research on the topic (see Connor 2006a, 2006b, 2006c, 2006d, and 2007; Connor and Bolotova 2006; and Connor and Lande 2005).

[5] A large majority of our sample of international cartels also are international in a geographic sense. Exceptions are national export cartels that usually have their membership drawn from one nation. Another exception is ocean liner conferences. They are categorized as global because their rates affected commerce between Europe and one other continent. All cartels fined by the EU qualify as international because the European Commission only has jurisdiction if a cartel sells a significant proportion of its output (or buys inputs) across the borders of the EU's member states.

has or is alleged to have one or more corporate or individual participants with headquarters, residency, or nationality outside the jurisdiction of the investigating antitrust authority. We have identified most of the cartels as international by using the country of registration of the parent companies participating in the cartel.

This paper further categorizes international cartels into three degrees of geographic spread, namely, *global, EU,* and *national.* Global international cartels fixed or attempted to fix prices on at least two continents. Most of the "global" cases examined herein involve cartels that targeted markets in "the triad" of the most industrialized regions of the world – Western Europe, North America, and East Asia. A large minority of the global cartels also conspired to fix prices in Africa, Latin America, Oceania, or other parts of Asia. The *EU-wide* cartels operate across two or more countries, but entirely within a single customs union, the European Union (EU).[6] The EU cartels are classified separately because while the EU is well along to becoming economically integrated into a single market, it is not quite a unified sovereign state with a federal structure. The national cartels confined their operations to one country.

Categorizing cartels according to their geographic locus of operation is usually straight forward. The corporate members of global cartels subject to U.S., Canadian, or EU prosecution usually are identified as such by the press releases or reports of the prosecuting authorities. Joint raids or publicly revealed investigations by two or more of the major antitrust agencies are further indicators of probable global scope. In a small number of cases, the composition of the cartel allows one to infer how widespread the cartel operated. However, a few cartel cases required judgment about their geographic locus of operation.

The *EU-wide* cartels are signaled by the involvement of the EC as the prosecuting unit, because the EC is usually required to establish significant effects on trade between the Member States in order to investigate a potential violation.[7] However, the reverse is not true. Member States of the EU typically prosecute only nation-wide cartels with negligible cross-border effects, but their competition authorities *may* prosecute international cartels under EU law as well. The 2003 prawns-fishing case in the Netherlands is the first example of this type.

Focusing exclusively on international cartels is justified on several counts. Foremost is the fact that international cartels present prosecutors with distinctly greater challenges than purely domestic conspiracies. The difficulties of obtaining evidence and testimony from sources located abroad are well documented by failed prosecutions in the early 1990s; lack of cooperation from foreign governments and courts added to these difficulties. Another justification is the notably greater publicity given international cases by journalists and the antitrust authorities themselves; this ensures that information more likely to be complete for international cartels than for modest domestic actions. Finally, the economic harm caused by international collusion tends to be greater than localized conspiracies.

[6] The EC has antitrust jurisdiction not only the EU proper but also a group of states that are members of the European Free Trade Agreement (Norway, Iceland, Liechtenstein and, before they joined the EU, Finland, Sweden, and Austria). This expanded antitrust zone is called the European Economic Area.

[7] The vitamin B4 cartels are a case in point. Three North American manufacturers agreed to cease exporting to Europe, and three European companies reciprocated. All six met once, but thereafter operated separately as far as is known. We treat them as two conspiracies, one centered in the NAFTA area and one EU-wide.

The *national* category contains the smallest cartels in a geographic sense, those few that had international representation but that operated solely or almost solely within a single national border or a single customs union.[8] A cartel prosecuted by one national authority may have been active more broadly, but a second antitrust authority may not have prosecuted because of lack of evidence or limited prosecutorial resources. In a few cases, multiple national prosecutions are entered as separate observations even though one might speculate that they were connected conspiracies.[9] Although a rather awkward phrasing, these cartels may be thought of as "domestic" international cartels.

Global cartels are a special kind of international cartel, one that fixed prices in at least two continents. Most global cartels attempted the control of prices in all three of the world's major industrialized regions: East Asia, North America, and Western Europe; all other areas open to international trade were usually affected. In a few cases, global cartels rigged prices on only two continents.[10]

Scope

This paper samples international cartels that have been "discovered" because they were sanctioned or are likely to be sanctioned for a price fixing violation from January 1990 through December 2005. By sanctioned is meant pleaded guilty, were judged guilty by a court of law or a commission, were indicted and are awaiting trial, were fined by an antitrust authority, or agreed to pay a civil settlement.[11] Cartels known to be under investigation by a public antitrust authority between January 1990 and March 2006 are sampled. Most were sanctioned by March 2006, but a small proportion are either still under investigation or had their investigations closed before an indictment or a Statement of Objections was issued. Usually the reasons for closing an investigation are not announced, but often the reason is lack of sufficient evidence or illegal activities that were curtailed prior to a statute of limitations.

There are no geographic or industrial limitations on the cartels sampled. However, as the world's most active antitrust authorities are clustered in North America and Europe, the sample contains relatively few cartels active only outside these continents. Searching for cases was made principally in English-language sources. More than half of the world's antitrust authorities have English-language sections that sometimes give detailed accounts of sanctioned cartels.[12] Cartels active in Australia, New Zealand, South Africa, and a few other Anglophone jurisdictions may be over-represented because they have assertive English-language presses.[13]

[8] A few "NAFTA" cartels that operated in both Canada and the United States are placed in this category.
[9] For example, several ready-mix cement bidding rings have been prosecuted in Europe that contained overlapping membership and time periods. Some European retail-gasoline and pharmaceutical cartels may have been prosecuted after cooperation among some EU member states.
[10] The choline chloride cartel is an example. For a couple of years the six North American and European producers had a world-wide scope, but then after agreeing to cease exports into each other's continents, they divided management into two parts that operated with little overlap or communication.
[11] In a few cases cartels are included that experienced initial sanctioning decisions in the 1980s were appealed and final decisions not issued until the 1990s.
[12] The OECD gathers competition-law agency reports annually.
[13] On the other hand, many non-English-speaking countries have major newspapers or press services that translate important business and government news.

Organization

We begin this report by explaining how the sample of private international cartels was created and providing a brief overview of how the observations are distributed by region, industry, and over time. The next section examines the known and projected affected sales of the cartels. We next analyze an important measure of modern cartel effectiveness, namely, the market price effects. Estimates of the amount of overcharges in at least one geographic region are available for about one-third of the sample. Overcharge rates are also calculated. Finally, we present information on recidivism and corporate monetary sanctions by antitrust authorities and courts everywhere in the world. This last substantive section is applicable to the current policy debate on optimal cartel sanctions.

2. Data

Collection Methods

Information is drawn from many sources. First, most discovered cartels are first revealed to the public when fines, a guilty plea, or an indictment is announced in press releases of the DOJ, the Canadian Competition Bureau (CCB), EC, or a score of other national antitrust authorities with active anticartel programs. The brief press releases are followed by additional documents, such as sentencing memorandums, plea agreements, detailed published decisions (in the EU especially), "statements of fact" (in Canada), annual reports, and speeches of antitrust officials. In Europe the most important cartels have the full decisions of the EC (some of them running to more than a hundred pages) posted publicly a year or two after the brief press releases about Commission decisions. Lesser cases are described in the Competition Directorate's quarterly newsletter. All these documents are preserved on the web sites of the U.S., Canadian, and the EU antitrust authorities going back to the mid 1980s in most cases. Related U.S., Canadian, and European court decisions are fully archived.

A second source of data occurs when an investigation is announced or leaked to the press or when raids on corporate offices are noticed. Then business newspapers, trade magazines, and news services begin to publish pieces on the alleged violators and their industries. Older articles are often available that describe the size, growth, and market structures of the affected markets. Once the span of the violation is known, production quantities or list or transaction prices can sometimes be located for some industries. Among the more useful trade magazines and newsletters are *Chemical Market Reporter*, *Oil and Gas Journal*, and similar publications available on major business-and-law search engines (*Factiva*, *LexisNexis*).

Third, a small number of academic and government researchers have been compiling similar data sets. Among the most useful are working papers by Levenstein and Suslow (2001, 2002) and Levenstein, Suslow, and Oswald (2003). A useful government publication is OECD (2002) and its annual competition-law reports by members. And of course we have built upon data collected in the authors' previous publications (e.g., Connor 2003).

Summary of Numbers of Observations

There are a total of 283 private international cartels in the sample (Table A).[14] Nearly half (47%) of the cartels operated within Europe: 20% across two or more Member States of the EU, and 24% within the borders of single nations of Western (24%) or Central (3%) Europe.[15] One-fourth of the sample consists of global cartels. One-sixth of

[14] There are two markets (German cement, stamps) with two episodes; otherwise, all observations have single episodes. On the definition of cartel episodes, see Levenstein and Suslow (2006: 54-56).

[15] This category may be overstated at the cost of the EU-wide cartels because since about 2000 the EC has pursued a policy of devolution of antitrust enforcement. Cases formerly handled by DG-COMP in Brussels are now being referred for prosecution to national competition authorities. In at least three

the international cartels confined their activities to North America. Most of the remaining 35 cases refer to cartels active only in Korea, Japan, Brazil, and Australia.[16] The geographic distribution of the sample does not necessarily reflect the true location of international cartel activity. Rather, the distribution is the result of variation in tolerance of cartels by national business cultures, differing degrees of effectiveness of detection of price fixing by antitrust authorities, and the assertiveness of public reporting of antitrust violations.[17] We expect the proportion of international cartels discovered outside North America will rise in the next few years.

Table A. Numbers of Cartels, by Location, Industry, and Legal Status

Geographic location:	*Number*	*Percent*
North America	46	16
EU-wide	56	20
Nations of Western Europe	68	24
Central and Eastern Europe	7	3
Asia	20	7
Oceania	4	1
Other (Africa 2, Latin America 9)	11	4
Global	71	25
Industry:		
Agricultural and forestry raw materials	6	2
Minerals	2	1
Food, beverage, tobacco products	19	7
Paper and printing	14	5
Organic chemicals	61	22
Inorganic chemicals	18	6
Petroleum products	11	4
Rubber and plastic	14	5
Stone, clay, graphite, and glass products	23	8
Metals, mostly fabricated	14	5
Machinery and electronic devices	17	6
Other manufactures	18	6
Construction	14	6
Transportation services	16	6
Communication services	13	5
Distribution	11	4
Other services	9	3

markets characterized by geographically localized markets (beer, retail gasoline, and cement), investigations of similar alleged violations have been conducted by multiple Member States.

[16] These cases do not include five prosecutions of global cartels by these jurisdictions.

[17] Tolerance is relatively high in Asia and Europe, but is changing fast in Europe and some countries of Asia (e.g., Korea). The first corporate leniency program was adopted in the United States and became effective only from about 1995 (Connor 2001). Similarly effective programs elsewhere began to turn up large numbers of confessions by cartelists only from about 2001 or 2002. Antitrust authorities other than the DOJ and the European Commission have notably stepped up publicity of cartel cases since around 2000, and the local business presses seem to have shown more competence and interest in reporting secisions.

Legal status:		
Government fines imposed	175	62
Other financial sanctions	18	6
Consent decree or warning	10	4
Investigation closed without penalties	13	5
Investigation incomplete [a]	67	24
TOTAL	28	100

Source: Spreadsheet dated October 2006.
a) Includes private damages suits with no settlements announced

More than 200 of the 283 cartels occupied various branches of the manufacturing sector. Of these, more than 38% are chemical intermediates[18] and 11% products made from nonmetallic minerals. No other branch of manufacturing accounted for more than 7% of the sector. In contrast with international cartels from the first half of the 20th century, modern international cartels more frequently appear (25% of the sample) in the service sector and few are seen colluding on raw materials (3%).

Our sample includes a large backlog of cartels believed to be under investigation with no known resolution of the legal actions (24% of the 283 observations).[19] Of the 216 cases investigated where a decision has been made somewhere in the world, only 6% were closed without a published warning or monetary penalty. Most sampled cartels (72%) have been found guilty by courts of law or administrative commissions. Of the 203 sanctioned cartels, 9% were sanctioned solely by settlements negotiated private plaintiffs,[20] and 5% of the government prosecutions ended with warnings or consent decrees rather than fines.

Besides the cartels themselves, we have collected information on the names of corporate and individual price-fixers. The number of corporations and other business entities found guilty or charged with violations is 1540. This number includes parent groups as well as their subsidiaries. On the one hand, 1540 is an over count because some of the corporations are double counted because of recidivism. On the other hand, 1540 is an undercount because on-going investigations frequently do not reveal the

[18] We treat the vitamins cartels as 16 separate cartelized markets (see Connor 2006a), whereas other cartel researchers count them as one cartel (Levenstein and Suslow 2006: footnote 46)

[19] By "investigation" we mean an official decision by an antitrust authority to open a probe or, if that has closed, a continuing unresolved private damages suit. Most of the investigations are known because of semi-public raids. Many other cartel investigations occur in secret until a decision is announced. In 2006 the DOJ had about 60 grand juries empanelled to hear international cartel cases, and the EC was known to have received about 80 amnesty applications for cartel violations (few of them acted upon). If no announcement can be found five years after one is opened, we assume that an official investigation has been terminated.

[20] The 9% figure is very likely an undercount because negotiated settlements may be accompanied by *unpublished* state or federal court decisions. Large class-action settlements are usually trumpeted by Internet web sites or on the Web pages of the plaintiffs' lead counsel; however, monetarily small cartel payouts or settlements involving only *cy pres* payments often go unreported by the press.

targets and because the press releases of antitrust authorities sometimes fail to list individually all the companies that were sanctioned.[21]

Temporal Patterns: Launch Dates and Duration

By about 1993-1995 the Antitrust Division of the U. S. Department of Justice (DOJ) had made the prosecution of cartels its highest enforcement priority (Connor 2004). Moreover, since 1997 the majority of guilty pleas and fines for price fixing have come from corporations headquartered outside the United States. In the European Union, reorganizations of the Directorate-General for Competition (DG-COMP) and statements by the Commissioners for Competition indicate that fighting cartels has been the highest priority since the late 1990s.[22] Many other national antitrust authorities echo these sentiments.

The number of international cartels discovered has been rising nearly every year since the 1980s (Figure 1). The numbers shown are what we term the "dates of first notice," i.e., the first year that either an investigation or a sanction[23] was announced or leaked to the press. The total number of legal actions took notable jumps in 1992, 1998[24], 1999, 2002, and 2004. The DOJ and EC have jockeyed for first place in the cartel-sanctions race. While compared to the EU in the early 1990s the US was slow to act, it overtook the EU around 1995. However since 2001, the EC has pulled out ahead. Since 2000-2002, the share of cartel discoveries by the US and EC have declined as sanctions imposed by other antitrust authorities have risen in importance.

[21] An extreme example is the huge construction-sector investigation by the Netherlands Antitrust Authority (NMa). Only 15 company names have been announced publicly, but 400 companies are being fined or offered leniency. In the Eastern German ready-mix concrete case, only 14 out of 69 punished firms' names were released by the Bundeskartellamt.

[22] Despite these pronouncements, annual reports of the two authorities seem to show that the largest allocation of effort is in the area of merger control.

[23] In the US and Canada, if fines are announced on several dates, it is the first dated that is recorded in our sample.

[24] Investigations of most of the US vitamins cases were announced in this year; most US and EU prosecutions of these 16 related cartels took place in 1999 and 2001, respectively. The DOJ seems to count the vitamins prosecutions as one to three cases, but the EU treated each cartel as a separate violation.

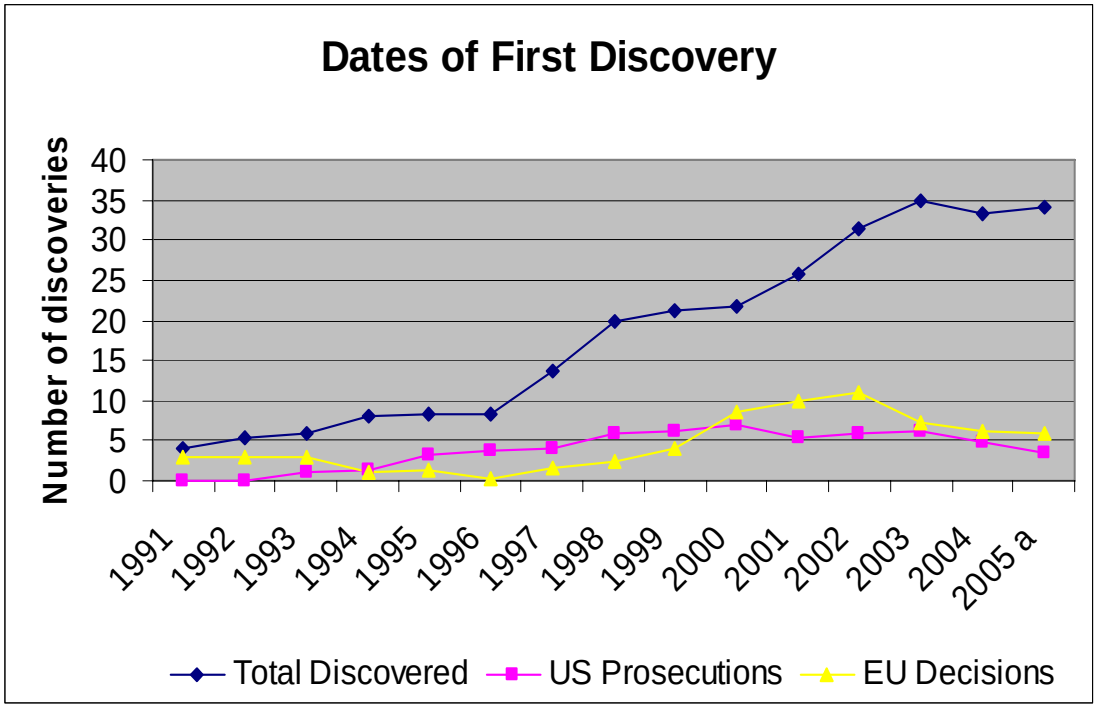

Figure 1. Number of International Cartels Discovered (3-Year Moving Average)

Data on the longevity of more than 230 cartels is shown in Appendix Table 23. One cartel that persisted through two world wars and multiple changes in competition laws endured for 95 years. Median duration was 5.0 years and mean duration 6.4 years. The longest lasting cartels were the global (6.0 median years) and EU-wide (5.5) types. The cartels from single nations of Western Europe endured only 3.5 years; Asian, Eastern European, and Latin American cartels were also relatively short-lived.

Limitations

While these trends tend to comport with the views of antitrust officials, lawyers, and other observers about changing enforcement priorities, the rising trend in total discoveries could in part reflect greater understanding of and attention to the world's business and legal press.

In common with nearly all other empirical studies on cartels, this paper considers only *known* cartels. Specifically, the data set comprises only private cartels whose participants were aware of the illegality of their actions in at least some of the jurisdictions in which the cartel operated. These cartels were clandestine, and members typically attempted to cover up or destroy evidence of their meetings and communications. Suggestions in the cartel literature are that only about 10% to 30% of all such conspiracies are discovered and punished (Connor 2003:62). Undiscovered cartels may be more durable or differ in some other economic characteristics, but it is also possible that discovery is tied only to managerial personality characteristics (e.g., the tendency to become a whistle-blower) that are distributed disproportionately to discovered cartels. If the latter is true, then the discovered cartels in this report may be representative of the majority of cartels that are hidden.

3. The Biggest Cartels

In this section we examine cartel size by the value of sales revenues in the affected market during the collusive period. Nominal cartel revenues are converted to US dollars with the annual average interbank exchange rates for the collusive period.[25] Real 2005 sales are computed using the Producer Price Indexes (PPIs) for the United States, for several major economies of Europe, or the mean of these two PPIs using the middle year of the collusive period as the base year (see Box).

Ranked by Affected Sales

The top 40 biggest cartels, measured in real 2005 affected sales, are shown in Figure 2. The sample is highly positively skewed. The top 40 cartels range in size from $8.5 billion to $97 billion. Sixteen of these cartels have affected markets with greater than $20 billion of sales.

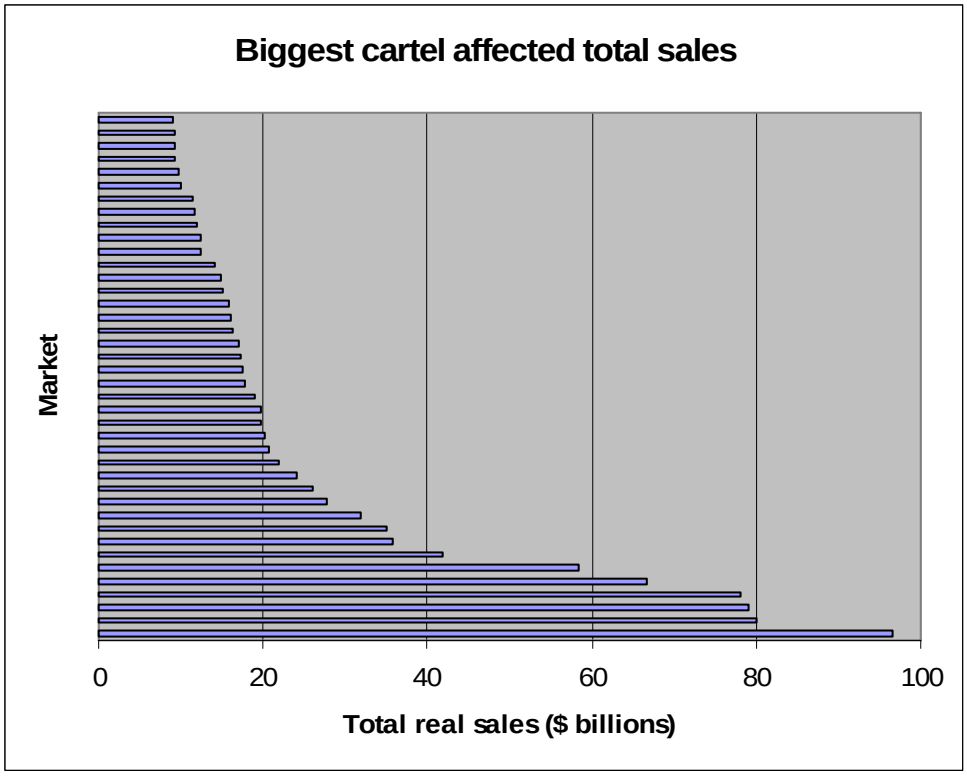

Figure 2. Distribution of the 40 Biggest Cartels by Real 2005 Affected Sales

Intuitively one would expect that cartels that global cartels have larger sales than more regional cartels. As can be seen in Figure 3, four of the top ten cartels[26] and half of the top 20 were in the global category. Most of the rest of the top 40 were active only in Western Europe or North America. Western European and global cartels each

[25] In cases where affected sales are not revealed, we assume umbrella pricing and use total industry sales in the appropriate region. A few cartels were under investigation as of 2005.

[26] The first four are publication paper (global), high voltage cable (Germany), commercial insurance brokers (US), SRO construction (Netherlands), in descending order.

represent 37.5% of the sales of 40 biggest cartels and the US is responsible for 20%. Surprisingly, none of the top 40 biggest cartels were active only in Asia. Two cartels from South America and Oceania were at places 36 and 28, respectively.

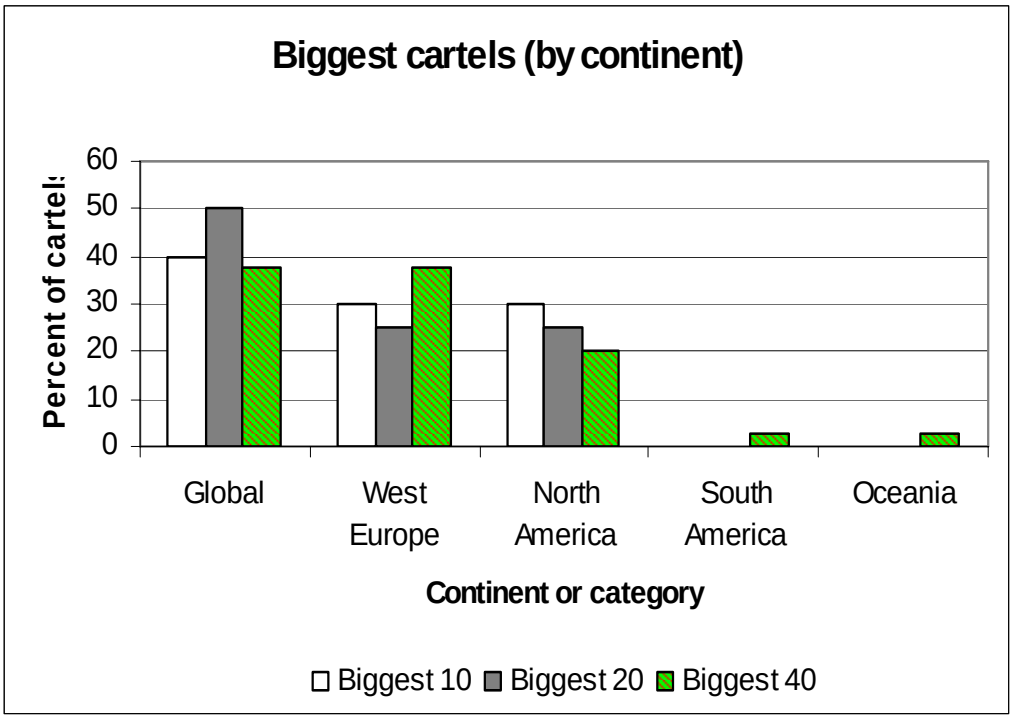

Figure 3. The 40 Biggest Cartels by Location

Projected Sales

As discussed above, a frequent limitation in cartel research is the clandestine nature of cartels. The majority of private cartels never come to light. Some antitrust authorities keep their investigations and decisions confidential and most reveal very little about the economic dimensions of penalized cartels. Similarly, when allegations of price fixing surface, most companies try to minimize publicity about their involvement. Large antitrust sanctions receive ample publicity by the business press, but decisions about smaller cartels may go unreported.

These points apply especially to information about reporting of affected sales. There may be publicly accessible information available for broadly defined industries (e.g., amino acids), but cartels often cartelized rather finely defined products (e.g., feed-grade lysine). Therefore, to provide a comprehensive estimate of total cartel impacts, we decided to estimate the unreported sales in markets where collusion is known to have occurred. A simple expected value method[27] allows us to estimate that affected sales in

[27] The underlying assumptions of the expected value model are: 1) A colluding cartel needs market power in order to collude. Therefore it is assumed that all cartels within each industry have a similar concentration level which means that the number of participating firms is irrelevant. 2) Since all data is within a short time frame (1990-2005) only duration, not time of collusion, matters. 3) Real sales are linear and each industry shares the same intercept and slope. 4) The mean duration for a cartel is 5 years which is used for duration where duration is unknown. See Helmers (2006).

46 markets with unknown sales are $763 billion.[28] Total known and projected sales of the 283 international cartels in our sample are $2.1 trillion.

By Geographic Location

Cartel size varies according to geographic scope (Figure 4). The chart counts the number of cartels for which we have sales data[29] and shows mean and median real 2005 sales.

The Western European cartels are the most numerous (67 observations) and have median affected sales of $2.85 billion, the second-largest category in the figure. This category includes 30 relative large EU-wide cartels (median of $4.7 billion in affected sales) and 37 smaller cartels ($1.5 billion) that were active in only one nation of Western Europe. The very large sizes of the EU-wide cartels reflect the frequency with which collusion is reinforced by EU trade associations, the European Commission's targeting of shipping conferences, and their long duration.[30]

There were 52 global cartels with global sales data available, the second-largest geographic type of cartel. Despite their greater geographic spread, the median affected sales size of global cartels ($2.64 billion) is only slightly larger than those that confined their operations to Western Europe. Indeed, the global cartels are on average considerably smaller (44% smaller) than the EU-wide cartels.

Naturally, cartels confined to single nations tend to be the smallest type, with those operating only in the United States, Canada, or both countries among the smallest of all.[31] The 40 North American cartels' median affected sales were just shy of $900 million. Even though the North American market is about equal in GDP to the EU market, the average North American cartel is only one-fifth as large.

[28] Projections are based on expectations of duration where duration is unknown and where sales are calculated using regional averages within each separate industry.
[29] We have sales data for 177 (63%) of the 283 cartels in the full sample.
[30] The mean duration of the EU-wide cartels is 7.2 years, 10 to 15% longer than the whole sample.
[31] Because of their small numbers, it is perilous to compare the median sizes of cartels operating in Eastern Europe, Africa, or Latin America.

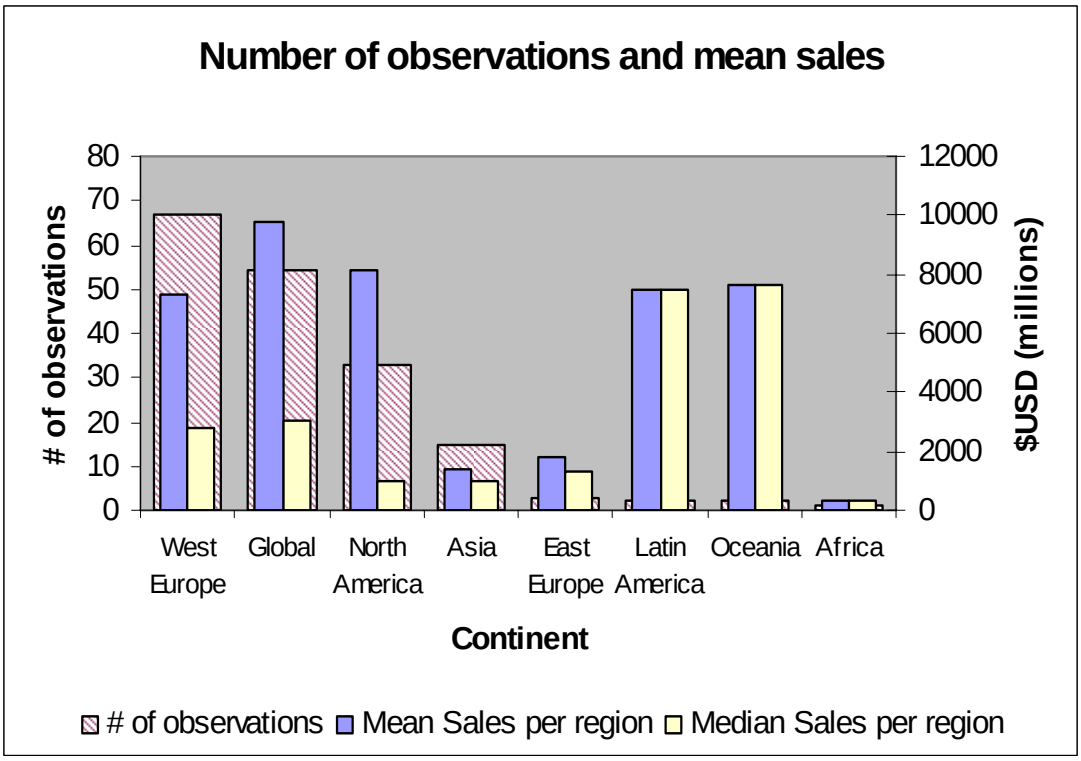

Figure 4. Geographic Distribution of Cartels by Number & Sales.

The disparity in Figure 4 between mean and median sales for the three largest geographic types of cartels suggests that the sales are highly positively skewed. This impression is reinforced by Figures 5 to 7. Smaller regions exhibit more equality of size distribution.[32] The United States and Europe in particular, have a more unequal distribution of cartel sizes.

In the United States, figure US, the largest cartelized markets are publication or "magazine" paper (under investigation), "prestige" cosmetics, and insurance brokers, in descending order. In Western European there are by three major cartels that are $20 to $60 billion bigger than the rest. These markets are German high-voltage cable, construction in the Netherlands, and the EU-wide cement cartel, in descending order. The German cable cartel – an extreme case in our sample --is so large ($80 billion) because it was formed in 1902 and endured for 95 years, thereby resulting in a very large adjustment for inflation.[33] Sales for the Dutch construction-industry bidding conspiracy (the "SRO" groups) were large because the bidding organization funneled virtually all tenders in the Netherlands for 12 years beginning in 1980

[32] One measure of inequality of distributions is the Gini coefficient, which yields a number between zero and one, the former meaning perfectly even and the latter very distorted. These regions have the following Gini distributions: USA 0.82, Total 0.74, EU 0.74, and other countries 0.66.

[33] The real affected sales figure of this cartel is strongly understated. Following the lead of the Bundeskartellamt, the German antitrust authority, we assumed that the cartel began in 1958, the first year of the current German antitrust law. Nominal sales were estimated to be $29 billion for 1958-1997. The real 2005 sales figure is derived from the earliest year we could obtain a European PPI, which is 1974. Had we extended the affected period back to 1902 under a no-growth scenario and used an appropriate 1950 PPI, 2005 affected sales would exceed $350 billion.

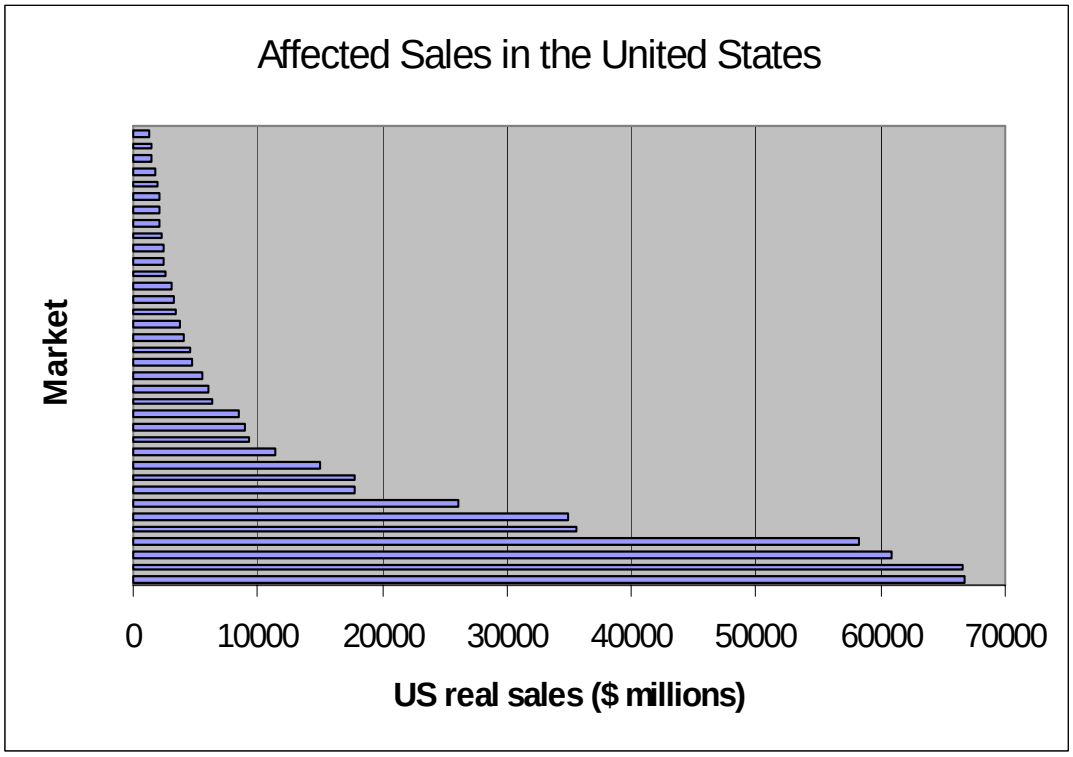

Figure 5. Distribution of U.S. Real 2005 Affected Sales

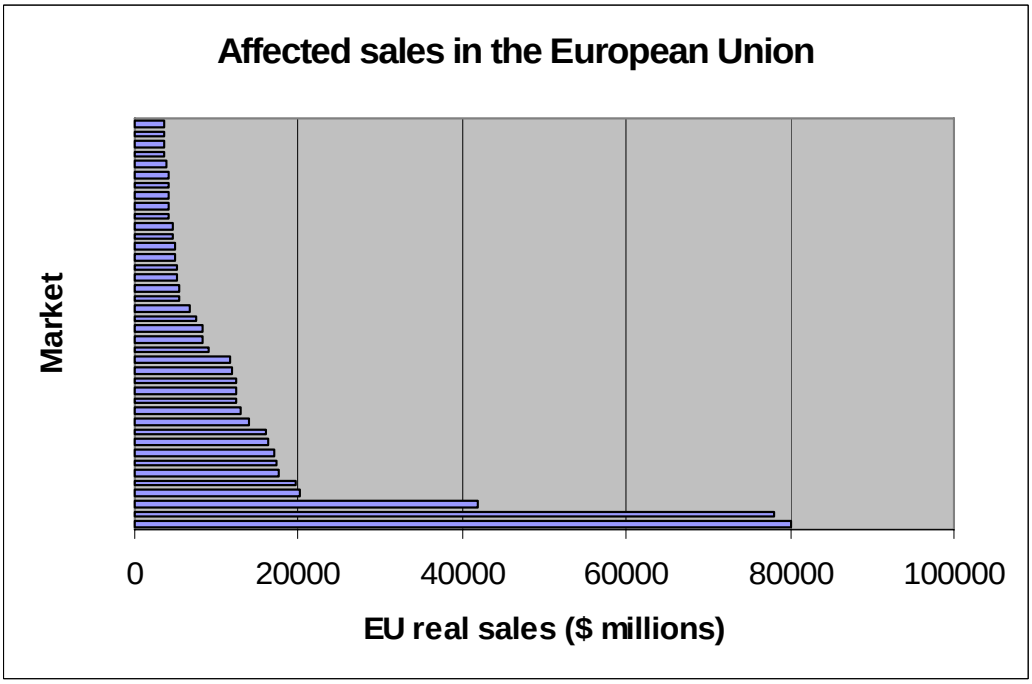

Figure 6. Distribution of EU Real 2005 Affected Sales

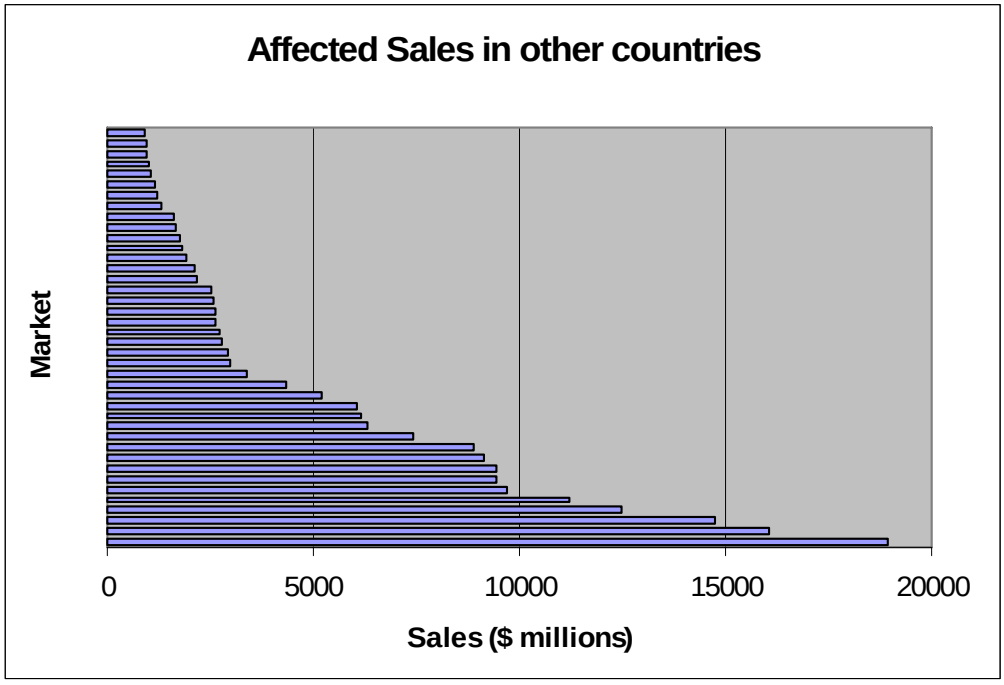

Figure 7. Distribution of Real 2005 Affected Sales in Africa, Asia, Latin America, and Eastern Europe.

Sales by Product Type and Industry

Cartelized markets tend to produce a limited range of product types and industries (cf., Table A and Figure 8). As in the past, modern international cartels sell mostly (79% of total sales) manufactured goods. Cartels selling industrial intermediate goods accounted for 62% of total 2005 affected sales and an even higher proportion (74%) in North America. However, capital inputs are only infrequently the object of collusion outside of Western Europe, where they accounted for 17% of EU affected sales.

The second most cartelized type of product is services, which accounts for 21% of affected sales. Services cartels comprise a relatively small share of the North America cartels, whereas they are more common in the rest of the world. Consumer manufactures account for 10% of all affected sales. The smallest type of cartelized product is raw materials.

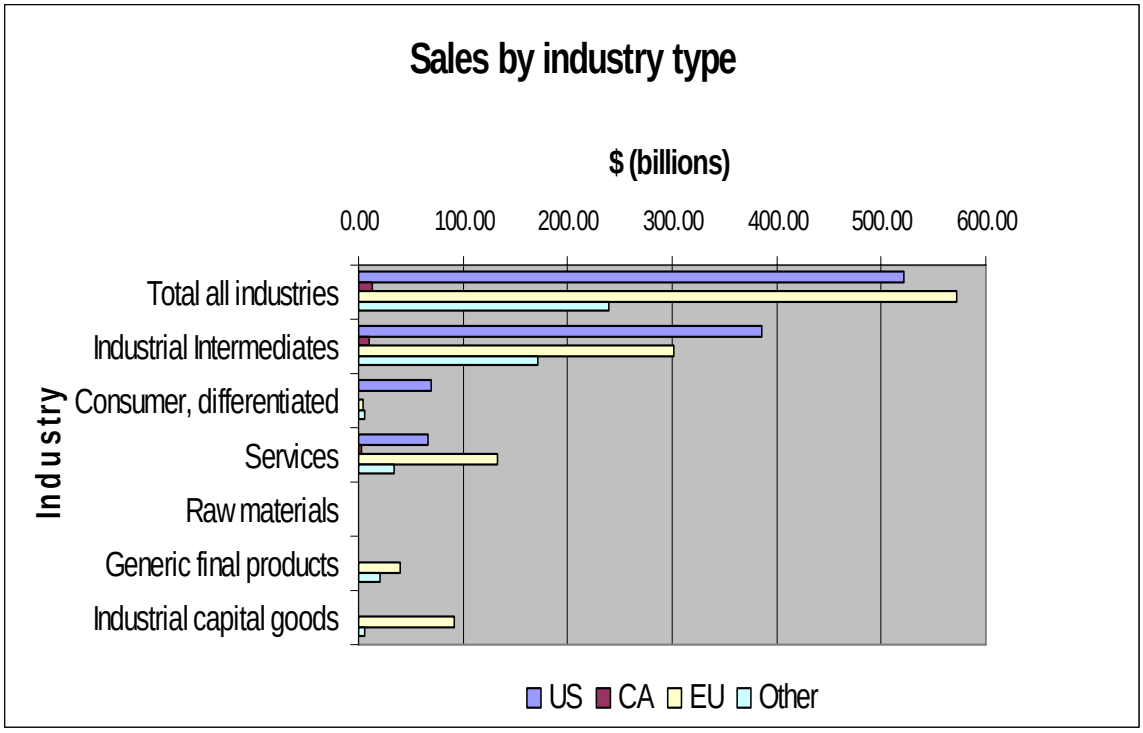

Figure 8. Distribution of Real 2005 Affected Sales by Cartel Product Type

Sales by industry groups are shown in Tables 21 and 22 in the Appendix. In the manufacturing sector (75% of total sales), *chemicals* is the leading industry (32% of manufactures' sales). This is followed by *nonmetallic minerals* (20%), *paper and printing* (15%), and *electronic devices* (11%). Services account for 22.8% of total sales, and the most important services are *construction* (35% of service sales); *finance, insurance, and banking* (27%); and *communication* services (18%).

4. Cartel Overcharges

The principal objective of most cartels is to increase the joint profits of the cartel's members.[34] Raising selling prices above the prices that would be observed in the market in absence of cartel conduct is the most common method of attaining supra-normal profits.[35] The price effects of cartels are measured by the difference between observed market price and the "but-for price" during the collusive period.[36] To easily compare the price effects across cartels, this difference may be divided by the but-for price (the *overcharge rate*) or by the observed market price (the *Lerner Index* of market power). In this report, we show the overcharge rate.[37]

Amounts, Nominal and Real

Our estimates of the dollar overcharges are shown in Table B. There are 209 unique observations. For most of the 34 global cartels, there are five overcharges available, three for the United States, Canada, and the European Union[38], one for the world, and a residual category largely consisting of East Asia and several less industrialized continents. However, for some global cartels only one or two estimates are available. Estimates in the first four columns of the table contain overcharges generated both by

Table B. Summary of Known Cartel Dollar Overcharges by Region [a]

Item	Jurisdictions			Other Regions	Total	
	U.S.	Canada	EU		Global	World
Number	50	31	62	32	34	106
Million Current U.S. dollars	39,977.4	711.8	56,290.7	7844.5	--	161,890.3
Million Real 2005 U.S. dollars	54,001.4	974.5	99,459.3	10,185.3	98,285.1	225,086.8
Million Real	1080	31	1604	318	2586.4	2123

[34] Many cartels established in the interwar period (1920-1939) claimed to pursue a price *stabilization* goal rather than improved collective profits. There is some empirical evidence to support this purpose (Levenstein and Suslow 2004). However, as many of these cartels operated in the Great Depression, during which prices frequently were falling, "stabilization" was in fact an attempt to prevent prices from falling as fast as natural market forces would have caused them to fall.

[35] Alternatively, if the cartel exercises oligopsony power, then the objective will to be to lower the price of a purchased input. Also, a cartel may try to enhance long-run profits by preventing market entry or slowing supply expansion by producers that are not members of the cartel. The latter conduct is most often regarded as an ancillary objective to control of market price.

[36] The but-for price is often called the competitive benchmark. It may be the price expected price under perfect competition, or it may be the price that members of the cartel would charge as a result of tacitly collusive conduct.

[37] This is the ratio generally preferred in legal writings; it may range negative to positive infinity. The Lerner Index is more common in the writings of economists; it can vary from zero to nearly one or from 0% to almost 100%. There is a simple formula that converts one index into the other.

[38] The EU is almost coextensive with Western Europe, but in most cases sales and overcharges are reported for the European Economic Area.

Dollars per cartel (mean)						
% of real dollars among regions	33%	0.6%	60%	6%	0%	--
% of real dollars total	24.0%	0.4%	44.3%	4.5%	26.9% [b]	100%

Source: Appendix Tables 6 to 10.
-- = Not available

a) Based on affected sales in the region. The first four columns include regional overcharges by global cartels. Global cartel overcharge are a sub set of the world overcharges. In many cases "World" overlaps with the region; in some cases, only a world estimate is available for a global cartel.

b) This ratio represents overcharges for which only global estimates are available; the remaining 73% of real overcharges are *duplicated* at the regional level.

purely national conspiracies[39] and by jurisdictional price effects from global cartels. Details are shown in Appendix Tables 6 to 10.

Calculating Real Sales, Overcharges, and Penalties

We display these figures in "real" 2005 U.S. dollars. We start with the nominal value of sales or overcharges and adjust for inflation and for the time value of money. If a cartel was located in North America, the U.S. Producer Price Index (PPI) for the mid point of the cartel's life is divided into the nominal value of sales revenues or overcharges. PPIs for Europe and the world were used for other cartel locations.

If there were fines or settlements paid, then the opportunity cost of money (prime bank lending rate + 1%) is calculated from the middle year of cartel activity until the year when the fines were paid using a Prime Rate deflator. (That is, we assume that the defendants invested their illegal profits in a conservative asset and that plaintiffs deserve prejudgment interest because they would have invested the same in the absence of an overcharge). The Prime Rate deflator is divided into the nominal penalty paid. Then the PPI deflator for the appropriate region (North America, Western Europe, or a combination of the two) is used to compute the 2005 value of those overcharges from the year the fines were paid.

We find that in nominal dollars, more than $160 billion in known damages were inflicted by the cartels in our sample. However, it is more appropriate to express historical data in "real" terms that corrects for the time value of money (see Box). The total known overcharges converted to 2005 U.S. dollars are more than $262 billion.[40] The typical

[39] Some may have been sub national in scope, in which case the affected sales will be sub national also. Similarly, if only one or a few Member States of the EU were affected by a cartel, only the smaller overcharges are shown.

[40] Using projected total sales, it is likely that total overcharges exceeded $550 billion.

cartel caused more than $2 billion in economic harm,[41] with the global type of cartel the most destructive. The overcharges in the rest of the world appear to be the smallest, but this is an illusion that arises from data constraints. For example, the overcharge estimates from Asia are derived mainly from reports of the newer antitrust authorities in Korea, Taiwan, Australia, and the like – smaller economies compared to the EU and United States.

Intensity by Regions

The ratios of cartel overcharges to affected sales are summarized in Table C. There are slightly fewer overcharge rates than amounts because several percentages were reported for markets for which sales could not be determined. We focus on median ratios because they are not symmetrically distributed.

Median overcharges fall within a fairly narrow range of 24 to 29% of affected commerce.[42] There is a surprising constancy of price effects across North America, Europe, and other continents. However, global cartels exhibited 20% greater price effects than other international cartels, a result consistent with previous research (Connor 2006b, Connor and Bolotova 2006).[43]

Table C. Summary of Cartel Overcharge Rates by Region [a]

Item	No. Am.	Canada	EU	Other Regions	Total	
					Global	World
Number	49	29	50	29	34	96
Median %	24	24	24	29	29	27
Mean %	76	28	32	75	25	57

Source: Appendix Tables 1 to 5.
a) Based on affected sales in the region. The first four columns include regional overcharges by global cartels. Global cartel overcharge are a sub set of the world overcharges. In many cases "World" overlaps with the region; in some cases, only a world estimate is available for a global cartel.

[41] This is the income transfer only; the dead-weight social loss is not computed but may add additional harm of 10 to 30%.
[42] Note that these are equivalent to the price-cost margins (Lerner Indexes) favored by economic analysts, not the mark-ups usually favored by legal writers. A 24% overcharge margin corresponds to a 32% mark-up on a benchmark price.
[43] This is not surprising as there is a considerable overlap between the two data sets for observations since 1990.

Intensity by Product Type

Median overcharge rates are further analyzed according to the type of cartelized product in Table D.[44] The great majority of cartelized products are industrial intermediate goods – chemicals, metals, plastics, and the like purchased in bulk by manufacturers for further processing. It is noteworthy that 30 of the 34 global cartels dealt with industrial intermediates. Overcharge rates for these products vary from 21 to 29% across geographic zones of activity. Raw materials and capital goods appear to have lower cartel margins, but caution is advised as the numbers of observations for these categories are quire limited.

Table D. Median Average Overcharge Rates by Product Type and Location

Item	No.	US	Can.	EU	Other	Global	World
		Percent of nominal sales					
Raw Materials	3	--	--	--	--	23.9	23.9
Industrial Intermediates	152	23.6	26.9	21.0	25.8	28.9	28.0
Industrial capital goods	9	--	--	28.9	5.2	--	8.8
Consumer, undifferentiated	39	--	--	61.5	9.0	--	49.9
Consumer, differentiated	17	1256.7	--	--	10.0	--	42.0
Services	63	20.0	4.8	22.1	22.5	9.8	17.1
Mean [a]	283	113.0	20.4	27.5	21.1	23.3	27.2

Source: Appendix Tables 1 to 5.
-- = Not available
Note: Global is a sub set of World.
a) Weighted by the number of cartels in each product type.

The overcharge rates for consumer products are distinctly higher than the average cartel price effects, whereas the rates for services are much lower. Indeed, a general point is that the overcharge rates appear to be correlated with the typical historical profit margins of those sectors. This pattern suggests that cartels may consider their historical profit rates when deciding to enter or form a cartel; perhaps nothing less than a doubling or trebling of profits is worth the risk of discovery and punishment. Geographic variation in consumer goods and services is more pronounced than for industrial goods.

[44] Recall that the cartels are shown by industry group in Table A. We do not have enough observations to show meaningful average overcharges at the industry level of detail.

5. Cartel Sanctions

Recidivism

Punishment of cartels is predicated on the notion that future attempts to commit the same crime will be thwarted. This is the principle of "specific deterrence."[45] Cartel sanctions are often higher for recidivists. Under fining guidelines instituted by the EU in 2006, price-fixing recidivism will automatically raise a violator's fine by 100%.

Recidivism bedevils the international cartel scene. Table E lists the 11 companies with the worst records as serial price fixers: each has been caught ten times or more engaging in international hard-core cartels. Most of the 11 are conglomerates with interests in petroleum or chemical manufacturing. Seven of the 11 corporations were members of the great vitamins cartels (Connor 2006d).[46] Nine of the top 11 recidivists hail from the EU, and the remaining two are Japanese firms. These 11 companies are simply the proverbial "tip of the iceberg," because we have found 174 documented instances of cartel recidivism; of these 86 companies recorded three or more cartel violations (Appendix Table 11).

Table E. The 11 Largest International Cartel Recidivists, 1990-2005

Company (other & former names)	HQ	Number of Convictions
BASF AG	DE	26
Total S.A. (TotalFinaElf, Atofina)	FR	18
Hoffmann-La Roche	CH	17
Akzo Nobel	NL	14
Aventis (Hoechst, Rhone-Poulenc, Sanofi)	FR/DE	14
ENI (Ente Nazionale, AGIP, Syndial, Polimeri)	IT	14
Shell (Royal Dutch Shell)	NL	14
Degussa (Huels)	DE	13
Bayer AG	DE	11
Mitsubishi Corp.	JP	10
Mitsui & Co. Ltd.	JP	10

Source: Appendix Table 11

Six countries account for the majority of recidivists (Table F). European companies account for the lion's share of cartel recidivists with three or more convictions: 49 European companies account for 64% of all violations. German, Swiss, and Dutch

[45] "General deterrence" is the effect that punishment of one party has in discouraging the same crime by other parties.

[46] Note that unlike some other analysts, but following the lead of the EU, we opted to count membership in the 16 vitamins "families" as separate violations.

companies are especially egregious recidivists. Thirteen companies from Japan and Korea accounted for 16% of the violations in the table. The absence of U.S. and Canadian companies from the list of leading cartels recidivists is noteworthy. However, when one dips below the top 11 to companies with three to nine violations, one finds 18 recidivists from North America with a cumulative total of 74 violations.

Table F. Headquarters International Cartel Recidivists with Three or more Violations, 1990-2005

Continent: Country	*Number of Companies*	*Number of Violations*	*Percent of Violations*
No. America:	18	74	17
USA	17	71	16
Canada	1	3	1
Western Europe:	49	278	64
Germany	14	88	20
Switzerland	5	50	12
Netherlands	7	49	11
France	4	31	7
Italy	2	28	6
UK	7	28	6
Finland	4	19	4
Belgium	2	14	3
Sweden	2	6	1
Denmark	1	6	1
Spain	1	4	1
Other:	17	81	19
Japan	8	47	11
Korea	5	20	5
Kuwait	1	5	1
Libya	1	3	1
South Africa	1	3	1
Australia	1	3	1
Total	86	433	100

Source: Appendix Table 11

Our compilation of cartel recidivists is surely understated for several reasons. First, we have no formal record of non-international cartel activity, which is considerable in Europe, Japan, and jurisdictions with ineffective anticartel enforcement. Second, our sampling starts with cartels that experienced antitrust legal actions after January 1990, and other sources, such as EU decisions from earlier years, indicate additional price-fixing violations by some of the 174 companies already identified as recidivists. Third, fewer than 30% of all cartels are sanctioned, so the number of undiscovered instances of recidivism may well be double or triple the number of known convictions.

Speed of Discovery

There is informal evidence that antitrust authorities are uncovering secret international cartels with greater alacrity over time. Figure 8 plots a date we call the "date of first notice" against the difference between that date and the date the cartel was formed. First notice is often a day that a raid is conducted in some jurisdiction (some are simultaneous raids in several jurisdictions), sometimes it is the day the existence of a grand jury is revealed, and sometimes it is the day the first (or only) antitrust authority announces a decision after a secret investigation.

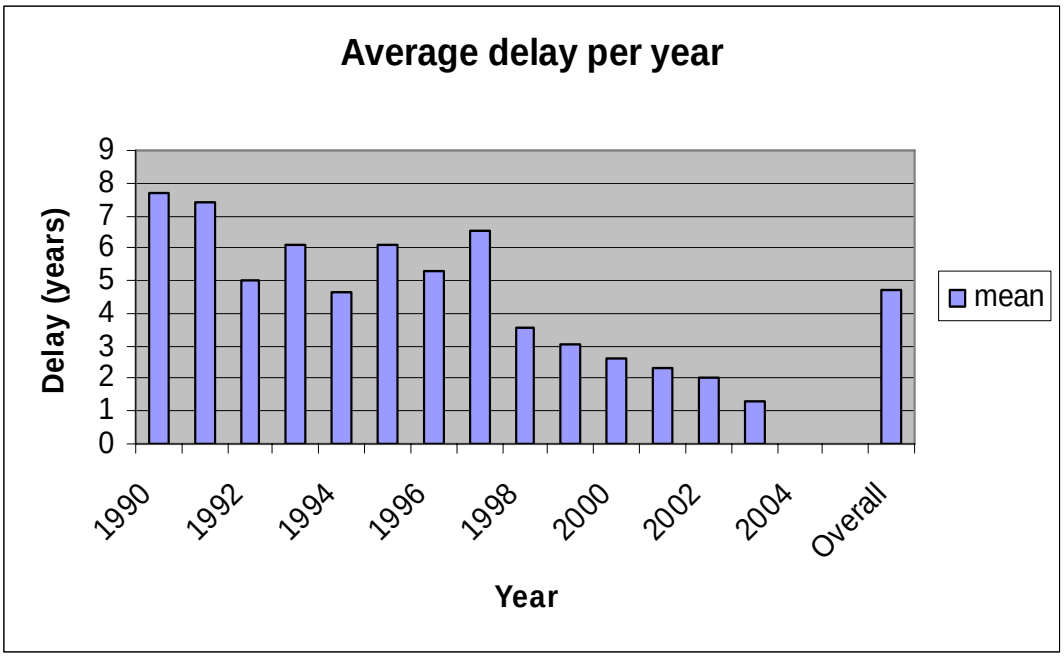

Figure 8. Years Between Cartel Formation and Discovery

The average delay between cartel formation and first notice is 4.7 years. However, the delay is clearly decreasing over time from a high of 7.7 years in 1990 to a low of 1.3 years in 2003. Because a cartel almost always stops colluding on or before the date of first notice, cartel duration seems to be declining during the 1990-2005 period. However, this apparent trend may be due to compositional changes in the sample. It contains a higher proportion if discoveries by newer antitrust authorities in the later years, and these authorities seem to discover mostly less durable conspiracies.

Trends in Cartel Sanctions

Figure 9 displays the temporal pattern of fines imposed on and settlements negotiated by private international cartels everywhere in the world. The penalties are converted to real 2005 U.S. dollars and are recorded in the year the decisions are made.[47] For most cartels, such as those discovered to have been active in Western Europe, only one government conviction occurred. However, for many North American cartels, a criminal conviction in the United States or Canada (often both) would be typically be followed by private suits that frequently took two or three years to be settled.[48] Finally, in the case of global cartels, North American antitrust fines would be paid, and two to four years later private settlements would be announced and the EU would decide on fines. Because of these lags and a desire to smooth the observations, we show the three-year moving averages of the penalties.

Cartel penalties accelerated rapidly from 1990-91 (when they were below $2 million in each year) to the 1998-2000 peaks (when they hovered around $2 *billion*). These peak years are strongly affected by the huge vitamins cartels. In 2001-2004, penalties have remained at or above $1 billion. It is too early to tell whether this relatively steady pattern in the early 2000s will become a permanent feature of the global antitrust-enforcement scene, or weather it is merely a pause before the trend continues its upward climb.

[47] The dates for cartel fines are clear and unambiguous, but those for private settlements sometimes require judgment. For example, for most of the vitamins cartels the DOJ and CCB fines were announced in the last eight months of 1999 (Connor 2006e). The first and largest U.S. federal class-action settlement was approved in late 2000; because it was the key event, this is the date recorded for all private settlements in the United States. However, there were many U.S. opt-outs who settled in 2003 and 2004, and the Canadian class-actions were settled in 2004.

[48] There are other temporal patterns as well. In some cases private settlements preceded the payment of fines, and in a significant number of cases private civil suits were successful for plaintiffs even though government investigations were closed without indictments.

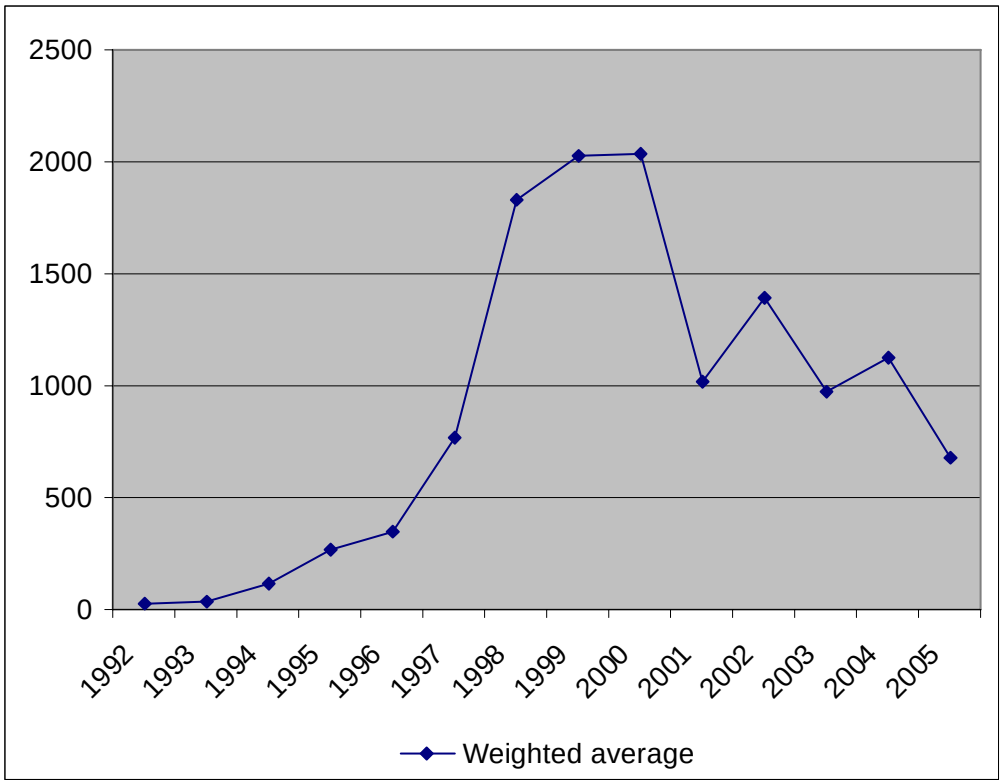

Figure 9. Monetary Penalties (Real 2005 U.S. Dollars) Imposed on International Cartels (Three-Year Moving Average)

Largest Cartel Sanctions

Figure 10 shows the pattern of the 40 largest real monetary penalties imposed on international cartels from 1990 to 2005. The penalties, which vary from $93 to $1252 million, are highly positively skewed.

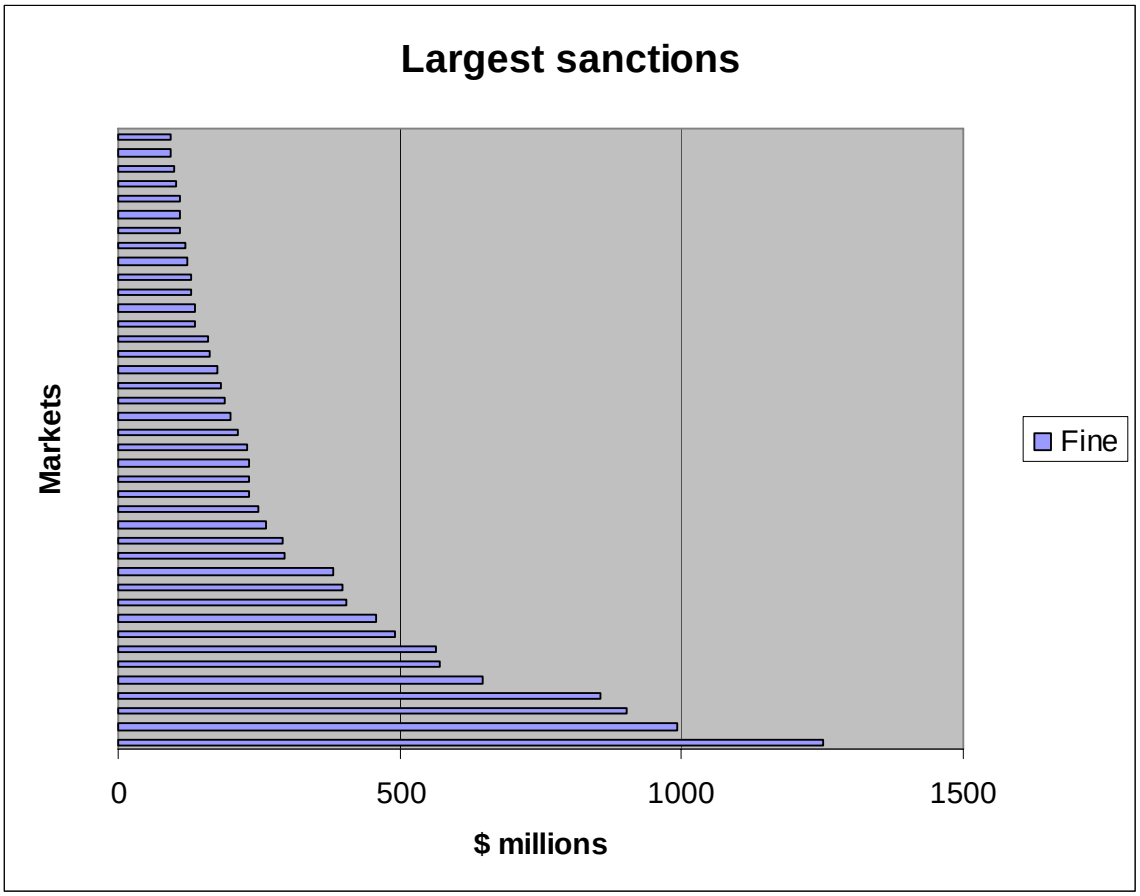

Figure 10. Forty Largest Price-Fixing Penalties, 1990-2005

Table G assembles a list of the 34 cartels with monetary sanctions above $100 million, ranked by 2005 US dollars. The 34 cartels account for 19% of the total number of sanctioned cartels, but 78% of the $13.5 billion in monetary value of corporate sanctions. Note that the fines expressed in 2005 dollars are only 53% of the $25 billion in *nominal* penalties imposed. The large reduction reflects the fact that cartelists are permitted to pay their fines and settlements without regard to pre-judgment interest.

Half of the 34 most penalized cartels were global cartels. The most typical highly penalized cartel is a global cartel that was fined by the DOJ, CCB, and EU and later negotiated a civil settlement with direct purchasers in North America. The *Vitamins, Graphite Electrodes, Lysine, Citric Acid,* and *Art Auction Houses* cases fit this pattern. A second category consists of cartels sanctioned solely by the EU: *Plasterboard, TACA,* and *Methionine* are examples of this type. Third, a few of the top 34 penalized cartels were fined by only one national authority: Germany imposed impressive fines on its *Concrete* and *Cement* cartels, Sweden on an *Asphalt* cartel, and Korea on two domestic cartels. The Netherlands antitrust authority NMa is still prosecuting hundreds of members of a large number of intersecting *Construction* cartels.

Table G. Largest Total Sanctions, 1990-2005			
Location	Market	*Real 2005 Million Dollars*	*Current million US Dollars*
NO	Tobacco Leaf, US	1162.28	1753.00
GLOBAL	Insurance brokers, commercial, US [m]	992.39	1129.00
GLOBAL	Vitamin E	923.80	1962.00
GLOBAL	Vitamin Premixes	708.46	1502.10
GLOBAL	Graphite Electrodes	631.18	1305.45
GLOBAL	DRAMs [m]	601.29	750.00
WE	Cement I, Germany	495.11	798.00
GLOBAL	Vitamin A	428.83	912.50
GLOBAL	Vitamin C	418.97	1071.60
GLOBAL	Fine Arts (Art Auction Houses)	357.87	624.95
WE	Construction, Netherlands [m]	260.66	401.00
WE	Plasterboard	245.58	478.30
GLOBAL	Beta Carotene	240.49	463.60
NO	High Fructose Corn Syrup, US	239.15	611.00
GLOBAL	Methionine	218.24	555.20
GLOBAL	Citric Acid	215.13	480.59
AS	Digital switches, Israel [m]	189.80	390.83
GLOBAL	Diamonds, gem	181.00	250.00
WE	Gasoline, IT	168.42	290.00
GLOBAL	Rubber Processing Chemicals [m]	153.43	233.20
NO	Cardizem CD hypertension drug, US	152.33	190.00
GLOBAL	TACA (Europe/No.Atlantic Shipping)	137.94	235.90
GLOBAL	Lysine	137.43	307.95
GLOBAL	Vitamin B5 (Calpan)	135.77	291.50
NO	Cosmetics, "prestige," U.S.	135.68	199.00
WE	Insurance, industrial property, Germany [m]	134.56	171.20
NO	Anti-anxiety drugs, US	125.78	174.00
WE	Copper tubes, plumbing	120.44	268.00
NO	Linerboard, US	117.61	254.50
WE	Concrete, Eastern Germany	115.22	192.60
WE	Asphalt, Sweden [m]	106.47	189.30
GLOBAL	Sorbates	105.84	424.36
AS	Telephone services, local, Korea	101.80	109.70
AS	Petroleum, Military fuels, Korea	101.33	146.30
Subtotal of 18 vitamins cartels		3,379.6	7,430.8
Subtotal of 34 largest (by real sanctions)		10,560.3	19,116.6
Subtotal of smaller 146 cartels		2909.5	6274.1
Total of 180 cases [a]		13,469.7	25,390.7

Source: Table 17
Superscript m = not all sanctions imposed as of late 2005
a) There were five cartels (not listed above) fined a total of $97 million by Italy and France with inadequate information about the dates of collusion to calculate real fines.

Because they are distinct products and in some cases were independent conspiracies, we have chosen to treat the 18 bulk vitamins cartels as separate observations (see Connor 2006a). Some, but not all of the world's antitrust authorities treated many of these cartels as a single infraction.[49] If one aggregates the penalties across the 18 cartels, the real 2005 global sanctions totaled $3.4 billion, which is an astounding 25.1% of all international cartel penalties in 1990-2005.

It is a curious fact that the two greatest penalties were imposed on US-based cartels that followed an unusual path: they have not yet been sanctioned by the U.S., EU or any other national antitrust authority. Only civil damages cases were brought in U.S. courts. The *Tobacco Leaf* cartel was a bid-rigging case prosecuted by direct purchasers in the United States, and *Commercial Insurance Brokers* was prosecuted first by the New York State Attorney General and later by his peers in other states.[50] Additional examples of cartels subject only to U.S. civil damages litigation are *High Fructose Corn Syrup, Linerboard, Cardizem, Anti-anxiety Drugs,* and *Cosmetics.*[51]

By Type of Litigation and Jurisdiction

Calculated in real 2005 US dollars, total known penalties imposed on 81 of the *global* international cartels was 7.6 billion, an astounding 56% of the total (Table H). The global-cartel penalties originated from 50 criminal convictions in the United States and Canada (19.4% of total penalties), 37 civil proceedings (16.3%), and 34 private damages cases in North America (28.2%).

One-fifth of the total penalties derived from fines imposed by national authorities on cartels with international membership but with activity confined to one nation; of these types of cartels, the penalties on 67 cartels from the EU Member States are the greatest; the fines of Korea, Israel and the United States are next in importance. Fines by the European Commission on 55 intra-EU cartels amounted to 7.1% of world-wide cartel penalties.[52]

[49] The US DOJ and private damages suits in North America generally referred to most of them as a single violation, whereas the EU clearly distinguished the cartels as multiple violations. Likewise, Canada treated its criminal prosecutions as separate violations.

[50] This case is still being litigated in the United States. Moreover, there are hints that prosecutions are being contemplated in the UK or by the EU, so we have tentatively classified this cartel as global in scope.

[51] The Israeli *Digital Switches* case has yet to be completed; the amount shown may be lower when judgment is finalized. The *Anti-anxiety Drugs* case (a/k/a *Mylan Laboratories*) is unique because of the involvement of the U.S. FTC.

[52] Combining global with EU-wide cartels, the EC originated 15.9% of the world's penalties on cartels. The EC and its Member States accounted for 30% of all international cartel penalties.

Table H. Cartel Sanctions by Litigation Category			
Cartels Location: Authority	**Cartels**	**Penalties**	
	Number [a]	*Real 2005 Million Dollars*	*Percent*
Global: Criminal and Civil	81 [b]	7598.9	56.4
Criminal (US+CA)	50	1609.9	12.0
US States	1	992.4	7.4
European Commission	31	1188.2	8.8
Australia & Korea	6	12.0	0.1
Private Damages Suits	34 [b]	3796.4	28.2
EU-wide: EC	55	961.2	7.1
North America:	56 [c]	2283.1	17.0
US federal	32	181.8	1.4
Canada	7	30.8	0.2
Joint US and Canada	7	22.0	0.2
Private and US States	18 [c]	2048.5	15.2
Single-Country Cartels:	109	2627.3	19.5
W. Europe: EU Member State	67	1858.5	13.8
E. Europe: European Nations	7	94.5	0.7
Asia: Asian Nations	20	523.8 [d]	3.9
Oceania: AU and NZ	4	6.7	0.1
Latin American Nations	9	65.4	0.5
Africa: US and So. Africa	2	78.4	0.6
TOTAL	180	13,469.7	100.0

Source: Table 18

a)The numbers for the locational subtotals (Global, EU-wide, etc.) count cartels with one or more litigation actions as one observation. However, the numbers below the locational rows count the number of guilty pleas, decisions, or suits.

b)There were 73 cartels fined and 8 private settlements with no previous government fines in any jurisdiction.

c)There was 46 cartels fined and 10 private settlements with no previous government fines in any jurisdiction.

d) Includes two proposed private settlements in Israel totaling 189.2 million 2005 US dollars.

Table I. Largest Government Fines, 1990-2005		
Market	*Real 2005 Million Dollars*	*Percent*
United States, federal:		
DRAMs [m]	440.9	
Graphite Electrodes	227.5	
Vitamin E	131.4	
Vitamin Premixes	109.5	
Rubber Processing Chemicals [m]	76.9	
Anti-anxiety drugs, US	75.3	
Polychloroprene synthetic Rubber [m]	73.1	
Vitamin C	72.8	
Construction, USAID in Egypt	55.5	
Parcel Tankers, Chemical Shipping [m]	52.0	
Total U.S. fines, 50 cases	1794.8	24.2
EU:		
Plasterboard	245.58	
DRAMs m	160.34	
TACA (Europe/No.Atlantic Shipping)	137.94	
Copper tubes, plumbing	120.44	
Graphite Electrodes	93.04	
Paper, carbonless	86.09	
Vitamin E	83.60	
Euro-Zone banks	71.01	
Rubber Processing Chemicals m	59.28	
Vitamin A	54.33	
Citric Acid	50.45	
Total fines, 63 cases	2215.69	29.9
Canada and Other Jurisdictions:		
Insurance brokers, commercial, US m	992.39	
Cement I, Germany	495.11	
Construction, Netherlands [m]	260.66	
Gasoline, IT	168.42	
Insurance, industrial property, Germany [m]	134.56	
Concrete, Eastern Germany	115.22	
Asphalt, Sweden m	106.47	
Telephone services, local, Korea	101.80	
Petroleum, Military fuels, Korea	101.33	
Mobile phone operators in NL	82.44	
Asphalt paving, Finland	80.69	
Cell phones, IT	58.52	

Petroleum products, Kazakhstan [m]	51.41	
Total of 99 cases	3402.1	45.9
Total fines, 212 cases	7412.6	100

Sources: Appendix Tables 12-15.
Superscript m = not all sanctions imposed as of late 2005

Government fines accounted for 55% of all international cartel penalties, but 52 private-party damages suits generated at least $6.0 billion in settlements (44% of the total). While nearly all of the settlements were an outcome of US treble damages suits, including several prosecuted by attorneys general of US states, private cases in Canada and Israel were significant. In the case of global cartels, the 34 settlements averaged $112 million; somewhat surprisingly, the 18 private suits involving cartels operating within North America settled for a similar average of $114 million. Also noteworthy is the fact that 18 of the private suits (35%) were successful even though no government convictions preceded the private actions.

Table I lists the leading international-cartel cases prosecuted by the DOJ and CCB as criminal cases and civil proceedings by the EU and sundry national antitrust authorities. The DOJ obtained fines on 50 international cartels totaling 1.8 billion real 2005 dollars, which was 24% of the world-wide total of $7.4 billion in government fines. Larger still were the 63 fines imposed by the EU: $2.2 billion, or 33% of the global total. The largest category of prosecutions ($3.4 billion or 46%) were 99 cases by other national and state authorities.[53] Of these 212 cases, 17 of the cartel fines exceeded $100 million and 34 exceeded $50 million for all the participants.

Fines versus Settlements

Government fines comprise slightly more than half (52%) of the total penalties imposed on international cartels during 1990-2005. However, private settlements comprise the largest single category of world-wide cartels penalties, some 6.5 million real US dollars or 48% of all penalties (Table J). The 55 cases for which we have information is likely an undercount, because direct-purchaser payouts are not as widely reported as are fines, and indirect-purchaser settlements are even more difficult to locate. Twenty-five settlements exceeded $50 million and 17 exceeded $100 million.

[53] The penalties imposed by the DOJ are almost always soon paid to the U.S. Treasury. Many EU decisions on cartel fines are appealed, and many of these appeals are successful in obtaining reduced fines. However, the fines imposed by the antitrust authorities of several developing countries are never paid.

Table J. Largest Private Settlements, 1990-2005	
Market	*Real 2005 Million Dollars*
Tobacco Leaf, US	1252.32
Vitamin E	509.73
High Fructose Corn Syrup, US	492.49
Fine Arts (Art Auction Houses)	401.11
Graphite Electrodes	371.37
Vitamin Premixes	348.57
Methionine	234.68
Vitamin A	232.89
Cosmetics, "prestige," U.S.	229.38
Vitamin C	218.66
Citric Acid	209.50
Linerboard, US	198.83
Digital switches, Israel	188.90
Diamonds, gem	181.00
Cardizem CD hypertension drug, US	164.13
Beta Carotene	118.91
Vitamin B4, North America	103.56
Lysine	86.81
Anti-anxiety drugs, US	85.30
MSG	72.58
Automotive Refinishing Paint m	63.71
Explosives, commercial, US	59.18
Sorbates	54.85
Vitamin B5 (Calpan)	50.89
EPDM, Synthetic Rubber m	50.69
Total private settlements, 55 cases	6479.0
Sources: Appendix Table 16.	

Intensity of Penalties

Table K summarizes the intensity of cartel sanctions. Each of the 212 government fines and 55 settlement amounts is divided by affected sales in the appropriate jurisdiction region.[54] If a cartel was active in and sanctioned in two or more jurisdictions, then the denominator is expanded to all the affected jurisdictions. For global cartels world-wide sales are employed.

[54] If a fine was imposed by an authority outside North America or Western Europe on a global cartel, the divisor is sales in the rest of the world. We have several cases where sanctions are known but sales are not.

We have 345 ratios. Looking at the median ratios, fines are harshest in North America.[55] Moreover, about two-thirds of the private settlements are added to US or Canadian fines, so for a typical cartel that paid both fines and settlements in the United States, corporate monetary penalties were 9 to 10% of affected sales. Fines for EU-wide cartels averaged only 3% of EU sales, and fines on cartels of other governments (most are member States of the EU) were less than half of that. The median penalty on all cartels relative to total affected sales is less than 2%.

Table K. Real Sanctions Relative to Real 2005 Affected Sales

Measure	US	CA	EU	Other Govt.	Private Settle-ments	Total [a]
Median %	4.87	4.38	2.98	0.76	4.47	1.82
Mean %	30.89	9.82	29.81	3.42	25.81	21.58
Number (372 total)	45	28	55	25	50	142

Source: Table 19

a) If a cartel received only one out of the five sanctions, then this column repeats that observation. However, if a cartel was penalized two of more times (e.g., a US fine and a US private suit), then this column has a unique ratio. All the other columns report unique observations

Table L shows similar calculations to the ones in Table K, but the denominator is regional or global overcharges instead of sales. From the perspective of optimal deterrence principles, the sanctions as a proportion of cartel overcharges are superior indicators of the quality of antitrust enforcement (Connor 2006c). As cartel overcharges are more difficult to determine, we have fewer such ratios (223) than for the sales ratios. These ratios are highly positively skewed (Table 29).

U.S. and Canadian fines, nearly all of them criminal convictions, resulted in the highest median average fine ratios (15 to 18%). The EU's fine structures are much lower, averaging less than 10% of overcharges in the EU market, and the fines of other governments lowest of all (about 4%). By far the harshest sanctions were levied by private plaintiffs, most of them in North America. Private suits recovered almost two-fifths of the damages incurred by buyers of cartelized goods. In dollars that reflect the time value of money, even when one adds the fines and settlements together, US citizens failed to be fully compensated for their cartel injuries. On a world-wide basis, total sanctions average about 21% of global overcharges.[56]

[55] The ratios are highly positively skewed, so the median is a more appropriate average than the mean.
[56] Only 9 of the 87 total ratios exceed 100%.

Table L. Real Sanctions Relative to Real 2005 Overcharges						
Measure	US	CA	EU	Other Govt.	Private Settle-ments	Total [a]
Median %	14.98	17.58	9.30	3.99	38.5	20.98
Mean %	23.35	24.3	41.94	55.76	53.7	63.48
Number (241 total)	30	20	32	17	37	87

Source: Table 20

If a cartel received only one out of the five sanctions, then this column repeats that observation. However, if a cartel was penalized two of more times (e.g., a US fine and a US private suit), then this column has a unique ratio. All the other columns report unique observations.

6. Summary and Conclusions

This report summarizes the principal features of a unique and timely set of data on modern private international cartels discovered anywhere in the world from January 1990 to the end of 2005. Considerable legal and economic data were collected.

The sample consists of 283 hard-core cartels. Approximately 44% were active only in Western Europe, 3% in Eastern Europe, 8% in Asia and Oceania, 16% in North America, and 4% in nations of other continents. The remaining 25% of cartels were *global* cartels – those operating across two or more continents. As for legal status, 24% were still being formally investigated in late 2005. Among those cartels with final dispositions, 86% had been required to pay monetary penalties; 5% had been enjoined or received warnings or a similar verbal admonishment from a competent antitrust authority; and the remaining 6% had seen their investigations closed without any known verbal or monetary sanctions.

These cartels were not fragile organizations. One cartel that persisted through two world wars and multiple changes in competition laws endured for 95 years. Median duration was 5.0 years and mean duration 6.4 years. The longest lasting cartels were the global (6.0 median years) and EU-wide (5.5) types. The cartels from single nations of Western Europe endured only 3.5 years; Asian, Eastern European, and Latin American cartels were also relatively short-lived.

International-cartel discovery rates have been increasing since 1990, from four to six per year in the early 1990s to about 35 per year in 2003-2005. Through 2002 the US DIJ and European Commission opened the majority of all formal investigations, but since then the antitrust authorities of many other jurisdictions have taken the lead.

Affected sales of the sample cartels expressed in real 2005 U.S. dollars are $2.1 trillion; about 36% of the total is estimated by a projection method explained in Section 3 of the text above. Cartels sizes are highly positively skewed. The largest cartel accumulated affected sales of $97 billion over its life time; 20 cartels had sales above $20 billion.

Global cartels had the highest median sales ($2.6 billion) among the more numerous types, but those active only in Western Europe were not far behind. In fact, cartels that affected sales in several EU countries were on average quite a bit larger ($4.7 billion) than global cartels. Those operating in single countries of Western Europe averaged affected sales of $1.5 billion and those in North America $900 million.

Seventy-nine percent of the sample's sales originated from cartels composed of manufacturers. The leading industries are chemicals, nonmetallic minerals, paper, and electronic devices. The next most important cartelized goods are services (21%), and the least important is raw materials. By type of products, the major cartelized goods are industrial intermediate inputs (62%); capital and consumer goods are seldom cartelized.

International cartels have caused a great deal of economic injuries. Measured from a large but incomplete sample of estimates, we find that total overcharges exceeded $200

billion and that the mean cartel overcharge was $2.1 billion. Global cartels were 22% more injurious than the average conspiracy. Overcharge rates were surprisingly similar in North America and the EU (medians of 24% of affected sales), but the median for global types and other jurisdictions was 29% of sales. As for product types, the overcharge rates were notably higher or the small number of consumer-goods cartels (median above 40%) and lower for the even fewer capital-goods conspiracies.

Monetary sanctions imposed on international cartelists since 1989 have been the highest in antitrust history. Yet, extensive recidivism implies that present cartel sanctions are inadequate to deter cartel formation. More than 170 companies were price-fixing recidivists during 1990-2005. Indeed, we document 11 instances where corporate recidivism occurred from 10 to 26 times. Recidivism is especially common among companies headquartered in Western Europe.

Total public and private penalties imposed on 180 of the cartels in 1990-2005 accumulated to $25.4 billion in nominal terms; however, because of the time value of money, real 2005 penalties were only $13.5 billion. Real penalties in the early 1990s totaled less than $2 million per year, accelerated quickly, and peaked at about $2 billion annually in 1998-2000. Since then global penalties stabilized at about $1 billion.

Penalties imposed on global cartels accounted for 56% of all real penalties, of which the 18 vitamins cartels were nearly half. Cartels caught in Europe accounted for 22% of the penalties, and North America cartels for 17%. Only about 5% of world wide penalties were imposed by authorities in Asia, Africa, or Latin America. Private damages suits in North America extracted at least 43% of the total penalties on international cartels.

Using real 2005 figures, we calculated the intensity of monetary sanctions by dividing by real sales or real overcharges. The median average penalty/sales ratio varied from 0.8 to 4.9%, depending on the jurisdiction and type of litigation. As a proportion of damages, median fines ranged from about 4% for the Member States of the EU to 15.0% for the United Sates, and to 17.6% for Canada. Private plaintiffs obtained 39% of damages from international cartelists. Very few fines or settlements recouped 100% of damages. World wide, median real cartel penalties of all types amounted to less than 21% of overcharges.

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Glossary

Glossary of Geographic Abbreviations			
Abbr.	**Location**	**Abbr.**	**Location**
AF	Africa	IT	Italy
AR	Argentina	JP	Japan
AT	Austria	LI	Lithuania
BR	Brazil	MX	Mexico
CA	Canada	NL	Netherlands
CL	Chile	NO	Norway
CN	China	NO AM	North America
CZ	Czech Republic	NZ	New Zeeland
DE	Germany	OC	Oceania
EE	Eastern Europe	PT	Portugal
EG	Egypt	RO	Romania
ES	Spain	RU	Russia
EU	European Union	SW	Sweden
FI	Finland	TW	Taiwan
FR	France	UK	United Kingdom
GLOBAL	Global	US	United States
HU	Hungary	WE	Western Europe
IL	Israel	ZA	South Africa
IS	Iceland		

APPENDIX TABLES

Table 1. U.S. [a] Overcharge Rates, 1990-2005

Market	*Nominal dollar ratio*
Anti-anxiety drugs, US	2500.00%
Methylglucamine	75.00%
Vitamin C, US imports from China *	64.22%
Graphite Electrodes	58.57%
Fine Arts (Art Auction Houses)	51.08%
Linerboard, US	50.00%
Aluminum Phosphide, US	47.50%
Vitamin B12	44.64%
Sulfuric acid, US *	42.58%
Sorbates	40.00%
Vitamin E	38.72%
Choline chloride (Vitamin B4)	33.76%
Construction, USAID in Egypt	33.33%
Vitamin A	32.77%
Corn Glucose Syrup, US	31.11%
Vitamin B5 (Calpan)	30.98%
Beta Carotene	30.61%
Flat glass, U.S.	30.00%
Vitamin Premixes	29.51%
DRAMs *	28.39%
Vitamin B4, North America	27.83%
Carbon Fiber	25.00%
Vitamin B6	24.07%
Vitamin C	23.56%
Vitamin B2	22.97%
Folic Acid (Vitamin B9)	22.61%
Moving and storage, Germany-US	20.00%
Canthaxanthin	19.40%
Citric Acid	18.27%
Vitamin B1	18.20%
Lysine	17.58%
Biotin (Vitamin H)	17.36%
Vitamin B3 (Niacin)	15.62%
Parcel Tankers, Chemical Shipping *	15.00%
Vitamin D	13.47%
Cardizem CD hypertension drug, US	13.28%
High Fructose Corn Syrup, US	13.06%
Methionine	13.04%
Carbon Cathode Block	12.50%
Polychloroprene synthetic rubber *	

Ferrosilicon, US	11.41%
Paper, thermal fax, US and CA	10.31%
Vitamin B4 (Choline Chloride) European branch	10.00%
Tobacco Leaf, US	8.33%
Carbon Black *	7.83%
Insurance brokers, commercial, US m	5.94%
Explosives, commercial, US	4.80%
Diamonds, Industrial	4.00%
Stamp Auctions (Episode 1)	3.01%
	0.29%
Median of 49	
Mean of 49	24.07%
	75.75%

Source: Spreadsheet dated 10/15/06
a) Includes a few cartels that operated in both the United States and Canada ("US and CA").
* = Investigation in progress in 2005

Table 2. Canadian Overcharge Rates, 1990-2005		
Continent	**Market**	*Nominal dollar ratio*
GLOBAL	Methylglucamine	75.00%
NO	Insecticide, BT , CA	65.39%
GLOBAL	Graphite Electrodes	56.92%
GLOBAL	Vitamin B12	48.15%
GLOBAL	Sorbates	41.67%
GLOBAL	Vitamin E	38.66%
GLOBAL	Citric Acid	33.33%
GLOBAL	Choline chloride (Vitamin B4) f	32.93%
GLOBAL	Vitamin A	32.22%
GLOBAL	Folic Acid (Vitamin B9)	31.25%
GLOBAL	Beta Carotene	30.71%
GLOBAL	Vitamin B5 (Calpan)	30.28%
NO	Vitamin B4, North America	27.90%
GLOBAL	Vitamin Premixes	27.21%
GLOBAL	Vitamin B6	24.16%
GLOBAL	Vitamin C	23.61%
GLOBAL	Vitamin B2	21.74%
GLOBAL	Vitamin B1	19.12%
GLOBAL	Canthaxanthin	18.52%
GLOBAL	Biotin (Vitamin H)	17.82%
GLOBAL	Lysine	17.39%
GLOBAL	Vitamin B3 (Niacin)	15.44%
GLOBAL	Vitamin D	14.00%
GLOBAL	Methionine	13.00%
GLOBAL	Carbon Cathode Block	12.50%
NO	Paper, thermal fax, US and CA	10.00%
WE	Vitamin B4 (Choline Chloride) Europe	9.07%
GLOBAL	Carbon Black m	7.14%
GLOBAL	Diamonds, Industrial	2.95%
Median of 29		24.16%
Mean of 29		27.53%

NO= No. America, WE= Western Europe
m) Investigation in progress in 2005

Table 3. EU-Wide Overcharge Rates, 1990-2005		
Continent	**Market**	*Nominal dollar ratio*
WE	Generic drugs, warfarin & penicillin m, UK	265.55%
WE	Infant Formula (Episode 2), Italy	125.00%
WE	Waste collection, Germany m	70.00%
WE	Steel, flat stainless	60.00%
WE	PVC (polyvinyl-chloride) plastic	55.94%
GLOBAL	Fine Arts (Art Auction Houses)	51.05%
GLOBAL	Graphite Electrodes	50.00%
WE	Euro-Zone banks	50.00%
WE	Cable, high-voltage, Germany	49.07%
GLOBAL	Citric Acid	47.50%
WE	Polypropylene plastic	44.76%
GLOBAL	Folic Acid (Vitamin B9)	38.50%
WE	Compressed gases, NL	37.58%
WE	Construction, Norway m	37.46%
GLOBAL	Choline chloride (Vitamin B4) f	33.82%
GLOBAL	Vitamin E	33.03%
GLOBAL	Vitamin B12	31.33%
GLOBAL	Beta Carotene	30.82%
GLOBAL	Vitamin B6	30.14%
GLOBAL	Vitamin B5 (Calpan)	29.87%
GLOBAL	Vitamin Premixes	29.49%
WE	Steel beams	25.22%
WE	Gasoline, FR	25.00%
GLOBAL	Vitamin A	24.82%
WE	Cartonboard	23.81%
WE	Eurocheque, EU	22.14%
GLOBAL	Vitamin B2	20.94%
WE	Steel pipes, insulated heating	20.68%
GLOBAL	Vitamin C	20.00%
GLOBAL	Canthaxanthin	19.39%
GLOBAL	Lysine	17.36%
WE	Paper, carbonless	16.90%
GLOBAL	Vitamin B3 (Niacin)	15.60%
GLOBAL	Parcel Tankers, Chemical Shipping m	15.00%
GLOBAL	Biotin (Vitamin H)	14.45%
WE	Zinc phosphate	13.33%
WE	Steel tubes ("oil country tubes")	12.03%
WE	Ferry services, English Channel	10.00%
GLOBAL	Vitamin D	9.08%
WE	Vitamin B4 (Choline Chloride) Europe	8.85%
WE	Construction, Netherlands m	8.80%
WE	Hydro-Electric power equipment, NO	8.76%
WE	Gasoline, Sweden	8.33%
WE	Insurance, industrial property, Germany m	6.97%
GLOBAL	Carbon Black m	6.74%
GLOBAL	Vitamin B1	6.47%

WE	Tobacco processing, Spain	6.09%
WE	Danish air routes	4.77%
WE	Gasoline, IT	3.55%
WE	Construction, SRO, Netherlands	0.00%
Median of 50		24.32%
Mean of 50		31.92%

NO= No. America, WE= Western Europe
m) Investigation in progress in 2005

Table 4. Other Area Overcharge Rates, 1990-2005		
Continent	**Market**	*Nominal dollar ratio*
WE	Construction, public works, France	1776.49%
WE	Infant Formula (Episode 1), Italy	100.00%
EE	Cement, Romania	75.00%
GLOBAL	Graphite Electrodes	59.01%
WE	Pharmaceuticals, cholesterol, IT	52.38%
WE	Petroleum, Iceland m	50.00%
WE	Pharmaceuticals, respiratory, IT	50.00%
AS	Philippines telecom, US	50.00%
WE	British Sugar	49.91%
GLOBAL	Vitamin B12	46.04%
GLOBAL	Vitamin E	43.04%
GLOBAL	Choline chloride (Vitamin B4) f	41.09%
GLOBAL	Vitamin B5 (Calpan)	37.68%
GLOBAL	Beta Carotene	37.06%
GLOBAL	Folic Acid (Vitamin B9)	36.00%
GLOBAL	Vitamin A	33.28%
GLOBAL	Vitamin B6	32.04%
GLOBAL	Vitamin Premixes	28.74%
GLOBAL	Citric Acid	28.57%
GLOBAL	Vitamin C	26.03%
GLOBAL	Vitamin B2	25.81%
GLOBAL	Canthaxanthin	23.39%
GLOBAL	Biotin (Vitamin H)	19.19%
AS	Petroleum, Military fuels, Korea	17.52%
AS	Telephone services, long-distance, Korea	17.15%
AS	Broadband Internet service, Korea	17.14%
AS	Telephone services, international, Korea	17.14%
AS	Telephone services, local, Korea	17.12%
GLOBAL	Vitamin B3 (Niacin)	15.81%
GLOBAL	Vitamin B1	15.19%
EE	Coffee wholesaling, Hungary	15.00%
GLOBAL	Vitamin D	14.77%
WE	Cement I, Germany	13.97%
WE	Steel tubes ("oil country tubes")	11.97%
WE	Cell phones, IT	10.56%
WE	Concrete, Eastern Germany	9.00%
GLOBAL	Lysine	7.75%
OC	Transformers, power & distn, E. AU	5.24%
GLOBAL	Construction, Nigeria LNG plants m	3.01%
Median of 50		28.57%
Mean of 50		75.10%

NO= No. America, WE= Western Europe, AS = Asia, OC = Oceania, EE = Eastern Europe
m) Investigation in progress in 2005

Table 5. Global Cartel Overcharge Rates, 1990-2005			
Continent	**Market**	*Nominal dollar ratio*	*Real 2005 dollar ratio*
GLOBAL	Aluminum Metal	60.00%	127.62%
GLOBAL	Graphite Electrodes	55.21%	81.04%
GLOBAL	Fine Arts (Art Auction Houses)	51.07%	62.55%
GLOBAL	Vitamin B12	40.90%	41.22%
GLOBAL	Vitamin E	36.82%	50.85%
GLOBAL	Choline chloride (Vitamin B4) [f]	36.49%	59.16%
GLOBAL	Shipping (French/African)	**35.50%**	--
GLOBAL	Plastic Additives: Heat Stabilizers[m]	34.23%	35.19%
GLOBAL	Plastic Additives: Impact Modifiers[m]	33.97%	34.92%
GLOBAL	Folic Acid (Vitamin B9)	33.16%	32.85%
GLOBAL	Beta Carotene	31.82%	40.44%
GLOBAL	Vitamin B5 (Calpan)	31.13%	48.76%
GLOBAL	Citric Acid	30.77%	39.27%
GLOBAL	Vitamin C	30.75%	35.82%
GLOBAL	Vitamin B6	29.80%	29.12%
GLOBAL	Vitamin Premixes	29.19%	31.43%
GLOBAL	Vitamin A	28.90%	40.05%
GLOBAL	DRAMs [m]	28.19%	17.40%
GLOBAL	Copper Concentrate [m]	23.88%	24.07%
GLOBAL	Vitamin B2	22.90%	32.59%
GLOBAL	Canthaxanthin	21.91%	24.82%
GLOBAL	Sorbates	20.07%	38.50%
GLOBAL	Biotin (Vitamin H)	17.29%	20.80%
GLOBAL	Vitamin B3 (Niacin)	15.67%	17.20%
GLOBAL	Parcel Tankers, Chemical Shipping[m]	15.00%	8.89%
GLOBAL	Lysine	13.26%	17.49%
GLOBAL	Vitamin B1	12.18%	12.27%
GLOBAL	Vitamin D	12.08%	13.79%
GLOBAL	DVD Players, 3C Pool [m]	**6.60%**	--
GLOBAL	Methionine	5.11%	5.22%
GLOBAL	Carbon Black [m]	3.05%	3.05%
GLOBAL	Construction, Nigeria LNG plants [m]	3.01%	3.01%
GLOBAL	Diamonds, Industrial	3.00%	2.85%
GLOBAL	Stamp Auctions (Episode 1)	0.29%	0.75%
Median of 34		28.54%	32.01%
Mean of 34		25.09%	32.28%

--= no real sales available
m) Investigation in progress in 2005

Table 6. Overcharges in the United States, 1990-2005			
Location	**Market**	*Million Nominal U.S. Dollars*	*Million Real 2005 U.S. Dollars*
NO	Linerboard, US	11000.0	13033.18
NO	Flat glass, U.S.	8700.0	10494.57
GLOBAL	DRAMs [m]	4700.0	5549.11
NO	Sulfuric acid, US [m]	3300.0	3980.70
NO	Insurance brokers, commercial, US [m]	2761.0	2918.60
NO	High Fructose Corn Syrup, US	1593.0	1959.41
NO	Corn Glucose Syrup, US	1400.0	1722.02
GLOBAL	Carbon Fiber	1375.0	2627.70
NO	Tobacco Leaf, US	1,220.0	1648.82
GLOBAL	Graphite Electrodes	1025.0	1376.11
GLOBAL	Vitamin E	642.0	947.16
GLOBAL	Vitamin Premixes	602.0	888.14
AS	Vitamin C, US imports from China [m]	411.0	419.39
GLOBAL	Sorbates	400.0	1056.25
GLOBAL	Methionine	365.0	443.50
GLOBAL	Carbon Black [m]	335.0	360.60
GLOBAL	Parcel Tankers, Chemical Shipping [m]	300.0	335.18
GLOBAL	Fine Arts (Art Auction Houses)	284.0	383.51
NO	Explosives, commercial, US	280.0	432.87
NO	Cardizem CD hypertension drug, US	274.0	274.10
GLOBAL	Vitamin A	270.0	398.34
GLOBAL	Vitamin C	242.0	431.08
GLOBAL	Citric Acid	222.0	271.36
NO	Vitamin B4, North America	167.0	273.24
GLOBAL	Choline chloride (Vitamin B4) [f]	158.0	380.39
NO	Anti-anxiety drugs, US	150.0	136.49
GLOBAL	Beta Carotene	120.0	160.63
AF	Construction, USAID in Egypt [n]	100.0	215.49
GLOBAL	Lysine	80.0	97.79
NO	Polyester staple, US and CA [m]	60.0	63.63
GLOBAL	Polychloroprene syn. Rubber [m]	58.1	73.89
GLOBAL	Vitamin B5 (Calpan)	57.0	113.66
GLOBAL	Vitamin B12	50.0	60.75
GLOBAL	Diamonds, Industrial	45.0	132.57
GLOBAL	Vitamin B3 (Niacin)	41.7	61.52
GLOBAL	Vitamin B2	31.7	51.87
NO	Paper, thermal fax, US and CA	26.0	32.79
GLOBAL	Biotin (Vitamin H)	25.0	30.38
GLOBAL	Canthaxanthin	22.5	30.12
GLOBAL	Methylglucamine	16.5	29.85
NO	Ferrosilicon, US	16.5	23.08
GLOBAL	Vitamin B6	13.0	15.80
GLOBAL	Vitamin D	9.7	11.19
WE	Aluminum Phosphide, US	9.5	11.98
GLOBAL	Vitamin B1	9.1	11.06
NO	Moving and storage, Germany-US	5.5	5.50
GLOBAL	Stamp Auctions (Episode 1)	5.0	18.44
GLOBAL	Folic Acid (Vitamin B9)	2.6	3.16
GLOBAL	Carbon Cathode Block	2.5	3.89
WE	Vitamin B4 (Choline Chloride) Europe	0.5	0.58

TOTAL	(50 observations)	39,977.4	54,001.4
MEDIAN		150.0	243.4
MEAN		888.4	1080.0

Source: Spreadsheet dated October 2006

m) Investigation in progress in 2005

Table 7. Overcharges in Canada, 1990-2005			
Location	**Market**	*Million Nominal U.S. Dollars*	*Million Real 2005 U.S. Dollars*
GLOBAL	Graphite Electrodes	185.00	272.93
GLOBAL	Insurance brokers, commercial, US [m]	144.00	149.84
NO	Iron oxide, Canada	65.00	84.20
GLOBAL	Vitamin Premixes	51.30	75.68
GLOBAL	Carbon Black [m]	50.00	52.74
GLOBAL	Vitamin E	43.00	63.44
GLOBAL	Methionine	39.00	45.03
GLOBAL	Citric Acid	25.00	37.22
GLOBAL	Vitamin C	17.00	30.28
GLOBAL	Vitamin A	13.80	20.36
GLOBAL	Choline chloride (Vitamin B4) [f]	13.50	30.84
GLOBAL	Sorbates	12.50	36.27
NO	Vitamin B4, North America	10.60	17.34
GLOBAL	Lysine	8.00	11.91
GLOBAL	Beta Carotene	7.30	9.77
WE	Vitamin B4 (Choline Chloride) Europe	3.90	5.22
GLOBAL	Vitamin B6	3.60	4.16
GLOBAL	Vitamin B5 (Calpan)	3.41	5.03
GLOBAL	Diamonds, Industrial	3.10	3.73
GLOBAL	Vitamin B2	2.53	4.14
NO	Paper, thermal fax, US and CA	1.82	2.30
NO	Insecticide, BT , CA	1.70	1.70
GLOBAL	Vitamin B1	1.27	1.47
GLOBAL	Vitamin B3 (Niacin)	1.25	2.37
GLOBAL	Methylglucamine	0.90	1.63
GLOBAL	Vitamin B12	0.89	1.59
GLOBAL	Carbon Cathode Block	0.75	1.17
GLOBAL	Vitamin D	0.68	0.75
GLOBAL	Folic Acid (Vitamin B9)	0.45	0.52
GLOBAL	Biotin (Vitamin H)	0.35	0.62
GLOBAL	Canthaxanthin	0.19	0.26
TOTAL	(31 observations)	711.8	974.5
MEDIAN		3.9	5.2
MEAN		23.0	31.4

Source: Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 8. Overcharges in EU or Western Europe, 1990-2005			
Location	**Market [a]**	*Million Nominal U.S. Dollars*	*Million Real 2005 U.S. Dollars*
WE	Cable, high-voltage, Germany	14256.0	39272.7
WE	Steel, flat stainless	9300.0	11328.2
WE	PVC (polyvinyl-chloride) plastic	5308.0	9268.3
WE	Cartonboard	3000.0	4692.5
WE	Waste collection, Germany [m]	**2800.0**	2913.6
WE	Polypropylene plastic	2417.0	3172.3
WE	Steel beams	2320.0	4114.9
GLOBAL	TACA (Europe/No.Atlantic Shipping)	1800.0	1985.6
WE	Petroleum, Iceland [m]	1625.0	2413.4
WE	Cement I, Germany	1600.0	1744.8
WE	British Sugar	1370.0	3190.4
GLOBAL	Graphite Electrodes	1200.0	2141.6
GLOBAL	Vitamin Premixes	774.0	856.2
GLOBAL	Vitamin E	699.0	1247.5
WE	Gasoline, FR	675.0	712.0
WE	Gasoline, IT	661.0	719.3
WE	Cell phones, IT	655.0	715.8
GLOBAL	Insurance brokers, commercial, US [m]	576.0	599.4
GLOBAL	Citric Acid	570.0	1128.2
WE	Paper, carbonless	485.0	1232.2
WE	Compressed gases, NL	357.0	612.8
GLOBAL	Vitamin A	319.0	569.3
WE	Generic drugs, warfarin & penicillin [m], UK	316.0	344.6
GLOBAL	Carbon Black [m]	305.0	321.7
GLOBAL	Parcel Tankers, Chemical Shipping[m]	300.0	316.5
WE	Steel pipes, insulated heating	242.0	360.3
GLOBAL	Vitamin C	231.0	497.8
GLOBAL	Steel tubes ("oil country tubes")	225.0	400.8
WE	Construction, Netherlands [m]	193.0	210.9
GLOBAL	Beta Carotene	175.0	283.4
GLOBAL	Choline chloride (Vitamin B4) [f]	138.0	351.0
WE	Construction, Norway [m]	130.0	141.5
GLOBAL	Fine Arts (Art Auction Houses)	122.0	178.9
WE	Euro-Zone banks	112.0	100.6
WE	Concrete, Eastern Germany	112.0	12.1
GLOBAL	Lysine	105.0	191.4
WE	Insurance, industrial property, Germany [m]	100.0	105.5
GLOBAL	Canthaxanthin	95.0	153.8
GLOBAL	Vitamin B5 (Calpan)	92.0	164.2
WE	Infant Formula (Episode 1), Italy	75.0	91.8
WE	Gasoline, Sweden	57.0	60.9
WE	Infant Formula (Episode 2), Italy	50.0	52.0
GLOBAL	Vitamin B2	49.0	97.0
WE	Danish air routes	49.0	53.2
GLOBAL	Vitamin B12	47.0	54.3
GLOBAL	Vitamin B3 (Niacin)	39.0	43.1
WE	Vitamin B4 (Choline Chloride) Europe	30.0	54.3
WE	Ferry services, English Channel	24.0	31.9
GLOBAL	Vitamin B6	22.0	25.4
WE	Hydro-Electric power equipment, NO	21.1	23.2
GLOBAL	Biotin (Vitamin H)	18.5	39.9

GLOBAL	Vitamin D	9.3	15.1
WE	Zinc phosphate	8.0	13.0
GLOBAL	Folic Acid (Vitamin B9)	7.7	8.9
GLOBAL	Vitamin B1	6.6	7.6
WE	Pharmaceuticals, respiratory, IT	6.5	7.1
WE	Construction, public works, Meuse, France	2.8	3.0
WE	Tobacco processing, Spain	2.6	3.7
WE	Construction, SRO, Netherlands	1.8	3.1
WE	Eurocheque	1.6	2.3
WE	Paper, corrugated cardboard, Norway	1.1	1.4
WE	Pharmaceuticals, cholesterol, IT	1.1	1.2
TOTAL	(62 observations)	56,290.7	99,459.3
MEDIAN		134.0	201.2
MEAN		907.9	1604.2

Source: Spreadsheet dated October 2006
a) If no country mentioned, the cartel was global or organized across several EU Member States.
m) under investigation

Table 9. Overcharges in Other Regions, 1990-2005 [a]			
Location	**Market**	*Million Nominal U.S. Dollars*	*Million Real 2005 U.S. Dollars*
GLOBAL	Graphite Electrodes	1100.0	2081.3
EE	Cement, Romania	909.0	957.5
GLOBAL	Vitamin Premixes	700.7	801.7
GLOBAL	Citric Acid	660.0	772.8
GLOBAL	Vitamin C	640.0	1037.5
GLOBAL	Steel tubes ("oil country tubes")	638.0	755.5
AS	Telephone services, local, Korea	567.0	611.0
GLOBAL	Construction, Nigeria LNG plants [m]	413.0	483.6
GLOBAL	Vitamin E	359.0	482.0
GLOBAL	Vitamin A	279.2	374.8
GLOBAL	Canthaxanthin	244.3	275.0
GLOBAL	Choline chloride (Vitamin B4) [f]	226.0	267.6
AS	Telephone services, long-distance, Korea	137.0	147.6
GLOBAL	Insurance brokers, commercial, US [m]	120.0	136.5
AS	Broadband Internet service, Korea	118.0	127.2
AS	Petroleum, Military fuels, Korea	96.0	116.1
AS	Philippines telecom, US	95.0	96.9
GLOBAL	Vitamin B12	93.1	110.3
GLOBAL	Beta Carotene	77.7	87.5
AS	Telephone services, international, Korea	73.0	78.7
GLOBAL	Lysine	65.0	96.8
GLOBAL	Vitamin B3 (Niacin)	41.1	47.0
GLOBAL	Biotin (Vitamin H)	39.2	46.4
GLOBAL	Vitamin B6	34.4	40.7
OC	Transformers, power & distn, E. AU	27.5	47.2
GLOBAL	Vitamin B5 (Calpan)	26.4	35.4
GLOBAL	Vitamin B2	25.8	30.2
EE	Coffee wholesaling, Hungary	15.3	13.1
GLOBAL	Vitamin B1	12.0	14.2
GLOBAL	Vitamin D	9.3	10.5
GLOBAL	Folic Acid (Vitamin B9)	2.1	2.4
EE	Coffee wholesaling, Czech Republic	0.5	0.4
TOTAL	(32 observations)	7844.5	10,185.3
MEDIAN		95.5	113.2
MEAN		245.1	318.3

Source: Spreadsheet dated October 2006

a) Includes Africa, Asia, Latin America, Oceania, and Eastern Europe.

m) Investigation in progress in 2005

Table 10. World-Wide Overcharges, 1990-2005			
Location	**Market**	*Million Nominal U.S. Dollars*	*Million Real 2005 U.S. Dollars*
GLOBAL	Aluminum Metal	**38400.0**	45497.6
WE	Cable, high-voltage, Germany	14256.0	39272.7
NO	Linerboard, US	11000.0	13033.2
WE	Steel, flat stainless	9300.0	11328.2
NO	Flat glass, U.S.	8700.0	10494.6
GLOBAL	DRAMs [m]	8400.0	5549.1
GLOBAL	Plastic Additives: Heat Stabilizers [m]	5800.0	6666.7
WE	PVC (polyvinyl-chloride) plastic	5318.0	9268.3
GLOBAL	Plastic Additives: Impact Modifiers [m]	4800.0	5517.2
GLOBAL	Insurance brokers, commercial, US [m]	3600.0	3804.3
GLOBAL	Graphite Electrodes	3500.0	5871.9
NO	Sulfuric acid, US [m]	3300.0	3980.7
WE	Cartonboard	3000.0	4692.5
WE	Waste collection, Germany [m]	**2800.0**	2913.6
WE	Polypropylene plastic	2417.0	3172.3
WE	Steel beams	2320.0	4114.9
GLOBAL	Vitamin Premixes	2128.0	2621.7
GLOBAL	TACA (Europe/No. Atlantic Shipping)	1800.0	1985.6
GLOBAL	Vitamin E	1743.0	2740.1
WE	Petroleum, Iceland [m]	1625.0	4239.2
WE	Cement I, Germany	1600.0	1744.8
NO	High Fructose Corn Syrup, US	1593.0	1959.4
GLOBAL	Citric Acid	1477.0	2209.6
NO	Corn Glucose Syrup, US	1400.0	1722.0
GLOBAL	Carbon Fiber	1375.0	2627.7
WE	British Sugar	1370.0	3190.4
NO	Tobacco Leaf, US	1220.0	1648.8
GLOBAL	Vitamin C	1130.0	1996.6
GLOBAL	Parcel Tankers, Chemical Shipping [m]	1031.0	651.6
EE	Cement, Romania	909.0	957.5
GLOBAL	Vitamin A	882.0	1362.9
GLOBAL	Steel tubes ("oil country tubes")	863.0	1156.3
GLOBAL	Copper Concentrate [m]	825.0	872.1
GLOBAL	Carbon Black [m]	690.0	735.1
WE	Gasoline, FR	675.0	712.0
WE	Gasoline, IT	661.0	719.3
WE	Cell phones, IT	655.0	715.8
AS	Telephone services, local, Korea	567.0	611.0
GLOBAL	Choline chloride (Vitamin B4) [f]	535.5	1029.8
WE	Paper, carbonless	485.0	1232.2
GLOBAL	Construction, Nigeria LNG plants [m]	413.0	483.6
GLOBAL	Sorbates	412.5	1092.5
AS	Vitamin C, US imports from China [m]	411.0	419.4
GLOBAL	Fine Arts (Art Auction Houses)	406.0	562.4
GLOBAL	Methionine	404.0	488.5
GLOBAL	Beta Carotene	380.0	541.2
GLOBAL	Canthaxanthin	362.0	459.2
WE	Compressed gases, NL	357.0	612.8
WE	Generic drugs, warfarin & penicillin [m], UK	316.0	344.6
NO	Explosives, commercial, US	275.0	432.9
NO	Cardizem CD hypertension drug, US	274.0	274.1

GLOBAL	Lysine	258.0	397.9
WE	Steel pipes, insulated heating	242.0	360.3
WE	Construction, Netherlands [m]	193.0	210.9
GLOBAL	Vitamin B12	191.0	226.9
GLOBAL	Vitamin B5 (Calpan)	178.8	318.3
NO	Vitamin B4, North America	178.0	290.6
NO	Anti-anxiety drugs, US	150.0	136.5
AS	Telephone services, long-distance, Korea	137.0	147.6
WE	Construction, Norway [m]	130.0	141.5
GLOBAL	Vitamin B3 (Niacin)	123.0	154.0
AS	Broadband Internet service, Korea	118.0	127.2
GLOBAL	Diamonds, Industrial	117.0	136.3
WE	Euro-Zone banks	112.0	100.6
WE	Concrete, Eastern Germany	112.0	12.1
GLOBAL	Vitamin B2	109.0	183.2
WE	Insurance, industrial property, Germany [m]	100.5	105.5
AF	Construction, USAID in Egypt [n]	100.0	215.5
AS	Petroleum, Military fuels, Korea	95.7	116.1
AS	Philippines telecom, US	95.0	96.9
GLOBAL	Biotin (Vitamin H)	83.0	117.2
WE	Infant Formula (Episode 1), Italy	75.0	176.1
AS	Telephone services, international, Korea	73.0	78.7
GLOBAL	Vitamin B6	73.0	86.1
NO	Iron oxide, Canada	65.0	84.2
NO	Polyester staple, US and CA [m]	60.0	63.6
NO	Compressed gas, CA	60.0	76.2
WE	Gasoline, Sweden	57.0	60.9
WE	Infant Formula (Episode 2), Italy	50.0	52.0
GLOBAL	Methylglucamine	**49.7**	31.5
WE	Danish air routes	46.0	53.2
WE	Vitamin B4 (Choline Chloride) Europe	34.4	60.1
GLOBAL	Vitamin B1	29.0	34.4
GLOBAL	Vitamin D	29.0	37.5
NO	Paper, thermal fax, US and CA	27.8	35.1
OC	Transformers, power & distn, E. AU	27.5	47.2
WE	Ferry services, English Channel	24.0	31.9
WE	Hydro-Electric power equipment, NO	21.1	23.2
NO	Ferrosilicon, US	16.0	23.1
EE	Coffee wholesaling, Hungary	15.3	13.1
GLOBAL	Carbon Cathode Block	**13.0**	5.1
GLOBAL	Folic Acid (Vitamin B9)	12.8	15.0
WE	Aluminum Phosphide, US	9.5	12.0
WE	Zinc phosphate	8.0	13.0
WE	Pharmaceuticals, respiratory, IT	6.5	7.1
NO	Moving and storage, Germany-US	5.5	5.5
GLOBAL	Stamp Auctions (Episode 1)	5.0	18.4
WE	Construction, public works, Meuse, France	2.8	3.0
WE	Tobacco processing, Spain	2.6	3.7
WE	Construction, SRO, Netherlands	1.8	3.1
NO	Insecticide, BT , CA	1.7	1.7
WE	Eurocheque	1.6	2.3
WE	Paper, corrugated cardboard, Norway	1.1	1.4
WE	Pharmaceuticals, cholesterol, IT	1.1	1.2
EE	Coffee wholesaling, Czech Republic	0.5	0.4
AS	Beer, Korea	0.1	0.1
TOTAL	(106 observations)	161,890.3	225,086.8

MEDIAN		217.5	304.4
MEAN		1527.3	2123.5
TOTAL	(38 observations, global only)		98,285.1
MEDIAN			607.0
MEAN			2586.4

Source: Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 11. International Cartel Recidivists, 1990-2005

Company (other & former names)	HQ	Number of Violations
BASF AG	DE	26
Total S.A. (TotalFinaElf, Atofina)	FR	18
Hoffmann La Roche	CH	17
Akzo Nobel	NL	14
Aventis (Hoechst, Rhone-Poulenc, Sanofi)	CH	14
ENI (Ente Nazionale, AGIP, Syndial, Polimeri)	IT	14
Shell (Royal Dutch Shell)	NL	14
Degussa (Huels)	DE	13
Bayer AG	DE	11
Mitsubishi Corp.	JP	10
Mitsui & Co. Ltd.	JP	10
Exxon Mobil (Esso, Mobil)	US	9
Holcim	CH	9
Solvay	BL	9
Crompton Corp. (Uniroyal)	US	8
Stora Enso Ojy	FI	8
Takeda Chemical Industry	JP	8
ADM	US	7
American Intl. Group (AIG)	US	7
DuPont	US	7
Hyundai	KO	7
Lafarge	FR	7
Sumitomo (Chemical, Metal)	JP	7
ABB (Asea Brown Boveri)	CH	6
International Paper	US	6
Moller Maersk Group	DK	6
Abbott Labs	US	5
BP Amoco	UK	5
Dow Chemical	US	5
E. Merck KgaA	DE	5
GrafTech (UCAR, Eastman Chemical)	US	5
Heidelberg Cement	DE	5
Interbrew	BL	5
Kuwait Petroleum	KW	5
Monsanto	US	5
P&O Ned Lloyd	NL/UK	5
Vodafone (Omnitel, Libertel)	UK	5
Abruzzi Unicem	IT	4
Ahlstrom	FI	4
Coats Holdings	UK	4

Heijmans	NL	4
ICI (Imperial Chem. Industries)	UK	4
KT Corp	KO	4
Nedlloyde Lijnen	NL	4
Nestlé	CH	4
Repsol Group	ES	4
Rio Tinto	UK	4
Thyssen AG (ThyssenKrupp)	DE	4
UPM Kymmene (Raflatac)	FI	4
Ajinomoto	JP	3
Altana Pharma	DE	3
Barbour Thread Ltd.	UK	3
Bemis Corporation	US	3
Celanese	US	3
Cheil Jedang	KO	3
Chinook Ltd.	CA	3
Cho Yang	KO	3
ConAgra	US	3
Daiichi	JP	3
Danone (BSN)	FR	3
Deutsche Africa Linie	DE	3
DSM NV	NL	3
Energie Baden-Wuettemberg	DE	3
Eridania	FR/IT	3
Great Lakes Chemical	US	3
Hanjin Shipping	KO	3
Hapag Lloyd	DE?	3
Johnson&Johnson	US	3
Kureha Chemical Industry	JP	3
Mayr-Meinhof	DE	3
Myllykoski	FI	3
Numico NV	NL	3
Paperlinx	AU	3
Philip Morris	US	3
Rohm & Haas	US	3
RWE (Mitgas)	DE	3
Sappi (S. D. Warren)	ZA	3
Senator (DSR)	DE	3
Siemens AG	DE	3
Skanska AB	SW	3
Sony	JP	3
Stena Line	SW	3
Tamoil	Libya	3
Tate & Lyle (A.E. Staley, British Sugar)	UK	3
88 more companies not listed herein	Various	2
TOTAL of 174 recidivists		

Source: Spreadsheet dated October 2006

Table 12. U.S. Government Cartel Fines, 1990-2005	
Market	*Real 2005 dollars*
DRAMs m	440.9
Graphite Electrodes	227.5
Vitamin E	131.4
Vitamin Premixes	109.5
Rubber Processing Chemicals m	76.9
Anti-anxiety drugs, US	75.3
Polychloroprene syn. Rubber m	73.1
Vitamin C	72.8
Construction, USAID in Egypt n	55.5
Parcel Tankers, Chemical Shipping m	52.0
Vitamin A	48.6
Citric Acid	48.5
Lysine	43.2
Sorbates	34.3
Beta Carotene	34.1
Fine Arts (Art Auction Houses)	31.1
Polyester staple, US and CA m	24.4
Polyols, polyester aliphatic, US m	24.4
Construction, marine, US n	22.5
Vitamin B5 (Calpan)	18.3
Vitamin B3 (Niacin)	14.9
Nitrile Rubber m	13.6
Vitamin B2	12.7
Sodium Gluconate	11.9
Explosives, commercial, US	11.8
MCAA	10.6
Moving and storage, Germany-US	8.8
Graphite, Isostatic Specialty Products	8.0
MSG	7.1
Transportation, marine, US n	6.8
Paper, thermal fax, US and CA	4.7
Sodium Erythorbate, North Am.	4.5
Maltol, Synthetic, North Am.	4.2
Bromines, US (possible EU)	4.1
Plastic dinnerware, US and CA	4.0
Carbon Electrical Productsm	3.4
Diamonds, Industrial	3.2
Methylglucamine	2.6
Vitamin B4, North America	2.5
Magnetic Iron Oxide (MIO) m	2.3
Choline chloride (Vitamin B4) f	2.1
Organic peroxides m	1.8
Carbon Cathode Block	1.2
Tampico Fiber, US	0.9
Canthaxanthin	0.7
Cable-stayed bridges, US n	0.7
Ferrosilicon, US	0.5
California bridge, US n	0.4

Aluminum Phosphide, US	0.2
Tactile tile, U.S.	0.0
Subtotal: 11 vitamins cartels	447.6
Total fines, 50 cases	1794.8

Table 13. Canadian Government Cartel Fines, 1990-2005	
Market	*Real 2005 US dollars*
Paper, Canada [m]	25.31
Graphite Electrodes	14.65
Vitamin Premixes	14.20
Vitamin E	8.48
Lysine	5.29
Vitamin C	4.95
Rubber Processing Chemicals [m]	4.64
Vitamin A	4.32
Citric Acid	3.82
Beta Carotene	2.27
Cement, Quebec, Canada	1.88
Compressed gas, CA	1.63
Vitamin B12	1.58
Vitamin B5 (Calpan)	1.56
Sorbates	1.29
Vitamin B3 (Niacin)	1.01
Paper, thermal fax, US and CA	0.95
Polyester staple, US and CA [m]	0.91
Insecticide, BT , CA	0.84
Vitamin B2	0.68
Vitamin B4, North America	0.68
Iron pipe, Canada	0.67
Choline chloride (Vitamin B4) [f]	0.64
Insecticides, Syn. Forest, CA	0.46
Sodium Erythorbate, North Am.	0.43
Sodium Gluconate	0.37
Vitamin B4 (Choline Chloride) Europe	0.36
Carbon Cathode Block	0.30
Graphite, Isostatic Specialty Products	0.21
Methylglucamine	0.17
Carbon Electrical Products[m]	0.12
Subtotal of 12 vitamins	40.70
Total of 31 cases	104.65
Source: Private Intl. Cartels Spreadsheet dated October 2006 m) Investigation in progress in 2005	

Table 14. European Union Cartel Fines, 1990-2005	
Market	*Real 2005 US dollars*
Plasterboard	245.58
DRAMs m	160.34
TACA (Europe/No.Atlantic Shipping)	137.94
Copper tubes, plumbing	120.44
Graphite Electrodes	93.04
Paper, carbonless	86.09
Vitamin E	83.60
Euro-Zone banks	71.01
Rubber Processing Chemicals m	59.28
Vitamin A	54.33
Citric Acid	50.45
Methionine	48.31
Sewing needles	46.94
Beer, Belgian, HORECA channel	46.87
Lysine	46.71
Vitamin B5 (Calpan)	45.96
Vitamin B4 (Choline Chloride) Europe	44.68
Tobacco, leaf ("raw"), procurement, IT	44.22
Copper tubes, industrial	42.19
Beta Carotene	41.44
Steel tubes ("oil country tubes")	40.50
Canthaxanthin	40.16
Vitamin C	40.11
Sorbates	37.84
Cartonboard	33.87
Steel pipes, insulated heating	33.27
Danish air routes	32.91
Choline chloride (Vitamin B4) f	32.90
Cement , white & gray	29.47
Steel beams	29.31
Graphite, Isostatic Specialty Products	28.09
Vitamin B2	25.90
Thread, industrial, Benelux and Nordic	21.37
Carbon Electrical Productsm	21.07
Vitamin D	19.41
Sodium Gluconate	17.01
British Sugar	16.54
Tobacco processing, Spain	16.51
Organic peroxides m	14.63
Steel, flat stainless	12.23
Compressed gases, NL	11.76
Fine Arts (Art Auction Houses)	11.37
MSG	9.83
Polypropylene plastic	9.43
Nucleotides (Nucleic Acid)	7.45
Construction, SRO, Netherlands	6.42
Zinc phosphate	6.12
Shipping CEWAL (N. Eur-W. Africa)	4.48

Graphite, Extruded	4.10
Shipping (Europe/Cent. W. Africa)	4.04
Ferry services, Adriatic	3.79
Thread, automotive	3.66
Shipping (French/African)	3.50
PVC (polyvinyl-chloride) plastic	3.45
Shipping (Europe/Far East)	3.00
Construction, mobile crane rental, NL	2.53
Eurocheque	2.07
Electrical equipment distribution, NL	1.71
Beer, France, HORECA f	1.52
Methylglucamine	1.45
Beer, Belgian, Retail Private Label	1.10
Ferry services, English Channel	0.26
Beer, Luxembourg, HORECA	0.14
Subtotal of 11 vitamins	468.639
Total fines, 63 cases	2215.69

Source: Private Intl. Cartels Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 15. Other Jurisdictions' Cartel Fines, 1990-2005		
Location of Cartel	Market	*Real 2005 US dollars*
GLOBAL	Insurance brokers, commercial, US m	992.39
DE	Cement I, Germany	495.11
NL	Construction, Netherlands m	260.66
IT	Gasoline, IT	168.42
DE	Insurance, industrial property, Germany m	134.56
DE	Concrete, Eastern Germany	115.22
SW	Asphalt, Sweden m	106.47
KO	Telephone services, local, Korea	101.80
KO	Petroleum, Military fuels, Korea	101.33
NL	Mobile phone operators in NL	82.44
FI	Asphalt paving, Finland	80.69
IT	Cell phones, IT	58.52
KZ	Petoleum products, Kazakhstan m	51.41
BR	Pharmaceuticals, generic, Brazil	47.46
SW	Bitumen, Sweden	46.82
KO	Excavators manufacturing, Korea	43.60
IT	Cigarettes, Italy	35.10
UK	Toys and games, UK	33.97
RU	Cement, Romania	31.40
FR	Construction, public works, Meuse, France	26.60
FR	Gasoline, FR	24.57
KO	Forklift manufcturing, Korea	24.52
KO	Cement, Korea	20.10
IT	Diabetes testing devices, IT	19.80
KO	Telephone services, long-distance, Korea	18.56
AR	Cement, Argentina m	17.87
FR	Beef, France	17.52
PT	Diabetes testing devices, Portugal	16.88
SW	Gasoline, Sweden	12.70
JP	Petroleum, Military fuel, JP	10.84
IT	Glass (food) containers, IT	10.72
CZ	Gasoline, Czech Republic	9.25
FR	Ball & roller bearings, FR	8.88
AU	Transformers, power & distn, E. AU	6.47
NL	Prawns, Netherlands	6.11
IT	Insurance, non-life, Italy	5.24
KO	Broadband Internet service, Korea	5.07
UK	Generic drugs, warfarin & penicillin m, UK	4.73
KO	Telephone services, international, Korea	4.34
GLOBAL	Graphite Electrodes	4.02
IT	Gas water heaters, IT	3.95
ES	Gasoline, Spain	2.98
GLOBAL	Vitamin E	2.87
GLOBAL	Vitamin A	2.77
NL	Construction of athletic tracks, NL	2.62
IT	Radiological media, IT	2.29
GLOBAL	Vitamin C	2.21

IT	Infant Formula (Episode 1), Italy	1.92
HU	Coffee wholesaling, Hungary	1.81
DE	Cable, high-voltage, Germany	1.72
KO	Batteries manufacturing, auto, Korea	1.53
NO	Hydro-Electric power equipment, NO	1.42
JP	Vinyl food wrap, Japan	1.27
IT	Auditing services, IT	1.07
IL	Digital switches, Israel	0.91
NL	Gasoline, NL	0.85
KO	Beer, Korea	0.67
NO	Paper, corrugated cardboard, Norway	0.60
HU	Cement, Hungary	0.41
IT	Diesel Fuel, IT	0.31
CZ	Coffee wholesaling, Czech Republic	0.27
AU	Compressors, Australia	0.27
IT	Pharmaceuticals, respiratory, IT	0.23
NL	Special concrete foundations design, NL	0.11
GLOBAL	Lysine	0.09
GLOBAL	Vitamin B5 (Calpan)	0.05
IT	Pharmaceuticals, cholesterol, IT	0.04
MX	Gas, liquid propane (LPG), Toluca, Mex.	0.02
GLOBAL	Insurance brokers, commercial, US m	992.39
Subtotal of 7 vitamins fines KO+AU		7.91
Total of 68 cases		3297.40

Source: Private Intl. Cartels Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 16. Private Cartel Settlements, 1990-2005		
Market	*Real 2005 US dollars*	*Nominal US dollars*
Tobacco Leaf, US	1252.32	
Vitamin E	509.73	
High Fructose Corn Syrup, US	492.49	
Fine Arts (Art Auction Houses)	401.11	
Graphite Electrodes	371.37	
Vitamin Premixes	348.57	
Methionine	234.68	
Vitamin A	232.89	
Cosmetics, "prestige," U.S.	229.38	
Vitamin C	218.66	
Citric Acid	209.50	
Linerboard, US	198.83	
Digital switches, Israel	188.90	
Diamonds, gem	181.00	
Cardizem CD hypertension drug, US	164.13	
Beta Carotene	118.91	
Vitamin B4, North America	103.56	
Lysine	86.81	
Anti-anxiety drugs, US	85.30	
MSG	72.58	
Automotive Refinishing Paint m	63.71	
Explosives, commercial, US	59.18	
Sorbates	54.85	
Vitamin B5 (Calpan)	50.89	
EPDM, Synthetic Rubber m	50.69	
Polyester staple, US and CA m	47.16	
Choline chloride (Vitamin B4) f	43.03	
MCC (microcrystalline cellulose)	42.75	
Biotin (Vitamin H)	42.15	
Construction, USAID in Egypt n	38.82	
Vitamin B2	38.00	
Flat glass, U.S.	36.66	
Glass containers, U.S.	30.94	
Vitamin B3 (Niacin)	30.75	
Carbon Fiber	23.48	
Polychloroprene syn. Rubber m	19.96	
Vitamin B1	14.49	
Rubber Processing Chemicals m	13.57	
Vitamin B6	13.39	
Paper, thermal fax, US and CA	11.14	
Magnetic audio tape, US	6.61	
Folic Acid (Vitamin B9)	6.59	
MCAA	6.44	
Sodium Erythorbate, North Am.	5.85	
Diamonds, Industrial	5.78	
Maltol, Synthetic, North Am.	5.51	
Bromines, US (possible EU)	5.30	
Vitamin B12	3.07	

Organic peroxides m	2.64	
Canthaxanthin	2.63	
Tampico Fiber, US	0.97	
Transportation, diamonds, intl., Israel	0.52	
Sodium Gluconate	0.35	
Aluminum Phosphide, US	0.20	
Stamp Auctions (Episode 1)	0.17	
Subtotal of 16 vitamins US & CA	1777.31	
Total of 55 cases	6478.96	
Source: Private Intl. Cartels Spreadsheet dated October 2006		

Table 17. Total Monetary Corporate Antitrust Sanctions, 1990-2005		
Market	*Real 2005 dollars*	*Nominal U.S. Dollars*
Tobacco Leaf, US	1162.28	1753.00
Insurance brokers, commercial, US [m]	992.39	1129.00
Vitamin E	923.80	1962.00
Vitamin Premixes	708.46	1502.10
Graphite Electrodes	631.18	1305.45
DRAMs **[m]**	601.29	750.00
Cement I, Germany	495.11	798.00
Vitamin A	428.83	912.50
Vitamin C	418.97	1071.60
Fine Arts (Art Auction Houses)	357.87	624.95
Construction, Netherlands [m]	260.66	401.00
Plasterboard	245.58	478.30
Beta Carotene	240.49	463.60
High Fructose Corn Syrup, US	239.15	611.00
Methionine	218.24	555.20
Citric Acid	215.13	480.59
Digital switches, Israel	189.80	390.83
Diamonds, gem	181.00	250.00
Gasoline, IT	168.42	290.00
Rubber Processing Chemicals [m]	153.43	233.20
Cardizem CD hypertension drug, US	152.33	190.00
TACA (Europe/No.Atlantic Shipping)	137.94	235.90
Lysine	137.43	307.95
Vitamin B5 (Calpan)	135.77	291.50
Cosmetics, “prestige,” U.S.	135.68	199.00
Insurance, industrial property, Germany [m]	134.56	171.20
Anti-anxiety drugs, US	125.78	174.00
Copper tubes, plumbing	120.44	268.00
Linerboard, US	117.61	254.50
Concrete, Eastern Germany	115.22	192.60
Asphalt, Sweden [m]	106.47	189.30
Sorbates	105.84	424.36
Telephone services, local, Korea	101.80	109.70
Petroleum, Military fuels, Korea	101.33	146.30
Choline chloride (Vitamin B4) [f]	95.06	249.50
Polychloroprene syn. Rubber [m]	93.06	118.40
Vitamin B2	91.11	214.80
Paper, carbonless	86.09	282.60
Mobile phone operators in NL	82.43	92.06
Asphalt paving, Finland	80.69	121.70
Construction, USAID in Egypt [n]	78.44	201.23
MSG	77.45	164.00
Polyester staple, US and CA [m]	72.52	89.62
Euro-Zone banks	71.01	89.70
Vitamin B4, North America	64.42	154.00
Cell phones, IT	58.52	80.70
Vitamin B3 (Niacin)	57.80	121.75
Parcel Tankers, Chemical Shipping**[m]**	52.01	62.58
Petoleum products, Kazakhstan [m]	51.41	55.40
EPDM, Synthetic Rubber**[m]**	50.69	70.00
Biotin (Vitamin H)	49.37	128.00
Pharmaceuticals, generic, Brazil	47.45	88.50

Sewing needles	46.94	77.80
Beer, Belgian, HORECA channel	46.87	91.50
Bitumen, Sweden	46.82	58.40
Canthaxanthin	45.50	88.70
Vitamin B4 (Choline Chloride) Europe	45.04	89.05
Tobacco, leaf (“raw”), procurement, IT	44.22	68.03
Excavators manufacturing, Korea	43.60	49.60
MCC (microcrystalline cellulose)	42.75	150.00
Copper tubes, industrial	42.19	92.00
Steel tubes (“oil country tubes”)	40.50	101.50
Explosives, commercial, US	37.87	112.14
Automotive Refinishing Paint [m]	37.68	67.00
Graphite, Isostatic Specialty Products	36.32	83.46
Cigarettes, Italy	35.10	62.40
Toys and games, UK	33.97	43.70
Cartonboard	33.87	117.20
Steel pipes, insulated heating	33.27	76.80
Danish air routes	32.91	43.10
Cement, Romania	31.40	35.90
Sodium Gluconate	29.58	85.97
Cement , white & gray	29.47	102.00
Steel beams	29.31	115.00
Construction, public works, Meuse, France	26.60	49.60
Flat glass, U.S.	26.55	61.70
Paper, Canada [m]	25.31	32.20
Gasoline, FR	24.57	29.80
Carbon Electrical Products[m]	24.56	142.10
Forklift Manufacturing, Korea	24.52	27.90
Polyols, polyester aliphatic, US [m]	24.37	33.00
Construction, marine, US [n]	22.51	49.30
Carbon Fiber	21.79	44.00
Thread, industrial, Benelux and Nordic	21.37	44.01
Vitamin B6	20.64	53.50
Cement, Korea	20.10	21.80
Vitamin B1	20.06	52.00
Diabetes testing devices, IT	19.80	35.20
Vitamin D	19.41	37.90
Organic peroxides [m]	19.07	111.18
Telephone services, long-distance, Korea	18.56	20.00
Cement, Argentina [m]	17.87	108.30
Beef, France	17.52	19.00
Diabetes testing devices, Portugal	16.88	19.20
British Sugar	16.54	59.70
Tobacco processing, Spain	16.51	24.90
MCAA	15.70	43.12
Nitrile Rubber [m]	13.63	15.20
Gasoline, Sweden	12.70	16.20
Steel, flat stainless	12.23	23.10
Compressed gases, NL	11.76	22.90
Paper, thermal fax, US and CA	11.65	31.45
Petroleum, Military fuel, JP	10.84	18.12
Glass (food) containers, IT	10.72	21.60
Polypropylene plastic	9.43	59.30
Gasoline, Czech Republic	9.25	10.33
Folic Acid (Vitamin B9)	9.06	23.50
Bromines, US (possible EU)	9.04	16.00
Ball & roller bearings, FR	8.88	18.77
Moving and storage, Germany-US	8.83	9.50

Maltol, Synthetic, North Am.	8.49	21.15
Sodium Erythorbate, North Am.	8.41	19.30
Nucleotides (Nucleic Acid)	7.45	16.00
Transportation, marine, US [n]	6.79	16.20
Diamonds, Industrial	6.63	20.35
Transformers, power & distn, E. AU	6.47	12.40
Construction, SRO, Netherlands	6.42	27.30
Zinc phosphate	6.12	11.95
Prawns, Netherlands	6.11	8.05
Vitamin B12	5.82	14.80
Magnetic audio tape, US	5.51	11.65
Insurance, non-life, Italy	5.24	13.20
Glass containers, U.S.	5.11	72.00
Broadband Internet service, Korea	5.07	5.46
Generic drugs, warfarin & penicillin [m], UK	4.73	8.00
Shipping CEWAL (N. Eur-W. Africa)	4.48	12.10
Telephone services, international, Korea	4.34	4.68
Methylglucamine	4.19	8.17
Graphite, Extruded	4.10	8.80
Shipping (Europe/Cent. W. Africa)	4.04	26.80
Plastic dinnerware, US and CA	4.02	9.14
Gas water heaters, IT	3.95	7.29
Ferry services, Adriatic	3.78	11.00
Thread, automotive	3.66	9.21
Shipping (French/African)	3.50	20.24
PVC (polyvinyl-chloride) plastic	3.45	20.00
Shipping (Europe/Far East)	3.00	7.70
Gasoline, Spain	2.98	3.56
Construction of athletic tracks, NL	2.62	3.37
Construction, mobile crane rental, NL	2.53	11.80
Magnetic Iron Oxide (MIO) [m]	2.33	5.00
Radiological media, IT	2.29	3.94
Eurocheque	2.07	7.80
Infant Formula (Episode 1), Italy	1.92	2.99
Cement, Quebec, Canada	1.88	4.10
Coffee wholesaling, Hungary	1.81	3.50
Cable, high-voltage, Germany	1.72	153.10
Electrical equipment distribution, NL	1.71	6.90
Compressed gas, CA	1.63	4.58
Batteries manufacturing, auto, Korea	1.53	1.62
Beer, France, HORECA [f]	1.52	3.07
Carbon Cathode Block	1.52	2.60
Tampico Fiber, US	1.50	3.70
Hydro-Electric power equipment, NO	1.42	2.62
Vinyl food wrap, Japan	1.27	3.36
Beer, Belgian, Retail Private Label	1.10	1.60
Auditing services, IT	1.07	2.24
Gasoline, NL	0.85	1.09
Insecticide, BT , CA	0.84	1.90
Cable-stayed bridges, US [n]	0.70	1.32
Beer, Korea	0.67	0.93
Iron pipe, Canada	0.67	1.80
Paper, corrugated cardboard, Norway	0.60	1.67
Ferrosilicon, US	0.48	1.28
Insecticides, Syn. Forest, CA	0.46	2.10
California bridge, US [n]	0.42	0.79
Cement, Hungary	0.41	0.48
Diesel Fuel, IT	0.31	0.52

Transportation, diamonds, intl., Israel	0.31	0.50
Aluminum Phosphide, US	0.30	0.80
Coffee wholesaling, Czech Republic	0.27	0.52
Compressors, Australia	0.27	0.49
Ferry services, English Channel	0.26	0.65
Pharmaceuticals, respiratory, IT	0.23	0.39
Stamp Auctions (Episode 1)	0.16	0.68
Beer, Luxembourg, HORECA	0.14	0.40
Special concrete foundations design, NL	0.11	0.12
Pharmaceuticals, cholesterol, IT	0.04	0.07
Tactile tile, U.S.	0.04	0.05
Gas, liquid propane (LPG), Toluca, Mex.	0.02	0.04
Subtotal of 18 vitamins (US, CA, KO & AU)	3,379.6	7,430.8
Total of 180 cases with real available	13,469.7	25,390.7
Infant formula, IT	--	11.83
Concrete, ready-mix, Italy (Lombardy)	--	49.10
Distribution, electrical appliances, FR	--	33.60
Elevator repairs, IT	--	8.42
Pharmaceuticals, obesity, IT	--	1.62
Recorded music, IT	--	4.47
Total of 185 cases, 6 with real not available		25,499.7

Source: Private Intl. Cartels Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 18. Penalties by Geographic Location of Cartel							
Location of Collusion: Penalty Source	**No.**	**Settlements**		**Fines**		**Total Penalties**	
		Real 2005 million US dollar	*%*	*Real 2005 million US dollar*	*%*	*Real 2005 million US dollar*	*%*
Africa: US DOJ [a]	2	22.96	0.4%	55.48	0.8%	78.44	0.6%
Asia:	20	189.21	3.1%	334.55	4.6%	523.76	3.9%
China	1	0	0.0%	0	0.0%	0	0.0%
Israel	2	189.21	3.1%	0.91	0.0%	190.11	1.4%
Japan	6	0	0.0%	12.11	0.2%	12.11	0.1%
Korea	10	0	0.0%	321.53	4.4%	321.53	2.4%
US DOJ [d]	1	0	0.0%	0	0.0%	0	0.0%
Eastern Europe:	7	0	0.0%	94.54	1.3%	94.54	0.7%
Czech Republic	2	0	0.0%	9.52	0.1%	9.52	0.1%
Hungary	2	0	0.0%	2.21	0.0%	2.21	0.0%
Kazakhstan	1	0	0.0%	51.41	--	51.41	0.4%
Lithuania	1	0	0.0%	0	--	0	0.0%
Rumania	1	0	0.0%	31.4	0.4%	31.4	0.2%
EU-Wide: EC	55	0	0.0%	961.18	13.1%	961.18	7.1%
Global:	73	3796.40	62.7%	3801.65	51.9%	7598.09	56.4%
US DOJ	30	--	--	1538.48	21.0%	1538.48	11.4%
Private US&CA	18	3796.40	62.7%	--	--	3796.40	28.2%
CA CBC	20	--	--	70.53	1.0%	70.53	0.5%
EU	31	--	--	1188.24	16.2%	1188.24	8.8%
Other National	6	--	--	12.02	0.2%	12.02	0.1%
US States	1	0?	0.0%	992.39	12.6%	992.39	7.4%
Latin America:	9	0	0.0%	65.35	0.9%	65.35	0.5%
Argentina	2	0	0.0%	17.87	0.2%	17.87	0.1%
Brazil	5	0	0.0%	47.45	0.6%	47.45	0.4%
Chile	1	0	0.0%	0	0.0%	0	0.0%
Mexico	1	0	0.0%	0.02	0.0%	0.02	0.0%
North America:	46	2048.53	33.8%	234.61	3.2%	2283.14	17.0%
Canada	7	0	0.0%	30.79	0.4%	30.79	0.2%
North America	7	75.02	1.2%	21.98	0.3%	97	0.7%
United States	32	1973.51	32.6%	181.84	2.5%	2155.35	16.0%
Oceania:	4	0	0.0%	6.73	0.1%	6.73	0.0%
Australia	3	0	0.0%	6.73	0.1%	6.73	0.0%
New Zealand	1	0	0.0%	0	0.0%	0	0.0%

W. European Nations:	67	0	0.0%	1858.45	25.4%	1858.45	13.8%
Finland	1	0	0.0%	80.69	1.1%	80.69	0.6%
France	8	0	0.0%	77.56	1.1%	77.56	0.6%
Germany	8	0	0.0%	746.62	10.2%	746.62	5.5%
Iceland	1	0	0.0%	0	0.0%	0	0.0%
Italy	24	0	0.0%	351.82	4.8%	351.82	2.6%
Netherlands	13	0	0.0%	375.2	5.1%	375.2	2.8%
Norway	3	0	0.0%	2.02	0.0%	2.02	0.0%
Portugal	1	0	0.0%	16.88	0.2%	16.88	0.1%
Spain	1	0	0.0%	2.98	0.0%	2.98	0.0%
Sweden	3	0	0.0%	165.99	2.3%	165.99	1.2%
United Kingdom	4	0	0.0%	38.7	0.5%	38.7	0.3%
TOTAL	180	6057.14	100.0%	7318.0	100.0%	13,469.68	100.0%

a) Includes one US DOJ prosecution of a cartel operating in Egypt. The settlement amount is federal government restitution.
b) Included in cell above
c) The only private settlement amounts outside North America are two in Israel and one in Australia.
d) Attempted prosecution of a Philippines cartel, abandoned because of comity objections.

Table 19. Real Sanctions Relative to Affected Sales						
Cartel Market	US	CA	EU	Other Govt.	Private	Total
	%	%	%	%	%	%
Anti-anxiety drugs, US	1102.2	--	--	--	738.31	1840.5
Construction, public works, Meuse, FR	--	--	1333.8	354.8	--	1688.6
Concrete, Eastern Germany	--	--	0.00	85.32	--	85.32
Paper, Canada [m]	--	61.07	--	--	--	61.07
Polyols, polyester aliphatic, US [m]	57.66	--	--	--	0.00	57.66
Fine Arts (Art Auction Houses)	4.87	--	4.37	0.00	49.35	39.80
Tobacco processing, Spain	--	--	35.38	0.00	--	35.38
Moving and storage, Germany-US	30.36	--	--	--	0.00	30.36
Euro-Zone banks	--	--	29.67	0.00	--	29.67
Insecticide, BT , CA	--	26.67	--	--	--	26.67
Eurocheque	--	--	22.01	0.00	--	22.01
Construction, USAID in Egypt [n]	15.22	--	--	--	6.30	21.52
Vitamin B5 (Calpan)	8.42	11.93	13.49	0.01	32.04	20.76
Folic Acid (Vitamin B9)	0.00	0.00	0.00	0.00	64.87	19.96
Digital switches, Israel	--	--	--	0.09	--	19.66
Beta Carotene	7.53	8.19	6.60	0.00	35.99	18.03
Vitamin E	6.69	6.45	3.47	0.09	35.50	17.08
Petroleum, Military fuels, Korea	--	--	--	16.58	--	16.58
Vitamin B2	7.61	5.11	9.73	0.00	31.16	16.42
Vitamin A	4.98	6.28	3.23	0.11	32.65	12.36
Tampico Fiber, US	7.62	--	--	--	4.72	12.35
Construction, Netherlands [m]	--	--	0.00	10.88	--	10.88
Diabetes testing devices, IT	--	--	--	10.24	--	10.24
Vitamin C	5.83	5.65	3.01	0.07	23.96	9.65
Zinc phosphate	--	--	9.28	0.00	--	9.28
Sodium Erythorbate, North Am.	5.56	4.43	--	--	4.25	9.24
Tobacco, leaf ("raw"), procurement, IT	--	--	8.99	0.00	--	8.99
Insurance, industrial property, DE [m]	--	--	0.00	8.90	--	8.90
Graphite Electrodes	10.97	3.80	3.50	0.08	14.08	8.71
Biotin (Vitamin H)	0.00	0.00	0.00	0.00	28.22	8.67
Vitamin Premixes	4.53	6.89	0.00	0.00	24.19	8.51
Vitamin B4, North America	0.34	1.48	--	--	8.46	8.37
MCC (microcrystalline cellulose)	0.00	--	--	--	7.51	7.51
Vitamin D	0.00	0.00	18.03	0.00	0.00	7.20
Vitamin B1	0.00	0.00	0.00	0.00	33.01	7.15
Vitamin B6	0.00	0.00	0.00	0.00	31.45	7.11
Cardizem CD hypertension drug, US	0.00	--	--	--	6.86	6.86
Tobacco Leaf, US	0.00	--	--	--	6.55	6.55
Vitamin B3 (Niacin)	4.70	10.64	0.00	0.00	13.25	6.42
Sodium Gluconate	7.66	2.44	11.06	0.00	0.18	6.04
Lysine	7.87	9.54	6.79	0.01	7.68	6.04
Vitamin B4 (Choline Chloride) Europe	0.00	0.72	11.99	0.00	0.00	5.87
Methylglucamine	10.11	12.61	5.75	0.00	0.00	5.63
Choline chloride (Vitamin B4) [f]	0.37	1.31	6.98	0.00	10.45	5.46
Polychloroprene syn. Rubber [m]	13.34	0.00	0.00	0.00	3.64	4.37
Cement I, Germany	--	--	0.00	3.97	--	3.97
Citric Acid	3.31	4.22	3.70	0.00	7.66	3.82
Sorbates	2.44	3.07	5.16	0.00	2.31	3.73
Insecticides, Syn. Forest, CA	--	3.72	--	--	--	3.72
Generic drugs, warfarin & penicillin [m], UK	--	--	0.00	3.65	--	3.65
Paper, thermal fax, US and CA	1.46	4.17	--	--	1.85	3.36
Nucleotides (Nucleic Acid)	0.00	0.00	9.63	0.00	0.00	3.25

Telephone services, local, Korea	--	--	--	3.01	--	3.01
Plastic dinnerware, US and CA	3.31	0.00	--	--	0.00	3.01
Danish air routes	--	--	3.00	0.00	--	3.00
Plasterboard	--	--	2.98	0.00	--	2.98
Nitrile Rubber [m]	5.37	--	0.00	0.00	0.00	2.95
Radiological media, IT	--	--	0.00	2.92	--	2.92
Asphalt paving, Finland	--	--	0.00	2.73	--	2.73
Maltol, Synthetic, North Am.	1.37	0.00	--	--	1.43	2.54
Steel pipes, insulated heating	--	--	2.50	0.00	--	2.50
Canthaxanthin	0.54	0.00	7.46	0.00	3.45	2.45
Graphite, Isostatic Specialty Products	1.64	0.52	6.01	0.00	0.00	2.43
Cement, Romania	--	--	--	2.41	--	2.41
Paper, carbonless	--	--	2.40	0.00	--	2.40
Prawns, Netherlands	--	--	0.00	2.38	--	2.38
Infant Formula (Episode 1), Italy	--	--	0.00	2.34	--	2.34
Methionine	0.00	0.00	1.31	0.00	4.99	2.33
Telephone services, long-distance, KO	--	--	--	2.28	--	2.28
Construction, marine, US [n]	17.44	--	0.00	0.00	0.00	1.94
DRAMs [m]	2.47	0.00	3.80	0.00	0.00	1.89
Asphalt, Sweden [m]	--	--	--	1.76	--	1.76
Gasoline, Sweden	--	--	0.00	1.74	--	1.74
Excavators manufacturing, Korea	--	--	--	1.73	--	1.73
Rubber Processing Chemicals [m]	2.50	1.99	4.80	0.00	0.41	1.72
Pharmaceuticals, cholesterol, IT	--	--	0.00	1.70	--	1.70
Pharmaceuticals, respiratory, IT	--	--	0.00	1.65	--	1.65
High Fructose Corn Syrup, US	0.00	--	--	--	1.59	1.59
Coffee wholesaling, Hungary	--	--	--	1.55	--	1.55
Copper tubes, industrial	--	--	1.53	0.00	--	1.53
Sewing needles	--	--	1.50	0.00	--	1.50
Forklift manufacturing, Korea	--	--	--	1.37	--	1.37
Glass (food) containers, IT	--	--	0.00	1.35	--	1.35
Beer, Belgian, Retail Private Label	--	--	1.34	0.00	--	1.34
Bromines, US (possible EU)	0.60	--	--	--	0.71	1.31
Carbon Cathode Block	5.32	4.32	0.00	0.00	0.00	1.31
Insurance brokers, commercial, US [m]	0.00	0.00	0.00	6.57	0.00	1.26
Gas water heaters, IT	--	--	0.00	1.23	--	1.23
Aluminum Phosphide, US	0.76	--	--	--	0.44	1.19
Compressed gases, NL	--	--	1.13	0.00	--	1.13
Transformers, power & distn., E. AU	--	--	--	1.09	--	1.09
Vitamin B12	0.00	64.98	0.00	0.00	3.12	1.05
Telephone services, international, Korea	--	--	--	0.999	--	0.999
Cell phones, IT	--	--	0.00	0.863	--	0.863
Gasoline, FR	--	--	0.00	0.863	--	0.863
Beer, Belgian, HORECA channel	--	--	0.85	0.000	--	0.853
Gasoline, IT	--	--	0.00	0.830	--	0.830
Cement, Korea	--	--	--	0.760	--	0.760
Broadband Internet service, Korea	--	--	--	0.721	--	0.721
Parcel Tankers, Chemical Shipping [m]	2.42	0.00	0.00	0.000	0.00	0.710
Copper tubes, plumbing	--	--	0.69	0.000	--	0.689
MCAA	5.96	--	0.00	0.000	2.84	0.672
Petroleum, Military fuel, JP	--	--	--	0.669	--	0.669
Compressed gas, CA	--	0.64	--	--	--	0.640
Cigarettes, Italy	--	--	--	0.571	--	0.571
Graphite, Extruded	0.00	--	1.74	0.000	0.00	0.543
Hydro-Electric power equipment, NO	--	--	0.00	0.536	--	0.536
EPDM, Synthetic Rubber [m]	0.00	0.00	0.00	0.000	1.35	0.506
Pharmaceuticals, generic, Brazil	--	--	--	0.490	--	0.490
Steel tubes ("oil country tubes")	--	--	1.88	0.000	--	0.478

Carbon Electrical Products [m]	6.64	2.09	0.41	0.000	0.00	0.474
British Sugar	--	--	0.47	0.000	--	0.465
Linerboard, US	0.00	--	--	--	0.45	0.451
Explosives, commercial, US	0.13	--	--	--	0.29	0.426
MSG	0.15	0.00	0.30	0.000	1.28	0.395
Cement, Argentina [m]	--	--	--	0.344	--	0.344
Beef, France	--	--	0.00	0.337	--	0.337
Magnetic Iron Oxide (MIO) [m]	0.98	--	0.00	0.000	0.00	0.271
Ferrosilicon, US	0.25	--	--	--	0.00	0.248
Steel beams	--	--	0.24	0.000	--	0.237
Gasoline, Czech Republic	--	--	0.00	0.230	--	0.230
Cartonboard	--	--	0.21	0.000	--	0.208
Cosmetics, "prestige," U.S.	0.00	--	--	--	0.20	0.204
Automotive Refinishing Paint [m]	0.00	0.00	0.00	0.000	0.44	0.171
Diamonds, Industrial	0.17	0.00	0.00	0.000	0.18	0.139
Polypropylene plastic	--	--	0.11	0.000	--	0.114
Insurance, non-life, Italy	--	--	0.00	0.114	--	0.114
Carbon Fiber	0.00	0.00	0.00	0.000	0.34	0.106
Ferry services, English Channel	--	--	0.09	0.000	--	0.094
Ferry services, Adriatic	--	--	0.09	0.000	--	0.093
Beer, Luxembourg, HORECA	--	--	0.08	0.000	--	0.077
Flat glass, U.S.	0.00	--	--	--	0.08	0.076
Steel, flat stainless	--	--	0.07	0.000	--	0.072
Cement , white & gray	--	--	0.07	0.000	--	0.070
Organic peroxides [m]	0.16	0.00	0.19	0.000	0.24	0.069
Construction, mobile crane rental, NL	--	--	0.06	0.000	--	0.063
PVC (polyvinyl-chloride) plastic	--	--	0.02	0.000	--	0.025
Electrical equipment distribution, NL	--	--	0.01	0.000	--	0.0144
Glass containers, U.S.	0.00	--	--	--	0.01	0.0088
Construction, SRO, Netherlands	--	--	0.01	0.000	--	0.0082
Stamp Auctions (Episode 1)	0.00	--	--	--	0.01	0.0064
Cable, high-voltage, Germany	--	--	0.00	0.0021	--	0.0021
Median	4.87	4.38	2.99	1.37	4.49	1.82
Mean	30.89	9.82	28.80	9.37	25.81	30.97
Number (372 total)	45	28	56	53	49	142

Source: Private Intl. Cartels Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 20. Real Sanctions Relative to Overcharges						
Cartel Market	US %	CA %	EU %	Other Govt. %	Priv-ate %	Total %
Construction, public works, Meuse, France	--	--	0.00	885.58	--	885.58
Moving and storage, Germany-US	160.57	--	--	--	0.00	160.57
Insurance, industrial property, DE [m]	--	--	0.00	127.57	--	127.57
Polychloroprene syn. Rubber [m]	98.92	--	--	--	27.02	125.94
Construction, Netherlands [m]	--	--	0.00	123.58	--	123.58
Polyester staple, US and CA [m]	38.42	--	--	--	74.11	113.96
Anti-anxiety drugs, US	55.18	--	--	--	36.96	92.15
Concrete, Eastern Germany	--	--	--	--	--	89.50
Petroleum, Military fuels, Korea	--	--	--	87.26	--	87.26
Tobacco Leaf, US	0.00	--	--	--	70.49	70.49
Folic Acid (Vitamin B9)	0.00	0.00	0.00	0.00	286.93	60.44
Coffee wholesaling, Czech Republic	--	--	--	60.24	--	60.24
Vitamin B1	0.00	0.00	0.00	0.00	181.40	58.32
Cardizem CD hypertension drug, US	0.00	--	--	--	55.57	55.57
Insecticide, BT , CA	--	49.55	--	--	--	49.55
Methionine	0.00	0.00	--	--	38.32	44.67
Paper, corrugated cardboard, Norway	--	--	0.00	43.77	--	43.77
Vitamin B3 (Niacin)	24.18	42.66	0.00	0.00	68.13	37.53
Construction, USAID in Egypt [n]	25.75	--	--	--	10.66	36.40
Paper, thermal fax, US and CA	14.44	41.22	--	--	18.22	33.22
Carbon Cathode Block	31.44	25.58	--	--	0.00	30.09
Cement I, Germany	--	--	0.00	28.38	--	28.38
Vitamin Premixes	12.33	18.76	0.00	0.00	65.84	27.02
Insurance brokers, commercial, US [m]	0.00	0.00	0.00	134.86	0.00	26.09
Vitamin B6	0.00	0.00	0.00	0.00	130.64	23.97
Gasoline, IT	--	--	0.00	23.42	--	23.42
Vitamin B4, North America	0.91	3.91	--	--	22.42	22.17
Gasoline, Sweden	--	--	0.00	20.86	--	20.86
Infant Formula (Episode 2), Italy	--	--	0.00	19.99	--	19.99
Tobacco processing, Spain	--	--	19.68	0.00	--	19.68
Telephone services, local, Korea	--	--	--	16.66	--	16.66
Coffee wholesaling, Hungary	--	--	--	13.78	--	13.78
Transformers, power & distn, E. AU	--	--	--	13.69	--	13.69
Methylglucamine	8.60	10.72	--	--	0.00	13.32
Telephone services, long-distance, Korea	--	--	--	12.57	--	12.57
High Fructose Corn Syrup, US	0.00	--	--	--	12.21	12.21
DRAMs [m]	7.95	--	--	--	0.00	10.84
Sorbates	3.24	3.56	--	--	3.07	9.69
Explosives, commercial, US	2.72	--	--	--	6.02	8.75
Cell phones, IT	--	--	0.00	8.18	--	8.18
Parcel Tankers, Chem. Shipping [m]	15.52	--	0.00	0.00	0.00	7.98
Fine Arts (Art Auction Houses)	8.11	--	0.24	0.00	82.24	7.00
Hydro-Electric power equipment, NO	--	--	0.00	6.12	--	6.12
Telephone services, international, Korea	--	--	--	5.52	--	5.52
Diamonds, Industrial	2.42	0.00	--	--	2.58	4.87
Vitamin D	0.00	0.00	4.87	0.00	0.00	4.61
Biotin (Vitamin H)	0.00	0.00	0.00	0.00	162.53	4.36
Broadband Internet service, Korea	--	--	--	3.98	--	3.98

Construction, SRO, Netherlands	--	--	3.52	0.00	--	3.52
Vitamin B4 (Choline Chloride) Europe	0.00	6.89	3.46	0.00	0.00	3.47
Gasoline, FR	--	--	0.00	3.45	--	3.45
Vitamin B2	24.43	16.39	1.01	0.00	100.00	3.44
Pharmaceuticals, respiratory, IT	--	--	0.00	3.30	--	3.30
Cement, Romania	--	--	--	3.28	--	3.28
Pharmaceuticals, cholesterol, IT	--	--	0.00	3.25	--	3.25
Beta Carotene	21.21	23.20	0.55	0.00	101.30	3.10
Vitamin B5 (Calpan)	16.14	30.92	1.06	0.00	61.47	3.02
Vitamin C	16.88	16.33	0.30	0.02	69.35	2.86
Vitamin A	12.21	21.19	0.36	0.02	80.03	2.71
Vitamin E	13.87	13.37	0.25	0.01	73.63	2.68
Vitamin B12	0.00	99.61	0.00	0.00	6.98	2.57
Aluminum Phosphide, US	1.57	--	--	--	0.91	2.48
Lysine	44.16	44.44	0.85	0.00	43.11	2.42
Danish air routes	--	--	2.34	0.00	--	2.34
Euro-Zone banks	--	--	2.22	0.00	--	2.22
Compressed gas, CA	--	--	--	--	--	2.13
Ferrosilicon, US	2.07	--	--	--	0.00	2.07
Zinc phosphate	--	--	1.79	0.00	--	1.79
Eurocheque	--	--	1.49	0.00	--	1.49
Generic drugs, warfarin & penicillin [m], UK	--	--	0.00	1.37	--	1.37
Choline chloride (Vitamin B4) [f]	0.56	2.06	0.41	0.00	15.62	1.10
Infant Formula (Episode 1), Italy	--	--	0.00	1.10	--	1.10
Graphite Electrodes	16.53	5.37	0.16	0.01	21.22	1.05
Canthaxanthin	2.39	0.00	0.99	0.00	15.34	1.04
Linerboard, US	0.00	--	--	--	0.90	0.90
Stamp Auctions (Episode 1)	0.00	--	--	--	0.85	0.85
Carbon Fiber	0.00	--	--	--	0.83	0.83
Citric Acid	17.88	10.26	0.17	0.00	41.40	0.70
Steel tubes ("oil country tubes")	--	--	0.32	0.00	--	0.30
Steel pipes, insulated heating	--	--	0.27	0.00	--	0.27
Flat glass, U.S.	0.00	--	--	--	0.25	0.25
Paper, carbonless	--	--	0.24	0.00	--	0.24
TACA (Europe/No. Atlantic Shipping)	--	--	0.20	0.00	--	0.20
Compressed gases, NL	--	--	0.08	0.00	--	0.08
Ferry services, English Channel	--	--	0.02	0.00	--	0.02
British Sugar	--	--	0.01	0.00	--	0.01
Cartonboard	--	--	0.01	0.00	--	0.01
Steel beams	--	--	0.01	0.00	--	0.01
Steel, flat stainless	--	--	0.0031	0.00	--	0.0031
Polypropylene plastic	--	--	0.0022	0.00	--	0.0022
PVC (polyvinyl-chloride) plastic	--	--	0.00041	0.00	--	0.00041
Cable, high-voltage, Germany	--	--	0.00	0.000007	--	0.000007
Median	14.98	17.58	0.31	7.15	38.32	4.61
Mean	23.35	24.3	1.47	51.62	53.74	36.8
Number (241 total)	30	20	31	31	37	92

Source: Private Intl. Cartels Spreadsheet dated October 2006
m) Investigation in progress in 2005

Table 21. Real Affected Sales by Industry Group and Location

Industry	No.	US	CA	EU	Other	Total
			Million real 2005 US dollars			
Agricultural raw materials, forestry*	6	29260.4	0.0	491.8	0.0	29752.2
Minerals	2	2733.9	173.0	2473.0	3021.9	8401.8
Construction	14	493.6	0.0	88417.7	22546.9	111458.3
Manufacturing:	204	423365.7	10087.6	406126.5	194330.1	1033909.8
Food and beverage	18	20541.2	0.0	11325.7	3691.4	35558.3
Tobacco	2	0.0	0.0	0.0	6148.7	6148.7
Textiles	2	0.0	0.0	0.0	0.0	0.0
Paper and printing	14	95225.8	4454.9	35929.9	24144.6	159755.2
Organic chemicals, food & ag. uses	36	23893.4	1804.4	24062.6	38202.9	87963.2
Organic chemicals, other	26	91759.6	834.5	21600.1	33638.5	147832.7
Inorganic chemicals, fertilizers	18	30444.6	1656.6	41568.5	21356.8	95026.4
Petroleum products	11	0.0	0.0	19615.4	2232.3	21847.7
Rubber and plastic	14	4608.1	65.1	26654.6	4771.3	36099.1
Stone, clay, graphite, glass products	23	102374.2	836.0	63816.4	35024.9	202051.5
Primary metals	1	35651.7	0.0	0.0	0.0	35651.7
Fabricated metal products	13	996.3	0.0	56273.3	9229.8	66499.4
Machinery	9	50.7	5.6	18379.4	4633.8	23069.5
Electronic devices	8	17820.2	430.6	84258.0	10981.2	113490.0
Instruments, misc. manufacturing	9	0.0	0.0	2642.7	273.9	2916.6
Services:	52	66311.1	3316.3	43260.7	92240.1	205128.2
Transport services	16	2181.9	107.6	11722.0	2956.9	16968.4
Communication services	10	0.0	0.0	1512.8	56195.8	57708.6
Wholesale, retail	11	0.0	0.0	14692.0	25775.3	40467.2
Finance, insurance, banking	6	60782.2	3171.3	14248.4	7312.2	85514.1
Other services	9	3346.9	37.4	1085.5	0.0	4469.9
Total, all industries	277	522239.2	13849.2	540534.4	311054.0	1387676.8

Source: Private Intl. Cartels Spreadsheet dated October 2006

Table 22. Real Affected Sales by Industry Group and Location

Industry	No.	US	CA	EU	Other	Total
			Percent			
Agricultural raw materials, forestry*	2.2%	5.6%	0.0%	0.1%	0.0%	2.1%
Minerals	0.7%	0.5%	1.2%	0.5%	1.0%	0.6%
Construction	5.1%	0.1%	0.0%	16.4%	7.2%	8.0%
Manufacturing:	73.6%	81.1%	72.8%	75.1%	62.5%	74.5%
Food and beverage	6.5%	3.9%	0.0%	2.1%	1.2%	2.6%
Tobacco	0.7%	0.0%	0.0%	0.0%	2.0%	0.4%
Textiles	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Paper and printing	5.1%	18.2%	32.2%	6.6%	7.8%	11.5%
Organic chemicals, food & ag. uses	13.0%	4.6%	13.0%	4.5%	12.3%	6.3%
Organic chemicals, other	9.4%	17.6%	6.0%	4.0%	10.8%	10.7%
Inorganic chemicals, fertilizers	6.5%	5.8%	12.0%	7.7%	6.9%	6.8%
Petroleum products	4.0%	0.0%	0.0%	3.6%	0.7%	1.6%
Rubber and plastic	5.1%	0.9%	0.5%	4.9%	1.5%	2.6%
Stone, clay, graphite, glass products	8.3%	19.6%	6.0%	11.8%	11.3%	14.6%
Primary metals	0.4%	6.8%	0.0%	0.0%	0.0%	2.6%
Fabricated metal products	4.7%	0.2%	0.0%	10.4%	3.0%	4.8%
Machinery	3.2%	0.0%	0.0%	3.4%	1.5%	1.7%
Electronic devices	2.9%	3.4%	3.1%	15.6%	3.5%	8.2%
Instruments, misc. manufacturing	3.2%	0.0%	0.0%	0.5%	0.1%	0.2%
Services:	18.8%	12.7%	23.9%	8.0%	29.7%	14.8%
Transport services	5.8%	0.4%	0.8%	2.2%	1.0%	1.2%
Communication services	3.6%	0.0%	0.0%	0.3%	18.1%	4.2%
Wholesale, retail	4.0%	0.0%	0.0%	2.7%	8.3%	2.9%
Finance, insurance, banking	2.2%	11.6%	22.9%	2.6%	2.4%	6.2%
Other services	3.2%	0.6%	0.3%	0.2%	0.0%	0.3%
Total, all industries	100	100	100	100	100	100

Source: Private Intl. Cartels Spreadsheet dated October 2006

Table 23. Average Duration of Cartels by Location, 1990-2005					
Continent	**No.**	**mean**	**median**	**min**	**max**
		Years			
AF	2	6.0	6.0	3	9
AS	20	2.2	2.0	0	5
EE	5	2.0	1.0	1	4
GLOBAL	65	7.6	6.0	0	30
LA	5	7.8	4.0	1	24
NO	41	5.6	4.0	1	40
OC	4	6.3	5.0	4	11
WE:	90	6.5	4.0	0	95
EU	36	7.2	5.5	0	44
Other WE	54	6.1	3.5	0	95
Total	232	6.4	5.0	1	95

Source: Private Intl. Cartels Spreadsheet dated October 2006
Note: Duration is understated because full years were recorded and most cartels were launched in January.