

# Cartel Fines in Europe

## *Law, Practice and Deterrence*

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*This article examines the law, practice and evidence on fines for price-fixing under European competition law. It undertakes the first comprehensive quantitative analysis of fines imposed on cartels by the European Commission. Based on an analysis of 30 fully reported cartel decisions, and appeals against many of these, the article looks at how fines were calculated in practice under the 1998 penalty guidelines, leniency notices and appeals, and whether they reflected consumers' losses and were likely to deter price-fixing. It also examines the impact of the 2006 penalty guidelines by recalculating fines for the decided cartel cases.*

### I. INTRODUCTION

The European Commission has intensified its prosecution of price-fixers in recent years. This has led to a significant increase in the number of convictions and level of fines. In fact the fines imposed in the first half of this decade were over four times the aggregate fines imposed for all antitrust violations by the European Commission in the previous three decades (FIGURE 1). In order to fully understand the enforcement process a quantitative analysis is undertaken of the European Commission's fines in 30 fully reported cartel decisions primarily over the period 1999 to 2006. This examines how fines were imposed under the European Commission's 1998 *Penalty Guidelines*,<sup>1</sup> leniency programme, and after appeal to the courts where applicable (sections II and III). The discussion then moves on to assess whether the fines under the 1998 *Penalty Guidelines* approximated consumers' economic losses, and were likely to deter price-fixing (section IV). The discussion concludes (section V) by recalculating fines imposed on a sample of cartels using the 2006 *Penalty Guidelines*,<sup>2</sup> which came into operation in September 2006, to see whether price-fixers would have been fined more heavily.

The analysis shows that while the headline fines for cartels were high, they were substantially reduced under the EU leniency programme and by the courts; that given sensible assumptions it was unlikely that the fines reflected consumers' losses and/or deterred price-fixing; and that while the 2006 *Penalty Guidelines* would have led to

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<sup>1</sup> EC Commission, *Guidelines on the method of setting fines imposed pursuant to Article 15(2) of Regulation No. 17 and Article 65(5) of the ESC Treaty*, 98/C 9/03 (1998 *Penalty Guidelines*).

<sup>2</sup> EC Commission, *Guidelines on the method of setting fines imposed pursuant to Article 23(2) of Regulation No. 1/2003 (2006 *Penalty Guidelines*)*.

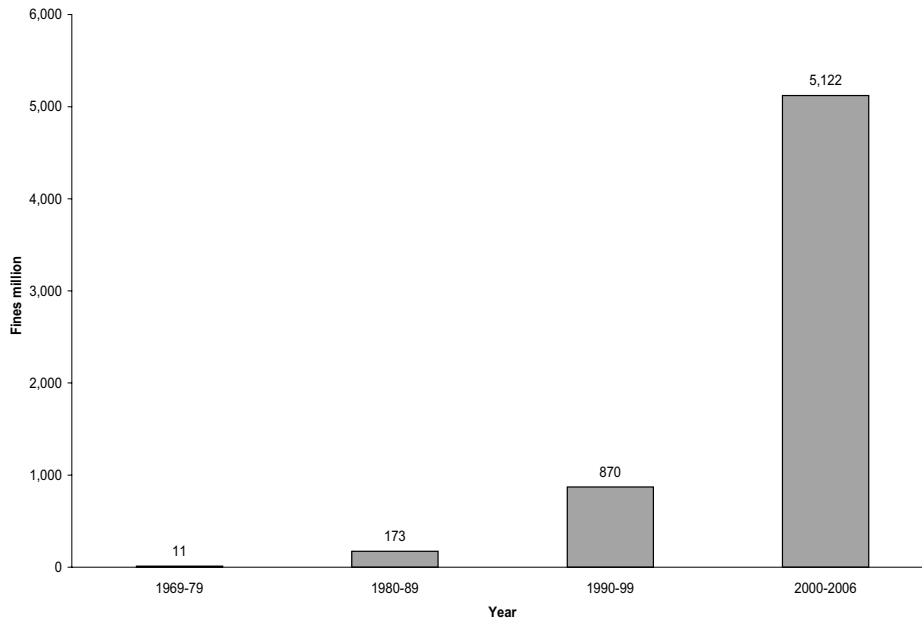


FIGURE 1 FINES IMPOSED BY EU COMMISSION 1969–2006

Source: Lovells, *Competition Law Enforcement*, June 2006.

Note: Fines to June 2006. The fines are for all infringements before any appeals, with the exception of 1998 decision TACA which was wholly annulled.

significantly higher fines overall, in a substantial proportion of cases they were likely to be lower.

## II. EU COMMISSION'S PAST PENALTY SYSTEM

The European Commission's *1998 Penalty Guidelines* set out the structure of fines for antitrust violations generally to September 2006, which together with the *1996 Leniency Notice*<sup>3</sup> and *2002 Leniency Notice*<sup>4</sup> provided the basis for the fines for price-fixing violations under Article 81 of the EC Treaty over the period of the study.

The European Commission's approach under the *1998 Penalty Guidelines* can be set out in four sequential steps:

- **Step 1—Basic Amount ( $x + y$ ):** The basic amount consists of three elements—the gravity of the offence ( $x$ ); deterrence uplift which is part of  $x$ ; and the duration of the offence ( $y$ ). Thus the basic amount equals  $x + y$  to use the formulation in the *1998 Penalty Guidelines*:

<sup>3</sup> EC Notice on the non-imposition or reduction of fines in cartel cases, 96/C207/04 (*1996 Leniency Notice*).

<sup>4</sup> Commission Notice on immunity from fines and reduction of fines in cartel cases, 2002/C45/03 (*2002 Leniency Notice*).

- **Gravity of offence (x):** Three types of infringements are distinguished with a corresponding tariff of initial fines—minor offences with a fine of between €1,000 and €1 million; serious offences with a fine of between €1 million and €20 million; very serious offences, such as hard-core cartels, with a fine above €20 million. The *1998 Penalty Guidelines* stipulated that gravity is to be assessed by reference to the nature of the offence, the impact on the market, and the size of the relevant geographical market.
- **Deterrence uplift (part of x):** In addition, the basic amount can be increased to ensure “sufficient deterrent”. The *1998 Penalty Guidelines* (para 1) state that the basic amount should “take account of the effective economic capacity of offenders to cause significant damage to other operators, in particular consumers, and to set the fine at a level which ensures that it has a sufficiently deterrent effect.”
- **Duration (y):** The basic amount will then be increased by taking into account the duration of the cartel. For short term infringements (less than one year) the basic amount is not increased; for medium-term infringements (one to five years) the amount is increased by up to 50 percent, and in cases of long duration the amount is increased by 10 percent each year.

The European Commission also has discretion to set a “symbolic” fine of €1,000 and the setting of such a fine must be justified in its decision. In practice the European Commission has set symbolic fines for “technical” breaches where some regulation, law and/or a government agency has facilitated price-fixing.<sup>5</sup>

- **Step 2—Aggravating & Attenuating Factors:** The “basic amount” calculated in Step 1 is then increased and reduced in line with a set of “aggravating circumstances” and “attenuating circumstances” respectively. Aggravating circumstances include recidivism, leading role, retaliatory measures against other undertakings, refusal to co-operate with or attempts to obstruct the European Commission in carrying out its investigations, and “other”. Attenuating circumstances include passive role, non-implementation of the offending agreement, termination of the infringement as soon as the European Commission intervenes, existence of reasonable doubt on the part of the undertaking as to whether restrictive conduct does indeed constitute an infringement, effective co-operation outside the scope of the leniency notice, and “other”.
- **Step 3—Aggregate Adjustments:** The *1998 Penalty Guidelines* (s. 5) reserved the right of the European Commission to adjust up or down the amount of fines to take account “of certain objective factors such as a specific

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<sup>5</sup> Organic Peroxides, Italian Raw Tobacco and Spanish Raw Tobacco. For citations, see ANNEX, below.

economic context, any economic or financial benefits derived by the offenders, ... the specific characteristics of the undertaking in question and their real ability to pay in a specific social context”.

- **Step 4—10 percent cap:** The final fine must not exceed the statutory ceiling of 10 percent of the undertaking’s worldwide turnover in the previous year.

These four steps can be set out more formally as follows.<sup>6</sup> The fine ( $F$ ) equals the basic amount ( $B$ ) multiplied by the adjustment factors.  $B$  can be broken down into  $x + y$  as in the *1998 Penalty Guidelines*, or the gravity of the offence ( $G$ ), multipliers for sufficient deterrence ( $s$ ), and the duration of the cartel in number of years ( $T$ ). Under this formulation the basic amount<sup>7</sup> is:

$$B = x + y = [G (1 + s)(1 + 0.1T)]$$

The adjustment factor ( $\alpha$ ) for aggravating, attenuation, and other factors can be written as:

$$\alpha = [1 - (i - j - a)]$$

where  $i$  is discount for attenuating factors,  $j$  the uplift for aggravating factors, and  $a$  the adjustment for other factors. The fine before leniency is then:

$$F = \alpha B \leq 0.1WT$$

or

$$F = [G (1 + d)(1 + 0.1T)] * [1 - (i - j - a)] \leq 0.1WT$$

which must be equal to or less than 10 percent of worldwide turnover ( $WT$ ) in the preceding year.

In addition, the European Commission operates a leniency programme which offers significant discounts on the fines imposed under the *1998 Penalty Guidelines*. Over the period in question, two (the 1998 and 2002) leniency notices were in operation. The *1998 Leniency Notice* led to discounts of between 10 percent and 100 percent. The *2002 Leniency Notice* provides for complete immunity for the “whistleblower” provided the undertaking was not the “ringleader” of the cartel, and reductions in fines of between 20 percent and 50 percent for parties who provide “value added” evidence defined as evidence “which strengthens ... the Commission’s ability to prove the facts in question” (para 22).

<sup>6</sup> For a slightly different treatment see W.P.J. Wils, *The Commission’s New Method for Calculating Fines in Antitrust Cases*, 23 *European Competition Law Review*, 252-263 (1998).

<sup>7</sup> This formula is slightly inaccurate because if the infringement is less than one year then there is no uplift for duration i.e.  $T$  is zeroed out.

Finally, those fined have the right to appeal the decision to the European courts. Most appeals relate not to liability but the fines imposed by the EU Commission.

### III. FINES IN PRACTICE

#### A. DATA

The empirical analysis in this section is based on the 30 fully reported cartel decisions<sup>8</sup> posted on the Commission's website at the end of June 2006. These involved 43 cartels—the higher figure results from the fact that there were 12 separate cartels in *Vitamins*, and two each in *Belgian Brewers* and *Speciality Graphite*.<sup>9</sup> Four vitamins cartels were time-barred (*Vitamins B1, B6, B and H*) and are excluded from the analysis below. Thus the main sample consists of fines imposed in 39 separate cartels on 207 firms.

The cartels in the sample are concentrated in the chemicals, industrial inputs, and food sectors (Table 1). The chemical industry had by far the largest number of cartels—17 or 44 percent of all prosecuted cartels.

On average a cartel had 5.3 participating firms and operated for 6.5 years. The largest cartel had 16 members (*FETTCSA*), and the longest operated for nearly 29 years undetected (*Organic Peroxides*).

TABLE 1 CARTELS BY INDUSTRY

Industry	Cartels	%	Commission Decisions
Chemicals	17	44%	<i>Lysine, Vitamins A, E, B2, C and D3, Beta Carotene Carotenoids; Citric Acid, Zinc Phosphate, Methionine, Dutch Indus. Medical Gases, Food Flavour Enhancers, Sorbates, Organic Peroxides, Chloine Chloride</i>
Industrial inputs	8	21%	<i>Seamless Steel Tubes, Carbonless Paper, Copper Plumbing Tubes, Concrete Reinforcing Bars, Graphite Electrodes, Isostatic Speciality Graphite, Extruded Speciality Graphite, Plasterboard</i>
Food	7	18%	<i>Belgian Brewers, Private Label (Belgian Brewers), Luxembourg Brewers, French Brewers, French Beef, Spanish Raw Tobacco, French Raw Tobacco</i>
Banks	2	5%	<i>German Banks, Austrian Banks</i>
Transport	2	5%	<i>FETTCSA, SAS/Maersk</i>
Games consoles	1	3%	<i>Nintendo</i>
Needles & Haberdashery	1	3%	<i>Needles &amp; Haberdashery</i>
Fine Arts Auctions	1	3%	<i>Fine Arts Auctions</i>

<sup>8</sup> Full citation of each cartel decision appears in the annex below.

<sup>9</sup> Previous analyses of the European Commission's fining practice have failed to undertake the same detailed quantitative analysis as here e.g. D. Geradin and D. Henry, *The EC Fining Policy for Violations of Competition Law: An empirical review of the Commission decisional practice and the Community courts' judgments*, GCLC Working Paper No. 2/05, February 2005. For an initial analysis of this data see C. Veljanovski, *Penalties For Price-Fixers—An analysis of fines imposed on 39 cartels by the EU Commission*, 27 *European Competition Law Review*, 510-513 (2006).

TABLE 2 SUMMARY OF FINES UNDER PENALTY AND LENIENCY NOTICES

Cartel/Date	no. firms	Gravity (G) € m	Duration (T) years	Basic (B) € m	Fine € m	
					Penalty Notice	Leniency Notice
1999						
Seamless Steel Tubes	8	80.0	5.0	119.0	107.1	99.0
2000						
Lysine	5	75.0	4.0	142.5	163.2	109.9
FETTCSA	16			11.9	6.9	6.9
2001						
Vitamin A	3	66.0	9.0	250.8	331.7	131.7
Vitamin E	4	91.0	9.0	324.8	438.0	202.8
Vitamin B2	3	50.0	4.0	97.5	135.3	69.7
Vitamin B5	3	54.0	8.0	158.4	212.0	111.4
Vitamin C	4	75.0	4.5	163.1	214.8	117.5
Vitamin D3	4	28.0	4.0	64.4	76.7	42.7
Beta Carotene	2	40.0	6.0	128.0	182.4	91.2
Carotinoids	2	40.0	5.5	124.0	176.7	88.4
Carbonless Paper	11	179.9	3.5	358.0	452.7	313.7
Graphite Electrodes	8	152.0	5.5	267.7	338.4	218.9
Citric Acid	5	101.5	4.0	274.1	315.2	135.2
German Banks	5	42.0	4.0	100.8	100.8	100.8
Belgian Brewers	2	70.0	4.5	101.5	114.1	89.7
Private Label (Belgian Brewers)	4	1.1		2.4	2.9	1.9
Lux Brewers	4	0.8	10.0	4.1	2.8	0.4
SAS/Maersk Air	2	49.0	2.5	61.3	61.3	52.5
Zinc Phosphate	6	15.8	4.0	20.7	14.7	12.0
2002						
Plasterboard	4	192.0	6.5	393.8	540.6	478.0
Methionine	3	78.0	12.5	333.0	333.0	127.1
Austrian Banks	8	102.8	3.5	138.0	138.0	124.3
Concrete Reinforcing Bars	8	27.5	10.5	84.4	86.0	85.0
Isostac Speciality Graphite	8	59.2	4.5	85.1	84.5	51.8
Extruded Speciality Graphite	2	30.0	3.5	40.5	33.8	8.8
Dutch Indus. & Medical Gases	7	28.1	4.0	38.9	29.5	25.7
Food Flavour Enhancers	4	13.2	9.5	40.7	40.7	20.6
Fine Arts Auction	2	50.4	6.5	83.2	75.6	20.4
Nintendo	8	37.0	6.5	136.8	223.3	167.8
2003						
French Beef	6	32.0		32.0	16.7	16.7
Sorbates	5	46.6	17.5	182.6	276.0	141.5
Organic Peroxides	6	71.8	24.5	409.6	363.1	69.5
2004						
Choline Chloride	3	35.2	5.5	79.1	88.5	66.3
Copper Plumbing Tubes	12	200.9	12.5	369.1	362.5	222.3
French Brewers	2			2.0	2.5	2.5
Spanish Raw Tobacco	9	19.5	5.0	33.8	23.9	20.0
Needles & Haberdashery	3	45.0	5.0	67.5	67.5	60.0

2005						
Italian Raw Tobacco	6	55.4	6.0	112.5	72.0	56.0
Totals	207	2,335.7	240.5	5,437.6	6,305.5	3,760.5
Average per cartel	5.3	59.9	6.5	139.4	161.7	96.4
Average per cartelist	n/a	13.1		26.3	30.5	18.2

The European Commission imposed fines of €6.3 billion before leniency. The average overall fine imposed on a cartel was €161.7 million reduced to an average of €96.4 million under the leniency programme. The average fine for a firm participating in a cartel was €30.5 million reduced to €18.2 million after leniency. Further, fines were typically reduced on appeal to the European Court of First Instance (CFI) by an average of 22.7 per cent for those that succeeded (see Table 5 below).

Figure 2 shows how aggregate fines change as cartel prosecutions move through the different stages. As can be seen, once the gravity of the offence is set, the fine

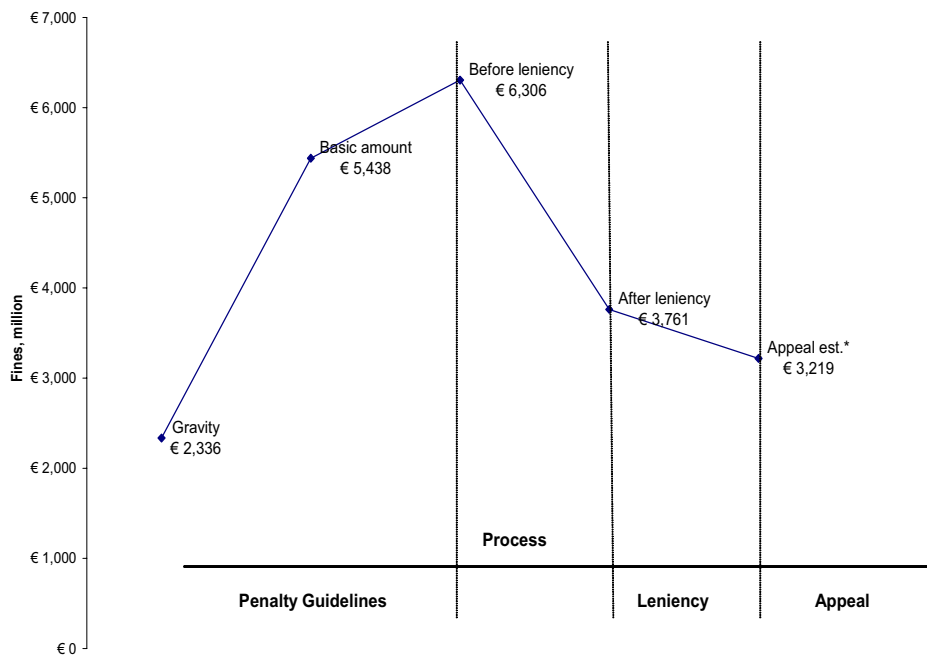


FIGURE 2 LEVEL OF FINES AT EACH STAGE OF FINING PROCESS

Note: fines after appeals have been estimated assuming an average 22.7% reduction in fines each pending cartelists' appeal if the appeal is successful.

increases most as a result of the application of the sufficient deterrence uplift and duration. It is further increased by adjustments for aggregating, attenuating, and other adjustments. However, the impact of the leniency programme saw aggregate fines fall dramatically by about 40 percent from over €6.3 billion to about €3.8 billion, and by a further 14.4 percent on appeal to an estimate of about €3.2 billion.<sup>10</sup>

Table 3 shows the relationship between the gravity of the offence, the basic amount, and fines before and after the application of the leniency notice. The fines imposed for “minor” and “serious” offences fell within the upper limits of the bands set in the *Penalty Guidelines* even though these relate to setting the initial amount for the gravity of the offence. For “very serious” offences the average fine of €79.2 million was nearly four times the minimum €20 million set out in the *Penalty Guidelines*. Thus with the exception of “very serious” offences, the initial tariff sets the upper limit to actual fines. This indicates that the European Commission came down relatively heavily on “very serious” offences.

TABLE 3 FINES BY GRAVITY OF OFFENCE (EXC. FULL LENIENCY)

Gravity	Tariff	Firms	Basic Amount €m	Fine €m	Fine after <i>Leniency</i> €m
minor	€1000 to €1m	10	0.5	0.5	0.4
serious	€1m to €20m	110	15.2	15.3	11.0
very serious	above €20m	50	61.9	79.2	50.7

## B. APPLICATION

If the steps in fining price-fixers are re-traced, the figures reveal the following trends.

### 1. *Basic Amount*

The gravity of the offence was referred to in 28 decisions with the majority of offences treated as “serious” (63 percent) or “very serious” (30 percent). One anomaly is that even though the European Commission classed the actions of firms in the Vitamins A, E, B2, B5 and D3 cartels as “very serious” offences (*Vitamins*, para 666), it set fines below the €20 million threshold for “very serious” offences under the *Penalty Guidelines* for BASF and Aventis (*Vitamin A*); Aventis and Eisai (*Vitamin E*); Takeda

<sup>10</sup> The fines after appeal to the courts were calculated by adding the total fines for all firms where an appeal is not pending plus the expected fines for those appeals pending. The latter was calculated by assuming a probability of a successful appeal of 62% (based on the past success rate of 13 out of 21 decided appeals) and an average reduction in fines of about 22% based on the average of successful appeals giving an expected reduction in fines for pending appeals of 14%.



(*Vitamin B2*); BASF (*Vitamin B5*); BASF and Merck (*Vitamin C*); and BASF, Roche, Aventis and Solvay (*Vitamin D3*).

In 19 decisions the European Commission referred to “sufficient deterrence”, and applied a multiplier of between 1.25 and 5 but this often varied for individual firms in a cartel.

If we look at the application of “sufficient deterrence” by the European Commission we observe that:

- in 9 decisions sufficient deterrence was not mentioned or applied (*Seamless Steel Tubes*, *Belgium Breweries*, *Zinc Phosphates*, *Austrian Banks*, *Speciality Graphites*, *Industrial & Medical Gases*, *Fine Art Auction*, *SAS/Maersk Air*, and *French Beef*); and
- where applied, the uplift has varied between 0 percent and 400 percent, or multipliers between 1 and 5. The multipliers vary for individual firms in a cartel e.g. in *Nintendo* Nintendo and Itochu both received uplifts of 200 percent, John Menzies 25 percent, and the other cartelists no uplift (*Contentra*, *Linea*, *Nortec*, *Bergsala* and *CD-Contact Data*).

The basic amount was routinely increased 10 percent for each year that the European Commission deemed that the cartel operated. However, in a number of cartels the duration of the cartel was not identified, and no separate fine adjustment given.

## 2. *Aggravating and Attenuating Adjustments*

The basic amount increased for 21 percent of firms for aggravating circumstances only, 24 percent had the basic amount reduced for attenuating circumstances only, 4 percent for both, and 52 percent of firms had no adjustment for either. The average reduction to the basic amount for attenuating circumstances was 23.3 percent, whilst aggravating circumstances increased fines by an average of 43.9 percent. The average net increase taking both into account was 20.6 percent.

## 3. *Aggregate Adjustments*

In a few cases a firm’s ability to pay was taken into account (under the heading “other adjustments”). SGL’s fine (*Specialty Graphite*) was reduced by 33 percent due to financial constraints and previous fines. However, the European Commission rejected (in)ability to pay in *FETTCSA*, *Belgian Brewers*, *Graphite Electrodes*, and *Austrian Banks*. It allowed payment by instalments in one case (*Sewon* in *Lysine*), and on appeal the CFI granted suspension of payments in *French Beef* to allow three firms (FNCEBV, FNICGV and FNSEA) time to raise the money necessary to pay the fines.

The European Commission has discretion to impose a “symbolic” fine of €1,000. In *Organic Peroxides*, one of the 6 cartelists the AC Treuhand—which is the privatisation agency of the German Federal Government—did not produce the cartelised product

(organic peroxides) but participated in the restriction of competition. The AC Treuhand advised the cartelists to conceal the agreement from the competition authorities, even mediated and participated in quota-fixing meetings, and on at least one occasion proposed quotas.<sup>11</sup> Oddly this government agency was only given a symbolic fine.<sup>12</sup>

In *Italian Raw Tobacco* two of the six cartelists, APTI and UNITAB, paid only symbolic fines. The European Commission found that legislation created incentives for APTI and UNITAB to agree minimum prices.<sup>13</sup> The European Commission also imposed symbolic fines on trade associations and cooperatives in *Spanish Raw Tobacco* (ASJA, UPA, COAG and CCAR<sup>14</sup>).

#### 4. 10 percent Cap

Individual fines were capped for eight firms in five cartels because they exceeded 10 percent of a cartel's worldwide turnover in the preceding year (Table 4).<sup>15</sup> (*Zinc Phosphate*, *Dutch Industrial & Medical Gases*, *Fine Arts Auction*, *Organic Peroxides* and *Spanish Raw Tobacco*). The average discount was 56.0 percent with a range from 18 percent (Sotheby's in *Fine Art Auctions*) to 89.5 percent (Perosa in *Organic Peroxides*).

TABLE 4 CARTELS WHERE FINES HAVE BEEN CAPPED

Cartel/Firm	Fine €m	Fine Capped Fine €m	Reduction (%)
<b>Zinc Phosphate</b>			
SNCZ	4.2	1.7	59.5
Waardals	4.2	0.7	83.3
<b>Dutch Industrial &amp; Medical Gases</b>			
AGA	14.0	5.5	60.4
Messer	1.7	1.1	33.3
<b>Fine Arts Auction</b>			
Sotheby's	41.6	34.1	18.0
<b>Organic Peroxides</b>			
PC	40.4	11.8	70.8
Perosa	5.6	0.6	89.5
<b>Spanish Raw Tobacco</b>			
Cetarsa	7.2	4.8	33.3

<sup>11</sup> *Organic Peroxides*, para. 343.

<sup>12</sup> *Organic Peroxides*, para. 454.

<sup>13</sup> *Italian Raw Tobacco*, paras 358-362.

<sup>14</sup> *Spanish Raw Tobacco*, paras 426-431.

<sup>15</sup> Table 4 excludes the fine cap of €3.99m on Domino (Mino) where it was found jointly and severally liable with Alliance One in *Italian Raw Tobacco* (para. 404).

### C. LENIENCY PROGRAMME

Fines were reduced for one or more firms in 35 of the 39 cartels (90 percent) under the EC leniency programme. The reductions ranged from 10 percent to 100 percent with full leniency granted to one or more firms in 12 cartels (*Vitamins A and E*, *Carbonless Paper*, *Methionine*, *Speciality Graphite Isostatic & Extruded*, *Food Flavour Enhancers*, *Fine Arts Auctions*, *Sorbates*, *Organic Peroxides*, *Copper Plumbing Tubes* and *Needles & Haberdashery*). No leniency reductions were given in four cartels (*German Bank Charges*, *French Beef*, *FETTCSA* and *French Brewers*).

The EC leniency programme had a significant impact on the fines eventually paid by offenders. For “minor”, “serious” and “very serious” offences, fines were reduced by 48 percent, 30 percent, and 45 percent on average respectively. In total, the leniency programme reduced fines by €2.5 billion with 10 “whistle blowers” receiving full immunity totalling €476.5 million in forgone fines. Over €2 billion was given to other offenders who “co-operated” with the European Commission during its investigations.

The leniency programme enables the European Commission to offer firms participating in a cartel a substantial reduction in the fine if they cooperate. To the extent these fine discounts lead to a more than compensating increase in the probability of detection and successful prosecution,<sup>16</sup> the leniency programme is a useful tool.<sup>17</sup> However, in practice the leniency programme appears over-generous.<sup>18</sup> For the 39 cartels considered here over €2.5 billion in foregone fines were given purportedly to secure the prosecution of 26 cartels and 178 firms. However, since 12 of these cartels had already been detected by the US authorities<sup>19</sup> and a further 5 (*Graphite Electrodes*, *Food Flavour Enhancers*, *Fine Arts Auction*, *Sorbates*, and *Chloine Chloride*)<sup>20</sup> were under parallel investigation, one may question whether leniency was central to either detecting the cartel or securing a successful prosecution. Indeed, the European Commission granted full immunity to “whistleblowers” in three cartels already detected by other antitrust authorities (*Vitamins A and E*, and *Organic Peroxides*).

<sup>16</sup> M. Motta, *Competition Policy—Theory and Practice*, (Cambridge University Press, Cambridge, pp. 193-202) summarising M. Motta and M. Polo, *Leniency Programs and Cartel Prosecution*, 21 *International Journal of Industrial Organization*, 347379 (2003). G.R. Spratling, *Detection and Deterrence: Rewarding Informants for Reporting Violations*, 69 *George Washington Law Review*, 798-823 (2001).

<sup>17</sup> Empirical analysis of the EC Commission’s earlier 1996 leniency policy found that it increased individual fines, and doubled the number of cartels prosecuted. S. Brenner, *An Empirical Study of the European Corporate Leniency Program*, Humboldt University Berlin, Working Paper, 2005.

<sup>18</sup> Arlman found that the 1996 *Leniency Notice* led to a reduction in the time it took for the EU Commission to process cartel investigations, but did not enhance deterrence nor did the penalty discounts often reward genuine “whistle blowing” and the provision of value-added information. S. Arlman, *Crime But No Punishment: An empirical study of the EU’s 1996 leniency notice and cartel fines in Article 81 proceedings*, manuscript, August 2005.

<sup>19</sup> This includes *Organic Peroxides*, *Lysine*, *Citric Acid* and all the 9 vitamins cartels. It excludes the *Methionine* cartel which was detected during the investigations into the *Lysine* cartel.

<sup>20</sup> A. Stephan, *An Empirical Assessment of 1996 Leniency Notice*, University of East Anglia, CCP Working Paper 05-10, September 2005, Table 1. This figure excludes the two *Speciality Graphite* cartels (Isostatic and Extruded) discovered during the *Graphite Electrodes* investigation.

## D. APPEALS

There is considerable litigation over the European Commission's fines.<sup>21</sup> Fines were appealed in 33 out of the 39 cartels (or 85 percent) by one or more firms.<sup>22</sup> 12 appeals were pending at the time of writing.<sup>23</sup> Of the 21 decided appeals, five were dismissed (*Private Label (Belgian Brewers)*, *Luxembourg Brewers*, *SAS/Maersk Air*, *French Beef* and *Zinc Phosphate*), in three the fines were not adjusted (*Vitamins A, E and B2*), and in 13 appeals fines were reduced by between 2 percent (*Belgian Brewers*) and 100 percent. In two cases the European Commission's fines were annulled—the entire €100 million fines in *German Banks* because the European Commission failed to get its paperwork to the Court on time, and in *FETTCSA* because the European Commission was time-barred. In *Specialty Graphite* the CFI did not adjust the €1.1 million fine imposed on Intech for *Isostatic Speciality Graphite* but reduced the portion for which EDM AG was jointly and

TABLE 5 CARTEL DECISIONS WHERE APPEALS HAVE SUCCEEDED

Cartel	Firm	Fine €m		
		ECC	CFI	Reduction
Seamless Steel Tubes	Total	99.0	86.2	13%
	Mannesmannrihem Werke	13.5	12.6	7%
	Vallourec	8.1	8.1	0%
	British Steel (Corus)	12.6	11.7	7%
	Dalmine	10.8	10.1	7%
	Sumitomo Steel	13.5	10.9	19%
	Nippon Steel	13.5	10.9	19%
	Kawasaki Steel	13.5	10.9	19%
	NKK	13.5	10.9	19%
FETTCSA	Total	6.9		100%
	Maersk	0.8	–	100%
	NYK	0.6	–	100%
	MOL	0.6	–	100%
	P&O	0.6	–	100%
	K Line	0.6	–	100%
	Nedlloyd	0.6	–	100%
	Hanjin	0.6	–	100%
	Hapag-Lloyd	0.4	–	100%
	Evergreen	0.4	–	100%
	NOL	0.4	–	100%
	DSR-Senator	0.4	–	100%

<sup>21</sup> J.M. Joshua and P.D. Camesasca, *EC Fining Policy Against Cartels after the Lysine Rulings: The Subtle Secrets of* x, *European Antitrust Review*, 45–10 (2004).

<sup>22</sup> *Austrian Banks* was excluded because it appealed to the CFI challenging the disclosure of certain information on the non-confidential version of the European Commission's decision. The CFI dismissed this appeal.

<sup>23</sup> *Carbonless Paper, Citric Acid, Plasterboard, Concrete Reinforcing Bars, Industrial & Medical Gases, Nintendo, Organic Peroxides, Chlorine Chloride, Copper Plumbing Tubes, Spanish Raw Tobacco, Needles & Haberdashery, and Italian Raw Tobacco.*

	Yangming		0.4	–	100%
	CHO Yang		0.1	–	100%
	MISC		0.1	–	100%
	OOCL		0.1	–	100%
	CGM		0.1	–	100%
Amino Acids		Total	109.9	102.6	7%
	ADM		47.3	43.9	7%
	Ajinomoto		28.3	28.3	0%
	Kyowa		13.2	13.2	0%
	Cheil Jedand Corp		12.2	10.1	17%
	Sewon		8.9	7.1	20%
Vitamin B5		Total	111.4	106.0	5%
	BASF		34.0	34.0	0%
	Roche		54.0	54.0	0%
	Daiichi		23.4	18.0	23%
Vitamin C		Total	117.5	113.6	3%
	BASF		14.7	10.9	26%
	Roche		65.3	65.3	0%
	Takeda		28.3	28.3	0%
	Merck		9.2	9.2	0%
Vitamin D3		Total	42.7	40.7	5%
	BASF		7.6	5.6	26%
	Roche		21.0	21.0	0%
	Aventis		5.0	5.0	0%
	Solvay		9.1	9.1	0%
Beta Carotene		Total	91.2	64.0	30%
	BASF		43.2	16.0	63%
	Roche		48.0	48.0	0%
Carotinoids		Total	88.4	62.0	30%
	BASF		41.9	15.5	63%
	Roche		46.5	46.5	0%
Graphite Electrodes		Total	218.9	164.4	25%
	SGL		80.3	69.1	14%
	UCAR		50.4	42.1	17%
	VAW		11.6	11.6	0%
	SDK		17.4	10.4	40%
	Tokal		24.5	12.3	50%
	Nippon		12.2	6.3	49%
	SEC		12.2	6.1	50%
	C/G		10.3	6.5	37%
German Bank Charges		Total	100.8		100%
	Commerzbank		28.0	–	100%
	Dresdner Bank		28.0	–	100%
	Bayerische Hypo- und Vereinsbank		28.0	–	100%
	Deutsche VerkehrsBank		14.0	–	100%
	Verreins- und Westbank		2.8	–	100%
Belgian Brewers		Total	89.7	88.1	2%
	Interbrew		45.7	45.7	0%
	Danone		44.0	42.4	4%
Methionine		Total	127.1	100.1	21%
	Aventis		–	–	–

Cartel	Firm	Fine €m		
		ECC	CFI	Reduction
Methionine (cont)	Degussa	118.1	91.1	23%
	Nippon Soda	9.0	9.0	0%
Isostatic Speciality Graphite	Total	51.8	42.5	18%
	SGL	18.9	9.6	49%
	Toyo Tanso	10.8	10.8	0%
	LCL	7.0	7.0	0%
	Tokai	7.0	7.0	0%
	Ibiden	3.6	3.6	0%
	NSC/NSCC	3.6	3.6	0%
	GrafTech International	—	—	0%
	Intech	1.0	1.0	0%
		1,255.3	970.3	22.7%

severally liable to €0.4 million, and reduced SGL's fine by 49 percent. On average the CFI has reduced Commission total fines after leniency by 22.7 percent for firms whose appeals were successful.

## VI. OPTIMAL DAMAGES & DETERRENCE

An important aspect of EC competition law is whether the current level of fines adequately deters price-fixers. The answer to this question depends on the answer to two related questions—(1) Do fines approximate accumulated consumers' losses over the life of the cartel?; and (2) Do fines reflect the fact that not all cartels are detected and prosecuted? Here we seek answers to these questions using data from 24 recent cartel prosecutions, and the economics of optimal damages and penalties as set out in the original work of Gary Becker<sup>24</sup> and William Landes,<sup>25</sup> and refined and expanded upon by a large body of texts.<sup>26</sup>

<sup>24</sup> G.S. Becker, *Crime and Punishment: An Economic Approach*, 76 *Journal of Political Economy*, 167217 (1968).

<sup>25</sup> W.M. Landes, *Optimal Sanctions for Antitrust*, 50 *University of Chicago Law Review*, 652-678 (1983). K.N. Hylton, *Antitrust Law—Economic Theory and Common Law Evolution*, (Cambridge University Press, Cambridge, 2003, Chap. 2) provides an excellent description of the economics of optimal enforcement. Also J.M. Connor, *Optimal Deterrence and Private International Cartels*, Dept. Economics, Purdue University, May 2005.

<sup>26</sup> W.H. Page, *Antitrust Damages and Economic Efficiency: An Approach to Antitrust Injury*, 47 *University of Chicago Law Review*, 467-504 (1980); W.H. Page, *The Scope of Liability for Antitrust Violations*, 37 *Stanford Law Review*, 1445-1512 (1985).

## A. DO FINES REFLECT CONSUMER HARM?

EU antitrust fines are based neither on the economic gain of the violator nor on the economic losses imposed on the harmed. They are an arbitrary administrative figure based on the gravity of the offence with adjustments to reflect a number of factors as discussed above. Indeed the European Commission goes out of its way to avoid quantification of cartel overcharges, and has stated in a number of decisions that it is not possible. This contrasts with the fining system of the US and some Member States<sup>27</sup> which are gain-based. In the US fines were originally based on the view that cartels on average imposed overcharges equivalent to 10 per cent of the value of sales of “affected commerce”.<sup>28</sup> This was doubled to 20 percent in the US *Guidelines* to provide adequate deterrence, implying that only half of the cartels were detected and prosecuted at the time.

Whether fines levied by the European Commission adequately reflect the accumulated losses sustained by consumers can be approximated using several simplifying assumptions. The loss to consumers consists of two components—the overcharge (OC) on the goods sold at the higher cartel price; and the consumers’ surplus (CS) on the output lost because in order to raise prices the cartel must restrict output. The lost consumers’ surplus is the difference between the price consumers would have paid, and the “but for” price in the absence of the cartel on the output not produced. If it is assumed that the “but for” price equals constant unit costs and the demand curve is linear, then the consumers’ surplus loss is 50 percent of the overcharge, and the total consumers’ loss is 150 percent of the overcharge. Thus one can approximate the consumers’ losses based on estimates of the overcharges.<sup>29</sup>

Unfortunately estimates of how much consumers have been overcharged are not available, and certainly not from European Commission decisions, nor are they easy to estimate. Thus it is necessary to make assumptions as to the likely overcharges. The OECD<sup>30</sup> has estimated that cartel overcharges average 15 to 20 percent. A more recent survey<sup>31</sup> of over 200 “social science studies” suggest higher estimates—an average overcharge of 40 percent positively skewed with the median of 25 percent, and one-fifth at 10 percent or less. International cartels have a larger median overcharge of 30–33 percent compared to 17–19 percent for domestic cartels.

For illustrative purposes it is assumed that cartels impose an annual average overcharge of 20 percent, that annual sales are constant at the end-period annual sales as

<sup>27</sup> The Dutch penalty guidelines use 10% of the “turnover involved” as an estimate of the violators’ gain and a starting point for the calculation of fines. M. Van Oers and B. Van der Meulen, *The Netherlands Competition Authority and its Policy on Fines and Leniency*, 26 *W.Comp* 1, pp.25–52 (2003).

<sup>28</sup> *Guidelines Manual*, U.S. Sentencing Commission, Washington DC, (1987) (as updated).

<sup>29</sup> E.L. Camilli, *Optimal Fines in Cartel Cases and the Actual EC Fining Policy*, 29 *W.Comp*.4, pp.575–605 (2006).

<sup>30</sup> *OECD Report on the Nature and Effect of Cartels*, 2002.

<sup>31</sup> J.M. Connor and Y. Bolotova, *Cartel Overcharges: Survey and Meta-analysis*, Perdue University 2 October 2005. J.M. Connor and R.H. Lande, *How High do Cartels Raise Prices?*, 80 *Tulane Law Review*, 513–570 (2005). Also estimates in R.A. Posner, *Antitrust Law*, University of Chicago Press, Chicago, 2nd Edn, (2001).

reported in the European Commission's decision, and losses attract compound interest at 4 percent. Based on these assumptions, the European Commission's fines undervalued estimated consumers' losses in all but three (*Vitamins B2, B5 and D3*) of the 24 cartels (Table 6). The degree of undervaluation is over 60 percent in 17 cartels. If a lower average overcharge of 10 percent is assumed, then the European Commission's fines reflect or more than reflect the estimated consumers' loss in only seven cartels (*Lysine*, all the vitamins' cartels except *A, E & Beta Carotene*, and *Food Flavour Enhancers*).

#### B. DO FINES DETER PRICE FIXING?

A fine will only act as a deterrent if it makes price-fixing unprofitable for a firm. With less than certain detection and conviction, price fixers will react not to the nominal fine but to the fine discounted by the probability that it will be imposed. This is called the *expected* fine. To illustrate, if the fine is €100 million but only one in three cartels are successfully prosecuted, then the *expected* fine is 33 percent of the €100 million, or only €33 million. The corollary is that in order to deter price-fixers, the fine must be grossed-up (multiplied) so that the *expected* fine equals the aggregate consumers'

TABLE 6 ESTIMATES OF CONSUMER LOSSES AND OPTIMAL FINES

Cartel	years	Fine €m	Sales* €m	OC €m	Consumer Loss €m	Fine/Harm	Optimal Fine Fine €m	Multiplier
Lysine	4	110	164	121	181	61%	549	5.0
Vitamin A	9	132	150	275	413	32%	1,251	9.5
Vitamin E	9	203	250	459	688	29%	2,085	10.3
Vitamin B2	4	70	34	25	38	186%	114	1.6
Vitamin B5	8	106	35	64	96	110%	292	2.8
Vitamin C	5	114	120	112	168	68%	510	4.5
Vitamin D3	4	41	20	15	22	184%	67	1.6
Beta Carotene	6	64	76	87	131	49%	397	6.2
Carotinoids	6	62	50	57	86	72%	260	4.2
Carbonless Paper	4	314	1,079	799	1,198	26%	3,631	11.6
Graphite Electrodes	6	219	420	481	722	30%	2,188	10.0
Methylglucanine	9	3	3	6	9	33%	26	9.1
Citric Acid	4	135	320	236	353	38%	1,071	7.9
Plasterboard	7	478	1,210	1,652	2,478	19%	7,508	15.7
Methionine	13	127	260	748	1,122	11%	3,400	26.8
Isostatic Speciality Graphite	5	42	84	79	118	36%	358	8.5
Extruded Speciality Graphite	4	9	42	31	46	19%	140	15.9
Food Flavour Enhancers	9	21	12	22	33	62%	100	4.9
Carbon & Graphite Products	10	101	290	604	905	11%	2,744	27.0
Organic Peroxides	25	70	250	1,694	2,649	3%	8,029	115.5
Choline Chloride	6	66	122	140	210	32%	635	9.6
Copper Plumbing Tubes	13	222	1,151	3,311	4,967	4%	15,052	67.7
MCCA Chemicals	15	217	125	434	651	33%	1,972	9.1
Rubber Chemicals	5	76	200	188	282	27%	854	11.3

\* Note: annual sales in the preceding year as reported by the European Commission.



loss. Taking the same figures and assuming that the €100 million measures the consumers' loss, the optimal fine with a conviction rate of 33 percent is three times the loss i.e. €300 million. This idea that the fine necessary for deterrence must be some multiple of the gains/losses is familiar to competition lawyers in the form of “double fines” and “triple damages” in US antitrust law.

The *1998 Penalty Guidelines* stated that the European Commission may set its fines to provide “sufficient deterrence”. This, however, bears no relationship to the adjustment of the fine to achieve *ex ante* deterrence of price-fixing conspiracies as just discussed. Rather, it is an attempt to adjust the arbitrary initial fine based on the gravity of offence for factors which suggest that the harm an individual cartelist may cause is higher because it is a relatively large undertaking.

Again, there is no data on the probability of detection when these cartels were formed or today. There are some estimates of cartel detection rates. Bryant and Eckard,<sup>32</sup> in a now dated study, estimate that about one in seven cartels were detected on the 1980s. Others suggest a much lower figure of one in ten cartels.<sup>33</sup>

To assess whether the present level of fines can be expected to deter price-fixing it is assumed that one in three (33 percent) cartels are successfully prosecuted, which is considerably higher than suggested by the above studies. The optimal fine can be calculated from the estimates of the overcharge for each cartel. The optimal fine equals  $(1.5 \times OC)/c$ , or slightly over 4.5 times the estimated overcharge ( $OC$ ) assuming a one in three conviction rate ( $c$ ).

Based on these assumptions the European Commission's fines significantly under-deter price-fixing. As the last column in TABLE 6 (which gives the ratio of optimal to actual fine) shows, fines would have to increase substantially for each cartel—instead of €3 billion collected in fines from the 24 cartels, over €50 billion or fines on average about 17 times greater than those imposed by the European Commission would be needed to deter price-fixers. With a 10 percent overcharge things improve, but the optimal fine is still on average many times (about ten-fold) greater.

## V. THE 2006 PENALTY GUIDELINES

The *2006 Penalty Guidelines*, which came into force in September 2006, alter the way fines are set for infringements of EU competition rules. The major difference is a move away from arbitrary tariffs based on the gravity of the offence, to fines based on sales and duration.

<sup>32</sup> P.G. Bryant and E.W. Eckard, *Price Fixing: The Probability of Getting Caught*, 73 *Review of Economics & Statistics*, 531-536 (1991).

<sup>33</sup> G.J. Werden and M.J. Simon, *Why Price Fixers Should Go to Prison*, 32 *Antitrust Bulletin*, 917-937 (1987).

### A. KEY CHANGES

Under the *2006 Penalty Guidelines*, the basic amount of the fine is calculated as a proportion of sales and the duration of the offence. The fine can be up to 30 percent of the value of sales in the last full business year of the offence for each year of the infringement. In addition, between 15 and 25 percent of the value of sales will be imposed as a deterrent to cartels, and may be imposed for other offences. Thus the basic amount ( $B$ ) equals a proportion ( $a$ ) of sales ( $S$ ) multiplied by the number of years of the infringement ( $T$ ), and an uplift for deterrence ( $b$ ):

$$B = aST + bS = (aT + b)S$$

As in the 1998 guidelines, uplifts and discounts are given for aggravating and mitigating factors. Aggravating circumstances include (a) recidivism (the basic amount will be increased by up to 100 percent for each prior offence); (b) refusal to co-operate with or attempts to obstruct investigations; and (c) retaliatory or coercive measures on other undertakings to participate in the infringement. Mitigating circumstances include (a) termination of the infringement as soon as the European Commission intervenes; (b) evidence that the infringement was committed negligently; (c) evidence of substantially limited involvement; (d) effective co-operation outside the scope of the leniency notice; and (e) where the anti-competitive action was authorised or encouraged by public authorities or legislation. The European Commission may also increase a fine so that it exceeds any gains to the offender, based on the undertaking's turnover, the latter presumably as a measure of likely gain or harm. These considerations can be gathered together as a further adjustment factor ( $a$ ), where  $a = 1 - (i - j - g)$ , and  $i$  is discount for mitigating factors,  $j$  the uplift for aggravating factors, and  $g$  an adjustment to mop up any deficit based on estimates of the offender's likely gains. Thus the fine is calculated as:

$$F = \alpha B = [(aT + b)S]^* [1 - (i - j - g)] \geq 0.1WT$$

and cannot exceed 10 percent of worldwide turnover ( $WT$ ) in the preceding year.<sup>34</sup>

### B. IMPACT ON FINES

What impact will these changes have on the level of fines? To answer this question fines imposed on 57 firms in 14 cartels where the European Commission's decision reported sales for the penultimate year have been recalculated using the *2006 Penalty Guidelines* and some simplifying assumptions. The basic amount was re-calculated assuming the following percentages using the European Commission's assessment of the gravity of the offence under the 1998 guidelines—10 percent of sales for “minor”,

<sup>34</sup> The European Commission has published proposals to amend the *2002 Leniency Notice*. The main change is designed to protect cartels who disclose evidence, in the form of corporate statements, against damages in civil damage proceedings.

20 percent for “serious”, and 30 percent for “very serious” offences. A further 25 percent of sales were added as a deterrent factor (*b*). Sales were those within the EEA.<sup>35</sup> The adjustments for aggravating and mitigating factors have been left as in the reported decisions except for *Lysine* where the 10 percent reduction for the immediate termination of the infringement when the European Commission intervened given to all cartel members, and the additional 20 percent reduction given to Sewon for its passive role were removed as these are unavailable under the *2006 Penalty Guidelines*. An uplift was added for prior offences of 50 percent each for ADM and Roche (*Citric Acid*) and Ajinomoto, Cheil and Takeda (*Food Flavour Enhancers*); and 100 percent for Akzo (*Choline Chloride*).<sup>36</sup>

The recalculated fines using the new guidelines are on average more than double those that were imposed by the European Commission (Table 7 below). They would

TABLE 7 FINES UNDER 1998 AND 2006 PENALTY GUIDELINES

Cartel	Firm	Basic amount €m	2006 Fine		1998 Fine €m	2006/ 1998 Fines
			€m	% Sales		
Amino Acids (Lysine)	ADM	34.9	52.3	128?	52.6	1.0
	Ajinomoto	78.8	118.1	158%	56.6	2.1
	Kyowa	16.8	16.8	105%	18.9	0.9
	Cheil Jedand Corp	14.5	14.5	85%	17.4	0.8
	Sewon	15.8	15.8	105%	17.8	0.9
Vitamin A	BASF	132.8	179.2	398%	92.3	1.9
	Roche	177.0	265.5	443%	171.0	1.6
	Aventis	110.6	110.6	295%	68.4	1.6
Vitamin E	BASF	184.4	248.9	398%	179.7	1.4
	Roche	184.4	276.6	443%	199.5	1.4
	Aventis	147.5	147.5	295%	39.9	3.7
	Eisai	99.4	99.4	265%	18.9	5.3
Vitamin B2	BASF	20.3	27.4	196%	37.8	0.7
	Roche	29.0	43.5	218%	84.0	0.5
	Takeda	7.8	7.8	130%	13.5	0.6
Vitamin B5	BASF	27.8	37.6	358%	68.0	0.6
	Roche	41.7	62.6	398%	108.0	0.6
	Daiichi	27.8	27.8	265%	36.0	0.8
Vitamin C	BASF	28.8	38.9	216%	29.4	1.3
	Roche	126.4	189.6	240%	131.0	1.4
	Takeda	20.8	20.8	160%	43.5	0.5
	Merck	20.8	20.8	160%	10.9	1.9
Vitamin D3	BASF	5.8	7.8	196%	15.1	0.5
	Roche	8.7	13.1	218%	42.0	0.3
	Aventis	2.9	1.5	73%	5.6	0.3
	Solvay	13.1	13.1	145%	14.0	0.9

<sup>35</sup> The new guidelines allow the European Commission to use sales for a geographical area wider than the EEA to calculate the basic amount. Thus by restricting sales to EEA the calculations may underestimate the potential fines for international cartels.

<sup>36</sup> In *Choline Chloride* the European Commission applied a 50% increase to the basic amount for recidivism to BASF (*Vitamins*); therefore no adjustment was made under the 2006 guidelines. It did not apply any such reduction to Akzo. It is also noteworthy that *Choline Chloride* was the only cartel in the sample to have an uplift for recidivism under the 1998 guidelines.

Table 7 (contd)

Cartel	Firm	Basic amount €m	2006 Fine		1998 Fine €m	2006/ 1998 Fines
			€m	% Sales		
Beta Carotene	BASF	23.4	31.5	277%	86.4	0.4
	Roche	132.4	198.6	308%	96.0	2.1
Carotinoids	BASF	14.3	19.2	257%	83.7	0.2
	Roche	14.3	21.4	285%	93.0	0.2
Carbonless Paper	AWA	480.9	721.3	195%	283.5	2.5
	Bollore	53.6	53.6	95%	28.4	1.9
Citric Acid	Carrs	8.7	8.7	75%	1.8	5.0
	Divipa	15.4	15.4	75%	1.8	8.8
	MHTP	210.2	210.2	130%	33.1	6.4
	Zicunaga	7.6	7.6	45%	1.5	4.9
	Mougeot	25.7	25.7	85%	7.3	3.5
	Kochler	144.8	144.8	130%	33.1	4.4
	Sappi	37.2	37.2	95%	15.1	2.5
	Torraspapel	58.3	58.3	95%	14.2	4.1
	Zanders	175.9	175.9	130%	33.1	5.3
	ADM	48.3	89.4	194%	79.4	1.1
	Cerestar Bioproducts	24.3	24.3	115%	4.6	5.3
	Haarmann & Reimer	45.5	45.5	145%	122.5	0.4
	Hoffmann-La Roche	59.9	110.9	268%	79.4	1.4
	Jungbunzlauer	101.5	101.5	145%	29.4	3.5
Plasterboard	BPB	1,111.0	1,666.5	330%	198.0	8.4
	Knauf Westd'	737.0	737.0	220%	85.8	8.6
	Lafarge	584.3	876.4	308%	249.6	3.5
	Gyproc	53.6	40.2	49%	7.2	5.6
Food Flavour Enhancers	Ajinomoto	6.6	9.9	293%	22.2	0.4
	Cheil	2.3	3.5	308%	4.6	0.8
	Daesang	2.3	2.3	205%	4.6	0.5
	Takeda	2.4	3.6	323%	9.4	0.4
Choline Chloride	UBC	131.0	97.2	100%	14.8	6.6
	Akzo Nobel	20.4	40.8	270%	30.0	1.4
	BASF	13.4	20.0	203%	43.7	0.5
Totals		5,924.6	7,655.6	226%	3,368.6	2.3

have totalled €7.7 billion compared to €3.4 billion actually imposed. Coincidentally, the fines imposed by the Commission were about the same as the reported total sales of all 57 firms; and hence the recalculated fines under the new guidelines are more than double the last years' sales. For many firms, the fines re-calculated under the new guidelines are substantially larger—in some cases as much as five, six, and up to eight times greater. This is the case for firms involved in the *Carbonless Paper* and *Plasterboard* cartels, who would be substantially worse off under the new guidelines. A surprising finding is that for 23 out of the 57 firms/offenders—about 40 percent—fines under the *2006 Penalty Guidelines* would have been lower, and in some cases substantially lower, than they paid. Firms implicated in the *Vitamins B2, B5, C and D3*, *Beta Carotene*, *Carotinoids*, *Lysine*, and *Food Flavour Enhancers* cartels (as shaded in the Table 7) would have been better off under the new guidelines. This is not really surprising given that the *Vitamins'* cartels were regarded as the most outrageous examples of price-fixing yet

detected. However, this finding may not reflect the true position generally, given that these cartels were fined very heavily under the *1998 Penalty Guidelines*. They may also have had the “book thrown at them” had the new guidelines been in operation at the time of the decisions. Notwithstanding this, the limited evidence suggests that the 1998 guidelines were capable of meting out very high fines and possibly larger ones than the new guidelines.

The guidelines are also overly complicated, and take the same factors into account several times e.g. in the calculation of the basic amount there is an uplift for deterrence and then a further uplift to reflect the offenders’ gain; co-operation is rewarded under the *Guidelines* and again rewarded under the leniency programme. Given the large number of appeals against the Commission’s fines these ambiguities should have been avoided.

## VI. CONCLUSIONS

This analysis suggests that the current method of imposing fines and their levels are unsatisfactory. The *1998 Penalty Guidelines* have given rise to excessive litigation, the leniency programme is over-generous, and the level of fines do not reflect the harm caused by cartels (based on the available research on overcharges) nor are they likely to deter price-fixing. The amended *2006 Penalty Guidelines* directly link fines to sales, the duration of the offence, and offenders’ gains. There is also a greater focus on deterrence with fines aimed at ensuring that offenders’ do not profit from price-fixing. Moreover, there is an appreciation of marginal deterrence in the way recidivism and other indicators of greater involvement in cartel formation and enforcement are penalised. These are all moves in the right direction. Nonetheless, the above estimates, while based on simplifying assumptions, indicate that actual and expected fines are not likely to reflect consumers’ losses or deter price-fixing. If future research confirms these findings, then fines will need to increase substantially to deter price-fixing. On the other hand, the effectiveness of such high fines depends on the firms’ ability to pay, the enforcement costs, and their political and public acceptability.<sup>37</sup> If fines are so high that firms are not able to pay them, this will not only send firms’ bankrupt but will not deter price-fixing. The judgment proof firm will act as if it is not subject to sanctions! Moreover, very high fines may be difficult to fully implement and clash with core legal principles, such as proportionality, and undermine the legitimacy of the law.

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<sup>37</sup> Craycraft *et al.* found that in the US only 42% of the firms would have been able to pay the optimal fine without falling into bankruptcy, and only 26% by means of the highest measure of the operating funds. C. Craycraft, J.L. Craycraft and J.C. Gallo, *Antitrust Sanctions and a Firm’s Ability to Pay*, 12 Review of Industrial Organization, pp.175-176 (1997). Werden and Simon, as note 33 above, find that optimal fines would exceed firms’ financial capacity to pay to support imprisonment of price-fixers. A. Stephan, *The Bankruptcy Wildcard in Cartel Cases*, CCP Working Paper 06-5, 2006.

## ANNEX

## EU COMMISSION CARTEL DECISIONS

Cartel	Case No.	Decision	Duration	
			Start	end
Main Sample				
Seamless Steel Tubes	IV/E-1/35.860-B	Dec-99	1990	1995
Lysine	COMP/36.545/F3	Jun-00	Sep-90	Jun-95
FETTCSA	IV/34.018	May-00	Jul-92	Sep-92
Vitamin A	COMP/E-1/37.512	Nov-01	Sep-89	Feb-99
Vitamin E	COMP/E-1/37.512	Nov-01	Sep-89	Feb-99
Vitamin B2	COMP/E-1/37.512	Nov-01	Jan-91	Sep-95
Vitamin B5	COMP/E-1/37.512	Nov-01	Jan-91	Feb-99
Vitamin C	COMP/E-1/37.512	Nov-01	Jan-91	Aug-95
Vitamin D3	COMP/E-1/37.512	Nov-01	Jan-94	Jun-98
Beta Carotene	COMP/E-1/37.512	Nov-01	Sep-92	Dec-98
Carotinoids	COMP/E-1/37.512	Nov-01	May-93	Dec-98
Carbonless Paper	COMP/E-1/36.212	Dec-01	Jan-92	Sep-95
Graphite Electrodes	COMP/E-1/36.490	Jul-01	May-92	Mar-98
Citric Acid	COMP/E-1/36.604	Dec-01	Mar-91	May-95
German Banks	COMP/E-1/37.919 (ex 37.391)	Dec-01	Oct-97	Dec-01
Belgian Brewers	IV/37.614/F3 PO	Dec-01	Jan-93	Jan-98
Private Label (Belgian Brewers)	IV/37.614/F3	Dec-01	Oct-97	Jul-98
Luxembourg Brewers	COMP/37.800/F3	Dec-01	Oct-85	Jun-00
SAS/Maersk	COMP.D.2.37.444/COMP.D.2.37.386	Jul-01	Sep-98	Feb-01
Zinc Phosphate	COMP/E-1/37.027	Dec-01	Mar-94	May-98
Plasterboard	COMP/E-1/37.152	Nov-02	31-Mar-92	25-Nov-98
Methionine	C.37.519	Jul-02	Feb-86	Feb-99
Austrian Banks	COMP/36.571/D-1	Jun-02	Jan-95	Jun-98
Concrete Reinforcing Bars	COMP/37.956	Dec-02	Dec-89	Jul-00
Isostatic Speciality Graphite	COMP/E-2/37.667	Dec-02	Jul-93	Feb-98
Extruded Speciality Graphite	COMP/E-2/37.667	Dec-02	24-Nov-93	29-Nov-96
Dutch Indus. & Medical Gases	COMP/E-3/36.700	Jul-02	Sep-93	Dec-97
Food Flavour Enhancers (Nucleotides)	COMP/C.37.671	Dec-02	Nov-88	Jun-98
Fine Arts Auction	COMP/E-2/37.784	Oct-02	Apr-93	Feb-00
Nintendo	COMP/35.587/COMP/35.706/ COMP/36.321	Oct-02	Jan-91	Dec-97
French Beef	COMP/C.38.279/F3	Apr-03	Oct-01	Jan-02
Sorbates	COMP/E-1/37.370	Oct-03	Dec-78	Oct-96
Organic Peroxides	COMP/E-2/37.857	Dec-03	01-Jan-71	31-Dec-99
Choline Chloride	COMP/E-2/37.533	Dec-03	13-Oct-92	30-Sep-98
Copper Plumbing Tubes	COMP/E-1/38.069	Sep-04	Jun-88	Mar-01
French Brewers	COMP/C.37.750/B2	Sep-04	Not stated	
Spanish Raw Tobacco	COMP/C.38.238/B.2	Oct-04	Mar-96	Aug-01
Needles & Haberdashery	F-1/38.338	Oct-04	Sep-94	Dec-99
Italian Raw Tobacco	COMP/C.38.281/B.2	Oct-05	Sep-95	Feb-02
Other decisions				
Methylglucanine	COMP/37.978	Nov-02	Nov-90	Dec-99
Carbon & Graphite Products	Commission press release	Dec-03	Oct-88	Dec-99
MCCA Chemicals	Stanbrook Hooper press release	Jan-05	1984	1999
Rubber Chemicals	COMP/38.443	Dec-05	1996	2001