

**Price and Profit Performance of Leading Cheese Marketers:
Some New Evidence**

By

Willard F. Mueller and Bruce W. Marion*

WP 116

December 1998

*The authors are Vilas Research Professor of Agricultural & Applied Economics emeritus and Professor in the Law School emeritus; and Professor Agricultural & Applied Economics, University of Wisconsin-Madison.

Price and Profit Performance of Leading Cheese Marketers: Some New Evidence

Introduction

The National Cheese Exchange (NCE) was a privately owned and operated cash auction market in Green Bay, Wisconsin, until it was closed in May 1997. Cheese manufacturers and marketers met each Friday morning for about 30 minutes to sell and buy carlots of bulk cheddar cheese from each other in 40-pound blocks and 500-pound barrels. NCE sales accounted for about 0.2 percent of all cheese made in the U.S. during 1988-1993. Each year about five sellers and five buyers made virtually all cheese trades.

The tiny volume traded in this obscure market by a few traders belied the far-reaching consequences of the prices that were established. NCE prices were used as the reference price in formula-pricing practically all bulk cheese sold by cheese companies. NCE prices also were frequently used as the reference price in selling private label and weak company brands of finished natural and processed cheeses to food retailers, food service outlets, and industrial users. Finally, NCE prices largely determined the price of fluid milk used by cheese manufacturers and significantly influenced the price of other dairy products.¹

A comprehensive economic analysis of cheese pricing was released in March 1996 (hereafter referred to as the *Cheese Pricing Report*).² That report and a subsequent

¹ The relationship between NCE prices and both bulk cheese prices and fluid milk prices is generally acknowledged by persons in the trade and by academic researchers. See, for example, Kraft General Foods, "Cheese Procurement Strategy," Operations, December 6, 1989; KGF 2948, 2959, cited in *Cheese Pricing Report* at note 10, Chapter 2.

² W. F. Mueller, B. W. Marion, M. B. Sial, and F. E. Geithman, *Cheese Pricing: A Study of the National Cheese Exchange*, University of Wisconsin and Wisconsin Department of Agriculture, Trade and Consumer Protection, March 1996. In 1992, the University of Wisconsin-Madison and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) agreed to collaborate in an analysis of cheese pricing. DATCP agreed to use its authority to compel production of documents; the university agreed to analyze these documents and data from other sources, and to prepare a report for DATCP.

study³ concluded that the NCE was not an effectively competitive price discovery mechanism, and that it facilitated market manipulation. The main beneficiaries of the situation appeared to be Kraft General Foods, Inc., and those cheese marketers with coincident interests in the level of NCE prices.

This paper presents an extension of those analyses. It examines trading motives, selling prices of finished cheeses, and the gross profit margins of leading cheese marketers. The analysis also examines the impact of higher selling prices of cheese marketers on consumer prices and purchases, and the impact of reduced cheese purchases by consumers on CCC purchases of surplus bulk cheese.

Much of this analysis was made possible by the public disclosure of pricing information that had been redacted from the *Cheese Pricing Report* released in March 1996. The original redaction of this information occurred because Kraft claimed that its pricing data constituted trade secrets and were therefore legally protected. Kraft threatened legal action if DATCP authorized the release of the *Cheese Pricing Report* containing such information. Per an agreement between DATCP and Kraft, the contested documents were redacted from the Report until there had been a "judicial resolution of a good-faith dispute over the trade secret status of the information." Kraft subsequently dropped its objection to the disclosure of the contested price documents. DATCP also made public the selling prices of Borden, Beatrice and Schreiber pursuant to an agreement

See also Willard F. Mueller, Bruce W. Marion and Maqbool H. Sial, "Price Leadership on the National Cheese Exchange, *Review of Industrial Organization*, 12: 145-170, 1997.

³ W. F. Mueller and B. W. Marion, "Practices Facilitating Manipulation of Prices on the National Cheese Exchange," Food Systems Research Group, Department of Agricultural and Applied Economics, University of Wisconsin-Madison, WP 115, January 1997.

that prohibited the disclosure of certain cost information that appeared on price documents.

A. Motives of Traders

Differences in the business characteristics of traders help explain why some were primarily buyers and others primarily sellers on the NCE during 1988-93. Essentially, some traders benefit from higher NCE prices and some from lower NCE prices, other things being the same. To understand this concept, one must understand how an individual company's input costs and selling prices are related to NCE prices.

We begin by examining the business characteristics of nine traders that accounted for 92 percent of sales and 93 percent of purchases on the NCE during 1988-93. Five of these traders—Kraft General Foods, Inc.; Borden, Inc.; Alpine Lace Brands, Inc.; Beatrice Cheese, Inc.; and Schreiber Foods, Inc.—are primarily cheese marketers that buy all or a substantial portion of the bulk cheese they require to make finished cheese sold to food retailers, food service companies and industrial users; three traders are agricultural cooperatives that are large manufacturers of cheese as well as cheese marketers: Mid-Am, Land O'Lakes, and AMPI; and one trader is a broker: Dairystate Brands, Inc.

As cheese marketers, Kraft, Borden, Alpine Lace, Beatrice and Schreiber have certain characteristics in common. They all buy bulk cheese from manufacturers at NCE-based formula prices. Several also manufacture some cheese. NCE prices also largely determine the cost of milk used in making cheese and thus are the dominant cost of cheese-making (roughly 75-85 percent).

There are significant differences among the brand names of these cheese marketers. Kraft sells about 75 percent of its finished cheese products to retailers under

highly differentiated Kraft brands that command significant price premiums over lesser brands. Borden, the second largest marketer of branded processed cheese to retailers, sells nearly all of its cheese under the Borden brand, which also commands a price premium over private label and weaker brands but a lower premium than Kraft brands. Alpine Lace markets and distributes specialty cheese under its brand.

Beginning in 1985, Kraft quit linking the selling prices for finished cheese to the NCE, instead selling its brands at wholesale list prices--which frequently remained unchanged for many months. Although Kraft cannot disregard the prices of private label brands, which Kraft views as its primary competition, it enjoys a significant degree of discretion over its selling prices, particularly in the short term.⁴ Since Kraft's gross profit margins come mostly from the difference between its selling prices and the cost of bulk cheese it buys or makes, it has a financial interest in lower NCE prices, all else remaining the same. This is confirmed by a statistical analysis of NCE prices and Kraft's selling prices and gross profit margins.

Regressing Kraft's monthly *net prices* to the trade for processed cheese (which accounts for 71 percent of Kraft cheese sales) on average monthly NCE barrel prices yields no statistically significant relationship for 1989-91.⁵ A similar result was found when Kraft's natural cheese net price to the trade was regressed on NCE block prices. This was as expected since Kraft sells branded products at prices that are not coupled to

⁴See *Cheese Pricing Report*, Chapter 6, text at notes 74-82.

⁵ These regressions yield the following equations:

$$\text{Processed cheese: } 2.28 + 0.01 \text{ NCE (barrels)}$$

$$(0.06)$$

$$\text{Natural cheese: } 2.18 + 0.27 \text{ NCE (blocks)}$$

$$(1.30)$$

NCE prices. On the other hand, regressing Kraft's monthly average *gross profit margin* for *processed cheese* (as measured by Kraft's *net* price to the trade less the NCE barrel price) on NCE barrel prices yields the following equation:

$$\text{GPM} = 2.28 - 0.988 \text{ NCE} \\ (-4.73)$$

where the number in the parentheses is the t-ratio. This result indicates that as NCE barrel prices *decreased* by 10 cents per pound, Kraft's gross profit margin on processed cheese *increased* by 9.88 cents per pound.

Regressing Kraft's monthly average gross profit margin for *natural cheese* on monthly NCE block cheese prices yields the following equation:

$$\text{GPM} = 2.18 - 0.730 \text{ NCE} \\ (-3.51)$$

where the number in the parentheses is the t-ratio. This result implies that when NCE block prices *decreased* by 10 cents per pound, Kraft's gross profit margins for natural cheese *increased* by 7.3 cents per pound.

Borden, like Kraft, generally benefits from lower NCE prices, as acknowledged by Borden's chief executive for cheese operations.⁶ Regressing Borden's gross profit margins on NCE barrel⁷ price for 1989-1991 yields the following equation:

$$\text{P} = 1.38 - 0.47 \text{ NCE} \\ (-2.34)$$

⁶ Borden Inc., Han Kim, Vice President-General Manager, Refrigerated Products, acknowledged that although Borden has some private label and food service business: "Borden...and most branded people, like Kraft, would like to see a lower cheese market. That will give us the best...profit opportunities. [Such opportunities occur because] they have list prices, and therefore, they like to see, you know, not the lowest...but they like to see...certain low points in the cheese market...." Typed transcript of recorded interview by DATCP and authors, August 31, 1993, typed transcript, pp. 68-69.

⁷ Borden purchased barrel cheese because it made and marketed only processed cheese.

where the number in parenthesis is the t-ratio. This result indicates that as NCE barrel prices went down by 10 cents per pound, Borden's gross profit margin rose by 4.7 cents per pound.

Beatrice and Schreiber differ somewhat from the other three leading marketers in that neither has strong consumer brands for finished cheese products. Unlike Kraft, Beatrice and Schreiber market cheese to customers at wholesale prices which are either formula-priced off the NCE or else which compete with products of other sellers that formula-price off the NCE. As a result, both their buying and selling prices tend to move in tandem with NCE prices,⁸ causing their interest in the level of NCE prices to differ from that of Kraft and Borden. However, even though a marketer of processed cheese may buy a good share of its bulk cheese, the fact that it buys bulk cheese and sells *finished* processed cheese at NCE-based formula prices means it may profit from increased NCE prices, all else being the same. Since bulk barrel cheese costs may represent about 70 percent of the total cost of making *processed* cheese products, a 10 cent per pound increase in NCE price will increase the cost of making finished products by 7 cents per pound but will increase the selling price by 10 cents per pound.⁹ On balance, however, the potential benefit of higher NCE prices to either Beatrice or Schreiber appears modest compared to the potential benefits marketers with strong brands may derive from lower

⁸ Regressing these companies' selling prices on NCE barrel prices yields the following equations:

$$\text{Beatrice price} = 0.64 + 0.76\text{NCE}$$

(11.59)

$$\text{Schreiber price} = 0.63 + 0.62\text{NCE}$$

(7.79)

⁹ See text in *Cheese Pricing Report* at Chapter 4, note 40.

NCE prices.¹⁰ In addition, Beatrice and Schreiber do not enjoy these benefits on their sales of natural cheese.

The three leading agricultural cooperative buyer-traders have two reasons for preferring higher NCE prices. First, the farmer-members of cooperatives benefit directly from higher prices for milk used in making cheese. To the extent that these cooperatives represent the interests of their dairy farmer-owners, they prefer higher NCE prices, all else being the same. Second, AMPI and Mid-Am also sell finished cheese under private label or weak brands of processed cheese, which gives them the same modest interests as Beatrice and Schreiber in higher NCE prices. One cheese cooperative (Land O' Lakes) sells some finished cheese under its own well-known brands, but insofar as it represents the interests of its dairy-farmer owners, it has an interest in higher NCE prices.

Since Dairystate is a broker, its interest in NCE prices presumably reflects those of its customers. Insofar as it primarily disposes of surpluses for cheese manufacturers, it would be primarily a seller on the NCE, as it was during 1988-1993.¹¹

In sum, the business characteristics of traders determine whether, other things being the same, they benefit from lower NCE prices or higher NCE prices. Based on their business characteristics as discussed above and documentary evidence as reported elsewhere,¹² we hypothesize that, other things remaining the same, cheese manufacturers

¹⁰ An analysis of Beatrice and Schreiber's monthly profit margins during 1989-1992 indicates that these margins were positively and significantly related statistically to NCE prices. However, an increase in NCE prices yielded only a modest increase in profit margins. These analyses were based on data supplied under a confidentiality agreement in response to a Demand for Production of Documents by the Wisconsin Department of Agriculture, Trade and Consumer Protection. See *Cheese Pricing Report*, Chapter 4, notes 41 and 47.

¹¹ *Cheese Pricing Report*, Chapter 4, Table 4.2.

¹² *Id.*, Chapter 4, Section E.

and marketers fall into two categories: (a) traders benefiting from lower prices: Kraft, Borden and Alpine Lace; and (b) traders benefiting from higher prices: Beatrice, Mid-Am, Schreiber, Land O' Lakes, and AMPI. Thus, if traders use the NCE primarily to influence prices to their advantage, we may expect those in category (a) to be predominantly sellers on the NCE and those in category (b) to be predominantly buyers on the NCE. These expectations are consistent with the purchase and sales conduct of leading traders on the NCE during 1988-1993, as shown in Table 1.

Table 1. Financial Interest in NCE Prices of Leading Cheese Marketers

Company	Benefit Financially if NCE Price is:	Total Loads Traded on NCE 1988-1993	
		Sales	Purchase
Kraft	Lower	1617	22
Borden	Lower	59	32
Alpine Lace	Lower	130	3
Beatrice	Neutral to higher	0	773
Mid-Am	Higher	4	491
Schreiber	Somewhat higher	7	322
AMPI	Higher	0	172
Land O' Lakes	Higher	72	189

Source: *Cheese Pricing Report*, Chapter 4.

B. Profit Margins of Leading Marketers

The preceding implies that since the mid 1980s, cheese marketers have had an incentive to influence NCE prices to their advantage depending on how they price their finished product. Table 2 summarizes the average gross profit margins of the four leading marketers of cheese for which we have data for 1989-1991. Each year Kraft's gross profit margins were substantially larger than those of the other marketers, especially those of Beatrice and Schreiber. Kraft's gross profit margins rose by 42 cents per pound between 1989 and 1991, reflecting a 13 cent per pound drop in the NCE price and a 29 cent per pound rise in the selling price. The increase in gross profit margins appears to be explained by Kraft's aggressive response to a change in profit goals following its acquisition by Philip Morris Companies Inc. in December 1988. The newly appointed president of Kraft General Foods was told by Philip Morris that Kraft was expected to increase operating profits by 30 percent above 1988.¹³ During 1989, Kraft's profit margins reached record levels.¹⁴ In December 1989, Kraft's strategic planners reported that Kraft had experienced exceptional earnings growth and recommended a return to more normal earnings growth, emphasizing instead volume and market share growth.¹⁵

Kraft management did not accept these recommendations; instead they pursued a

¹³ Alex M. Freedman and Richard Gibson, "Philip Morris's Kraft General Foods Expects Sharp '89 Earnings Increase," *Wall Street Journal*, February 24, 1989, p. 1.

¹⁴ Kraft's gross profit margins are measured by the spread between the average net wholesale price charged retailers and other customers and the average cost of making finished cheese products (Appendix Table 1). Raw material costs, mainly cheese and other forms of milk, average about 75 to 85 percent of the cost of making finished cheese products in the U.S. cheese industry.

¹⁵ Kraft General Foods, Inc., *Refrigerated Products Group, 1990 Strategic Plan*, December 1989.

**Table 2. Average Net Selling Prices and Gross Profit Margins,
Four Cheese Marketers, 1989-1992**

	NCE Price per/lb of Barrel Cheese ¹ (1)	Kraft (2)			Borden (3)			Beatrice (4)			Schreiber (5)		
		Avg Price to Trade	Gross Profit Margin	Avg Price to Trade	Gross Profit Margin	Avg Price to Trade	Gross Profit Margin	Avg Price to Trade	Gross Profit Margin	Avg Price to Trade	Gross Profit Margin		
1989	\$1.31	\$2.11	\$0.80	\$1.99	\$0.68	\$1.60	\$0.29	\$1.42	\$0.11	\$1.42	\$0.11		
1990	1.28	2.38	1.10	2.16	0.88	1.65	0.37	1.48	0.20	1.48	0.20		
1991	1.18	2.40	1.22	2.00	0.82	1.52	0.34	1.32	0.14	1.32	0.14		
Change 1989-91	-0.13	0.29	0.42	.01	0.14	-.08	.05	-.09	0.03	-.09	0.03		

Source: Records supplied by companies in response to a demand of the Wisconsin Department of Agriculture, Trade and Consumer Protection. These data were not disclosed at the time the *Cheese Pricing Report* was made public in March 1996. They were subsequently made public by the Wisconsin Department of Agriculture, Trade and Consumer Protection.

¹ Unweighted 12-month average NCE barrel price.

strategy of rapid earnings growth achieved by further widening of price-cost margins.¹⁶ In 1989, Kraft had a gross profit margin (the spread between net selling of processed cheese price and the NCE price of bulk barrel cheese) of 80 cents per pound for Kraft processed cheese, which accounted for almost 71 percent of its total cheese sales in 1992.¹⁷ This gross profit margin was widened to \$1.10 in 1990 and \$1.22 in 1991, an increase of 52.5 percent over the already record high gross profit margins of 1989 (Table 2).

Although Kraft's higher selling prices and wider profit margins reduced Kraft's market share, its estimated total gross profits for processed cheese rose from \$527 million in 1989 to \$720 million in 1991, a rise of 36.6 percent. Kraft's combined gross profit for processed and natural cheese rose from \$800 million in 1989 to \$1,020 million in 1991, an increase of 27.5 percent (Table 3). We do not have margin data for Kraft's cream cheese, where it enjoyed a 69 percent market share in 1990.¹⁸

Three other leading cheese marketers, for which we have price information,¹⁹ did not enjoy comparable profit gains. Although Borden had the second largest processed cheese brand, its 1990 market share of 8 percent was a poor second to Kraft's 59 percent share of processed cheese. Borden's weaker market position translated into smaller gross profit margin gains than those achieved by Kraft. Whereas Kraft's gross profit margins rose by 42 cents per pound between 1989 and 1991, Borden's gross profit margins grew by only 14 cents per pound during the period (Table 2). The increase came almost totally

¹⁶ See *Cheese Pricing Report*, Chapter 5 for a detailed discussion of Kraft pricing conduct on the NCE in this period.

¹⁷ Appendix Table 1.

¹⁸ See *Cheese Pricing Report*, Appendix Tables 6.4b and 6.9c

¹⁹ Comparable information was not available for Alpine Lace and the three agricultural cooperative cheese manufacturers discussed above.

**Table 3. Kraft's Estimated Gross Profit Margins for Processed
And Natural Cheese, 1989-1991**

	Kraft Processed Cheese	Kraft Natural Cheese	Total
	---millions of dollars---		
1989	\$527	\$273	\$800
1990	712	329	1041
1991	720	300	1020
Change			
1989-1990	\$185	56	241
1989-1991	193	27	220

Source: Calculated using gross profit margins in Table 2 and cheese volumes in Appendix Table 1.

from the decrease in NCE prices of 13 cents per pound (Table 2, column 1).

Beatrice and Schreiber did not fare as well as Kraft and Borden. Their gross profit margins rose by only 5 cents per pound and 3 cents per pound, respectively (Table 2). This reflected the fact that each sold cheese at prices that were either directly or indirectly coupled to the NCE, where prices fell from \$1.31 per pound in 1989 to \$1.18 per pound in 1991. Such coupling caused their selling prices to fall by 8 cents and 9 cents, respectively, between 1989 and 1991 (Table 2). Their margins likely would have fallen even more had not Kraft increased substantially its selling price over the period, thus widening the price spread between Kraft brands and private label brands. This apparently enabled private label companies like Beatrice and Schreiber to maintain somewhat higher selling prices than would otherwise have been possible.

In summary, the above facts support the hypothesis that Kraft and Borden had an incentive to influence NCE prices to their advantage and that during these years they were successful in doing so. Kraft's ability to widen its gross profit margins implies considerable control over selling and buying prices.

C. Impact on Retail Prices and Sales

Kraft's price and profit margin increases affected the prices paid and the volume of cheese purchased by consumers. We first examine these effects as reflected in the prices and sales of processed cheese at food stores, where Kraft brands accounted for about 60 percent and Borden brands 8 percent of all processed cheese sales. Most of the remaining sales were under private label store brands supplied by Beatrice, Schreiber and other cheese companies.

Figure 1 compares the average NCE barrel price with the average *net* price to the trade of Kraft processed cheese from January 1989 through December 1991, as reported in a Kraft document.²⁰ (Kraft compared its processed cheese selling price per pound with NCE barrel prices here and in other company documents because barrel cheese accounts for most manufacturing costs.) In January 1989, the spread between the NCE barrel price and Kraft's average net price to the trade (hereafter Kraft's price-cost margin) averaged 80 cents per pound. During the summer of 1989, the price-cost margin narrowed as NCE barrel prices rose. Between January 1989 and December 1989, Kraft increased by about 16 percent the average net price to the trade of its process cheeses. This restored Kraft's price-cost margin in December 1989 to slightly above that of January 1989. But as barrel prices dropped beginning in January 1990, Kraft maintained selling prices, so that in February and March 1990 the price-cost margin was about \$1.20, or 50 percent greater than in January 1989. In the following months the margins remained wide, reaching \$1.44 in October 1990. For the six months November 1990-April 1991, when NCE barrel prices remained steady near \$1.05 per pound, Kraft's price-cost margins averaged \$1.34, which was 67 percent above January 1989. Even following a sharp reduction in net prices between November and December 1991, the price-cost margin for Kraft's processed cheese remained 36 percent above that in January 1989.

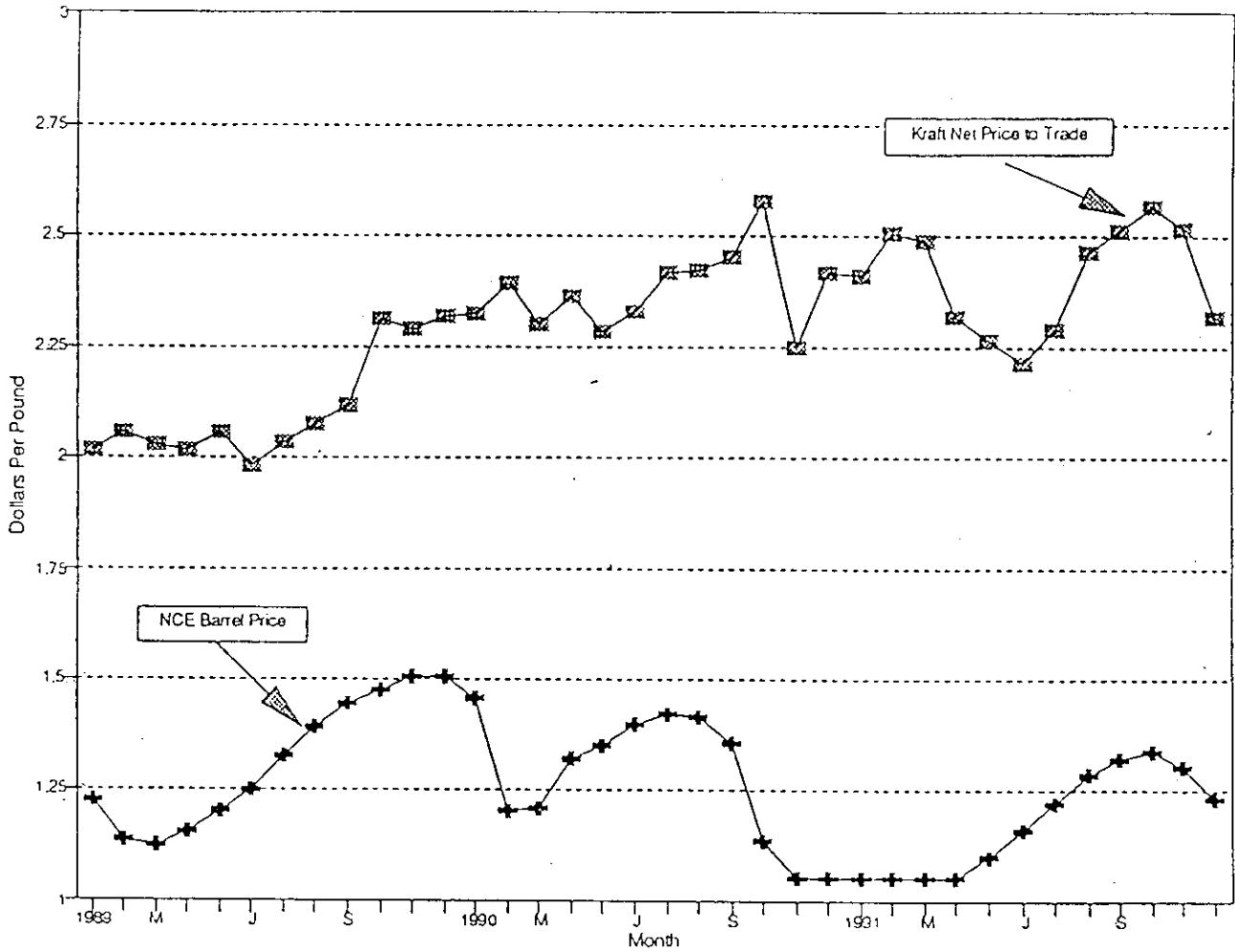
We do not have precise data for Kraft's subsequent pricing conduct. However, Kraft reportedly lowered its prices during 1992, so that by March 1993, Kraft's prices at retail were "back in line with those of competitors."²¹

²⁰ *Cheese Pricing Report*, Figure 6.4. This price information was redacted in the *Cheese Pricing Report* Figures 6.4 and 6.5 but was subsequently made public by DATCP.

²¹ Suen L. Hwang, "Kraft Puts the Cheese Market in Ferment," *Wall Street Journal*, March 16, 1993, B-1.

Figure 1.

Kraft Net Price of Processed Cheese and NCE Barrel Price, 1989-1991



Source: "Kraft Retail Price, Kraft Net Price & NCE, Processed Cheese," Kraft General Foods, Inc., KGF 16912

When Kraft increased its prices and gross profit margins, other cheese companies followed, albeit by smaller amounts.²² Not only did retailers pass on to consumers the higher prices, but apparently added to them by widening their own margins.²³ The end result was a large increase in the gross margin (as measured by the average retail price of processed cheese less the NCE barrel price), averaging \$2.14 per pound during 1990-1992 (Figure 2). After 1992, gross margins decreased, averaging \$1.82 during 1993-1995. Had dollar margins been the same during 1990-1992 as during 1993-1995,²⁴ average retail prices of processed cheese during 1990-1992 would have been 32 cents per pound (9.5 percent) less than they actually were in these years.

The price elasticity of demand for processed cheese at retail has been estimated to be -0.44 .²⁵ This implies that, other cheese prices remaining unchanged, a 9.5 percent increase in the price of processed cheese would reduce processed cheese purchases by 4.2 percent.²⁶

²² *Cheese Pricing Report*, Appendix Figure 6.2.

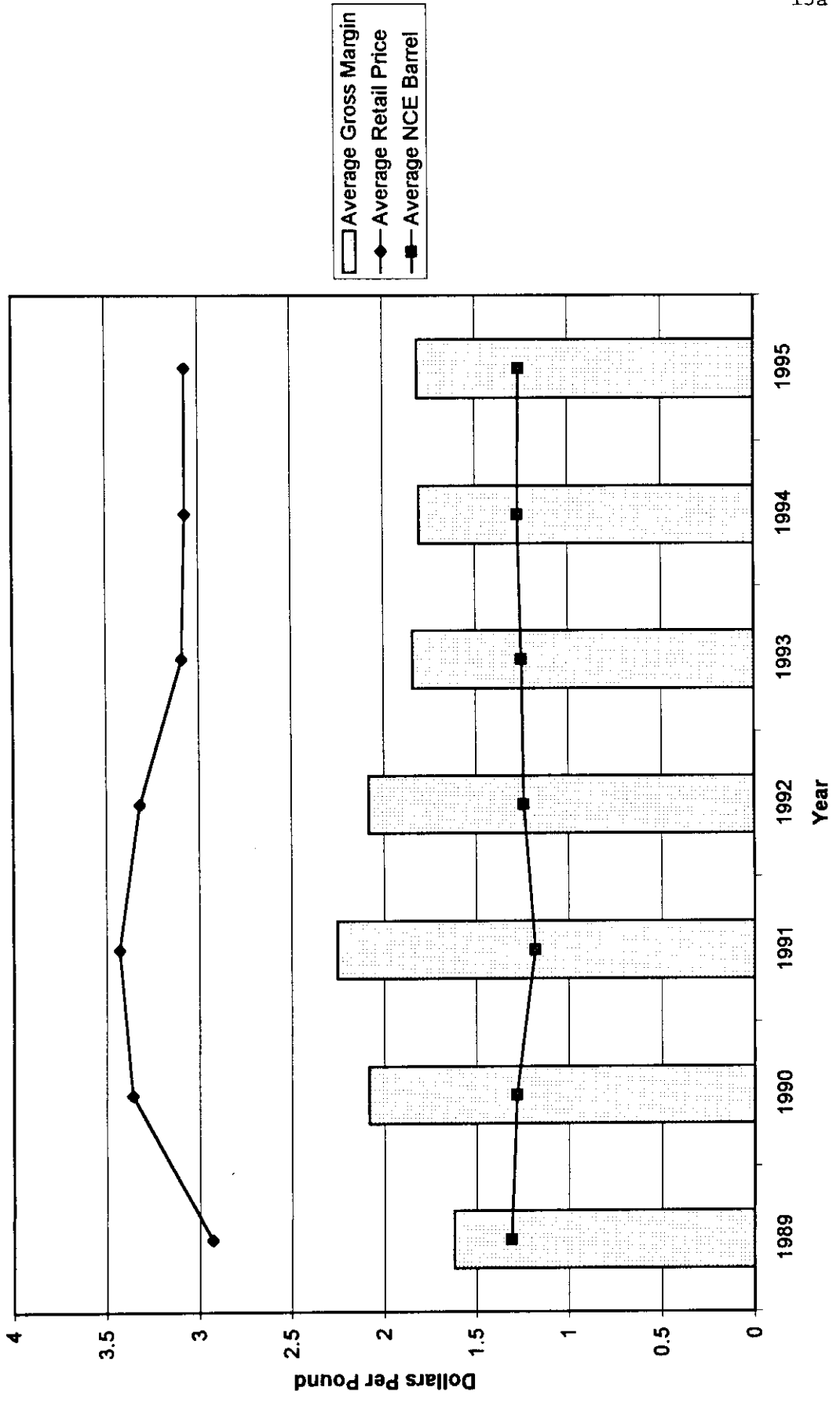
²³ The average retail price for processed cheese had the same percentage markup (25 percent margin) over the Kraft price each year during 1989-1991. The comparable comparison for natural cheese indicates that retailer margins rose between 1989 and 1991.

²⁴ This is a conservative yardstick for comparisons because we have made no adjustments for increases in the CPI after 1992: 3.0 percent in 1993; 2.6 percent in 1994; and 2.8 percent in 1995.

²⁵ For elasticity estimates see: Brian Gould and H. C. Lin, "The Demand for Cheese in the United States: The Role of Household Composition," *Agribusiness* 10: 43-59, 1994; W.T. Boehm and E. M. Babb, "Household Consumption of Storable Manufactured Dairy Products," Department of Agricultural Economics, Purdue University, West Lafayette, IN, Agricultural Experiment Station Bulletin no 85, 1975; D. Heien and Cr. Wessells, "The Demand for Dairy Products: Structure, Prediction, and Decomposition." *AJAE*, 70 (2), 219, 1988.

²⁶ Kraft also increased the gross profit margins for its *natural* cheeses between 1989 and 1991, but by a smaller percentage than for its processed cheese, where Kraft's brand strength was greater. This also resulted in increased gross retail margins during 1990-1992 (Appendix Table 3). Had gross margins been the same during 1990-1992 as during 1993-1995, retail prices during 1990-1992 would have been 21 cents (5.9 percent) per pound lower than they actually were. The price elasticity of demand for *natural* cheese has been estimated to be about -1.0 . This implies that, other cheese prices remaining unchanged, a 5.9 percent increase in price causes a 5.9 percent decrease in retail cheese purchases.

Figure 2. Gross Retail-NCE Margins for Processed Cheese, 1989-1995



Source: Appendix Table 2

Because the elasticity of demand for individual cheeses differs from that for all cheese combined, it is necessary to estimate the impact of greater margins on total cheese purchases at retail. Figure 3 displays average retail prices for all processed and natural cheese combined, the average NCE block and barrel prices, and the resulting gross retail margins for 1988-1995. Had retail gross margins during 1990-1992 been the same as during 1993-1995, retail prices for all cheese during 1990-1992 would have averaged 25 cents (7.2 percent) per pound lower than they actually were. Assuming a price elasticity of demand of -0.33 ,²⁷ a 7.2 percent change in price causes a 2.4 percent change in the amount demanded. This translates into an annual decrease in retail sales during 1990-1992 of about 43 million pounds per year, assuming total processed and natural retail cheese sales of about 1,800 million pounds, including cream cheese.²⁸

Although the above estimate is not precise, it is consonant with short-term purchase patterns for cheese sold at retail. Whereas total retail cheese sales rose by 10.7 percent between 1988 and 1990, these sales remained virtually unchanged between 1990 and 1992.²⁹

D. Impact on Bulk Cheese Prices and Sales

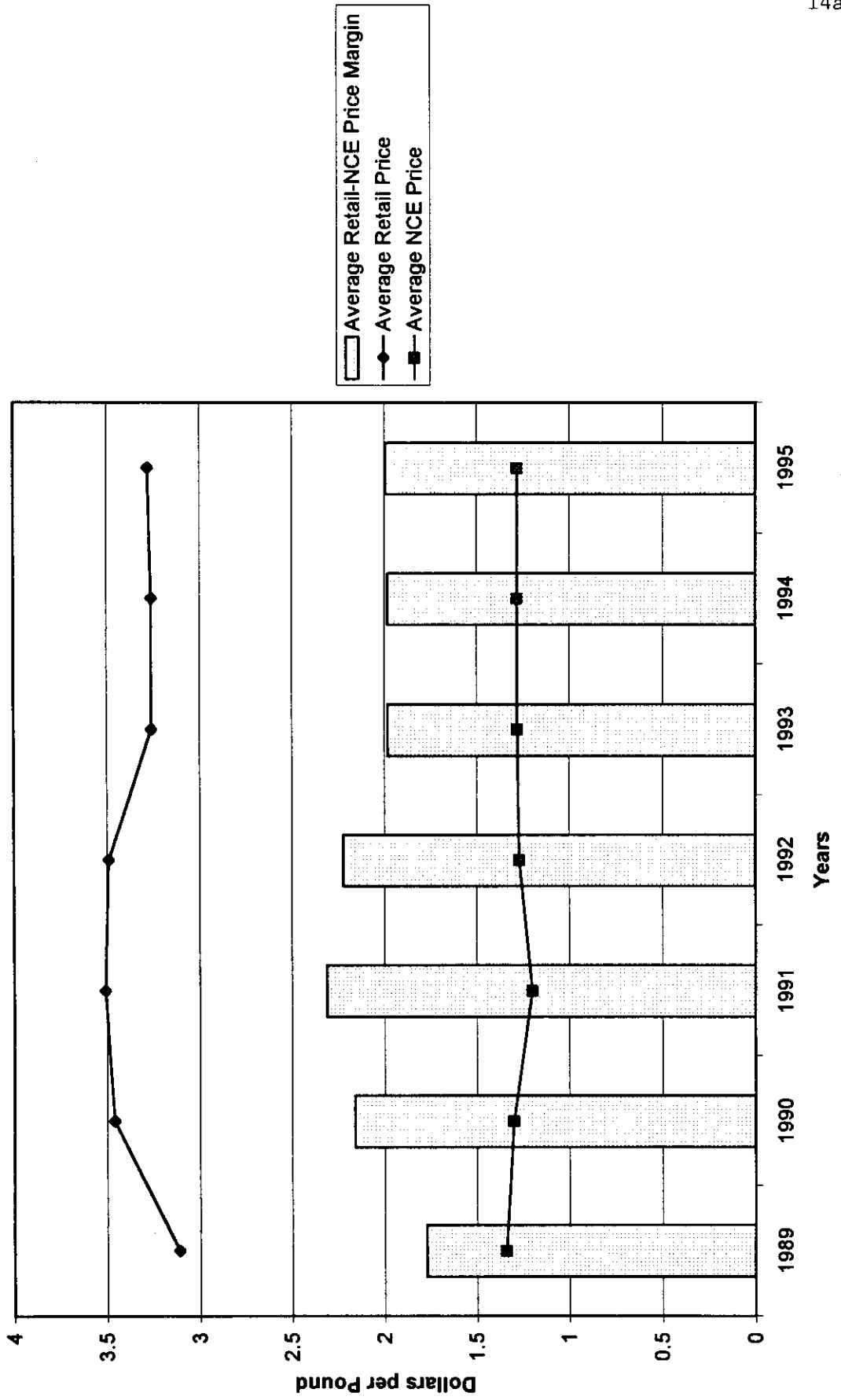
The widened gross profit margins for cheese not only decreased retail sales but the derived demand for bulk cheese. The above estimated decrease in retail sales of about 43

²⁷ Kuo S. Huang, *U.S. Demand for Food: A complete System of Price and Income Effects*. USDA, ERS, Technical Bulletin No. 1714, December 1985.

²⁸ *Cheese Pricing Report*, Appendix Table 6.a. We cannot estimate the effect on total cheese consumption because we do not know what happened to wholesale cheese prices to the food service and industrial cheese customers. However, the derived demand for these uses is very price inelastic, especially in the short term. It therefore seems probable that their usage changed very little in response to the increased availability of cheese.

²⁹ *Id.*

Figure 3. Gross Retail-NCE Margins for All Natural and Processed Cheese, 1989-1995



Source: Appendix Table 4

million pounds annually translated into a decrease in the demand for bulk cheese of about 39 million pounds.³⁰ This decline in the derived demand for bulk cheese contributed to the decline in NCE barrel cheese prices during this period. Barrel prices dropped especially sharply in late 1990. On August 10, 1990, the NCE barrel price was \$1.425; by November 2, it had dropped nearly 40 cents to \$1.0525. At that point prices were below the government price support level for bulk cheese, where they remained until May 1991. During November 1990-September 1991, the government purchased 39.5 million pounds of barrel and block cheese.³¹

In summary, the increase in the gross profit margins of Kraft, other cheese marketers, and food retailers resulted in higher prices to consumers, lower prices to bulk cheese makers and their dairy farmer suppliers, and caused CCC to spend millions of dollars in cheese purchases.

E. Impact of Leading Traders on NCE Prices

The analyses in the *Cheese Pricing Report* indicated that when leading cheese companies had a financial interest in the level of NCE prices, they engaged in strategic trading designed to influence prices to their advantage. Strategic conduct of individual traders was guided by their financial interest in particular outcomes and the likelihood of success in achieving such outcomes. Financial interests in contrary outcomes divided traders into conflicting camps: seller-traders and buyer-traders. The seller-traders were headed by Kraft, which generally benefited from lower Exchange prices, all else being the

³⁰ During 1990-1992, processed cheese accounted for 40 percent of the pounds of cheese sold at retail. Thus, we estimate that 17 of the 43 million pounds in reduced retail cheese sales were for processed cheese. Each pound of processed cheese uses about $\frac{3}{4}$ of a pound of natural cheese.

³¹ *Cheese Pricing Report*, Appendix Table 6.2.

same. Borden and Alpine Lace often shared Kraft's interest in lower Exchange prices. The buyer-trader group consisted of Beatrice and Schreiber, which often benefited modestly from higher NCE prices, and three agricultural cooperative cheese makers, insofar as they reflected the interests of their farmer-members in higher milk prices.

The outcome of the strategic interaction of the conflicting trader groups depends on their relative competitive strengths. An econometric analysis, appearing in the *Cheese Pricing Report*, examined the relative market power of leading seller-traders and buyer-traders during 1988-1993.³² The analysis found a statistically significant negative relationship between the trading activity of seller-traders, led by Kraft, and NCE prices. That is to say, Kraft's trading activity tended to reduce prices below what they would have been based on supply and demand factors alone. This result occurred despite an apparent effort of buyer-traders to countervail Kraft's efforts.

F. Summary

The various facts and analyses in this chapter support the following conclusions.

1. Differences in the business characteristics of cheese companies explain why some cheese companies were primarily buyers and others primarily sellers of cheese on the NCE, other things being the same. Processed cheese marketers with strong retail brands whose selling prices were not coupled to the NCE benefited from lower NCE prices. Cheese marketers that coupled their selling prices to the NCE benefited modestly from higher NCE prices. Cheese

³² A peer-reviewed journal article reported the results of the econometric analysis. Willard F. Mueller, Bruce W. Marion and Maqbool H. Sial, "Price Leadership on the National Cheese Exchange," *Review of Industrial Organization*, 12: 145-170, 1997; see also *Cheese Pricing Report*, Chapter 5, Section F.

manufacturing cooperatives and their farmer member-owners benefited from higher NCE prices.

2. Profit margins of Kraft increased substantially between 1989 and 1991, reflecting large increases in its finished cheese prices and decreases in bulk cheese prices. Kraft's gross profits rose from \$800 million in 1989 to \$1020 million in 1991. The magnitude of the widened profit margins apparently reflected a change in Kraft's profit goals following its acquisition by Philip Morris in December 1988. Other leading cheese marketers enjoyed much smaller gains in their profit margins.
3. Food retailers not only passed on to consumers the higher wholesale prices triggered by Kraft, but widened their own gross margins in the process. The higher retail prices significantly reduced cheese consumption.
4. The decrease in cheese consumption reduced bulk cheese purchases, and contributed to NCE prices falling below the CCC price support level. This required the CCC to purchase about 40 million pounds of bulk cheese at a cost of over \$40 million.
5. The econometric analysis of trader activity on the NCE during 1988-1993, as reported in our earlier analyses, found a statistically significant relationship between the trading conduct of some leading traders and the level of Exchange prices. After controlling for overall supply and demand conditions, the analysis found that when Kraft and two fellow seller-traders, Borden and Alpine Lace, were active on the NCE the level of prices was lower. The analysis found no

statistically significant relationship between NCE prices and the trading activity of leading buyer traders.

Thus, Kraft's behavior during 1988-1993 impacted negatively on cheese and milk prices in two ways. First, Kraft's actions as a seller on the NCE drove NCE prices lower than they would have been, absent Kraft's actions. Second, Kraft's actions to increase their gross margins during 1989-1992 resulted in higher retail cheese prices and a decline in demand for cheese. In order to satisfy the large increase in profit goal imposed by Phillip Morris, Kraft both increased selling prices and reduced their most important cost, the cost of bulk cheese.

6. The evidence presented in this paper along with that in the *Cheese Pricing Report* indicates that although Kraft General Foods began to exercise its market power on the NCE in August 1986, it became particularly aggressive in its strategic actions following its acquisition by Phillip Morris in December 1988.

Appendix Table 1.
Kraft Estimated Total Sales of Processed and Natural Cheese,
Excluding Cream Cheese, 1989-1992

--million pounds—

	Processed Cheese	Natural Cheese	Total Sales
1988	640	259	899
1989	659	255	913
1990	648	244	892
1991	590	234	824
1992	556	232	788

Source: Total sales volumes for 1992 are the actual volumes reported by Kraft in Exhibit D, Kraft counsel Roibin Ryan, Kirkland and Ellis, to Reid Klopp, Counsel, DATCP, February 21, 1994. The volume for 1988-1991 were estimated based on Kraft's actual volume in 1992 indexed to Kraft's 1988-1992 retail volumes of processed (American) and natural cheese, excluding cream cheese, reported by IRI, Appendix Tables 6.4c; *Cheese Pricing Report*.

**Appendix Table 2. Average Retail Price of Processed Cheese,
NCE Barrel Price, and Gross Margin, Per Pound, 1989-1995**

—Dollars per Pound—

Year	Average Retail Price	Average NCE Barrel	Average Gross Margin ¹
1989	\$2.93	\$1.31	\$1.62
1990	3.36	1.28	2.08
1991	3.43	1.18	2.25
1992	3.32	1.24	2.08
1993	3.09	1.25	1.84
1994	3.07	1.27	1.80
1995	3.07	1.26	1.81

Source: *Food Consumption Prices and Expenditures, 1970-1995/SB-939*, ERS/USDA and NCE prices.

Note: Estimated total processed and natural cheese prices assumes that processed (American) cheese sales were equal to one-third of total processed and natural cheese sales and natural cheese sales equal to two-thirds of such sales.

¹Retail price less NCE price.

**Appendix Table 3. Retail Price of Natural Cheese, NCE Price of Blocks,
and Retail-NCE Margin, 1989-1995**

—dollars per pound—

	Average Retail Price	Average NCE Block Price	Average Gross Margin ¹
1989	\$3.20	\$1.35	\$1.85
1990	3.51	1.31	2.20
1991	3.55	1.21	2.34
1992	3.57	1.28	2.29
1993	3.34	1.29	2.05
1994	3.35	1.29	2.06
1995	3.39	1.30	2.09

Source: *Food Consumption Prices and Expenditures, 1970-1995/SB-939*, ERS/USDA and NCE prices.

¹Retail price less NCE price.

Appendix Table 4. Retail Price of Total Processed and Natural Cheese Sales, NCE Cheese Price, and Retail-NCE Margin, 1989-1995

—Dollars per pound—

	Average Retail Price	Average NCE Price ¹	Average Gross Margin ²
1989	\$3.11	\$1.34	\$1.77
1990	3.46	1.30	2.16
1991	3.51	1.20	2.31
1992	3.49	1.27	2.22
1993	3.26	1.28	1.98
1994	3.26	1.28	1.98
1995	3.28	1.29	1.99

Source: *Food Consumption Prices and Expenditures, 1970-1995/SB-939*, ERS/USDA and NCE prices.

Note: Estimated total processed and natural cheese prices assumes that processed (American) cheese sales were equal to one-third of total cheese sales and natural cheese sales equal to two-thirds of total cheese sales.

¹Average NCE price is weighted with barrel price as one-third and block price two-thirds of the total average of NCE price.

²Retail price less NCE price.