

**Lysine and Price Fixing:
How Long? How Severe?**

by

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Abstract

In October 1996 the Archer Daniels Midland Company (ADM) pled guilty to criminal price fixing with respect to sales of lysine and agreed to pay a \$70 million fine. Earlier, in August 1996 two Japanese producers and a Korean producer of lysine had agreed to plead guilty to criminal price fixing charges. And earlier still, in July 1996 ADM and the two Japanese companies settled the civil suits filed by some harmed buyers by agreeing to pay a sum of \$45 million.

It is this last event that serves as the focus for this paper. The adequacy of the settlement amount was a major area of dispute. Connor (1996, 1997, 1998) has claimed that the trebled damages to lysine purchasers were an order of magnitude larger. Crucial to Connor's conclusions are his assumptions as to the time period during which the conspiracy had an effect on prices and the "but for" price that otherwise would have prevailed in the absence of the conspiracy. This paper will argue that Connor substantially over-estimated the period of the conspiracy and under-estimated the "but-for" price.

Key words: antitrust; price-fixing; treble damages

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I. Introduction

Conspiratorial price fixing is a serious federal offense in the U.S. legal system. It is a felony, with convictions leading to jail terms and fines for individuals and fines for their companies. In addition, price-fixers are subject to federal civil suits by harmed parties who, if they succeed in demonstrating direct-impact harm from the price fixing, can require the price-fixers to pay them triple the amount of their damages.

In October 1996 the Archer Daniels Midland Company (ADM) pled guilty to criminal price fixing with respect to sales of lysine and agreed to pay a \$70 million fine. Earlier, in August 1996 two Japanese producers and a Korean producer of lysine had agreed to plead guilty to criminal price fixing charges. And earlier still, in July 1996 ADM and the two Japanese companies settled the civil suits filed by some harmed buyers by agreeing to pay a sum of \$45 million.

It is this last event that will serve as the focus for this paper. The private treble-damages litigation process is an important part of the antitrust enforcement process, and rightly so. But sensible enforcement calls for sensible estimates of damages. That message will be at the heart of this paper.

II. Background

Lysine is an essential amino acid that is an important component of animal feed.¹ As of the late 1980s there were three major producers of lysine in the world: Ajinomoto of Japan (with about 60% of

¹ Further details on much of what follows can be found in Connor (1998).

world sales), Kyowa Hakko of Japan (with about 20% of world sales), and Sewon of South Korea (with about 15% of world sales). The first two firms also operated relatively small production facilities in the U.S. In 1989 the U.S. imported 60% of the 40,000 tons of its animal-feed lysine use. A major input into lysine is dextrose, of which ADM's wet-corn milling operations were a major source. Lysine prices were about \$1.65 per pound.

In 1989 ADM decided to build a large lysine production facility in Decatur, IL, ADM's headquarters city, that would eventually double the world's production capacity for lysine. ADM's lysine production began in 1991 and expanded rapidly. As is seen in Table 1, by January 1991 lysine prices were below \$1.20 per pound and falling; by December 1991 they were below \$1.00, and they hit a low of \$0.64 in July 1992. ADM's production costs were apparently in the vicinity of \$0.70 per pound.² The other producers' costs, with older and smaller plants and higher transportation costs, were higher.

In April 1992 ADM officials (Mark Whitacre and Terrence Wilson) met in Japan with officials of the two Japanese companies and suggested the formation of an "amino acids trade association"; the association had its first meeting in June. Subsequent meetings of the companies (which were joined by Sewon and later by a second Korean company Cheil Jedang) became the forum for discussions of prices, production levels, and sales share allocations.

In November 1992 Whitacre became an inside source of information for the FBI, subsequently supplying audio tapes of conversations with lysine managers and of several meetings with meetings of the lysine producers. With Whitacre's covert assistance the FBI was able to make video tapes of some

² It is unclear from Connor (1998) as to whether these represented marginal costs or average costs.

of the meetings. In early June 1995 the Department of Justice (DOJ) convened a grand jury in Chicago to consider the mounting evidence of a price-fixing conspiracy. And on June 27 the FBI made a highly publicized raid on ADM's offices to gather documents, thus revealing the DOJ's concern about the price-fixing of lysine. The next day Whitacre revealed his role as the inside source for the DOJ.

In September and November 1995, while the DOJ's investigation was continuing and formal federal charges had not yet been filed, a number of private civil (treble damages) suits were filed by buyers of lysine (e.g., animal feed manufacturing companies). In April 1996 ADM, Ajinomoto, and Kyowa offered to settle with the private plaintiffs as a class for \$45 million (with \$25 million, \$10 million, and \$10 million offered respectively). In July a number of the plaintiffs (who were unhappy with the settlement offer) opted out of the class, while some of the remaining plaintiffs argued that the settlement was too low³ and should not be approved by the Federal District Court Judge, Milton Shadur, who had jurisdiction over the consolidated civil suits. Nevertheless, Judge Shadur approved the settlement with respect to those plaintiffs that chose to remain as part of the class.

The adequacy of the amounts proposed in the settlement was a major area of dispute. It is to two of the components of that dispute that we now turn.

III. Treble Damages, in Theory and in Practice

1. The theory.

The private treble damages remedy is an integral part of the antitrust enforcement process. As a general matter, private litigation with a remedy of a multiple of the damages suffered makes good

The Connor (1996) report treated them as long-run marginal costs.

³ A major basis for this claim was Connor (1996).

sense. Price-fixing is usually a covert activity; price fixers rarely trumpet their actions with press releases. It is therefore difficult to detect and will be detected incompletely and imperfectly. Incomplete detection (type II error) implies that a penalty in excess of a simple disgorgement of the violator's gains (which are roughly comparable to the victim's losses) is necessary to achieve sufficient deterrence.⁴ Imperfect detection (type I error) implies that the penalty should not be infinitely high.

Pure theory, then, tells us only that the penalty should be greater than 1.0 and less than infinity. Only empirical analyses of detection rates, error rates, and enforcement costs can provide greater specificity. The uniform application of a treble damages remedy clearly represents a rough-and-ready compromise within the possible range.⁵

2. The steps.

In order to calculate the damages suffered by the victims of price-fixing (which are then trebled), five pieces of information are necessary:

1. The period of time during which the conspiracy had an effect on prices.
2. The prices at which the conspirators sold their output.⁶
3. The "but for" prices that would have prevailed in the market in the absence of the conspiracy.⁷

⁴ Even with perfect detection, something more than a simple disgorgement is required since enforcement is costly and the simple disgorgement would encourage a "nothing ventured, nothing gained" attitude by violators. See Becker (1968) and Stigler and Becker (1974).

⁵ There is a separate question as to whether the bounty received by the successful plaintiff ought to be identical to the penalty extracted from the losing defendant. See Polinsky (1988).

⁶ Also relevant might be the prices of (non-conspiring) competitors of the conspirators, who might adjust their prices in the light of the conspirators' prices.

⁷ This should include the "but for" prices of the non-conspiring competitors.

4. The quantities sold by the conspirators during the period of the conspiracy.⁸

With these four pieces of information one can calculate the price-overcharge "rectangle." In order to calculate the deadweight welfare loss "triangle," one more piece of information is needed:

5. The price-elasticity of demand for the product.

3. The Connor (1996) report.

After a settlement of the civil suits for \$45 million was proposed in April 1996, a number of plaintiffs objected that the proposed settlement was too low. A report by Connor (1996) supported these claims. Using the methodology outlined above, he concluded that the combined price-overcharge and deadweight loss came to about \$165-\$180 million.⁹ When trebled, the amounts would have been about \$495-\$540 million, or about 11-12 times the proposed settlement.

Crucial and controversial in Connor's analysis were his assumptions with regard to the "but for" price (\$0.70 per pound) and the time period during which the conspiracy had an effect on prices (the 36 months of August 1992 through March 1993 and September 1993 through December 1995).¹⁰ The two assumptions are related, and each will be examined in turn.

4. What was the "but for" price?

The "but for" price should be the price that otherwise would have prevailed in the market in the absence of a conspiracy. This counterfactual price should be based on an assessment of the market conditions, including its structural characteristics, that would have been present. Connor assumed that the "but for" price would have been a "competitive" price that would have approximated ADM's

⁸ And the quantities sold by the non-conspiring competitors.

⁹ As is usual in such calculations the estimated price overcharge (\$155-\$166 million) was much larger than the deadweight welfare loss (\$3-\$14 million).

apparent marginal costs of production of about \$0.70 per pound.¹¹

But the lysine industry of 1992-1995 was not a simple "competitive" industry. Prior to ADM's entry the lysine market was essentially a three-firm oligopoly. With ADM's entry it was a four-firm oligopoly.¹² The Herfindahl-Hirschman Index (HHI) was well above 3000. Barriers to entry were high.¹³ It was a standardized commodity, with a standard chemical formula. The buyers of lysine were numerous -- the 1992 Census of Manufactures listed 1,160 companies in the "prepared feeds, n.e.c." industry (SIC 2048) -- and were unconcentrated.¹⁴

In sum, the lysine industry had virtually all of the characteristics of an industry in which implicit oligopolistic coordination of some kind would likely have arisen in the absence of the explicit conspiracy.¹⁵

¹⁰ These claims are repeated in Connor (1997).

¹¹ Connor (1998, p. 28) reinforced this notion by presenting a standard industry demand-supply diagram, with the type of rising supply curve that is often portrayed as typical of a competitive industry. It is crucial for the following discussion in the text to recall that a supply curve cannot be portrayed for a monopolist or for a group of oligopolists that recognize their interdependence (i.e., the marginal cost curve of a monopolist is not its supply schedule).

¹² And with the modest entry of Cheil Jedang in late 1992 it was technically a five-firm oligopoly.

¹³ Connor (1998, p. 8) summarized them as high sunk costs (over \$150 million) for building a plant that would achieve minimum efficient scale (MES), a technology base that was proprietary, and a three-plus year lag in building and bringing on-line the MES facility. An additional factor was that the MES facility would have been a non-trivial percentage of the world's existing capacity, so that any entrant that operated at MES could not avoid affecting world supply significantly, and thus the limit-pricing analysis found in Bain (1956) and Sylos-Labini (1962) would also be appropriate.

¹⁴ The 1987 Census listed 1,182 firms, with the largest four accounting for 20% of animal feed sales and an HHI of 168. (The 1992 Census did not provide four-firm concentration ratios or HHIs.) Though feed sales were localized in nature, the important point is that the buying side of the lysine market lacked the handful of large customers, accounting for a relatively large fraction of sales/purchases, that could knowledgeably bargain and play off the sellers against each other and thereby keep the sellers' market power in check.

¹⁵ See Stigler (1964). Although the four companies had their headquarters in three separate countries and thereby may not have shared a common linguistic/cultural history, they nevertheless would have had a strong structural basis for reaching an implicit understanding.

How, exactly, would an implicit understanding among the oligopolists have operated? That is not easy to determine. It is clear that the prospects of and then the reality of ADM's entry did cause lysine prices to decrease from the level that had been maintained by the three-firm oligopoly. The relatively low prices that prevailed through the summer of 1992 may have been ADM's efforts to introduce itself to and make a name for itself in the lysine market; or they might have been an indication of an aggressive signal to its rivals by ADM of "here's what I am capable of doing;" or they might have been an equally aggressive "warning shot across the bow" by the incumbents; or they might have been the simple consequence of more supply coming into the market and the incumbents' refusing to decrease their supply correspondingly.¹⁶

After this initial disruption to the market, what then would have prevailed? Although ADM was the low cost and dominant producer in the U.S. market (with about 50% of sales), it seems unlikely that the company would have continued to maintain prices at its own marginal costs (i.e., Connor's assumed "but for" price of \$0.70), unless ADM were hoping permanently to drive its rivals from the market. There is nothing to indicate that this was ADM's goal.

Instead, we must now enter the world of oligopoly speculation. Perhaps ADM, as the dominant firm in the U.S. market with the lowest costs, would have chosen an elevated price level that was just at or below the higher costs of its major rival (Ajinomoto). This would be in the spirit of a "dominant firm" model, which also carries a Bertrand and Stackelberg flavor.¹⁷ Or the four (or five)

¹⁶ In any event the decrease in prices that occurred prior to ADM's first sales in 1991 had to have occurred at the instigation of the incumbents.

¹⁷ See Stigler (1965). Unfortunately, though Connor (1997, 1998) indicates that ADM's rivals' costs were higher, since they were losing larger sums (than was ADM) per ton at the low prices of mid 1992, it is unclear how much higher they were.

oligopolists might have engaged in Cournot-style behavior, in which case their likely prices would have been at least as high as those actually observed during the 1993-1995 period.¹⁸ Or we might look to the last six months of 1995, after the highly publicized FBI raid of June 1995, as an indication of what prices the non-conspiring oligopolists might have charged.¹⁹ For these six months the average price of lysine was about \$0.94 per pound, well above \$0.70.

In sum, in the absence of the conspiracy, it seems highly unlikely that the behavior in the market would have approximated the purely competitive, price-equals-marginal-cost outcome. Instead, some form of implicitly coordinated oligopolistic behavior would have prevailed, with prices in excess -- probably, substantially in excess -- of the "but for" price of \$0.70 per pound assumed by Connor.

5. What was the period during which the conspiracy had an effect on prices?

Connor (1996) did not offer extensive justification for his choice of the 36 months of August 1992-March 1993 and September 1993-December 1995 as the periods during which the conspiracy had an effect on prices. He appears to have been greatly influenced by his assumption and use of \$0.70 per pound as the "but for" price and by the temporal pattern of prices shown in Table 1: a rise in prices (above \$0.70) after July 1992, a dip (below \$0.70) in the spring and early summer of 1993, and then a sustained rise (above \$0.70) in the late summer of 1993.

However, as has been argued above, even if \$0.70 per pound was an approximation to ADM's marginal costs, a "but for" price in the lysine market of \$0.70 per pound was unlikely; instead, a higher

¹⁸ This result was demonstrated by Warren-Boulton (1996).

¹⁹ Connor (1996) included these last six months in the conspiracy period. As is argued below, the continuation of the conspiracy after the FBI raid seems highly unlikely.

price would have been likely. Consequently, temporal variations of selling prices around \$0.70 by themselves ought to carry little or no weight. Further, a casual inspection of the monthly price series contained in Table 1 shows that, for all six of the years for which data were available, lysine prices tended to rise between the summer months (June, July, August) and the end of the year (October, November, December). The price increases of late summer 1992 and 1993, which Connor interpreted as manifestations of the operations of the conspiracy, may well instead have been a normal seasonal pattern of these prices.

In addition, it seems highly unlikely that the conspiracy could have persisted past June 1995, when the FBI raided ADM's offices and the DOJ's investigation was publicly revealed.²⁰

The inspection of the monthly price data does indicate an unusual and suspicious pattern of relative month-to-month stability from October 1993 through August 1994, with then an increase and a new level of stability through about February 1995. Given the larger amount of month-to-month variation that preceded and followed these 17 months, this period of apparently uncharacteristic stability seems a more likely candidate for the period during which the conspiracy was having an effect on prices.²¹ Perhaps an extra month at the beginning (i.e., September 1993), when the conspiracy may have been beginning to take hold, and at the end (i.e., March 1995), when the conspiracy would have

²⁰ If the conspiracy had abruptly ended at the time of the FBI raid, there conceivably might have been "persistence" (inertia) effects from the conspiracy that extended past June. But, as is argued below, the price effects of the conspiracy appear to have been unraveling even earlier, around the end of February 1995.

²¹ An important part of the conspiratorial process is for the conspirators to reassure each other that none is "cheating" on the agreement. This reassurance is easier to offer and accept in a stable price environment than in a variable price environment, which is what makes the period of relative price stability suspicious (especially given the pattern of substantial monthly price variability that surrounds it).

been effectively disintegrating, might be added.

In sum, an alternative view of the monthly price data casts doubt on the longer (36 month) conspiracy period of the Connor (1996) report and suggests a substantially shorter period of about 17-19 months.²²

IV. Conclusion

How long did the lysine price-fixing conspiracy last? How severe were its price-overcharge consequences?

Connor (1996, 1997, 1998) has argued that the period was relatively lengthy (36 months) and its consequences relatively severe (based on an assumed "but for" price of \$0.70 per pound). But a reconsideration of the industry structure and price data suggests that the likely price of lysine that would have prevailed in this oligopolistic industry in the absence of the conspiracy would have been substantially higher than that posited by Connor and the likely period of the conspiracy was considerably shorter. Though the conspiracy surely did have harmful effects on the purchasers of lysine, those effects were less extensive and less severe than was claimed.

References

²² At the time of the ADM guilty plea in October 1996, the DOJ's press release listed the conspiracy period as running from June 1992 (the date of the first meeting of the amino acids trade association) through June 27, 1995 (the day of the FBI raid). But the actual plea agreement that ADM signed was less precise as to the actual dates of the conspiracy. Though the plea agreement specifies a "relevant time period" of June 1992 until June 27, 1995, it then states, "During certain periods of time during the relevant time period, the defendant, through several of its representatives, participated in a conspiracy among the major lysine-producing firms." No further specificity is provided. So, ADM's guilty plea

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itself does not help pinpoint the period of the conspiracy.

Table 1: Average Selling Prices for Lysine (per pound), 1990-1995

<u>Month</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
January	\$1.32	\$1.19	\$0.91	\$0.98	\$1.12	\$1.20
February	1.19	1.17	0.84	0.94	1.11	1.11
March	1.15	1.13	0.82	0.89	1.11	1.11
April	1.08	1.09	0.80	0.78	1.11	1.08
May	1.01	1.04	0.78	0.66	1.11	0.98
June	0.99	1.03	0.69	0.62	1.11	0.98
July	0.99	1.01	0.64	0.76	1.09	0.98
August	1.00	1.08	0.70	0.88	1.11	0.98
September	1.06	1.11	0.82	0.98	1.16	0.88
October	1.15	1.12	0.92	1.08	1.20	0.98
November	1.24	1.07	0.98	1.10	1.22	0.98
December	1.23	0.97	0.98	1.13	1.22	1.08
Simple average	\$1.12	\$1.08	\$0.82	\$0.90	\$1.14	\$1.08

Source: In re: Amino Acid Lysine Antitrust Litigation, Exhibit C to Plaintiff's Interim Report No. 1, April 29, 1996.