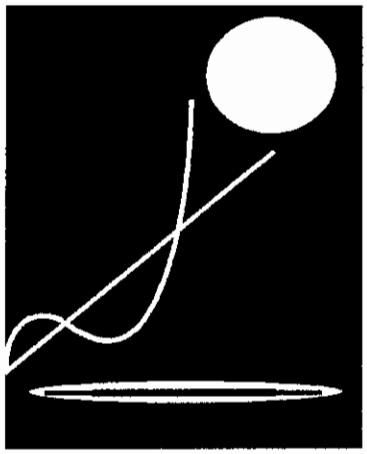

Food Marketing Policy

Issue Paper

No. 6 May 1994

Harvesting and Tacit Collusion in the Breakfast Cereal Industry: A Case Study of Nabisco Shredded Wheat and Post Grape Nuts

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I. Introduction

Shredded wheat was invented in the late 19th century and has been marketed under the Nabisco brand name since 1925. In 1985 the R.J. Reynolds Tobacco Company acquired the Nabisco Company and in 1988 the RJR Nabisco Company underwent a leveraged buyout (LBO) led by Kolberg, Kravis, and Roberts that recapitalized the firm at a record $25 billion (Food Institute Report 1988, p. 2). The firm has continued to struggle under its LBO debt in a fashion that suggests the $25 billion price paid was too high.

In September 1992, RJR Nabisco attempted to sell its ready-to-eat (RTE) breakfast cereal unit to General Mills for $450 million; however, the deal fell through because of active antitrust investigation. Two weeks later Nabisco and Philip Morris/Kraft General Foods (Post Cereals) announced a preliminary agreement whereby Philip Morris would acquire the Nabisco breakfast cereal franchise for the same price, $450 million. That deal was consummated in January 1993; however, it was immediately challenged by the state of New York on antitrust grounds. This paper is based to a large extent upon the public record of that ongoing antitrust case and detailed supermarket scanner data on the ready-to-eat cereal industry that the University of Connecticut Food Marketing Policy Center has purchased from Information Resources, Inc.

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The senior author is currently expert economist for the State of New York in its challenge of the acquisition of the Nabisco ready-to-eat breakfast cereal business in the U.S. and Canada by Philip Morris (Kraft-General Foods subsidiary). This paper was circulated to attorneys representing the State of New York and attorneys from Arnold and Porter, counsel for the defendants. Their review does not constitute endorsement, verification or responsibility for any of the opinions stated herein. The opinions expressed in this paper are the authors' and are based solely on the facts and publications cited herein. This research was supported by Special Research Grant No. 91-34178-6330, Cooperative State Research Service, USDA.

Economists have documented that highly leveraged firms, such as RJR Nabisco, tend to behave differently than less leveraged competitors because of a need for cash to pay down LBO debt (Chevalier 1993, Cotterill 1993b). Highly leveraged firms have even more incentive than other firms to exercise market power to increase short term business profitability. Once this "harvest" is over they often sell the remaining assets in a strategic fashion to generate additional cash. KKR's management and attempted sale of Nabisco Shredded Wheat are an excellent example of this strategy. Post management, in a letter to the Philip Morris Board of Directors requesting approval for the Nabisco acquisition, recognize this and state:

> "Since KKR purchased RJR Nabisco in 1988, the franchise appears to have been managed for short term profit." (Cotterill 1993a, Para 30).

In this paper we identify the primary components of Nabisco's "harvest and sell" strategy. We examine market share, retail price, merchandising, advertising and profit data.[1] Our main thesis and conclusion after analyzing available data is that a significant component of the Nabisco strategy was tacit coordination with Post Grape Nuts to elevate profits and lessen market share losses. In other words, Post and Nabisco tacitly coordinated their cereal price and merchandising actions in a fashion that allowed Post as well as Nabisco to significantly increase profits. Consequently, consumers paid more for these breakfast cereals than they would have paid in a more competitive market. As Levy and Reitzes (1993) have stressed, such coordination need not be explicit collusion or price fixing. Tacit collusion based upon close

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[1] Over time we have purchased annual "Supermarket Review" reports from the Information Resources, Inc. (I.R.I.) company to conduct research on food marketing issues. This I.R.I. Infoscan data base covers 74 product categories for 1988-1992 and reports information at the brand level on a quarterly basis for individual urban areas (e.g., San Francisco) and the nation. The data base covers most major branded and private label manufactured food products sold through supermarkets, and thus includes cold breakfast cereals. Quarterly brand level advertising data are from Leading National Advertisers, Inc.

tracking of each brand's marketing strategies and each firm's individual interest in maximizing profits is sufficient basis for the observed anticompetitive conduct.

The reader should not infer the existence of any unlawful conduct from this paper's description of tacit coordination (also referred to as tacit collusion) by companies in the ready-to-eat cereal industry. Tacit collusion or coordination, by itself, has not been found to violate the antitrust laws (Scherer and Ross 1990, p. 346-47). However, as stated in the prior paragraph, tacit collusion or coordination can have the effect of raising prices to non-competitive levels to the detriment of consumers, and thus has been criticized by economists (Scherer and Ross 1990, p. 347). Such tacit collusion or coordination may also be a relevant factor to consider in evaluating an acquisition under the antitrust laws (U.S. Dept. Justice, Horizontal Merger Guidelines, 1992, S 2.1). This paper does not address the legality, under the antitrust laws, of Kraft's acquisition of the Nabisco RTE cereal business, which is currently being challenged in federal court by the State of New York.

The following section explains the harvest strategy and compares it to the traditional limit price strategy. The third section develops the economic concept of tacit collusion in a differentiated product industry and identifies conduct patterns that would be observed if such noncompetitive conduct is in place. The fourth, fifth, sixth, and seventh sections present evidence for our hypotheses. The final section contains conclusions. Appendix tables and references are attached to provide further basis for the presentation and analysis in the text.

II. To Harvest or Not to Harvest

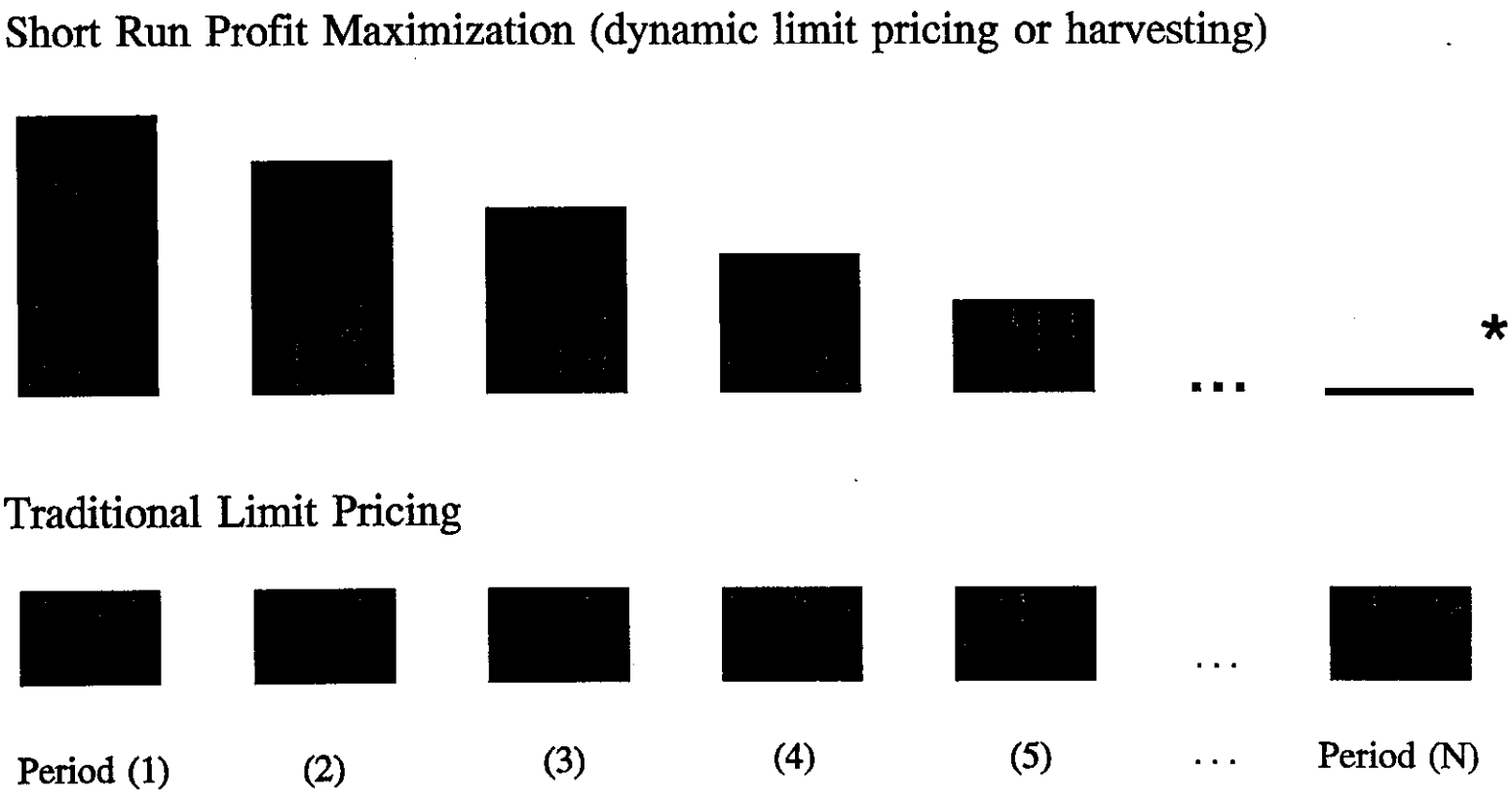
The technical economic name for the harvest strategy is dynamic limit pricing (Scherer and Ross 1990, p. 357-361). Prior to an LBO a firm may have been exercising market power by

following a traditional limit price strategy. Under that strategy price is above average cost but not so high as to attract significant entry or expansion by other firms, thereby insuring a stable market share and stream of excess profits over time (traditional limit pricing example in Figure 1). An LBO significantly increases the firm's discount rate. Cash is needed now to avoid bankruptcy or lesser but binding short term financial constraints. In an LBO situation a dollar earned from operations today is much more valuable than a dollar from operations in the distant future. Thus, the leveraged buyout event in many instances forces a firm that is exercising some market power under the traditional limit pricing strategy to shift to a dynamic limit pricing strategy to monetize all of its market power in the short run. It raises price and cuts marketing outlays beyond levels required to maintain its market share and manages its share decline in a fashion that maximizes short run profits. This short run profit maximization (dynamic limit pricing or harvest) strategy is also illustrated in Figure 1. When executives are seeking to maximize the net present value of the firm and they face a very high discount rate, the harvest strategy dominates the traditional limit pricing strategy. As we will show and Philip Morris/Kraft General Foods management suggests (quote on page 2) Nabisco clearly did switch to a harvest strategy for its RTE cereal business in late 1989.

III. On Collusion in Differentiated Product Industries

To facilitate our analysis it will be useful to explain how economists analyze tacit collusion or coordination in differentiated product industries. Generally economists regard product heterogeneity as a barrier to collusion (U.S. Dept. Justice, Horizontal Merger Guidelines, 1992, Sec. 2.11). One must, however, not confuse product heterogeneity with product differentiation. Hydroelectric turbines are heterogeneous products because each is designed with a set of

Figure 1 Comparisons of Excess Profit Stream Over Time for the Exercise of Market Power via the Traditional Limit Pricing and the Short Run Profit Maximizing (Dynamic Limit Pricing or Harvesting) Strategies



* No excess profits in period N.

Source: Adapted from Scherer and Ross, 1990, (p. 360).

complex technical specifications that must possess specific values for a particular site. Costing such a complex and unique product is very difficult. Consequently, it is very difficult to tacitly coordinate pricing of such "malleable" products, and any exercise of market power usually requires explicit collusion, e.g., the electrical equipment conspiracy case (U.S. vs. General Electric Co. et al.; Scherer and Ross 1990, p. 243, 258-259).

A differentiated product differs from a heterogeneous product because it is not malleable. It is a well defined, stable set of product attributes that are promoted to consumers under a brand name. Nabisco Shredded Wheat, for example, has very little in common with a hydroelectric turbine. This point is not trivial—Professor Daniel Rubinfeld, expert economist for Philip Morris/Kraft General Foods, cites Scherer and Ross as evidence that collusion is unlikely in the RTE cereal industry. He states:

> Economists' studies of industrial organization tell us that collusive behavior is most likely to occur in concentrated industries with homogeneous products.[29]

[29] See, for example, F.M. Scherer, Industrial Market Structure and Economic Performance, Second Edition, 1990, pp. 200-205. Scherer notes that "The type of heterogeneity most likely to disrupt pricing discipline appears to be multi-dimensionality of a product's technical features." (p. 203) {Rubinfeld 1993, p. 13}

Yet even if one recognizes that product differentiation avoids the "malleable product" problem associated with heterogeneous goods, in an industry such as RTE cereal there are several dozen branded products as well as private label products. If all such products compete with each other, as Professor Rubinfeld predictably opines,[2] then the sheer size of the coordination problem would seem insurmountable.

[2] When pricing, Post focuses on particular brands that are in each individual product's "competitive set." This set generally includes products that are in different marketing segments. Moreover, products in one competitive set compete for sales with products in other competitive sets (Rubinfeld 1994, p. 3).

There are two general responses to this assertion. First, if the industry is highly concentrated, then the relatively few large sellers have portfolios of brands and, to a large extent, internalize the interbrand coordination problem. Concerning intercompany coordination, facilitating devices such as leader-follower routines in key competitive dimensions can support substantial coordination. (We will have more to say on this below.)

Second, this assertion depends critically upon the nature of product differentiation. If Chamberlinian or symmetric differentiation exists then all brands compete with all other brands. The increase in demand for a product due to a reduction in price or shifts in other strategic variables comes from all other brands in the market in proportion to their market shares. For example, if Brand X with a 10 percent market share lowers price, and Brand Y accounts for one half of the remaining 90 percent of the market then one half of Brand X's increased demand comes from Brand Y. Hotelling or spatial product differentiation, on the other hand, is clearly more plausible for the RTE cereal industry. In the Hotelling model, each brand can be visualized as being located at a point in a multidimensional product space, and as competing only with its close neighbors (substitutes) because they have similar attributes.

Readily observable industry marketing conduct—segmentation and targeting of strategic moves (pricing, advertising, couponing) to the moves of well identified "nearby" products—supports the Hotelling spatial model, not the Chamberlinian symmetric model. Levy and Reitzes (1993) demonstrate that spatial differentiation, unlike product heterogeneity, facilitates tacit collusion because it is easier to identify and discipline cheaters. Marketers of each brand clearly

know who their nearby (major) competitors are and can more easily track strategic moves.[3]

Those that argue that collusion is unlikely offer yet another argument. Even if one recognizes that Hotelling product differentiation exists, competition can take many forms and so there may be several dimensions that one must tacitly coordinate in order to exercise market power. There are two parts to this argument. Although there are only a few close competitors, the problem of coordination across many dimensions of competition may be too complex. Second, high prices may reflect tacit collusion on price, but competition may "bust out" in other dimensions. Professor Rubinfeld, writing on behalf of Philip Morris/Kraft General Foods, states:

> Based on my study of the RTE cereal market, it is clear that this is not a market in which collusion would be likely to be successful. In addition to price, colluding firms would have to agree on: (a) product improvements, (b) product introductions, (c) trade allowances, (d) advertising, and (e) couponing. In light of the many dimensions of competition in the RTE cereal market, any cartel would be ineffective if it merely controlled published wholesale prices. In fact, any coordinated effort to elevate wholesale prices would be likely to stimulate competition on *all* other dimensions: differences in product attributes, product improvement, product introduction, trade allowances, advertising and couponing. (Rubinfeld 1993, p. 13).

We label Professor Rubinfeld's second contention the "pervasive competition" doctrine. Even if businessmen do collude in one or more dimensions they do so only to compete more effectively in yet another dimension.

We will place in a footnote our analysis of whether tacit collusion on price and possibly

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[3] This tracking capability has significantly increased during the past ten years. New computerized business communications (the food industry's standardized Uniform Communication System), electronic checkout scanner data services and many other third party market monitoring services enable marketing managers to track competitor as well as their own strategic moves on a weekly and in some cases almost daily basis (Cotterill 1985, 1988). These advances, in the main, have produced a vastly more efficient food marketing system. Their advent, however, makes it even more important to maintain a competitive market structure with incentives to compete.

other major variables that harms consumers is mitigated by "competition" in other dimensions.[4] Here we choose to focus upon the fact that if such pervasive competition does exist then one would not see an increase in profits when tacit coordination on price becomes effective. The case at hand is two "spatially close" brands of RTE cereal: Post Grape Nuts and Nabisco Shredded Wheat.

IV. Market Share Analysis

In this section we analyze the impact of Nabisco's harvest strategy on market shares. The profitability of a harvest strategy depends critically upon a brand's elasticity of demand. When the brand's price is elevated, if demand is not sufficiently inelastic, the loss in market share (sales) will result in lower total profits and defeat the harvest strategy.

As the prior section explained a brand can have a low price elasticity in a spatially differentiated market. Brand marketers actually seek to establish and enhance a brand's unique position and market segmentation because they insulate their product from price competition.

Tacit collusion is a second major contributor to brand price inelasticity. If a close

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[4] This reasoning implies that consumers are indifferent or prefer the latter of the following two alternatives: an opportunity to purchase $2.50/lb breakfast cereal with minimal marketing and promotion and the opportunity to purchase the same cereal at a collusive price of $5.00/lb but with a reduced price offer for Nintendo on the back panel, frequent T.V. advertisements targeted at one's children, and cents off coupons available from time to time to soften the price shock. Writing about the airlines industry prior to deregulation, which was a price cartel that competed in nonprice dimensions such as the quality of meals and service, Scherer and Ross state: "One of the surest ways to call forth the wrong amount of variety is to set, either through governmental regulation or a rigid cartel mechanism, a uniformly high monopoly price and then let individual producers compete for business on non-price bases." (Scherer and Ross 1990, p. 601).

Scherer (1979) and Schmalensee (1978) illustrate this point for the RTE cereal industry. The Federal Horizontal Merger Guidelines also reject the pervasive competition argument stating:

> Terms of coordination need not perfectly achieve the monopoly outcome in order to be harmful to consumers. Instead, the terms of coordination may be imperfect and incomplete—inasmuch as they omit some market participants, omit some dimensions of competition, omit some customers, yield elevated prices short of monopoly levels, or lapse into episodic price wars—and still result in significant competitive harm. (U.S. Dept. of Justice 1992, Sec. 2.11).

substitute brand follows a harvester's price elevation, then consumers no longer have the opportunity to switch to that lower priced substitute brand. Thus, when tacit collusion between close substitutes is effective we would expect less loss of market share due to a harvest strategy.[5]

We will begin our analysis by examining annual market share trends over the 1988-1992 period at the company level.[6] Table 1 reports the volume market shares for the six major RTE cereal manufacturers for 1988-1992. Quarterly market shares are reported in Appendix Table A1.[7] Nabisco started the five year period with a 5.42 percent share of market. By 1992 that market share had declined to 2.94 percent. During the five year period the industry was buffeted by several marketing events including the rise of private label, and the oat bran craze

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[5] Following Baker and Breshnahan (1985) one can rigorously state the determinants of a brand's price elasticity as follows:

$$\eta_1 = \eta_{11} + \eta_{12}\eta_{21} + \ldots + \eta_{1N}\eta_{N1} = \eta_{11} + \sum_{i=2}^{N} \eta_{1i}\varepsilon_{i1}$$

Where: η_1 = brand 1's price elasticity; η_{11} = the brand's nonfollowship elasticity, i.e., the "change" in its output when it changes price and no one follows. η_{1i} is brand 1's cross price elasticity of demand with respect to price i, i.e., the "change" in its output when price i changes; and ε_{i1} is the change in price i when price 1 changes. These cross price and price respnse elasticities are summed over the other brands and since under tacit collusion (price followship) this sum is positive, it reduces brand 1's price elasticity. All "changes" mentioned above are actually percent changes. If the number of close substitute products is small and these products are insulated from other products then effective N is small, and the effective cross price elasticities η_{1i} are larger, and the effective price followship elasticities, ε_{i1}, are larger. These shifts all tend to reduce the brand's price elasticity of demand.

[6] In the next two sections we will analyze pricing issues and explain how observed pricing and brand level market share conduct patterns for Nabisco Shredded Wheat and Post Grape Nuts are consistent with a profitable tacitly collusive harvest strategy.

[7] All market shares in this paper are for the national ready to eat (RTE) cereal category which is all cold cereal except wheat germ. Appendix Table A11 reports annual and quarterly RTE cereal national consumption as a percent of cold cereal national consumption. In all cases it is above 99.6 percent. Thus, the deletion of wheat germ produces a more fungible product market but does not significantly alter the market shares.

that peaked in 1989 and benefitted General Mills with its line of Cheerios products. As this paper documents, the persistence of the Nabisco decline, however, was primarily self inflicted.

Table 1 Ready-to-Eat Cereal Volume Share for 6 Major Manufacturers, 1988-1992

	1988	1989	1990	1991	1992
Kellogg	40.965	39.670	37.351	37.393	37.029
General Mills	21.306	23.685	24.462	25.114	25.576
Post	11.883	10.560	11.188	11.420	11.792
Quaker Oats	8.528	8.068	7.547	7.188	7.133
Ralston Purina	5.462	5.946	6.002	4.938	4.629
Nabisco	5.423	4.702	4.362	3.208	2.941
Private Label	3.670	4.494	6.106	7.747	7.990

Source: I.R.I. Infoscan Data Base. University of Connecticut, Food Marketing Policy Center.

The Nabisco shredded wheat business can be divided into Nabisco Big Biscuit Shredded Wheat, Nabisco Spoon Size Shredded Wheat, and Nabisco Shredded Wheat and Bran.[8] The brand market shares reported in Appendix Tables A5 and A6 document changes in the ranks and market shares of these brands. Nabisco Spoon Size Shredded Wheat was the 15th largest brand with a 1.61 percent share of market (SOM) in 1988. By 1992 it had dropped to 22nd with 1.11 percent SOM. Big Biscuit ranked 28th with 0.97 percent SOM in 1988 but dropped to 36th with 0.71 percent SOM in 1992. Shredded Wheat and Bran ranked 39th in 1988 with 0.79 percent SOM and dropped to 61st with 0.42 percent SOM in 1992.

Although the Shredded Wheat line lost significant market position and share, Appendix Table A8 indicates that the company's top three brands continue to be sold throughout the U.S.

[8] For a short period Nabisco apparently produced a "Shredded Wheat and Oat Bran" product, however its sales were limited and negligible.

Other smaller Nabisco brands were more aggressively harvested during the 1990-1992 period. Nabisco Fruit Wheats, for example, was introduced by Nabisco in 1987. Initially it was quite successful, ranking 33rd with 0.900 percent SOM in 1988. By 1992 its share had declined to less than 0.125 percent and it dropped out of the top 100 brands. Nabisco Frosted Wheat Squares was introduced as a new product in 1988 and ranked 61st with 0.475 SOM but dropped to 77th with 0.260 SOM in 1992. Two other RTE cereal brands, Nabisco 100 percent Bran and Nabisco Team Flakes, also lost market share during the 1988-1992 period. Nabisco Teddy Graham Breakfast Bears, introduced as a kid cereal, was initially successful but was discontinued as part of Nabisco's harvest strategy (See Appendix Tables A8 and A10).

Appendix Table A8 documents that losses in market share for Fruit Wheats and Team Flakes correspond with major reductions in their distribution, i.e., many retailers stopped carrying these products. For example, stores accounting for 95.7 percent of all commodity volume (supermarket products) sold to consumers carried Fruit Wheats in early 1988, but that distribution measure dropped to 38.8 percent by the end of 1992.

V. Retail Price Analysis

As a starting point for our retail price analysis let us examine the trend over time for RTE cereal prices and the food at home component of the Consumer Price Index. Figure 2 reports these price trends for the period 1983-1992.[9] The food at home component of the Consumer Price Index increased 38 percent over that 10 year period. RTE cereals increased 75 percent

[9] Retail RTE cereal prices cover the retailers markup, as well as the RTE cereal manufacturers price to the retailer. Since retail markups tend to be stable and uniform for brands in a category such as RTE cereals, the observed trends in retail RTE cereal prices are overwhelmingly due to changes in cereal manufacturer price and trade promotion strategy. Tables in Appendix A contain the data for all charts presented in this section.

during the same period. Herein lies the most fundamental reason for the recent consumer outcry over RTE cereal prices.[10]

These price series, however, may overstate the rise of cereal prices relative to the food-at-home CPI for shoppers that use manufacturers' coupons. Neither series incorporates price reductions due to redeemed manufacturer coupons. Coupon usage and values are higher for RTE cereal than for other food products (Food Institute 1993, p. 308; Food Institute 1994, p. 309). However, adjusting for manufacturer's coupons would lower the RTE price index more than the food-at-home CPI, only if the value of manufacturer coupon related price reductions for RTE cereal increased more rapidly than similar price reductions for foods in the CPI food at home price series.[11] Regardless, price trends reported in Figure 2 hold for consumers that do not use manufacturer's coupons and, in fact, 65 percent of RTE cereal volume in 1992 was purchased without a manufacturer coupon (Food Institute 1994, p. 309).

Figure 3 displays the price index trend for the total U.S. over the 1988-1992 period for

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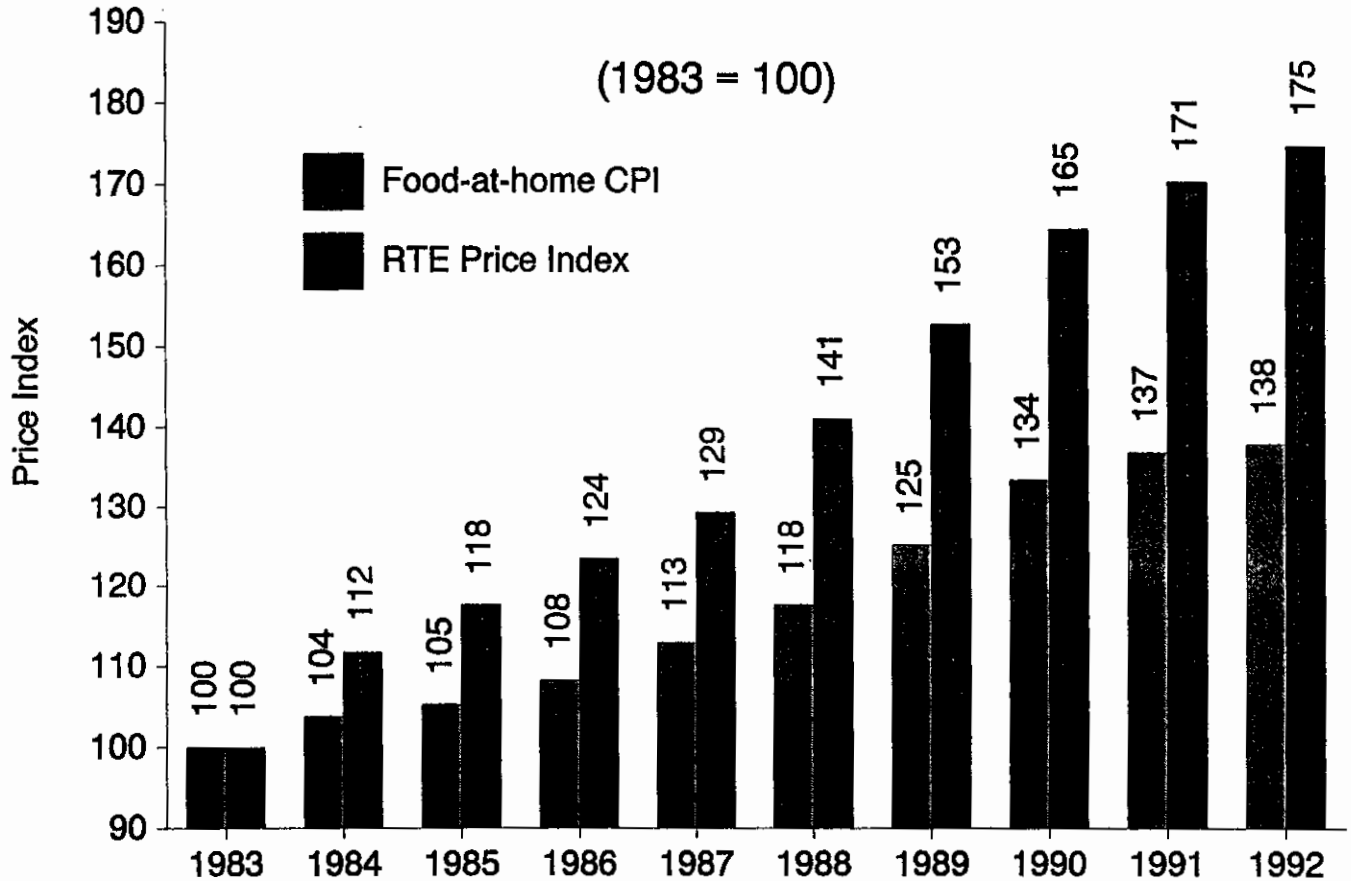
[10] Since August 1993 articles on high cereal prices have appeared in several newspapers, including the *New York Times*, *Detroit Free Press*, *Miami Herald*, *Cleveland Plain Dealer*, *St. Louis Post Dispatch*, and the *Salt Lake Tribune*. Television news coverage includes Cable Network News and CNBC News. A packet of the press clippings is available from the Food Marketing Policy Center. At one point the Public Relations Office for Kellogg's was preparing a report for the Kellogg's Board of Directors on the adverse publicity. They called us and asked for our source of information on RTE cereal prices. They were somewhat surprised to find out that the source for the pre 1988 cereal prices in Figure 2 was a Kellogg Company chart submitted to antitrust authorities and subsequently made public by the New York Attorney General when he announced his challenge of the merger. (See also footnote 12, p. 21)

[11] Another technical point is that these two price series do not treat retailer coupons in exactly the same fashion. The Consumer Price Index subtracts price mark downs that are actually on the box but subtracts retailer's coupons only if they are actually attached to the product (Bureau of Labor Statistics 1988, p. 172). The RTE Cereal Price Index, at least since 1988, is adjusted for all in-store promotions and redeemed coupons that are distributed locally by the retailer (retail coupons). Thus, it includes price mark downs that are not marked on the box and redeemed retailer coupons that are not attached to the box. We emphasize, all reported RTE cereal prices in this paper are net of local merchandising (trade promotions that often mark down prices and/or offer retailer coupons). Thus, they are, if anything, lower than retail shelf prices.

Figure 2

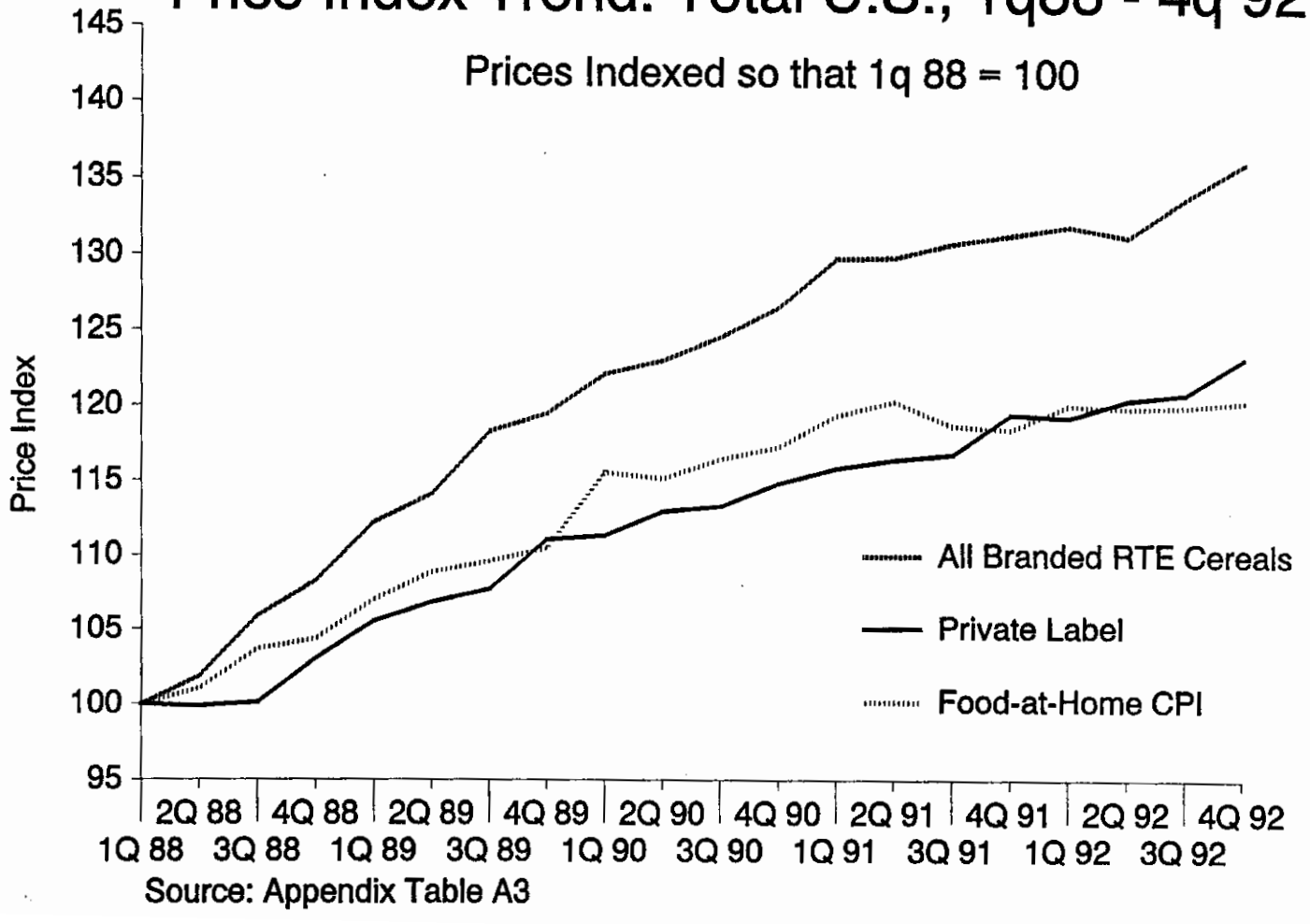
RTE Cereal Price Index vs Food-at-home CPI



Source: Appendix Table A2; Cotterill, 1993a, Exhibit C.

Figure 3

Price Index Trend: Total U.S., 1q88 - 4q 92



Source: Appendix Table A3