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An Econometric Analysis of the Demand for RTE Cereal: Product Market Definition and Unilateral Market Power Effects

by
Ronald W. Cotterill and
Lawrence E. Haller

Food Marketing Policy Center
Research Report No. 35
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University of Connecticut
Department of Agricultural and Resource Economics

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*Note: the views expressed herein are those of the authors and do not necessarily represent the opinions of the U.S. Department of Agriculture.

Preface

This research report is the econometric analysis of product market definition and unilateral market power that the senior author presented as expert economic witness for the state of New York in State of New York v. Kraft General Foods et al. at trial in September 1994. It is the first, and to date as of September 1997, only full-scale attempt to present in a federal district court analysis of a merger's impact using scanner generated brand level data and econometric techniques to estimate brand and category level elasticities of demand. The court rejected this analysis [State of New York v. Kraft General Foods, 926 F. supp. 358 (S.D. N.Y. 1995)]. We think that it should not have done so, and would like to make this work more readily available than the court record so that economists who are working on the analysis of market definition and market power can review it. Also, this study is the only public study to date that has had access to weekly brand level coupon distribution data by city, and Nielsen group rating points (GRP), which are weekly measures of ad exposure for a brand in local city market areas. Thus it provides own and cross brand coupon and advertising elasticities. The empirical results are generally as hypothesized; own advertising and couponing increase sales, competitor activities reduce sales.

The genesis of this work during litigation is an interesting story for those who would attempt to do similar work on a merger case. The acquisition of Nabisco Shredded Wheat by Philip Morris via its Kraft General Foods subsidiary occurred in the fall of 1992. Robert Abrams, the New York Attorney General, announced his challenge of the merger in January 1993. For over a year litigation moved through a series of hearings and rulings. In the spring of 1994 and earlier, the state of New York asked via discovery for any scanner data on Ready-to-Eat (RTE) cereal that the defendants possessed. Defendants provided no data. In July 1994, in preparation for the trial that occurred in September/October 1994, the senior author of this report prepared "Expert Report of Ronald W. Cotterill" [93 Civ. 0811 (KMW)]. Exhibit 6 of that report was an analysis of unilateral market power using brand level elasticities of demand from the business records of the defendants. It documented the exercise of unilateral market power between Post and Nabisco brands. The first section of that exhibit is reproduced as the foreword to this report because it nicely explains unilateral power analysis.[1] Defendants responded to this statistical analysis by introducing on the eve of trial (August 29, 1994) in "Expert Report of Daniel L. Rubinfeld" [their economist] a comprehensive scanner data set for the leading brands of breakfast cereal and an analysis to refute our work.

Using the scanner data that finally became available, we had 18 days to produce the analysis presented in this research report. It was presented to the court as Exhibit C in Affidavit of Professor Ronald W. Cotterill, September 16, 1994 (State of New York v. Kraft General Foods et al. 93 Civ. 0811 [KMW]). One of defendant's responses to this econometric study was to introduce data for four additional brands during trial and claim that their incorporation

[1] The full text of that analysis is available in the public record of the case [No. 93 Civ. 0811 KMW]. For pioneering work on brand level analysis see also Baker and Bresnahan (1985), Cotterill (1994), and Cotterill, Franklin and Ma (1996).

destroyed a key market definition result of this analysis. In fact, when those brands were included the general conclusions of this study did not change [trial transcript @ Vol. 7, p. 1249]. Defendants also presented other criticisms of this study at trial and we rebutted them.

Here we are not presenting arguments made at trial surrounding this report, nor are we presenting any discussion from Judge Wood's opinion wherein she rejects this analysis. A full understanding of this econometric foray into court requires reading of the defendant's economist expert report, especially the statistical analysis, the trial transcript, and the court's opinion. The defendant's economist's report is briefly critiqued at the end of this report (pages 17-19). It is a classic example of "garbage in garbage out" analysis. A future report by the senior author of this report will present a complete review.

Ronald W. Cotterill

Foreword

Pricing, Market Share and Unilateral Market Power in the RTE Cereal Industry[*]

This paper addresses two basic objectives. First, there is a need to understand more clearly how the large leading firms in the highly concentrated RTE cereal industry exercise market power, i.e. elevate prices to consumers to levels well above marginal costs of production to support very high marketing expenses and operating profit rates. Second, there is a need to understand how the prices of RTE cereal products, especially of Nabisco Shredded Wheat and Post Grape Nuts, will be affected if Post's unilateral market power is reduced by the divestiture of Nabisco Shredded Wheat.

Progress in our understanding of how firms price in differentiated product industries, stemming from a seminal theoretical advance by Deneckere and Davidson (1985) and amplifications thereof by Willig (1991) and Werden and Rozanski (1994), provides a basis for this analysis. As these prior works illustrate, the impact of a merger between two previously independent brands is an excellent heuristic device to introduce the complexities of pricing in a differentiated industry.

In this short paper, I will develop and apply Deneckere and Davidson's basic contribution to the analysis of unilateral market power, apply an expanded version of Willig's model to the RTE cereal industry, and argue that firm, not brand level market shares in the industry have probative value (i.e. provide guidance) for the analysis of unilateral as well as coordinated market power.

My basic conclusion and supporting reasoning is as follows. Leading large market share firms in the industry are able to exercise substantial market power because they control portfolios of highly differentiated branded cereal products. When a RTE cereal firm adds one or more brands to its portfolio via merger, it internalizes any prior competitive interaction that such brands had with its pre-merger portfolio of brands. Consequently, to the extent that the acquired brands are substitutes for its own brands, it can profitably increase the prices of all brands in the portfolio. The amount by which prices can be elevated is directly proportional to the degree of interaction between the acquired brands and brands in the pre-merger portfolio. In the Federal Merger Guidelines, this price increase of all brands in its post-merger portfolio is termed a unilateral market power effect because it does not require the concurrence or cooperation of other firms in the industry. This unilateral pricing action also has a ripple effect that increases the prices of other firms' cereal brands, which in turn can feed back to further enhance prices in the firm's post-merger portfolio.

Tacit coordination is a distinct and separate economic phenomenon that contributes to increased prices. The fact that most brands of RTE cereal are grouped in the portfolios of relatively few large firms means the tacit coordination problem between portfolios is reduced. A merger such as the Philip Morris acquisition of Nabisco Shredded Wheat, that reduces the number of large firms in the RTE cereal industry from 6 to 5, enhances the ability of the

[*] This foreword is from a paper with the same title that was Exhibit 6 in the senior author's Expert Report, dated July 1994, in State of New York v. Kraft General Foods et al. 93 Civ. 0811 (KMW).

remaining five large firms to tacitly collude, i.e. exercise what the Federal Merger Guidelines describes as "coordinated market power" to elevate prices to consumers.[1]

Unilateral Market Power

Werden and Rozanski (1994) provide an excellent recent explanation of the unilateral pricing problem in a differentiated product industry:

> Competition in many differentiated products industries can be accurately described by a model with two essential attributes—the strategic variable for competition in the short term is price, and firms act non-cooperatively. The condition of equilibrium in such models is that firms are satisfied with their price choices in that no firm could increase its profits by altering price given the prices set by rivals. In such models, all firms have some degree of market power, and all firms charge prices in excess of short-run marginal cost.
>
> Such models predict that a firm would increase price if it merged with a "direct competitor," i.e., a rival firm selling a product to which some of the first firm's customers would switch in response to an increase in the first firm's price. After the merger, some of the profits one merging firm would lose as it increased price would be recaptured through increased sales by the other merging firm. This recapture effect provides profit incentive to raise price above the pre-merger level.[2] If each merging firm were a direct competitor of the other, the merge would result in price increases for products of both merging firms. The amount of the price increases would be determined in large part by the relative importance of each merging firm as a direct competitor with the other, i.e., by the familiar cross elasticities of demand. Other determinants include the elasticities of demand and price-cost margins for the competing products of the merging firms.
>
> A price increase for one of the merging firm's products would induce price increases for directly competing products of non-merging firms. Price increases for those products would induce price increases for products directly competing with them, and so on, spreading the price effects of the merger through a broad range of products. The merging firm would be likely to increase prices substantially more than other firms, but price increases by non-merging firms generally would contribute significantly to the total effect of the merger on consumers. (Werden and Rozanski, 1994, p.41).

Werden and Rozanski argue that brand level market shares are not reliable measures of the ability to exercise unilateral market power. This certainly is

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[1] For an analysis of coordinated market power see Food Marketing Policy Issue Paper No. 6, *Harvesting and Tacit Collusion in the Breakfast Cereal Industry: A Case Study of Nabisco Shredded Wheat and Post Grape Nuts*, Ronald W. Cotterill, Andrew W. Franklin, and Lawrence E. Haller, May 1994.

[2] It should be noted that the recapture effect and profit incentive referred to by Messrs. Werden and Rozanski are unilateral market power effects which do not require tacit collusion or any form of coordination between firms in the industry.

true in the RTE cereal industry. To date, however, in the debate over the importance of market shares as a predictor of market power, economists have failed to understand that the differentiated product model provides a powerful, virtually unassailable prediction. The level of prices in an industry such as the RTE cereal industry is related to industry concentration measures that are based upon firm level market shares. As a firm assembles more brands in its portfolio, it internalizes competitive interactions and thus is able to exercise unilateral market power that not only raises prices of its own products, but also the prices of the brands of other firms in the industry. An industry such as the RTE cereal industry with its 200 plus brands, concentrated in the portfolios of the top firms, has higher prices than it would have if its 200 brands were held in smaller, more numerous portfolios.

Assessing the Impact of Divestiture of the Nabisco Shredded Wheat Brands by Kraft

Willig (1991, p.300) provides a formula for computing the price elevation effect of a merger. The facts in this case suggest an alternative computation. Post actually acquired and assumed active management of Nabisco Shredded Wheat in early January 1993. Thus, our most recent data comes from a period of joint profit maximization. Moreover, evidence from the business record[3] establishes that prior to the acquisition, Nabisco pursued a harvest strategy that facilitated and benefited from tacit coordination with Grape Nuts. To the extent that tacit collusion between Post and Nabisco was effective, the pricing and profit margins from the period prior to January 1993 also reflect joint profit maximization. Thus, the relevant empirical assessment is to determine how much prices would drop as a result of a divestiture-induced decrease in unilateral market power. This requires a slight modification in the Willig formula. One must use the monopolistic 1993 price/cost differential rather that the competitive price/cost differential along with the own and cross price elasticities of demand to estimate the price decreases which would result from such a reduction in unilateral market power.

[3] See Food Marketing Policy Issue Paper No. 6, *Harvesting and Tacit Collusion in the Breakfast Cereal Industry: A Case Study of Nabisco Shredded Wheat and Post Grape Nuts*, Ronald W. Cotterill, Andrew W. Franklin, and Lawrence E. Haller, May 1994.

An Econometric Analysis of the Demand for RTE Cereal: Product Market Definition and Unilateral Market Power Effects*

I. Introduction

The availability of data from the Nielsen Integrated Data Base, provided by defendants via the Rubinfeld Expert report, enables estimation of price elasticities that provide corroborating evidence for an adult cereal product market. The results also document the exercise of unilateral market power between the Post and Nabisco brands. This is an exercise of power that will persist if the merger is not undone. As explained in the text of this affidavit, the adult market includes brands from the Simple Health Nutrition, All Family Basic, and Taste Enhanced Wholesome segments, plus Kellogg's Frosted Mini Wheats and Nabisco Frosted Wheat Squares from the Family Acceptable Kid cereal segment because they are shredded wheat products. In this analysis, the latter two brands are grouped with the Taste Enhanced Wholesome brands. Estimation of own and cross price elasticities is difficult in any context (Tomek and Robinson,1981; Raunikar and Huang,1987). It is especially difficult to estimate brand level elasticities within an industry, especially an industry such as RTE cereal because there are many brands. Also, any model of demand behavior for RTE cereals needs to incorporate trade promotion activity, couponing, and advertising as well as prices. Fortunately, the brand level market structure of this industry meshes nicely with recent advances in demand analysis to provide a framework for identifying and estimating the impact of these strategic variables. A multiple stage budgeting framework allows us to avoid specifying every brand's price, trade promotion activity, couponing level, and advertising level in each brand's demand equation.

The record clearly establishes that RTE cereal brands are "spatially" differentiated products that are grouped into segments. Consumer perception and observed purchase behavior indicate that consumers use a sequential or multi-stage decision process to choose among the numerous brands of cereal. Consumers do not inspect every brand of cereal when they make a purchase. Figure 1 illustrates the decision making process. First, the consumer decides on the basis of her general perceived level of RTE cereal price, how much RTE cereal she will

* This analysis is a reprint of Exhibit C from Affidavit of Professor Ronald W. Cotterill, September 16, 1994, with incorporation of corrections provided in Exhibit B from Supplemental Affidavit of Ronald W. Cotterill, September 26, 1994, State of New York v. Kraft General Foods et al. 93 Civ 0811 (KMW).

buy, then she decides how much adult and/or kid cereal to purchase. Within the adult market the consumer chooses among three segments: Simple Health Nutrition, All Family Basic, and Taste Enhanced Wholesome. Then within each segment she chooses particular brands. Consumers need not consciously make these sequential decisions every time they purchase cereal. Since they purchase cereal often, they know what cereals get eaten in their household, and they move quickly through the choice framework to the segments and brands that they prefer.

This multistage budget approach also corresponds to the framework that Post and Nielsen use to analyze brand cross purchase and shifting interactions among brands (McGraw, 1994). In the Brand Interaction reports, gains and losses among brands in the Simple Health Nutrition segment are analyzed at the individual brand levels, but gains and losses to brands outside of the segment are aggregated into a lump sum. The interaction indices, a generalized measure of substitutability or shifting among different brands in the Simple Health Nutrition segment, correspond to the estimated total cross price elasticities of this model.[1]

In a letter to Kraft General Foods proposing to evaluate the impact of couponing and trade deals on brand volume, Nielsen Marketing Research executives state:

> The scope of this analysis will be Taste Enhanced Wholesome (TEW) cereals. Attachment 1 lists the brands to be analyzed. We are choosing to evaluate this part of the entire RTE cereal category for the following reasons:
>
> - The TEW segment consists of brands that possess strong interactions with each other.
> - Including other category segments into the evaluation may "dilute" the switching patterns observed in the data. For example, a household may always purchase a Traditional Kid cereal and a TEW cereal for different members of their household. However, the data does not reflect the intended user of each brand, and in effect may falsely indicate a switch form [*sic*] a Traditional Kid brand to TEW.
>
> [@ KGF048666, PX853]

This reasoning precisely supports our multistage budget approach.

Following theoretical work in multi-stage budget models of consumer choice by Gorman (1971) and Deaton and Muellbauer (1980), empirical demand analysts have recently used the framework to estimate systems of demand equations. The most relevant work is a recent study published by Hausman, Leonard, and Zona (1994) that

[1] If the only strategic variable causing shifts in customers were brand prices (i.e. no change in trade promotions, coupon levels or advertising levels) and one knows how much prices change, then the interaction indices would be a direct estimate of the total cross price elasticities.

uses a three stage budget process to estimate own and cross price elasticities for several brands of beer. A draft paper by Hausman (1994) also applies the multistage model to RTE cereal. Our method for RTE cereals is similar and proceeds as follows. At the industry level in Figure 1 we will rely upon a recent estimate by Hausman (1994) of the own price elasticity of demand. He uses monthly BLS data over sixteen years for the quantities of RTE cereal consumed, its deflated price, deflated disposable income, demographic demand shift and input cost shift variables to estimate an own price elasticity of –0.9, (significant at the 1% level, Hausman 1994, p. 19). To estimate the own price elasticity of demand for adult cereal given a level of RTE cereal consumption, we estimate a double log demand model for an aggregate "all adult cereal" with its own price, the price of an aggregate "all kid cereal," the quantity of RTE (adult and kid) cereal consumed, adult and kid trade promotions, adult and kid coupon activity and adult and kid advertising activity. Estimated coefficients in the double log model are elasticities. Since they are estimated for a given level of real expenditure (quantity of RTE cereal) they are conditional elasticities. We will explain the meaning of conditional elasticity further when we discuss results.

This estimation serves double duty because it allows us to apply in a rigorous fashion the merger guidelines market definition test to determine whether adult cereals are an antitrust market. The test is whether the own price elasticity of demand for adult cereals is sufficiently inelastic to permit a small but significant nontransitory increase in price, *e.g.* a 5 percent increase to be profitable (Merger Guidelines). Specifically, would such a price increase cause consumers of adult cereals to shift to kid cereals or some other breakfast food?

At the segment level we estimate a similar double log model to analyze the demand for Simple Health Nutrition cereals, All Family Basic cereals, Taste Enhanced Wholesome cereals and private label cereals. Each quantity is an aggregation of the brands in its segment and is hypothesized to be a function of its own aggregate price, the aggregate prices of the other segments, the quantity of adult cereal purchased, and each segments aggregate trade promotion, coupon, and advertising activity levels. Again, since the model contains the quantity of adult cereals, the own and cross price elasticities are conditional elasticities, *i.e.* they show how cereal purchases shift among the segments for a given level of adult cereal consumption.

Finally, within each segment we estimate double log demand equations for each brand in the segment with brand prices, the quantity of segment cereal purchased, and brand level variables for trade promotion, coupon and advertising activity. Since each brand model contains the appropriate segment quantity purchased, the own and cross price elasticities are also conditional elasticities, *i.e.* they show how cereal purchases shift in a segment for a given level of segment consumption.

Since price changes also affect the real expenditure level (quantity of segment, quantity of adult, quantity of RTE cereal consumed) in the models, this "real income" effect must also be incorporated into our final estimates of the unconditional or total own and cross price elasticities. The regression results for the brand, segment, and market levels in combination yield own and cross price elasticities for all brands included in the study. In conjunction with price cost margin information, the total own and cross price elasticities for the Post brands, Nabisco Frosted Wheat Squares, and the Nabisco Shredded Line enable an estimate of the unilateral market power associated with this merger.

II. The Data and Variables Used in the Analysis

The Nielsen IDB data are weekly data for the ten largest U.S. Nielsen Markets and has several leading brands of cereal including Post Grape Nuts, Post Natural Bran Flakes, Post Raisin Bran, the Nabisco Shredded Wheat line (Spoon Size, Big Biscuit, and Shredded Wheat and Bran) and Nabisco Frosted Wheat Squares. Table 1 lists and classifies the brands from the data set that were in distribution in the 10 cities throughout most, if not all, of the June 22, 1991 to June 18, 1994 period that the data set covers. Due to time constraints, and our finding that adult cereals are an antitrust market, we analyze only adult cereals at the segment and brand level. There are 3 adult brand segments plus a private label segment.[2]

To assess the representativeness of the Nielsen IDB data we can compare market shares for the 52-week period ending 1/22/94 to Nielsen Topline market share estimates for the same period. As reported in Table 1, the IDB brand level market shares track the Topline shares which are used regularly by Post, very closely. The weighted average market shares for the ten largest Nielsen markets included in this study are also very close to the national shares. One can also compare the Nielsen Topline market share totals from Table 1 for each segment to the segment shares in Figure 1 to evaluate the sample's coverage of each segment. The Simple Health Nutrition sample accounts for 82.5 percent of the segment volume. The All Family Basic sample accounts for 81.4 percent of the segment volume. After adding the market shares for Kellogg's Frosted Mini Wheats and Nabisco Frosted Wheat Squares to the Taste Enhanced Wholesome segment share in Figure 1 (because they are so classified in the sample) the Taste Enhanced Wholesome sample accounts for 38.6 percent of the segments volume. Grouping the two kid segments together, the kid

[2] The Nielsen IDB data do not break out private label for adult or kid segments. Since approximately two thirds of private label are adult cereals, we classify it there and include it to evaluate its competitive interaction with adult brands.

sample accounts for 55.6 percent of the kid market. In conclusion, the individual brands market shares in the 10 city sample are representative of their national market counterparts. The Simple Health Nutrition and All Family Basic samples have comprehensive coverage of their segments. The coverage of the Taste Enhanced Wholesome segment is significantly lower.

The relative proportion of kid to adult cereal in the sample is .4605. In the population, after adjusting the shares in Figure 1 for the shift of the two brands, it is 0.5222. But, if we allocate only 67 percent of private label share to adult cereals and allocate the remainder to kids cereals (4 of 6 top private label brands are adult brands) then the sample ratio increases to 0.518. Thus, the sample is representative of the split between adult and kid cereal in the population except for the private label allocation.

Chart 1 lists the variables used in the adult cereal market regression. It provides a useful template for describing all of the variables employed in this study. The dependent variables in all regressions are the logarithm of weekly quantity sold in a city. For the adult cereal market regression, it is the sum of the quantity sold for all adult brands listed in Table 1. The logarithm of adult price (LNP_A) is the log of the market share weighted average price of the adult cereal brands in Table 1. The log kid price (LNP_K) uses the market share weighted average price of the kid cereal brands in Table 1. At the brand level, price is a weighted average price for volume sold with and without trade promotion. Prices are usually lower on promoted volume.

The log of adult trade promotions (LTPROM_A) is the percent of all adult cereal that was sold on promotion. The Nielsen IDB provided a second measure of the extent of trade promotions, the percent of supermarket sales (all commodity volume) in a market that comes from stores that have a particular brand of RTE cereal on trade promotion. We did not use this variable because one can not aggregate it to the segment or market level. Also, the percent sold on promotion variable provides a more sensitive measure of the terms and impact of trade promotion programs. A trade promotion that achieves an aisle end display for example, will move more product than on that does not. Post documents moreover, indicate that there is a close relationship between weekly volume sold on promotion and a set of underlying trade promotion strategies. Although this variable doesn't allow us to isolate the impact of any particular promotion strategy, it does control for their impact on quantity sold thereby allowing us to measure the impact of price and other strategic variables upon quantity for a given level of trade promotion.

At the brand level in the Nielsen IDB, the coupon variable is the face value of a coupon times the number of coupons dropped. Since coupons are not dropped every week and all redemptions from a drop do not occur in the week of the drop, we rely upon a Post study of the redemption pattern (Post Consumer Promotion Analysis, October 1992,

@KGF 1089444) to construct a 12 week moving average value of coupons in circulation for each brand.[3] The logarithm of adult coupons LCOUP_A) is the log of the sum of brand level moving average for all adult brands listed in Table 1. The coupon variable for the kid market (LCOUP_K) and other coupon variables in this study are computed in a similar fashion.

The logarithm of adult advertising (LADV_A) is based upon the Nielsen weekly measure of each brand's Gross Rating Points (GRP). Post documents (Grape Nuts Driving Forces Model, July 28, 1993 @ KGF 0267086) indicate that the decay rate of advertising is .3. In other words, a commercial's volume-generating power is only 70 percent of its initial level a week later. Two weeks after airtime, it retains only $(.7)^2$=.49 of its original power. We use this decay parameter to construct a 12-week geometric lag and to compute the power of a brand's advertising operative at a point in time. For aggregate variables such as segment and the adult or kid market, the value of this weighted variable is summed for the brands in the set and then the log is taken.

III. Estimation Methods and Results for the Adult Market Stage

When estimating market level as opposed to household level demand equations, prices are endogenous. This means that one must use a generalized least squares (GLS) estimation technique rather than ordinary least squares (OLS). Following Hausman, Leonard, and Zona (1994), as Professor Rubinfeld did in his expert report, we use a two stage GLS procedure. In the first stage, the prices for a cereal in one of the cities, e.g. New York, are regressed on its prices in the 9 other cities. The predicted price for New York from this regression is purged of endogenous price variation in New York. The same is done for the other nine cities. Then, the second stage is to replace brand prices with purged prices in the demand equation estimation. Both GLS and OLS results are reported in the Appendix to this report. (The Appendix is available upon request.) Only GLS results will be discussed in the text.

In addition to the explanatory variables discussed previously, all models estimated also have a constant and a set of binary variables that allow the intercept of the regression to shift from city to city. This controls for city-specific fixed effects including city size. These variables are not included in the text tables to keep them manageable.

Table 2 presents estimation results for the adult cereal market. For the full model, the conditional own price elasticity is very inelastic, -0.2552, and statistically significant at the 1 percent level. Thus, if the

[3] The weights for the 12 weeks after a drop are the percent of total redemptions that occur during that week are expressed as a percent. The are: .20, .15, .11, .10, .08, .07, .06, .05, .04, .03, .03.

quantity of RTE cereal consumed is held constant, a 1 percent price increase results in a 0.255 percent reduction in the quantity of adult cereal bought via a shift to kid cereal. The cross price elasticity with respect to kid cereal is positive as expected and significant. The coefficient for Quantity of RTE cereal is 0.98 which indicates that a 1 percent increase in RTE cereal consumption increases adult consumption 0.98 percent.

The trade promotion variables in the full model perform as expected. Increases in adult trade promotion increase quantity sold, and increases in kid trade promotion reduce the quantities of adult cereal sold. In effect they capture that portion of the weighted average price that is due to trade promotion, thereby allowing the price variable to measure more directly the impact of changes in the nonpromoted price upon quantity demanded. As one can see in Table 2, when the trade promotion variables are removed from the model (the weighted average price model) the conditional price elasticity coefficients double, but are still inelastic.

The coupon variables in both models perform as expected; however, the advertising variables for some reason do not. Excluding the trade promotion variables reduces the adjusted R^2; however, the model explains 98.97 percent of the variation in the quantity of adult cereal, a very good fit indeed. The exclusion of the trade promotion variables tends to increase the coefficient estimates for advertising and couponing. These variables also capture some of the trade promotion effect because cereal firms tend to synchronize coupon and advertising campaigns with trade promotion events (integrated marketing strategies).

Let us now return to the conditional own price elasticity estimate for the full model and compute the total elasticity. When the price of adult cereal goes up 1 percent, quantity goes down 0.255 percent due to shifts to kid cereals; but we need to evaluate the additional loss due to consumers buying less RTE cereal. Since adult cereals in the sample are 69.2 percent of the RTE cereal (Table 1, 10 city column market shares), RTE cereal prices increase 0.69%. Given a -0.9 own price elasticity for RTE cereal, this reduces the quantity of RTE cereal purchased by (-0.9)(0.692)=-0.623%. Returning to the full model regression in Table 2, a 0.623% reduction in the quantity of RTE cereal reduces the quantity of adult cereal purchased (0.98)(-0.623)=-0.610%. Thus the total own price elasticity for adult cereals is -0.255 -0.610 = -0.865. A one percent increase in the price of adult cereal produces a 0.865 percent decrease in quantity. By the same method, the total own price elasticity for the weighted average price model is -1.168.

Writing on the issue of antitrust market definition, Scheffman clearly states that the own price elasticity of demand for adult cereal and not the cross price elasticity of demand for kid cereal with respect to an increase in the price of adult cereal is the critical parameter. He writes:

> The statistical approach to this market definition issue attempts to confront the issue of potential power to control price directly by examining historical data through a statistical lens. The idea here is straightforward. The power to control price requires a low own-price elasticity of demand. If the demand for widgets is quite elastic with the respect to the price of widgets (the "own-price"), there is no significant ability to profitably raise price, since price increases will result in a large reductions [*sic*] in the sales of widgets...
>
> Notice that in the discussion of the proceeding paragraph there is no mention of cross elasticities. It is the own-price elasticity that is dispositive of buyers *potential* response to increases n the price of widgets. [Sheffman, 1991, p.3]

In the full model where the impact of trade promotion on price is captured by the trade promotion variable, if the percent of volume sold on trade promotions by the hypothetical adult cereal monopolist is held constant, she can raise price in a profit maximizing fashion since the total own price elasticity is less than one. The situation in the weighted average price model is less clear. Werden (1992), among others, explains that this situation requires information on the industry's price cost margins, because the own price elasticity (-1.1675) is below a negative one.

A profit maximizing monopolist would set a price cost margin equal to the inverse of this elasticity which is 0.8565. In fact, if the adult cereal price cost margin is below this level, a price increase will increase profits. Documents in the record indicate that industry variable gross profit rates (operating revenue minus variable manufacturing costs, transportation and warehousing, divided by operating revenue) for all cereal operations of Post and the top four manufacturers (Kellogg, General Mills, Post, and Quaker) in 1992 were 0.743 and 0.749 respectively [Post Division 1992 Competitive Update @ KGF0150184, PX1063]. Moreover, the variable gross profit margins (VGPs) on adult cereals are lower than kid cereals. A Post division, 1995 planning document states that its variable gross profit (VGP) rate on adult cereal for 1994 is estimated to be 0.706 [@ KGF 1166783, PX113]. Therefore, the adult cereal market is an antitrust market. Perhaps an example using the industry parameters would be useful to demonstrate that a 5 percent price increase is profitable for the hypothetical adult cereal monopolist.

Facts:	adult cereal own price elasticity	= -1.1675
	adult market price cost margin (VGP)	= .706
Assume:	price of adult cereal	= $ 1.00
	then the industry's per unit VGP	= $ .706
	adult market quantity	= 10 units
Then:	adult variable gross profit	= $ 7.06
Now:	increase the price 5% to	$ 1.05

Facts: adult market price cost margin (VGP) increases to $ .756
Adult market quantity goes down (5x-1.16=-5.8%) to 9.42
Adult market variable gross profits = $ 7.12
Conclusion: the 5 percent price increase increases adult market profits.

IV. Estimation Results for the Adult Segment Demand Equations

Chart 2 lists the names and abbreviations for all the variables used in the adult segment regressions that are reported in Tables 3 and 4. Table 3 reports results for the full model, i.e., with the appropriate trade promotion variables, and Table 4 reports results for the weighted average price model. As at the adult market level, including the trade promotion variables reduces the reported conditional own and cross price elasticities because they capture the interaction among firms trade promotion programs and related price reductions on quantity purchased. In both tables, strategic variables in nearly all cases perform as hypothesized.

Increases in segment own price reduce segment quantity demanded. Increases in other segment prices increase quantity demanded. Increases in own and other firm trade promotion variables in table 3 respectively increase and reduce own quantity demanded. The same is true for couponing except for the impact of Simple Health Nutrition on private label demand in both Tables 3 and 4. The advertising variables are somewhat less well behaved but all own advertising elasticities are positive as expected and significant. There is no manufacturer couponing or advertising for private label.

The expenditure elasticities for the quantity of adult cereal behave differently for the segments in both Tables 3 and 4. The Simple Health Nutrition segment and the private label segment have expenditure elasticities in the 0.6 to 0.7 range. This means a one percent increase in the consumption of adult cereals only generates a 0.6 to 0.7 percent increase in quantity for each of the segments. All Family Basic and Taste Enhanced Wholesome, on the other hand, have expenditure elasticities above 1.

V. Estimation Results for the Brand Level Demand Equations

Tables 5 through 11 report regression results for brands in the Simple Health Nutrition, All Family Basic and Taste Enhanced Wholesome segments. Charts 3 though 5 provide easy access to variable names for these tables. For each segment, one table reports results for the full specification model and a second table reports results for the weighted average price model. As with earlier stages, the latter model tends to have higher conditional own price elasticities. Frankly the results are too voluminous to allow discussion of each table and all the brands. The discussion will focus upon the Nabisco and Post

brands for the weighted average price model only, deviations from the full model are generally similar to the deviations discussed at the adult market and segment stages.

Starting with Table 6, the weighted average price model for Simple Health Nutrition, column one reports the estimated elasticities for the Shredded Wheat demand model. The conditional own price elasticity is -1.736 and significant. Each of the conditional cross price elasticities is positive and every one except Post Natural Bran Flakes is significant at the 1 percent level. Moreover, concerning the unilateral effects hypothesis, Grape Nuts has the highest conditional cross elasticity, 0.7235. A one percent increase in Grape Nuts' price increases Shredded Wheat quantity purchased 0.7235 percent. General Mills Total is a distinct second at 0.4634. Third is Kellogg's Nutrigrain at 0.4119. Fourth in Kelloggs Special K at 0.3561. Last and not significantly different from zero is Post Natural Bran Flakes.

Moving down column 1 in Table 6 to other variables in the Shredded Wheat demand model, the expenditure elasticity coefficient for the quantity of Simple Health Nutrition cereal is low at 0.7515 but no lower than it is for Kelloggs Nutrigrain (column 4) at 0.7396 and for Post Natural Bran Flakes (column 5) at 0.6195. Nabisco couponing activity (LCOUP_NL) has a positive impact (+0.0229) on quantity purchased, as expected. Grape Nuts' couponing activity has an even larger and significant negative impact (-0.0251) on Shredded Wheat volume. This cross couponing effect also is larger in absolute value than all other shredded wheat rivals and indicates that consumers view the two brands as close substitutes. General Mills Total and Post Natural Bran Flakes coupon activity is contrary to hypothesis. Each has a positive significant impact on Shredded Wheat quantity purchased.

Nabisco Shredded Wheat advertising has positive and significant impact on its quantity as expected. Grape Nuts advertising has a negative impact on Shredded Wheat quantity but the estimated elasticity is not statistically significant. General Mills Total advertising, however, has a significant negative impact and Kellogg's Special K has a perverse significant positive impact on Shredded Wheat quantity. The adjusted R^2 is 0.9545, the highest in the table.

Examining the Grape Nuts model in column 2 of table 6 provides additional strong evidence that Shredded Wheat and Grape Nuts are very close substitutes. Shredded Wheat's conditional cross price elasticity with Grape Nuts is very high, +1.228. It is nearly twice as high as the next closest substitute, Kellogg's Nutrigrain, (0.6338). General Mills Total is third at 0.5833 and Kellogg's Special K is fourth with 0.2345. Each of these conditional cross price elasticities is significant at the 1 percent level. Post Natural Bran Flakes, the fifth brand in this segment has a negative but insignificant cross price elasticity.

Moving down column 2 in Table 6, the salient results include a significant expenditure elasticity for Grape Nuts, 0.8707, a significant positive own coupon elasticity and a significant, very high positive own advertising elasticity, 0.1178. Nabisco Shredded Wheat coupon and advertising activities have negative impacts on Grape Nuts but neither is significant.

Proceeding to column 5, Post Natural Bran Flakes, the most important result for our analysis of unilateral market power is that neither Shredded Wheat nor Grape Nuts have conditional cross price elasticities that are significantly different from zero. Combined with the fact that the Post Natural Bran Flakes cross price elasticity is not significantly different from zero in the Shredded Wheat and the Grape Nuts demand equations, this establishes that no unilateral market power exists between Shredded Wheat and Post Natural Bran Flakes except possibly via second order impacts through "third party" brands. The exercise of power between Shredded Wheat and Grape Nuts will raise the price of the other substitutes (Willig 1991) which in turn will raise the price of Post Natural Bran Flakes if they are substitutes; however, this effect is probably minor.

Moving to the weighted average price model for All Family Basic brands (Table 8), column 2 reports the estimation results for Post Toasties, the only Post or Nabisco brand in this segment. Note that it has an elastic and significant conditional own price elasticity, -3.517. Both Kellogg's Corn Flakes (LNP_CF) and Cheerios (LNP_CH) are significant substitute products with conditional cross price elasticities of 1.2404 and 1.3148 respectively. Quaker Oat Squares (LNP_QO), however, is the closest substitute with an elasticity of 3.36.[4]

If one examines the Kellogg's Corn Flakes model (column 1), one can see that the cross price elasticity for Post Toasties price with Corn Flake quantity is negative (-0.0715) but not significant. Thus, Post Toasties price has no impact on Corn Flakes quantity, but Corn Flakes price has a strong impact on Post Toasties quantity. As explained in the previous footnote, a substantial portion of this result is due to the asymmetry in market shares. Post Toasties has a 0.27 percent market share and Kellogg's Corn Flakes has a 5.61 percent share which is 20 times greater than Toasties. The loss of 1 percent of Corn Flakes volume to Toasties due to an increase in the price of Corn Flakes translates to a 20 percent increase in Post Toasties share. Going the other way, an increase in Toasties' price that shifts 20 percent of its

[4] A cross price elasticity can be higher in absolute value than an own price elasticity for two reasons. First recall that this is the change in Post Toasties quantity for a change in Quaker Oat Squares price which is different than a change in Post Toasties price. Second, since the market share for Quaker Oat Squares is over twice as large as the share for Toasties, a given percentage loss of Oat Squares translates to a more than double percentage gain to Post Toasties.

volume to Corn Flakes would only increase Corn Flakes volume 1 percent.

Finally, note that the expenditure elasticity for Post Toasties is 0.5322. Only three other brands in the entire study have lower expenditure elasticities: Nabisco Frosted Wheat Squares (L_FW_QTY), Quaker 100% Natural Granola (L_QN_QTY), and Kellogg's Cracklin Oat Bran (L_CO_QTY). All are in the Taste Enhanced Wholesome segment (Table 10). This implies that Post Toasties will have relatively low cross-price elasticities with brands from other segments. For example, when Shredded Wheat raises its price, that increases the aggregate Simple Health Nutrition price, which increases the quantity of All Family Basic purchased (see Table 4 column 2), cross price elasticity for All Family Basic with respect to Simple Health Nutrition price is 0.6359. But a 1 percent increase in the quantity of All Family Basic results in only a 0.53 percent increase in Post Toasties quantity. All other brands in Table 8 would have higher quantity increases because the expenditure elasticities are higher. This low "price transmission" effect and Post Toasties' very low market share, which means a price increase by Toasties does not increase the All Family Basic price index much, leads to the conclusion that Post Toasties has effectively zero cross price elasticities with other Post and Nabisco brands. Unlike Grape Nuts and Shredded Wheat, there is not possibility for the exercise of market power inherent in the ownership of Post Toasties.

Proceeding to the last segment, Taste Enhanced Wholesome brands, Table 10 reports estimation results for the weighted average price model. Post Raisin Bran (L_PR_QTY) is in column 2 and Nabisco Frosted Wheat Squares is in column 3. (Kellogg's Raisin Bran is in column 1 and Kellogg's Frosted Mini Wheats (L_MW_QTY) is in column 3). Post Raisin Bran has a very elastic conditional own price elasticity, -2.774 and, as one would expect, Kellogg's is the closest substitute with a cross price elasticity equal to 0.8655. In equation 1 (Kellogg's Raisin Bran) the cross price elasticity for Post Raisin Bran is also by far the highest, at 1.49. The difference in the magnitude of these two cross price elasticities is not explained by differences in market shares. In fact since Post Raisin Bran's share is 1.82 percent and Kellogg's Raisin Bran share is 3.96 (Table 1) if anything the ranking should be reversed.

Moving down column 2, the Post Raisin Bran demand equation, note that Nabisco Frosted Wheat Squares cross price elasticity is not significantly different from zero. Also, if one inspects the Post Raisin Bran cross price elasticity coefficient in the Frosted Wheat Squares demand equation (column 4) it is negative but not significantly different from zero. Since the cross price effects are zero, one can conclude that there is no possibility to exercise unilateral market power between these brands. Also, since the expenditure elasticities of these brands are low (Frosted Wheat Squares is the lowest in the entire

sample), there are effectively negligible cross price effects with brands outside of the segment.

VI. Computation of Total Price Elasticities and Estimation of Unilateral Market Power

With the estimation results in hand for the brand demand equations in each segment, the segment and adult market demand equations and our known all RTE cereal own price elasticity, -0.9, one can compute the total elasticity matrix for all prices and expenditure quantities at all levels in the demand system. The resulting matrices are very large but are reported as Table14 (full model system) and Table 15 (Average Weighted Price model system). Tables 11 and 12 are abbreviated versions of those tables that report all market level, and segment level total price elasticities as well as the total own and cross price elasticities for brands within each of the three segments. Here only Table 12, the results for weighted average price model will be discussed. At the top of the table the total own price elasticity for adult cereals, which has already been discussed extensively is reported. It is -1.1675. Note the own price elasticity for kid cereal is somewhat higher at -1.3357. The magnitude of the cross price elasticities corresponds with the relative market share differences between adult and kid cereals. In the middle of the first page of Table 12, the total own price elasticity for the Simple Health Nutrition segment is reported. Since it is –2.1498 and the corresponding profit maximizing price cost margin is its inverse (-0.465), and since the actual price cost margins of the brands in this segment are above this level, a hypothetical monopolist with the Simple Health Nutrition brands could not profitably raise price. The Simple Health Nutrition segment is not an antitrust market.

The matrix at the bottom of page 1 of Table 12 reports that total own and cross price elasticities for brands in the Simple Health Nutrition segment. The critical parameters for our analysis of unilateral market power, which has by process of elimination been reduced to the interaction of Nabisco Shredded Wheat and Post Grape Nuts, are the four elasticities in the top left hand corner. As Baker and Breshnahan (1985) first pointed out and the economics profession thereafter confirmed (see for example Willig (1991, p. 299) and Werden and Rozanski, 1994), the exercise of unilateral market power depends on the existence of positive cross price elasticities that are large relative to own price elasticities. Assuming the market is competitive before the merger, the unilateral power analysis measures positive price impacts that the merger has due to the internalization of the cross price elasticities. This reduces own price elasticity on the two merged brands and thus allows the profit maximizing firm to elevate prices and increase profits. Note that the reported own price elasticities in Table

12 for Shredded Wheat and Grape Nuts, which are quite elastic, are not determinative of the increase in market power due to the merger. It is the change in own price elasticity due to internalization of a significant close rival's cross price elasticity that determines how much prices and profits increase. Willig (1991 p. 299-300) explains how to compute merger price premiums. This case, however, is different. The merger has already occurred and there was a significant period prior to the merger where Grape Nuts and Shredded Wheat tacitly coordinated prices. Thus, a divestiture model is needed. Period one prices and price cost margins are high due to joint profit maximization for Grape Nuts and Shredded Wheat. After divestiture, period two prices and price cost margins are lower for the separately managed brands. Managers of the two brands still maximize profits but the parameters of the problem have changed so profit maximization results in more competitive price and profit levels. For the Cotterill divestiture model, assume there is initially one firm selling two brands whose individual demand curves are given by:

$$Q_1 = \alpha_1 + g_{11}P_1 + g_{12}P_2$$
$$Q_2 = \alpha_2 + g_{21}P_1 + g_{22}P_2$$

The intercept terms contain the other nonprice variables in the estimated models. They are assumed constant.[5] Each brand has constant marginal cost, c_i, but costs may be different for the brands. In this case, the firms profit maximization problem for brand 1 is

Maximize w.r.t. P_1

$$\begin{aligned}\pi_1^0 &= P_1^0 Q_1 + P_2^0 Q_2 - c_1 Q_1 - c_2 Q_2 \\ &= \alpha_1 P_1^0 + g_{11}(P_1^0)^2 + g_{12}P_1^0 P_2^0 - c_1\alpha_1 - c_1 g_{11}P_1^0 - c_1 g_{12}P_2^0 + \\ &\quad \alpha_2 P_2^0 + g_{21}P_1^0 P_2^0 + g_{22}(P_2^0)^2 - c_2\alpha_2 - c_2 g_{21}P_1^0 - c_2 g_{22}P_2^0\end{aligned}$$

For P_1 , one obtains

$$\frac{d\pi_1^0}{dP_1^0} = \alpha_1 + 2g_{11}P_1^0 + g_{12}P_2^0 - c_1 g_{11} + g_{21}P_2^0 - c_2 g_{21} = 0$$
$$\Rightarrow P_1^0 = \frac{\alpha_1 - c_1 g_{11} - c_2 g_{21} + (g_{12} + g_{21})P_2^0}{-2g_{11}}.$$

[5] The model could be generalized to include cross couponing and advertising effects if we had cost data on them so that we could determine profit maximizing levels.

The relationship for brand 2 is

$$P_2^0 = \frac{\alpha_2 - c_1 g_{12} - c_2 g_{22} + (g_{12} + g_{21}) P_1^0}{-2 g_{22}}.$$

In period 1, the firm divests one brand. Now, each brand maximizes its profits independently. Brand 1's maximization problem is now

Maximize w.r.t P_1

$$\begin{aligned}
\pi_1^1 &= P_1^1 Q_1 - c_1 Q_1 \\
&= \alpha_1 P_1^1 + g_{11}(P_1^1)^2 + g_{12} P_1^1 P_2^1 - c_1 \alpha_1 - c_1 g_{11} P_1^1 - c_1 g_{12} P_2^1 \\
\frac{d\pi_1^1}{dP_1^1} &= \alpha_1 + 2 g_{11} P_1^1 + g_{12} P_2^1 - c_1 g_{11} = 0 \\
&\Rightarrow P_1^1 = \frac{\alpha_1 - c_1 g_{11} + g_{12} P_2^1}{-2 g_{11}}.
\end{aligned}$$

Brand 2's solution is

$$P_2^1 = \frac{\alpha_2 - c_2 g_{22} + g_{21} P_1^1}{-2 g_{22}}.$$

We can calculate the price-decreasing effect of the divestiture of brand 1 by subtracting P_1^1 from P_1^0:

$$\begin{aligned}
P_1^0 - P_1^1 &= \frac{\alpha_1 - c_1 g_{11} - c_2 g_{21} + (g_{12} + g_{21}) P_2^0 - \alpha_1 + c_1 g_{11} - g_{12} P_2^1}{-2 g_{11}} \\
&= \frac{g_{21}(P_2^0 - c_2) + g_{12}(P_2^0 - P_2^1)}{-2 g_{11}}.
\end{aligned}$$

Brand 2's price decrease is similarly

$$P_2^0 - P_2^1 = \frac{g_{12}(P_1^0 - c_1) + g_{21}(P_1^0 - P_1^1)}{-2 g_{22}}.$$

Solving these simultaneously, we arrive at the brands' price decreases in terms of the demand equations' parameters and the brands' pre-divestiture price cost margins.

$$P_1^0 - P_1^1 = \frac{(g_{12})^2}{4g_{11}g_{22} - g_{12}g_{21}}(P_1^0 - c_1) - \frac{2g_{22}g_{21}}{4g_{11}g_{22} - g_{12}g_{21}}(P_2^0 - c_2)$$

$$P_2^0 - P_2^1 = \frac{-2g_{11}g_{12}}{4g_{11}g_{22} - g_{12}g_{21}}(P_1^0 - c_1) + \frac{(g_{21})^2}{4g_{11}g_{22} - g_{12}g_{21}}(P_2^0 - c_2).$$

Calculating the g Parameters from Elasticities

Recognizing that the demand elasticity of brand i with respect to the price of brand j is

$$\eta_{ij} = \frac{dQ_i}{dP_j}\frac{P_j}{Q_i}, \text{ we see that } g_{ij} = \frac{dQ_i}{dP_j} = \eta_{ij}\frac{Q_i}{P_j}.$$

We can calculate the potential price decreases resulting from a divestiture of the Nabisco Shredded Wheat line by Post using the elasticities from Table 6, the mean prices and weekly quantities for 1993 total U.S. from the Nielsen Integrated Data Base, and 1993 price cost margins (marginal contribution minus trade expenses since weighted average price is net of price reductions due to trade promotions) from 1993 Post Detail P&L's @KGF1012921. We examine the effect of the divestiture on both the Nabisco Shredded Wheat line and Post Grape Nuts. The price, quantity, and margin figures used are:

P_{SW} = \$3.2713	P_{GN} = \$2.5539
Q_{SW} = 1,1148,160	Q_{GN} = 861,644
P_{SW} - c_{SW} = \$2.0025	P_{GN} - c_{GN} = \$1.38162

The calculated price decreases are

$P_{sw}^0 - P_{sw}^1 = \$0.658$ $\qquad$ $P_{GN}^0 - P_{GN}^1 = \$0.587.$

In other words, the price of Shredded Wheat will decrease 65.8 cents after divestiture and the removal of unilateral power. This assumes that unilateral power is not replaced by tacit coordination of the sort the Nabisco harvest operation signaled and sustained in 1990-1992. The price of Grape Nuts will decrease 59 cents. This amount is no more than price decreases seen in very rigorous trade promotion campaigns, or the face value of many coupons that consumers redeem. The average retail price of Shredded Wheat drops 20 percent and Grape Nuts average price drops 23 percent.

Let's examine the impact of the price decrease on the brand wholesale prices and percent contribution margin (as reported @ KGF 1012919). For Shredded Wheat (prior to divestiture) its 1993 wholesale price was $2.65 per lb. and its average variable costs to purchase inputs, manufacture product, transport, warehouse and deliver product were only $.43/lb. The percent contribution margin (CM) is 83.6 percent, well above average adult contribution margin for adult cereal, 70.6 percent, (KGF 1166783, PX 113) and the industry average (top 4 firms) percent CM for all cereals, 74.9 percent (KGF 0150184, PX 1063). After the divestiture the new wholesale price is $1.99 and the percent contribution margin is

$$\frac{1.99-.43}{1.99} x\ 100 = 78.4\%$$

Although a 66 cent price decrease sounds like it would severely depress the Shredded Wheat contribution, it's so high initially that after divestiture its 78.4 percent margin is still substantially above the Post adult 70.6 percent adult and industry all RTE cereal 74.9 percent benchmarks.

For Grape Nuts its 1993 wholesale price was 1.92 and its percent contribution margin was 81.51 percent. The 59 cent decrease reduces wholesale price to $1.33. Subtracting its 36 cent average variable cost per pound and dividing by wholesale price gives a new percent contribution margin of 72.9 percent. This is in line with Post and industry margins. These changes would benefit consumers and not depress gross profits on these brands below RTE cereal industry standards, which are high compared to other food and manufacturing industries.

VII. A Critique of the Rubinfeld Regression

In his expert report, Professor Rubinfeld provides six regressions that he maintains show that the adult cereal market is not an antitrust market and that there are not significantly positive cross price elasticities between Grape Nuts and Nabisco Shredded Wheat. His conclusions are false and not supported by his analysis for two general reasons: mishandling of data and flawed, inconsistent model specification.

Regarding the data, professor Rubinfeld has faulty understanding of the variables and the samples he has used. He maintains that his ADVERT variable measures the dollar value of a brands advertising in a city (Rubinfeld deposition, September 1994). In fact it has nothing to do with advertising. It is the Nielsen ACV variable multiplied by the sales-weighted percent of supermarkets selling the brand with <u>any</u> promotion. The Nielsen ACV variable is the total dollar supermarket

sales in a city and not a dollar measure of brand advertising. For example, in Boston a typical entry for a week is $155 million dollars (supermarket sales) and for the national or total U.S. variable, a typical entry is $5.0 billion dollars. By inspection of the values of this variable and knowledge of the industry, one can clearly establish that these values are too large to be any meaningful measure of advertising in the industry. Rubinfeld's advertising variable for Spoon Size Shredded Wheat is completely inconsistent with the data in the underlying Nielsen IDB data set. For dozens of weeks, his variable is zero when Spoon Size advertising is a seven digit number. The wrong data field seems to have been accessed.

Rubinfeld's coupon variable for Big Biscuit and Spoon Size Shredded Wheat are correlated at the 0.99 level, yet he puts both variables in the same regression, and finds "significant" results. In fact only 9 data points out of 800 in the sample are different. Seven of them are for the week of October 26, 1991. Thus the "significant" results that he is reporting are fitting variation in only 9 observations that may be coding errors.

The same situation occurs for his Group Rating Points variables for Big Biscuit and Spoon Size. They are correlated at the .999 percent level because the 800 observations have identical value except for 10 observations and 9 of the differences occur on September 28, 1991. Professor Rubinfeld states that his regressions are for the period June 22, 1991 to December 31, 1992. In fact they are missing data in the first 12 weeks of the period and the computer program has automatically deleted those observations. His sample period actually includes weeks from September 14, 1991 to December 26, 1992.

Shifting to Professor Rubinfeld's model specification, two very basic and severe mistakes invalidate his conclusions. First, with regard to demand model specification, when estimating the Lucky Charms model, Rubinfeld includes Nabisco Big Biscuit and Spoon Size Shredded Wheat and three other Simple Health Nutrition brands. But when he estimates the Shredded Wheat brand model or Grape Nuts model, he does not specify the prices for many of the other brands that are in the Lucky Charms model. The consumer's choice must remain constant for all models estimated. If a consumer considers Shredded Wheat prices when purchasing Lucky Charms, then he <u>also</u> considers Lucky Charms when purchasing Shredded Wheat. Note that in our system models, the same set of brands and choice variables for those brands (prices, advertising, etc.) are included in all demand equations.

The second major theoretical flaw in the Rubinfeld approach is his use of cross price elasticities for individual brands to infer that the adult cereal market is not an antitrust market. First, as explained in this paper and by others including Scheffman, the own price elasticity of demand for <u>adult</u> is the relevant parameter to estimate. His cross price elasticities for Simple Health Nutrition brands in the Lucky Charms model are biased due to gross misspecification, however even if they

were not it defies common sense to think that enough quantity from the two significant SH/N brands (NutriGrain and Quaker 100% Natural granola) and the two weakly significant brands (Spoon Size and Post Natural Bran Flakes) would shift to Lucky Charms to make a price increase on all adult cereals unprofitable. Their share of adult cereal is too low, approximately 3.75%, to have an impact even if a very large number of their consumers shifted to Lucky Charms. Moreover, the demographics of Lucky Charms consumers and Simple Health Nutrition consumers are so divergent that there cannot be that many consumers who regard Lucky Charms as a significant substitute for Simple Health Nutrition brands. As Nielsen market researchers explain (see quote on pg. 3 of this paper), these misspecified models capture variety, not substitutability.

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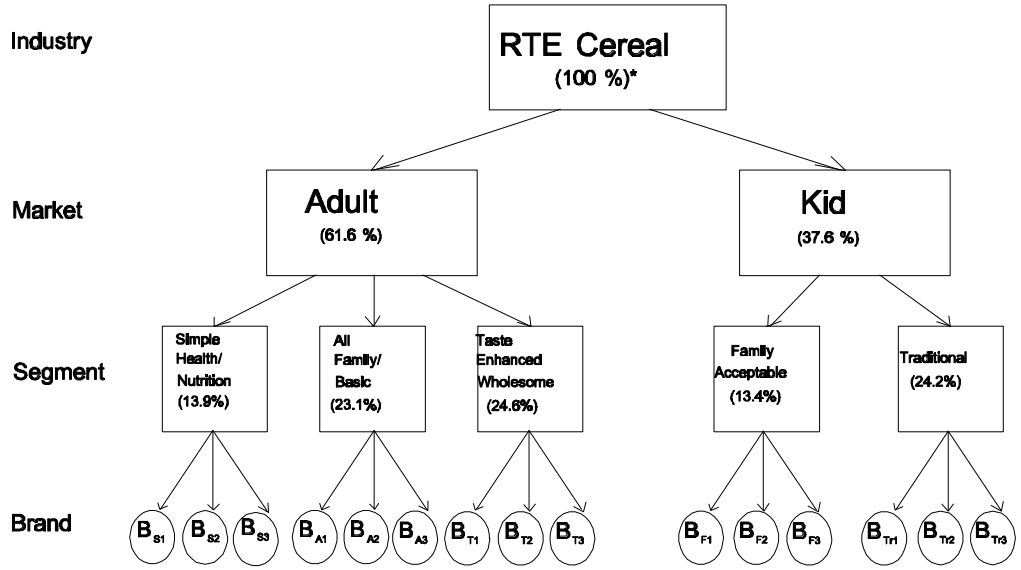
Figure 1. Consumer Multi-Stage Budget Decision Process.



*The market share figures sum to 99.2 percent. Variety packs that account for 0.64 percent of the market are not included in this graphic, and the remaining discrepancy may be due to rounding. Nielsen Topline includes private label in the appropriate segments. Market share data is for 52 weeks ending 1/22/94 and is from Nielsen 4 Week Topline Report 1/22/94, KGF 0888410.

Chart 1. Variable Names, Adult Market Regressions

Quantity	
LNQ_A	Log of the Quantity of Adult Cereal Aggregate
LNQ_K	Log of the Quantity of Kid Cereal Aggregate
Price	
LNP_A	Log of the Price of Adult Cereal Aggregate
LNP_K	Log of the Price of Kid Cereal Aggregate
Total Quantity	
LQRTE	Log of the Quantity of Adult plus Kid Cereal
Promotion	
LTPROM_A	Log of the Percent Sold on Promotion of Adult Cereal
LTPROM_K	Log of the Percent Sold on Promotion of Kid Cereal
Couponing	
LCOUP_A	Log of the Coupon Value (12 week weighted moving average), Adult Cereal
LCOUP_K	Log of the Coupon Value (12 week weighted moving average), Kid Cereal
Advertising	
LADV_A	Log of the Advertising (12 week geometric log, λ =.7), Adult Cereal
LADV_K	Log of the Advertising (12 week geometric log, λ =.7), Kid Cereal

Chart 2. Variable Names, Adult Segment Regressions

Segment Quantity	
LNQ_SHN	Log of the Quantity of Simple Health Nutrition Segment Aggregate
LNQ_AFB	Log of the Quantity of All Family Basic Segment Aggregate
LNQ_TEW	Log of the Quantity of Taste Enhanced Wholesome Segment Aggregate
LNQ_TPL	Log of the Quantity of Private Label Segment Aggregate
Segment Prices	
LNP_SHN	Log of the Price of Simple Health Nutrition Segment Aggregate
LNP_AFB	Log of the Price of All Family Basic Segment Aggregate
LNP_TEW	Log of the Price of Taste Enhanced Wholesome Segment Aggregate
LNP_TPL	Log of the Price of Private Label Segment Aggregate
LTQRTE_A	Log of the Quantity of Adult Cereal Segments
Promotion	
LPTO_SHN	Log of the Percent Sold on Promotion of Simple Health Nutrition Segment Cereal
LPRO_AFB	Log of the Percent Sold on Promotion of All Family Basic Segment Cereal
LPRO_SHN	Log of the Percent Sold on Promotion of Taste Enhanced Wholesome Segment Cereal
LPRO_TPL	Log of the Percent Sold on Promotion of Private Label Segment Cereal
Couponing	
LCUP_SHN	Log of the Coupon Value (12 week weighted moving average), Simple Health Nutrition Segment
LCUP_AFB	Log of the Coupon Value (12 week weighted moving average), All Family Basic Segment
LCUP_TEW	Log of the Coupon Value (12 week weighted moving average), Taste Enhanced Wholesome
Advertising	
LADV_SHN	Log of the Advertising (12 week geometric log, l = .7), Simple Health Nutrition Segment
LADV_AFB	Log of the Advertising (12 week geometric log, l = .7), All Family Basic Segment
LADV_TEW	Log of the Advertising (12 week geometric log, l = .7), Taste Enhanced Wholesome

Chart 3. Variable Names, Simple Health Nutrition Regressions

Brand Quantity	
L_GN_QTY	Log of the Quantity of Post Grape Nuts
L_NL_QTY	Log of the Quantity of Nabisco Shredded Wheat Line
L_NG_QTY	Log of the Quantity of Kellogg's Nutrigrain Line
L_TL_QTY	Log of the Quantity of General Mills Total
L_NB_QTY	Log of the Quantity of Post Natural Bran Flakes
L_SK_QTY	Log of the Quantity of Kellogg's Special K
Brand Price	
LPN_GN	Log of the Price of Post Grape Nuts
LNP_NL	Log of the Price of Nabisco Shredded Wheat Line
LNP_NG	Log of the price of Kellogg's Nutrigrain Line
LNP_TL	Log of the Price of General Mills Total
LNP_NB	Log of the Price of Post Natural Bran Flakes
LNP_SK	Log of the Price of Kellogg's Special K
Segment Quantity	
LN_AFBQ	Log of the Quantity of Simple Health Nutrition Segment
Brand Promotion	
LTPRO_GN	Log of Percent Sold on Promotion of Post Grape Nuts
LTPRO_NL	Log of Percent Sold on Promotion of Nabisco Shredded Wheat Line
LTPRO_NG	Log of Percent Sold on Promotion of Kellogg's Nutrigrain Line
LTPRO_TL	Log of Percent Sold on Promotion of General Mills Total
LTPRO_NB	Log of Percent Sold on Promotion of Post Natural Bran Flakes
LTPRO_SK	Log of Percent Sold on Promotion of Kellogg's Special K
Brand Couponing	
LCOUP_GN	Log of Coupon Value (12 week weighted moving average), Post Grape Nuts
LCOUP_NL	Log of Coupon Value (12 week weighted moving average), Nabisco Shredded Wheat Line
LCOUP_NG	Log of Coupon Value (12 week weighted moving average), Kellogg's Nutrigrain Line
LCOUP_TL	Log of Coupon Value (12 week weighted moving average), General Mills Total
LCOUP_NB	Log of Coupon Value (12 week weighted moving average), Post Natural Bran Flakes
LCOUP_SK	Log of Coupon Value (12 week weighted moving average), Kellogg's Special K
Brand Advertising	
LADV_GN	Log of Advertising (12 week geometric log, λ = .7), Post Grape Nuts
LADV_NL	Log of Advertising (12 week geometric log, λ = .7), Nabisco Shredded Wheat Line
LADV_NG	Log of Advertising (12 week geometric log, λ = .7), Kellogg's Nutrigrain Line
LADV_TL	Log of Advertising (12 week geometric log, λ = .7), General Mills Total
LADV_NB	Log of Advertising (12 week geometric log, λ = .7), Post Natural Bran Flakes
LADV_SK	Log of Advertising (12 week geometric log, λ = .7), Kellogg's Special K

Chart 4. Variable Names, All Family Basic Regressions

Brand Quantity	
L_CF_QTY	Log of the Quantity of Kellogg's Corn Flakes
L_PT_QTY	Log of the Quantity of Post Toasties
L_CH_QTY	Log of the Quantity of General Mills Cheerios
L_WH_QTY	Log of the Quantity of General Mills Wheaties
L_CX_QTY	Log of the Quantity of Ralston Chex
L_RK_QTY	Log of the Quantity of Kellogg's Rice Krispies
L_CR_QTY	Log of the Quantity of Kellogg's Crispix
L_QO_QTY	Log of the Quantity of Quaker Oats
Brand Price	
LNP_CF	Log of the Price of Kellogg's Corn Flakes
LNP_PT	Log of the Price of Post Toasties
LNP_CH	Log of the Price of General Mills Cheerios
LNP_WH	Log of the Price of General Mills Wheaties
LNP_CX	Log of the Price of Ralston Chex
LNP_RK	Log of the Price of Kellogg's Rice Krispies
LNP_CR	Log of the Price of Kellogg's Crispix
LNP_QO	Log of the Price of Quaker Oats
Segment Quantity	
LN_AFBQ	Log of the Quantity of All Family Basic Segment
Brand Promotion	
LTPRO_CF	Log of the Percent Sold on Promotion Kellogg's Corn Flakes
LTPRO_PT	Log of the Percent Sold on Promotion Post Toasties
LTPRO_CH	Log of the Percent Sold on Promotion General Mills Cheerios
LTPRO_WH	Log of the Percent Sold on Promotion General Mills Wheaties
LTPRO_CX	Log of the Percent Sold on Promotion Ralston Chex
LTPRO_RK	Log of the Percent Sold on Promotion Kellogg's Rice Krispies
LTPRO_CR	Log of the Percent Sold on Promotion Kellogg's Crispix
LTPRO_QO	Log of the Percent Sold on Promotion Quaker Oats
Brand Couponing	
LCOUP_CF	Log of the Coupon Value (12 week weighted moving average), Kellogg's Corn Flakes
LCOUP_PT	Log of the Coupon Value (12 week weighted moving average), Post Toasties
LCOUP_CH	Log of the Coupon Value (12 week weighted moving average), General Mills Cheerios
LCOUP_WH	Log of the Coupon Value (12 week weighted moving average), General Mills Wheaties
LCOUP_CX	Log of the Coupon Value (12 week weighted moving average), Ralston Chex
LCOUP_RK	Log of the Coupon Value (12 week weighted moving average), Kellogg's Rice Krispies
LCOUP_CR	Log of the Coupon Value (12 week weighted moving average), Kellogg's Crispix
LCOUP_QO	Log of the Coupon Value (12 week weighted moving average), Quaker Oats
Brand Advertising	
LADV_CF	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Corn Flakes
LADV_PT	Log of the Advertising (12 week geometric log, λ = .7), Post Toasties

(continues)

Chart 4. (continued)

LADV_CH	Log of the Advertising (12 week geometric log, λ = .7), General Mills Cheerios
LADV_WH	Log of the Advertising (12 week geometric log, λ = .7), General Mills Wheaties
LADV_CX	Log of the Advertising (12 week geometric log λ = .7), Ralston Chex
LADV_RK	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Rice Krispies
LADV_CR	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Crispix
LADV_QO	Log of the Advertising (12 week geometric log, λ = .7), Quaker Oats

Chart 5. Variable Names, Taste Enhanced Wholesome Regressions

L_PR_QTY	Log of the Quantity of Post Raisin Bran
L_RB_QTY	Log of the Quantity of Kellogg's Raisin Bran
L_MW_QTY	Log of the Quantity of Kellogg's Frosted Mini Wheats
L_CO_QTY	Log of the Quantity of Kellogg's Cracklin Oat Bran
L_FW_QTY	Log of the Quantity of Nabisco Frosted Wheat Squares
L_QN_QTY	Log of the Quantity of Quaker 100% Natural
Brand Price	
LNP_PR	Log of the Price of Post Raisin Bran
LNP_RB	Log of the Price of Kellogg's Raisin Bran
LNP_MW	Log of the Price of Kellogg's Frosted Mini Wheats
LNP_CO	Log of the Price of Kellogg's Cracklin Oat Bran
LNP_FW	Log of the Price of Nabisco Frosted Wheat Squares
LNP_QN	Log of the Price of Quaker 100% Natural
Segment Quantity	
LN_TEWQ	Log of the Quantity of All Family Basic Segment
Brand Promotion	
LTPRO_PR	Log of the Percent Sold on Promotion of Post Raisin Bran
LTPRO_RB	Log of the Percent Sold on Promotion of Kellogg's Raisin Bran
LTPRO_MW	Log of the Percent Sold on Promotion of Kel. Frosted Mini Wheats
LTPRO_CO	Log of the Percent Sold on Promotion of Kellogg's Cracklin Oat Bran
LTPRO_FW	Log of the Percent Sold on Promotion of Nab. Frosted Wheat Squares
LTPRO_QN	Log of the Percent Sold on Promotion of Quaker 100% Natural
Brand Couponing	
LCOUP_PR	Log of the Coupon Value (12 week weighted moving average), Post Raisin Bran
LCOUP_RB	Log of the Coupon Value (12 week weighted moving average), Kellogg's Raisin Bran
LCOUP_MW	Log of the Coupon Value (12 week weighted moving average), Kellogg's Frosted Mini Wheats
LCOUP_CO	Log of the Coupon Value (12 week weighted moving average), Kellogg's Cracklin Oat Bran
LCOUP_FW	Log of the Coupon Value (12 week weighted moving average), Nabisco Frosted Wheat Squares
LCOUP_QN	Log of the Coupon Value (12 week weighted moving average), Quaker 100% Natural
Brand Advertising	
LADV_PR	Log of the Advertising (12 week geometric log, λ = .7), Post Raisin Bran
LADV_RB	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Raisin Bran
LADV_MW	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Frosted Mini Wheats
LADV_CO	Log of the Advertising (12 week geometric log, λ = .7), Kellogg's Cracklin Oat Bran
LADV_FW	Log of the Advertising (12 week geometric log, λ = .7), Nabisco Frosted Wheat Squares
LADV_QN	Log of the Advertising (12 week geometric log, λ = .7), Quaker 100% Natural

Table 1 Nielsen Data Structure, Adult and Kid Markets

Adult Segments														
Simple Health Nutrition				All Family Basic				Taste Enhanced Wholesome				Private Label		
Name	Topline Market Share	IDB Mkt Share	10 City Avg Mkt Share	Name	Topline Market Share	IDB Mkt Share	10 City Avg Mkt Share	Name	Topline Market Share	IDB Mkt Share	10 City Avg Mkt Share	Topline Market Share	IDB Mkt Share	10 City Avg Mkt Share
P Grape Nuts	2.22	2.21	2.21	K Corn Flakes	5.11	5.10	5.61	P Raisin Bran	1.66	1.66	1.82	9.00	8.58	6.57
N Shred. Wheat Line	2.32	2.32	2.50	K Crispix	0.91	0.90	0.84	K Raisin Bran	3.66	3.64	3.96			
Spoon Size	1.15	---	---	K. Rice Krispies	3.81	2.93	3.07	K Frosted Mini Wheats	3.28	3.27	2.98			
Big Biscuit	0.75	---	---	GM Wheaties	1.28	1.27	1.20	K Crakln Oat Bran	0.65	0.65	0.68			
Wheat and Bran	0.42	---	---	GM Cheerios	3.68	3.67	3.94	N Frostd Wheat Sqs	0.30	0.30	0.26			
NutriGrain Line	0.74	0.74	1.04	Q Oat Squares	0.54	0.54	0.59	Q 100% Natural	0.74	0.73	1.04			
GM Total	2.02	2.02	2.27	Ralston Chex	2.96	3.00	2.66							
P Natural Bran Flakes	0.55	0.55	0.55	Post Toasties	0.52	0.51	0.27							
K Special K	1.29	1.28	1.55											
Market Share Totals:	11.46	9.12	10.12		18.81	17.92	18.18		10.29	10.25	10.74	9.00	8.58	6.57

(continues)

Table 1 (continued)

Kid Segments							
Family Acceptable Kid				Traditional Kid			
Name	Topline Market Share	IDB Mkt Share	10 City Avg Mkt Share	Name	Topline Market Share	IDB Mkt Share	10City AvgMkt Share
K Frosted Flakes	4.91	4.90	5.21	K Froot Loops	1.98	1.97	1.90
GM Honey Nut Cheerios	2.73	2.72	3.07	K Corn Pops	1.21	1.21	1.19
GM Apple Cinn Cheerios	0.87	0.87	0.98	GM Lucky Charms	1.58	1.57	1.59
				GM Trix	0.95	0.95	1.06
				GM Kix	1.00	1.00	1.22
				GM Cinn Toast Cr	1.25	1.24	1.37
				Q Cap'n Crunch	1.04	4.04	1.04
				Q Life (line)	1.53	1.53	1.58
Market Share Totals:	8.51	8.49	9.26		10.54	10.51	11.05

Notes: GM = General Mills, K = Kellogg's, N = Nabisco, P = Post, Q = Quaker.
Brands included in the Nielsen IDB that we received from defendants but not included in this study are Barbara's Shredded Wheat, Sunshine Shredded Wheat, Private Label Shredded Wheat, Private Label Nuggets, Nabisco Fruit Wheats, Kellogg's Shredded Wheat Squares. These are very small share brands that are not distributed in all ten cities. All Nielsen market shares are for 52 weeks ending 1/22/94. The Nielsen Topline data comes from Nielsen 4 Week Topline Report 1/22/94 (KGF 0888410). The Nielsen IDB and 10 city average market shares are from the data furnished by defendants.

Table 2. Adult Cereal Market Regressions

Dependent Variable: Logarithm of Weekly Quantity of Adult Cereal (LNQ_A)
Sample: 1360 observations from Sept. 14, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	Full Model	Weighted Average Price Model
Independent Variable[2]	Estimated Coefficient (t-ratio)	Estimated Coefficient (t-ratio)
Log Adult Price (LNP_A)	-0.2552 (-7.139)*	0.5960 (-13.12)*
Log Kid Price (LNP_K)	0.3065 (10.45)*	0.6048 (16.31)*
Log Quantity RTE Cereal (LQRTE)	0.9804 (88.84)*	0.9612 (80.94)*
Log Adult Trade Promo (LTPROM_A)	0.0775 (21.10)*	
Log Kid Trade Promo (LTPROM_K)	-0.0649 (-29.79)*	
Log Adult Coupons (LCOUP_A)	0.0113 (3.407)*	0.0189 (4.273)*
Log Kid Coupons (LCOUP_K)	-0.0155 (-4.063)*	-0.0109 (-2.908)*
Log Adult Advertising (LADV_A)	-0.0313 (-4.328)*	-0.0395 (-4.170)*
Log Kid Advertising (LADV_K)	0.0186 (2.813)*	0.0244 (2.797)*
$\overline{R}^2$	0.9943	0.9897

* significant at the 1% level.

[1] 11 weeks at the beginning of the June 22, 1991 to June 18, 1994 period are lost due to computation of 12 moving average variables for advertising and coupons. Weeks after April 16, 1994 are lost because of lack of data on 1 or more variables.

[2] The city binary variables and the constant are not reported in this table to keep its size manageable.

Table 3. Adult Segment Regressions: Full Model

Dependent Variable: Logarithm of Weekly Quantity of Simple Health Nutrition (LNQ_SHN), All Family Basic (LNQ_AFB), Taste Enhanced Wholesome (LNQ_TEW), Private Label (LNQ_TPL).
Sample: 1360 observations from Sept. 14, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1		2		3		4	
	LNQ_SHN		LNQ_AFB		LNQ_TEW		LNQ_TPL	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log SHN Price (LNP_SHN)	-1.0735	-12.32*	0.1865	2.24**	0.2027	1.73	0.6934	5.46*
Log AFB Price (LNP_AFB)	0.1212	2.73*	-0.2317	-5.47*	0.1482	2.49*	0.2807	4.34*
Log TEW Price (LNP_TEW)	0.2592	4.12*	0.2298	3.82*	-0.7721	-9.15*	0.3135	3.42*
Log TPL Price (LNP_TPL)	0.2143	2.35*	-0.1909	-2.19**	-0.0184	-0.15	-0.1783	-1.34
Log Quantity Segment Cereal (LTQRTE_A)	0.7496	32.89**	1.0748	49.34*	1.0873	35.54*	0.7026	21.15*
Log SHN Trade Promo (LPRO_SHN)	0.0812	25.06*	-0.0358	-11.82*	-0.0061	-1.41	-0.0043	-0.91
Log AFB Trade Promo (LPRO_AFB)	-0.1055	-17.61*	0.1802	31.47*	-0.1594	-19.83*	-0.0862	-9.87*
Log TEW Trade Promo (LPRO_TEW)	-0.0028	-8.01*	-0.0486	-14.68*	0.1236	26.56*	-0.0137	-2.72*
Log TPL Trade Promo (LPRO_TPL)	0.0066	1.48	-0.0512	-12.12*	0.0000	0.00	0.1361	21.13*

(*continues*)

Table 3. (continued)

Independent Variable	1 LNQ_SHN Estimated Coefficient	(t-ratio)	2 LNQ_AFB Estimated Coefficient	(t-ratio)	3 LNQ_TEW Estimated Coefficient	(t-ratio)	4 LNQ_TPL Estimated Coefficient	(t-ratio)
Log SHN Coupons (LCUP_SHN)	0.0347	7.53*	-0.0201	-4.56*	-0.0344	-5.58*	0.0509	7.59*
Log AFB Coupons (LCUP_AFB)	-0.0181	-2.89*	0.0223	3.72*	-0.0023	-0.28	-0.0318	-3.48*
Log TEW Coupons (LCUP_TEW)	-0.0108	-2.05**	0.0058	1.16	0.0392	5.53*	-0.0547	-7.11*
Log SHN Advertising (LADV_SHN)	0.0581	6.84*	-0.0654	-8.05*	0.0625	5.48*	-0.0198	-1.60
Log AFB Advertising (LADV_AFB)	-0.0792	-7.41*	0.1162	11.36*	-0.0964	-6.72*	-0.0900	-5.77*
Log TEW Advertising (LADV_TEW)	0.0041	0.46	-0.0330	-4.20*	0.0465	3.94*	-0.0409	3.20*
$\overline{R}^2$	0.9768		0.9826		0.9616		0.8918	

Note: Own brand strategic variables are underlined.
* significant at the 1% level
** significant at the 5% level

[1] 11 weeks at the beginning of the June 22, 1991 to June 18, 1994 period are lost due to computation of 12 moving average variables for advertising and coupons. Weeks after April 16, 1994 are lost because of lack of data on 1 or more variables. The city binaries and the constant are not reported in this table to keep its size manageable.

Table 4. Adult Segment Regressions: Weighted Average Price Model

Dependent Variable: Logarithm of Weekly Quantity of Simple Health Nutrition (LNQ_SHN), All Family Basic (LNQ_AFB), Taste Enhanced Wholesome (LNQ_TEW), Private Label (LNQ_TPL).
Sample: 1360 observations from Sept. 14, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1		2		3		4	
	LNQ_SHN		LNQ_AFB		LNQ_TEW		LNQ_TPL	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log SHN Price (LNP_SHN)	-1.9848	-18.93*	0.6359	5.64**	0.3810	2.60	0.5234	3.72*
Log AFB Price (LNP_AFB)	0.3069	5.60*	-0.6798	-11.55*	0.6506	8.51*	0.4514	6.15*
Log TEW Price (LNP_TEW)	0.4149	5.65*	0.6905	8.75*	-1.8581	-18.14*	0.4930	5.01*
Log TPL Price (LNP_TPL)	0.0645	0.56*	0.1509	1.21**	-0.0758	-0.47	-0.8004	-5.16*
Log Quantity Segment Cereal (LTQRTE_A)	0.6368	24.17**	1.1977	42.29*	1.0265	27.91*	0.6469	18.31*
Log SHN Coupons (LCUP_SHN)	0.0531	9.18*	-0.0356	-5.73*	-0.0196	-2.43**	0.0458	5.90*
Log AFB Coupons (LCUP_AFB)	-0.0307	-3.93*	0.0495	5.90*	-0.0335	-3.08*	-0.0440	-4.20*
Log TEW Coupons (LCUP_TEW)	-0.0259	-3.85*	0.0116	1.60	0.0555	5.90*	-0.0749	-8.28*
Log SHN Advertising (LADV_SHN)	0.1116	10.40*	-0.1027	-8.91*	0.0629	4.20*	0.0457	3.18*
Log AFB Advertising (LADV_AFB)	-0.1208	-8.85*	0.1539	10.49*	-0.1118	-5.86*	-0.1124	-6.14*
Log TEW Advertising (LADV_TEW)	0.0449	4.03*	-0.0809	-6.75*	0.0791	5.09*	0.0589	3.94*
$\overline{R}^2$	0.9610		0.9630		0.9304		0.8464	

Note: Own brand strategic variables are underlined. * significant at the 1% level ** significant at the 5% level

[1] 11 weeks at the beginning of the June 22, 1991 to June 18, 1994 period are lost due to computation of 12 moving average variables for advertising and coupons. Weeks after April 16, 1994 are lost because of lack of data on 1 or more variables. The city binaries and the constant are not reported in this table to keep its size manageable.

Table 5. Simple Health Nutrition Individual Brand Regressions: Full Model

Dependent Variable: Logarithm of Weekly Quantity of Shredded Wheat Line (L_NL_QTY), Grape Nuts Nuggets (L_GN_QTY), GM Total (L_TL_QTY), Kellogg's Nutrigrain (L_NG_QTY), Post Natural Bran Flakes (L_NB_QTY), and Kellogg's Special K (L_SK_QTY).
Sample: 1240 observations from Dec 7, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

Independent Variable	1 L_NL_QTY Coeff. (t-ratio)	2 L_GN_QTY Coeff. (t-ratio)	3 L_TL_QTY Coeff. (t-ratio)	4 L_NG_QTY Coeff. (t-ratio)	5 L_NB_QTY Coeff. (t-ratio)	6 L_SK_QTY Coeff. (t-ratio)
Log NL Price (LNP_NL)	-1.4637	1.2861	-0.7786	1.0433	0.1489	0.8607
	(-11.74)*	(7.64)*	(-4.12)*	(4.49)*	(0.82)	(4.24)*
Log GN Price (LNP_GN)	0.7366	-1.7229	-0.0893	0.3029	-0.2371	0.8455
	(9.44)*	(-16.37)*	(-0.75)	(2.08)**	(-2.10)**	(6.66)*
Log TL Price (LNP_TL)	0.3815	0.3144	-1.0764	0.2401	0.1303	0.4541
	(6.08)*	(3.71)*	(-11.31)*	(2.05)**	(1.43)	(4.45)*
Log NG Price (LNP_NG)	0.3501	0.5621	-0.1276	-2.1242	0.3744	0.4861
	(5.88)*	(7.00)*	(-1.41)	(-19.13)*	(4.34)*	(5.02)*
Log NB Price (LNP_NB)	0.1324	0.0889	0.1259	-0.3974	-1.5068	0.0412
	(1.69)	(0.84)	(1.06)	(-2.72)*	(-13.27)	(0.32)
Log SK Price (LNP_SK)	0.3780	0.2112	0.4715	0.4393	0.4161	-1.7715
	(5.62)*	(2.33)**	(4.62)**	(3.50)*	(4.27)*	(-16.19)*
Log Quantity SHN Cereal (LN_SHNQ)	0.7623	0.8810	0.9761	0.7879	0.6867	1.1236
	(31.73)*	(27.18)*	(26.78)*	(17.58)*	19.71)*	(28.76)*

Log NL Trade Promo (LTPRO_NL)	0.0108	-0.0020	-0.0016	-0.0038	-0.0089	-0.0076
	(7.30)*	(-1.03)	(-0.73)	(-1.37)	(-4.15)*	(-3.17)*
Log GN Trade Promo (LTPRO_GN)	-0.0004	0.0150	-0.0063	-0.0021	-0.0081	-0.0042
	(-0.37)	(9.48)*	(-3.53)*	(-0.98)	(-4.77)*	(-2.19)**
Log TL Trade Promo (LTPRO_TL)	-0.0117	-0.0189	0.0516	-0.0181	-0.0180	-0.0128
	(-4.92)*	(-5.88)*	(14.26)*	(-4.07)*	(-5.22)*	(-3.29)*
Log NG Trade Promo (LTPRO_NG)	-0.0026	-0.0005	-0.0038	0.0160	-0.0012	-0.0012
	(-2.52)*	(-0.34)	(-2.45)*	(8.45)*	(-0.80)	(-0.72)
Log NB Trade Promo (LTPRO_NB)	-0.0014	0.0041	-0.0020	-0.0061	0.0072	0.0000
	(-1.50)	(3.24)*	(-1.38)	(-3.47)*	(5.28)*	(0.01)
Log SK Trade Promo (LTPRO_SK)	-0.0001	0.0004	-0.0027	-0.0054	-0.0058	0.0138
	(-0.11)	(0.27)	(-1.56)	(-2.57)*	(-3.52)*	(7.55)*
Log NL Coupons (LCOUP_NL)	0.0243	-0.0079	-0.0148	-0.0135	0.0009	0.0060
	(8.81)*	(-2.12)**	(-3.53)*	(-2.62)*	(0.22)	(1.34)
Log GN Coupons (LCOUP_GN)	-0.0251	0.0661	-0.0099	-0.0152	-0.0056	-0.0257
	(-5.50)*	(10.72)*	(-1.42)	(-1.79)	(-0.85)	(-3.46)*
Log TL Coupons (LCOUP_TL)	0.0131	0.0012	0.0244	-0.0346	-0.0161	-0.0024
	(3.28)*	(0.22)	(4.01)*	(-4.63)*	(-2.77)*	(-0.37)
Log NG Coupons (LCOUP_NG)	-0.0076	0.0013	-0.0027	0.0644	-0.0004	-0.0006
	(-1.86)	(0.24)	(-0.44)	(8.47)*	(-0.07)	(-0.09)
Log NB Coupons (LCOUP_NB)	0.0100	-0.0212	-0.0124	0.0056	0.0788	0.0034
	(2.66)*	(4.18)*	(-2.18)*	(0.80)	(14.45)*	(0.56)
Log SK Coupons (LCOUP_SK)	0.0046	0.0019	0.0042	-0.0335	-0.0038	0.0117
	(1.16)	(0.34)	(0.69)	(-4.48)*	(-0.66)	(1.79)

(*continues*)

Table 5 (continued)

Independent Variable	1 L_NL_QTY Coeff. (t-ratio)	2 L_GN_QTY Coeff. (t-ratio)	3 L_TL_QTY Coeff. (t-ratio)	4 L_NG_QTY Coeff. (t-ratio)	5 L_NB_QTY Coeff. (t-ratio)	6 L_SK_QTY Coeff. (t-ratio)
Log NL Advertising (LADV_NL)	0.0292	-0.0056	-0.0088	-0.0038	0.0291	-0.0194
	(12.03)*	(-1.70)	(-2.38)**	(-0.84)	(8.27)*	(-4.92)*
Log GN Advertising (LADV_GN)	-0.0127	0.1122	-0.0425	0.0004	-0.0050	-0.0294
	(1.84)	(12.00)*	(-4.05)*	(0.03)	(-0.50)	(-2.61)*
Log TL Advertising (LADV_TL)	-0.0186	0.0323	-0.0081	0.0066	0.0093	-0.0125
	(-4.21)*	(5.41)	(-1.21)	(0.80)	(1.46)	(-1.73)
Log NG Advertising (LADV_NG)	0.0137	-0.0141	-0.0180	0.0102	-0.0333	0.0269
	(1.80)	(-1.37)	(-1.55)	(0.72)	(-3.00)*	(2.17)**
Log NB Advertising (LADV_NB)	-0.0033	-0.0149	0.0044	-0.0038	0.0028	0.0138
	(-1.26)	(-4.25)*	(1.13)	(-0.79)	(0.75)	(3.26)*
Log SK Advertising (LADV_SK)	0.0287	-0.0068	-0.0595	-0.0622	0.0353	0.0948
	(3.03)*	(-0.53)	(-4.14)*	-3.52)*	(2.57)*	(6.16)*
$\overline{R}^2$	0.9574	0.9461	0.9322	0.9314	0.9172	0.9466

Note: Own brand strategic variables are underlined.
* significant at the 1% level ** significant at the 5% level

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because GRP (Advertising) data ends April 16 1994, coupons ends May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at the start of the data so regression started then in attempt to keep the same sample at brand level. The city binaries and the constant are not reported in this table to keep its size manageable.

Table 6 Simple Health Nutrition Individual Brand Regressions: Weighted Average Price Model

Dependent Variable: Logarithm of Weekly Quantity of Shredded Wheat Line (L_NL_QTY), Grape Nuts Nuggets (L_GN_QTY), GM Total (L_TL_QTY), Kellogg's Nutrigrain (L_NG_QTY), Post Natural Bran Flakes (L_NB_QTY), and Kellogg's Special K (L_SK_QTY).
Sample: 1240 observations from Dec 7, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1	2	3	4	5	6
	L_NL_QTY	L_GN_QTY	L_TL_QTY	L_NG_QTY	L_NB_QTY	L_SK_QTY
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Independent Variable	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)
Log NL Price (LNP_NL)	-1.7326	1.2280	-0.4870	0.9752	0.2817	0.9528
	(-13.89)*	(7.15)*	(-2.44)**	(4.17)*	(1.55)	(4.70)*
Log GN Price (LNP_GN)	0.7235	-2.0711	0.1642	0.2648	-0.2049	0.9740
	(9.52)*	(-19.80)*	(1.35)	(1.86)	(-1.85)	(7.86)*
Log TL Price (LNP_TL)	0.4634	0.5833	-1.5949	0.3971	0.2174	0.6165
	(7.69)*	(7.03)	(16.56)*	(3.51)*	(2.48)*	(6.29)*
Log NG Price (LNP_NG)	0.4119	0.6338	-0.0914	-2.5210	0.3615	0.5467
	(7.20)*	(8.05)*	(-1.00)	(-23.49)*	(4.34)*	(5.88)*
Log NB Price (LNP_NB)	0.1269	-0.0177	0.2630	-0.2651	-1.6941	-0.0037
	(1.66)	(-0.17)	(2.16)*	(-1.86)	(15.28)*	(-0.03)
Log SK Price (LNP_SK)	0.3561	0.2345	0.5833	0.5587	0.3652	-2.0598
	(5.36)*	(2.57)*	(5.50)*	(4.49)*	(3.78)*	(-19.09)*
Log Qty SHN Cereal (LN_SHNQ)	0.7515	0.8707	1.0318	0.7396	0.6195	1.1491
	(31.27)*	(26.33)*	(26.87)*	(16.41)*	(17.72)*	(29.43)*
Log NL Coupons (LCOUP_NL)	0.0229	-0.0061	-0.0137	-0.0154	0.0046	0.0028
	(8.17)*	(-1.57)	(-3.05)*	(-2.92)*	(1.12)	(0.62)
Log GN Coupons (LCOUP_GN)	-0.0251	0.0653	-0.0077	-0.0222	-0.0039	-0.0028
	(-5.37)*	(10.16)*	(-1.03)	(-2.54)*	(-0.58)	(3.00)*

(*continues*)

Table 6 (continued)

	1 L_NL_QTY	2 L_GN_QTY	3 L_TL_QTY	4 L_NG_QTY	5 L_NB_QTY	6 L_SK_QTY
Log TL Coupons (LCOUP_TL)	0.0129	0.0028	0.0271	-0.0406	-0.0207	-0.0014
	(3.16)*	(0.50)	(4.16)*	(5.31)*	(-3.49)*	(-0.21)
Log NG Coupons (LCOUP_NG)	-0.0018	-0.0005	-0.0001	0.0629	0.0019	-0.0019
	(-1.93)**	(-0.08)	(-0.02)	(7.99)*	(0.31)	(-0.28)
Log NB Coupons (LCOUP_NB)	0.0118	-0.0212	-0.0137	0.0105	0.0786	-0.0028
	(3.07)*	(-3.99)*	(-2.22)*	(1.46)	(14.03)*	(-0.45)
Log SK Coupons (LCOUP_SK)	0.0017	0.0074	0.0006	-0.0261	-0.0043	0.0092
	(0.42)	(1.31)	(0.10)	(-3.41)*	(-0.72)	(1.38)
Log NL Advertising (LADV_NL)	0.0295	-0.0014	-0.0086	-0.0044	0.0219	-0.0223
	(12.30)*	(-0.41)	(-2.24)*	(-0.99)	(6.29)*	(-5.72)*
Log GN Advertising (LADV_GN)	-0.0100	0.1178	-0.0391	-0.0057	-0.0188	-0.0365
	(-1.41)	(12.41)*	(-3.47)*	(-0.43)	(-1.83)	(-3.19)*
Log TL Advertising (LADV_TL)	-0.0219	0.0280	0.0058	-0.0037	0.0050	-0.0122
	(-4.88)*	(4.52)*	(0.80)	(-0.43)	(0.76)	(-1.67)
Log NG Advertising (LADV_NG)	0.0053	-0.0248	-0.0062	0.0126	-0.0255	0.0333
	(0.68)	(-2.31)*	(-0.50)	(0.86)	(-2.25)**	(2.64)*
Log NB Advertising (LADV_NB)	-0.0020	-0.0096	-0.0050	0.0003	0.0044	0.0151
	(-0.74)	(-2.64)*	(-1.18)	(0.07)	(1.14)	(3.53)*
Log SK Advertising (LADV_SK)	0.0292	0.0126	-0.0836	-0.0547	0.0396	0.0953
	(3.08)*	(0.97)	(-5.52)*	(-3.07)*	(2.87)*	(6.18)*
$\overline{R}^2$	0.9545	0.9401	0.9191	0.9260	0.9110	0.9431

Note: Own brand strategic variables are underlined. * significant at the 1% level ** significant at the 5% level

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because GRP (Advertising) data ends April 16 1994, coupons ends May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at the start of the data so regression started then in attempt to keep the same sample at brand level. The city binaries and the constant are not reported in this table to keep its size manageable.

Table 7. All Family Basic Individual Brand Regressions: Full Model

Dependent Variables: Logarithm of Weekly Quantity of Kellogg's Corn Flakes (L_CF_QTY), Post Toasties (L_PT_QTY), General Mills Cheerios (L_CH_QTY), General Mills Wheaties L_WH_QTY, Ralston Chex L_CX_QTY, Kellogg's Rice Krispies L_RK_QTY, Kellogg's Crispix L_CR_QTY, Quaker Oat Squares L_QO_QTY
Sample: 1116 Observations from Sept. 14, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1		2		3		4	
	L_CF_QTY		L_PT_QTY		L_CH_QTY		L_WH_QTY	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log CF Price (LNP_CF)	-0.8386	-8.93*	0.4872	1.11	0.2469	2.73*	0.2525	1.69
Log PT Price (LPN_PT)	-0.1568	-2.19**	-2.9445	-8.78*	0.1128	1.63	0.4350	3.81*
Log CH Price (LPN_CH)	0.4202	3.58*	0.9625	1.75	-0.7695	-6.80*	0.5690	3.05*
Log WH Price (LNP_WH)	0.3490	3.24*	-1.5517	-3.16*	0.1009	1.00	-2.1406	-12.83*
Log CX Price (LPN_CX)	0.1807	1.34	1.7527	2.78*	0.1929	1.49	0.0694	0.32
Log RK Price (LNP_RK)	0.2424	2.84*	0.4648	1.17	0.2432	2.96*	0.0669	0.49
Log CR Price (LPN_CR)	0.0944	0.99	-0.2072	-0.47	0.0015	0.02	0.0033	0.02
Log QO Price (LNP_QO)	-0.2612	-1.38	3.2535	3.67*	0.0792	0.43	0.6762	2.24**
Log Quantity AFB Cereal (LN_AFBQ)	1.0463	26.73*	0.4975	2.72*	0.6569	17.41*	0.7071	11.36*
Log CF Trade Promotion (LTPRO_CF)	0.1509	20.68*	-0.0550	-1.61	-0.0439	-6.24*	-0.0637	-5.49*
Log PT Trade Promotion (LTPRO_PT)	-0.0006	-0.21	0.1689	12.04*	0.0047	1.63	0.0000	0.00
Log CH Trade Promotion (LTPRO_CH)	-0.0565	-7.36*	0.0064	0.18	0.1471	19.89*	0.0187	1.53
Log WH Trade Promotion (LTPRO_WH)	-0.0180	-5.07*	0.0025	0.15	-0.0019	-0.55	0.0640	11.34*
Log CX Trade Promotion (LTPRO_CX)	-0.0211	-3.24*	0.0053	0.17	-0.0143	-2.28**	-0.0298	-2.87*
Log RK Trade Promotion (LTPRO_RK)	-0.0427	-7.26*	0.0370	1.35	-0.0118	-2.09**	-0.0230	-2.46*

(*continues*)

Table 7 (continued)

	1		2		3		4	
	L_CF_QTY		L_PT_QTY		L_CH_QTY		L_WH_QTY	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log CR Trade Promotion (LTPRO_CR)	0.0053	2.22**	0.0262	2.36**	-0.0010	-0.43	-0.0081	-2.14**
Log QO Trade Promotion (LTPRO_QO)	-0.0026	-1.29	0.0323	3.47*	-0.0005	-0.25	-0.0011	-0.35
Log CF Coupons (LCOUP_CF)	0.0303	3.52*	0.0307	0.76	-0.0165	-1.99**	0.0061	0.44
Log CH Coupons (LCOUP_CH)	-0.0110	-0.96	0.1506	2.78*	0.0548	4.91*	-0.0523	-2.84*
Log WH Coupons (LCOUP_WH)	0.0019	0.24	-0.0371	-1.01	-0.0225	-2.98*	0.0453	3.64*
Log CX Coupons (LCOUP_CX)	-0.0158	-1.49	-0.1095	-2.20**	-0.0532	-5.19*	-0.0134	-0.79
Log RK Coupons (LCOUP_RK)	-0.0061	-0.69	-0.0720	-1.72	-0.0042	-0.49	-0.0466	-3.27*
Log CR Coupons (LCOUP_CR)	-0.0141	-1.95**	0.0451	1.33	0.0252	3.60*	-0.0108	-0.94
Log QO Coupons (LCOUP_QO)	0.0115	2.07**	-0.0229	-0.88	-0.0113	-2.13**	0.0026	0.29
Log CF Advertising (LADV_CF)	0.0252	1.23	0.0046	0.05	-0.0004	-0.02	0.1231	3.77*
Log PT Advertising (LADV_PT)	0.0050	0.92	-0.0205	-0.80	-0.0082	-1.55	-0.0165	-1.90
Log CH Advertising (LADV_CH)	0.0266	1.78	0.1243	1.78	0.0059	0.41	0.0236	0.99
Log WH Advertising (LADV_WH)	-0.0110	-1.71	-0.1550	-5.14*	0.0046	0.73	0.0262	2.55*
Log CX Advertising (LADV_CX)	-0.0096	-1.82	-0.0583	-2.37**	0.0067	1.32	0.0160	1.91
Log RK Advertising (LADV_RK)	0.0483	1.91	-0.3257	-2.76*	-0.0411	-1.69	-0.0986	-2.45*
Log CR Advertising (LADV_CR)	-0.0283	-1.36	-0.0318	-0.33	-0.0050	-0.25	-0.0670	-2.03**
Log QO Advertising (LADV_QO)	0.0090	1.91	0.0301	1.37	0.0232	5.10*	-0.0159	-2.12**
$\overline{R}^2$	0.9149		0.7696		0.9230		0.8241	

	5		6		7		8	
	L_CX_QTY		L_RK_QTY		L_CR_QTY		L_QO_QTY	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log CF Price (LPN_CF)	0.5078	5.63*	0.1833	1.49	0.5334	4.25*	0.1955	1.96**
Log PT Price (LNP_PT)	-0.0107	-0.16	-0.2555	-2.72*	0.0819	0.85	0.1426	1.87
Log CH Price (LNP_CH)	0.3095	2.75*	-0.0057	-0.04	0.0216	0.14	0.0230	0.18
Log WH Price (LNP_WH)	0.0173	0.17	0.1351	0.98	0.1955	1.40	0.0591	0.53
Log CX Price (LNP_CX)	-1.3412	-10.38*	0.2174	1.23	0.0943	0.52	0.3567	2.49*
Log RK Price (LNP_RK)	0.1039	1.27	-1.3060	-11.70*	0.2927	2.57*	0.1925	2.12**
Log CR Price (LNP_CR)	-0.0161	-0.18	-0.3239	2.60*	-2.4962	-19.61*	0.2935	2.89*
Log QO Price (LNP_QO)	0.7771	4.27*	-0.5276	-2.13**	0.3094	1.22	-1.2991	-6.44*
Log Quantity AFB Cereal (LN_AFBQ)	0.4692	12.49*	1.0236	19.97*	0.5527	10.56*	0.2884	6.92*
Log CF Trade Promotion (LTPRO_CF)	-0.0327	-4.67*	-0.0735	-7.69*	-0.0587	-6.02*	-0.0069	-0.88
Log PT Trade Promotion (LTPRO_PT)	-0.0004	-0.15	-0.0077	-1.97**	-0.0023	-0.58	0.0024	0.74
Log CH Trade Promotion (LTPRO_CH)	-0.0179	-2.44**	-0.0561	-5.58*	-0.0421	-4.11*	-0.0184	-2.25**
Log WH Trade Promotion (LTPRO_WH)	-0.0011	-0.33	0.0029	0.63	-0.0126	-2.67*	-0.0032	-0.84
Log CX Trade Promotion (LTPRO_CX)	0.0994	15.88*	-0.0135	-1.58	0.0017	0.19	-0.0112	-1.62
Log RK Trade Promotion (LTPRO_RK)	0.0075	1.32	0.1187	15.42*	-0.0049	-0.63	-0.0214	-3.41*
Log CR Trade Promotion (LTPRO_CR)	-0.0017	-0.76	0.0001	0.03	0.0260	8.20*	-0.0034	-1.35
Log QO Trade Promotion (LTPRO_QO)	-0.0008	-0.44	0.0022	0.85	-0.0017	-0.63	0.0146	6.86*
Log CF Coupons (LCOUP_CF)	-0.0010	-0.12	0.0067	0.60	0.0288	2.50*	-0.0290	-3.17*
Log CH Coupons (LCOUP_CH)	0.0189	1.70	-0.0084	-0.55	-0.0023	-0.15	0.0065	0.52
Log WH Coupons (LCOUP_WH)	-0.0212	-2.83*	0.0169	1.65	0.0001	0.01	-0.0149	-1.79
Log CX Coupons (LCOUP_CX)	0.1019	9.97*	0.0154	1.10	-0.0078	-0.55	-0.0090	-0.79

(*continues*)

Table 7 (continued)

	5		6		7		8	
	L_CX_QTY		L_RK_QTY		L_CR_QTY		L_QO_QTY	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log RK Coupons (LCOUP_RK)	-0.0052	-0.61	0.0610	5.21*	-0.0098	-0.82	0.0036	0.38
Log CR Coupons (LCOUP_CR)	0.0080	1.15	-0.0063	-0.67	0.0611	6.31*	0.0051	0.66
Log QO Coupons (LCOUP_QO)	0.0031	0.57	-0.0120	-1.64	0.0043	0.58	0.0388	6.55*
Log CF Advertising (LADV_CF)	-0.0646	-3.28*	0.0046	0.17	-0.0278	-1.01	0.0623	2.84*
Log PT Advertising (LADV_PT)	0.0112	2.14**	-0.0193	-2.67*	0.0083	1.14	0.0016	0.28
Log CH Advertising (LADV_CH)	-0.0639	-4.46**	0.0114	0.58	-0.0426	-2.13**	0.0070	0.44
Log WH Advertising (LADV_WH)	0.0146	2.36**	-0.0126	-1.50	-0.0082	-0.95	-0.0142	-2.06**
Log CX Advertising (LADV_CX)	0.0067	1.32	-0.0164	-2.38**	-0.0149	-2.11**	-0.0138	-2.46*
Log RK Advertising (LADV_RK)	0.0149	0.61	0.0584	1.77	0.0167	0.50	-0.0859	-3.19*
Log CR Advertising (LADV_CR)	0.0371	1.86	0.0171	0.63	0.0409	1.47	0.0516	2.34**
Log QO Advertising (LADV_QO)	0.0045	1.00	-0.0197	-3.19*	-0.0002	-0.03	-0.0002	-0.03
$\overline{R}^2$	0.8825		0.8743		0.8092		0.8629	

Note: Own brand strategic variables are underlined.
* significant at the 1% level.
** significant at the 5% level.

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because the GRP (Advertising) data ends April 16, 1994, coupons end May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at start of data so regression started then in attempt to keep the same sample at brand level. Also lost one city (Philadelphia) because 11 weeks of no quantity data for Post Toasties, resulting in 9 cities, 124 observations each. The city binaries and the constant are not reported in this table to keep its size manageable.

Table 8. All Family Basic Individual Brand Regressions: Weighted Average Price Model

Dependent Variables: Logarithm of Weekly Quantity of Kellogg's Corn Flakes (L_CF_QTY), Post Toasties (L_PT_QTY), General Mills Cheerios (L_CH_QTY), General Mills Wheaties L_WH_QTY, Ralston Chex L_CX_QTY, Kellogg's Rice Krispies L_RK_QTY, Kellogg's Crispix L_CR_QTY, Quaker Oat Squares L_QO_QTY
Sample: 1116 Observations from Sept. 14, 1991 to April 16, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1		2		3		4	
	L_CF_QTY		L_PT_QTY		L_CH_QTY		L_WH_QTY	
Independent Variable	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)	Estimated Coefficient	(t-ratio)
Log CF Price (LNP_CF)	-1.5906	-14.83*	1.2404	2.84*	0.4565	4.57*	0.4615	3.11*
Log PT Price (LNP_PT)	-0.0715	-0.82	-3.5117	-9.91*	0.0812	1.00	0.2864	2.38**
Log CH Price (LNP_CH)	0.7300	5.38*	1.3148	2.38**	-1.5128	-11.98*	0.4652	2.48*
Log WH Price (LNP_WH)	0.6698	5.39*	-1.5618	-3.09*	-0.0869	-0.75	-2.6120	-15.17*
Log CX Price (LNP_CX)	0.8344	5.66*	0.7412	1.24	0.0043	0.03	0.0225	0.11
Log RK Price (LNP_RK)	0.4564	4.64*	0.6471	1.62	0.4541	4.96*	0.2311	1.70
Log CR Price (LNP_CR)	0.3233	2.96*	-0.3064	-0.69	-0.1940	-1.91	-0.0277	-0.18
Log QO Price (LNP_QO)	0.2186	0.96	3.3660	3.64*	0.0793	0.37	0.6986	2.22**
Log Quantity AFB Cereal (LN_AFBQ)	1.1370	25.71*	0.5322	2.96*	0.6866	16.68*	0.6334	10.34*
Log CF Coupons (LCOUP_CF)	0.0378	3.68*	-0.0071	-0.17	-0.0169	-1.77	-0.0083	-0.59
Log CH Coupons (LCOUP_CH)	-0.0195	-1.39	0.1703	2.98*	0.0466	3.56*	-0.0236	-1.22
Log WH Coupons (LCOUP_WH)	-0.0157	-1.66	-0.0476	-1.24	-0.0171	-1.94**	0.0363	2.77*
Log CX Coupons (LCOUP_CX)	-0.0299	-2.30**	-0.1304	-2.46*	-0.0532	-4.39*	-0.0158	-0.88
Log RK Coupons (LCOUP_RK)	-0.0222	-2.08**	-0.0856	-1.97**	-0.0063	-0.63	-0.0228	-1.54
Log CR Coupons LCOUP_CR)	-0.0177	-2.01**	0.0480	1.34	0.0324	3.96*	-0.0006	-0.05
Log QO Coupons (LCOUP_QO)	0.0076	1.11	0.0042	0.15	-0.0075	-1.18	0.0041	0.43

(*continues*)

Table 8 (continued)

Independent Variable	1 L_CF_QTY Estimated Coefficient	(t-ratio)	2 L_PT_QTY Estimated Coefficient	(t-ratio)	3 L_CH_QTY Estimated Coefficient	(t-ratio)	4 L_WH_QTY Estimated Coefficient	(t-ratio)
Log CF Advertising (LADV_CF)	0.0558	2.27**	0.0210	0.21	0.0401	1.75	0.1626	4.78*
Log PT Advertising (LADV_PT)	-0.0064	-0.99	0.0105	0.40	0.0030	0.49	-0.0149	-1.66
Log CH Advertising (LADV_CH)	0.0055	0.31	0.0058	0.08	0.0334	2.01**	0.0615	2.50*
Log WH Advertising (LADV_WH)	0.0165	2.14**	-0.1168	-3.73*	-0.0078	-1.08	0.0126	1.18
Log CX Advertising (LADV_CX)	0.0029	0.47	-0.0452	-1.77	-0.0043	-0.73	0.0020	0.23
Log RK Advertising (LADV_RK)	-0.0093	-0.31	-0.2860	-2.30**	-0.0391	-1.38	-0.0666	-1.58
Log CR Advertising (LADV_CR)	-0.0318	-1.25	-0.0356	-0.37	-0.0135	-0.57	-0.0622	-1.77
Log QO Advertising (LADV_QO)	0.0002	0.03	0.0246	1.05	0.0250	4.69*	-0.0093	-1.17
$\overline{R}^2$	0.8707		0.7347		0.8908		0.7974	

Independent Variable	5 L_CX_QTY Estimated Coefficient	(t-ratio)	6 L_RK_QTY Estimated Coefficient	(t-ratio)	7 L_CR_QTY Estimated Coefficient	(t-ratio)	8 L_QO_QTY Estimated Coefficient	(t-ratio)
Log CF Price (LNP_CF)	0.7942	8.45*	0.5977	4.57*	0.8087	6.54*	0.2662	2.80*
Log PT Price (LNP_PT)	0.0061	0.08	-0.2907	-2.74*	0.1328	1.32	0.1238	1.60
Log CH Price (LNP_CH)	0.4852	4.08*	0.3075	1.86	0.0621	0.40	0.0087	0.07
Log WH Price (LNP_WH)	-0.1619	-1.49	0.2026	1.34	0.3685	2.57*	0.1499	1.36
Log CX Price (LNP_CX)	-2.2767	-17.64*	0.2481	1.38	0.0999	0.59	0.4437	3.39*
Log RK Price (LNP_RK)	0.0838	0.97	-1.9915	-16.60*	0.1495	1.32	0.2700	3.09*
Log CR Price (LNP_CR)	-0.0914	-0.96	0.2974	2.24**	-2.9117	-23.13*	0.4284	4.43*
Log QO Price (LNP_QO)	0.8193	4.12*	-1.2185	-4.39*	0.2328	0.89	-1.4836	-7.36*
Log Quantity AFB Cereal (LN_AFBQ)	0.4504	11.63*	1.0496	19.46*	0.4522	8.86*	0.2178	5.55*
Log CF Coupons (LCOUP_CF)	-0.0031	-0.35	-0.0042	-0.34	0.0567	4.80*	-0.0286	-3.15*
Log CH Coupons (LCOUP_CH)	0.0089	0.73	0.0108	0.63	-0.0035	-0.22	0.0082	0.66
Log WH Coupons (LCOUP_WH)	-0.0079	-0.95	0.0237	2.05**	0.0214	1.96**	-0.0161	-1.92
Log CX Coupons (LCOUP_CX)	0.1094	9.59*	0.0333	2.10**	0.0068	0.45	-0.0173	-1.50
Log RK Coupons (LCOUP_RK)	-0.0020	-0.22	0.0670	5.14*	-0.0204	-1.65	0.0015	0.16
Log CR Coupons (LCOUP_CR)	-0.0007	-0.09	-0.0083	-0.77	0.0490	4.81*	0.0105	1.34
Log QO Coupons (LCOUP_QO)	0.0030	0.50	-0.0129	-1.54	0.0041	0.52	0.0406	6.69*

(*continues*)

Table 8 (continued)

Independent Variable	5 L_CX_QTY Estimated Coefficient	(t-ratio)	6 L_RK_QTY Estimated Coefficient	(t-ratio)	7 L_CR_QTY Estimated Coefficient	(t-ratio)	8 L_QO_QTY Estimated Coefficient	(t-ratio)
Log CF Advertising (LADV_CF)	-0.1217	-5.66*	-0.0688	-2.29**	-0.0377	-1.33	0.0634	2.91*
Log PT Advertising (LADV_PT)	0.0093	1.62	-0.0094	-1.19	-0.0045	-0.59	0.0004	0.07
Log CH Advertising (LADV_CH)	-0.0436	-2.79*	-0.0385	-1.78	-0.0434	-2.11**	0.0022	0.14
Log WH Advertising (LADV_WH)	0.0006	0.09	-0.0160	-1.71	-0.0148	-1.67	-0.0092	-1.35
Log CX Advertising (LADV_CX)	0.0145	2.64*	-0.0280	-3.65*	-0.0073	-1.01	-0.0129	-2.32**
Log RK Advertising (LADV_RK)	0.0132	0.49	0.1399	3.76*	0.0050	0.14	-0.0754	-2.78*
Log CR Advertising (LADV_CR)	0.0657	2.95*	0.0091	0.29	0.0358	1.22	0.0428	1.90
Log QO Advertising (LADV_QO)	0.0096	1.91	-0.0189	-2.71*	-0.0055	-0.83	0.0023	0.45
$\overline{R}^2$	0.8513		0.8341		0.7839		0.8554	

Note: Own brand strategic variables are underlined.
* significant at the 1% level.
** significant at the 5% level.

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because the GRP (Advertising) data ends April 16, 1994, coupons end May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at start of data so regression started then in attempt to keep the same sample at brand level. Also lost one city (Philadelphia) because 11 weeks of no quantity data for Post Toasties, resulting in 9 cities, 124 observations each. The city binaries and the constant are not reported in this table to keep its size manageable

Table 9 Taste Enhanced Wholesome Individual Brand Regressions: Full Model

Dependent Variables: Logarithm of Weekly Quantity of Kellogg's Raisin Bran (L_RB_QTY), Post Raisin Bran (L_PR_QTY), Kellogg's Frosted Mini Wheats (L_MW_QTY), Nabisco Frosted Wheat Squares (L_FW_QTY), Quaker 100% Natural (L_QN_QTY), and Kellogg's Cracklin' Oat Bran (L_CO_QTY).
Sample: 1170 observations from December 7, 1991 to February 26, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1 L_RB_QTY Coeff.	2 L_PR_QTY Coeff.	3 L_MW_QTY Coeff.	4 L_FW_QTY Coeff.	5 L_QN_QTY Coeff.	6 L_CO_QTY Coeff.
Independent Variable	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)
Log RB Price (LNP_RB)	-0.8765	0.7437	0.4179	0.1072	-0.0865	-0.0196
	(-9.65)*	(6.20)*	4.74)**	(0.88)	(-1.12)	(-0.20)
Log PR Price (LNP_PR)	1.1335	-2.1429	0.4286	-0.2149	-0.0291	0.1527
	(9.91)*	(-14.18)*	(3.86)*	(-1.40)	(-0.30)	(1.25)
Log MW Price (LNP_MW)	0.5815	0.5872	-1.2646	0.0800	0.0353	-0.0671
	(5.52)*	(4.22)*	(-12.36)*	(0.56)	(0.39)	(-0.60)
Log FW Price (LNP_FW)	-0.3079	0.0660	0.3101	-1.2230	-0.3919	0.2124
	(-2.13)**	(0.35)	(2.21)**	(-6.27)*	(-3.17)*	(1.38)
Log QN Price (LNP_QN)	0.1510	-0.5285	0.6256	-0.1983	-2.8139	-0.7889
	(0.82)	(-2.17)**	(3.49)*	(-0.80)	(-17.86)*	(-4.02)*
Log CO Price (LNP_CO)	0.2074	0.4410	0.1710	-0.0420	-0.0128	-2.2910
	(1.60)	(2.57)*	(1.36)	(-0.24)	(-0.12)	(-16.58)*
Log Qty TEW Cereal (LN_TEWQ)	1.2861	0.6653	0.6915	0.3226	0.2617	0.3614
	(36.25)*	(14.20)*	(20.09)*	(6.75)*	(8.64)*	(9.57)*

(*continues*)

Table 9 (continued)

Independent Variable	1 L_RB_QTY Coeff. (t-ratio)	2 L_PR_QTY Coeff. (t-ratio)	3 L_MW_QTY Coeff. (t-ratio)	4 L_FW_QTY Coeff. (t-ratio)	5 L_QN_QTY Coeff. (t-ratio)	6 L_CO_QTY Coeff. (t-ratio)
Log RB Trade Promo (LTPRO_RB)	0.0695	-0.0255	-0.0269	-0.0146	-0.0155	-0.0242
	(12.55)*	(-3.49)*	(-5.00)*	(-1.95)**	(-3.29)*	(-4.10)*
Log PR Trade Promo (LTPRO_PR	-0.0181	0.0505	0.0089	-0.0037	-0.0196	-0.0229
	(-5.61)*	(11.85)*	(2.83)*	(-0.85)	(-7.12)*	(-6.67)*
Log MW Trade Promo (LTPRO_MW)	-0.0164	-0.0006	0.0316	-0.0159	-0.0060	-0.0048
	(-6.13)*	(-0.17)	(12.17)*	(-4.40)*	(-2.61)*	(-1.68)
Log FW Trade Promo (LTPRO_FW)	-0.0024	-0.0035	0.0011	0.0047	0.0028	0.0034
	(-1.29)	(-1.38)	(0.58)	(1.85)	(1.71)	(1.70)
Log QN Trade Promo (LTPRO_QN)	-0.0023	0.4806	-0.0028	-0.0070	0.0092	-0.0062
	(-1.01)	(1.60)	(-1.25)	(-2.27)**	(4.72)*	(-2.57)*
Log CO Trade Promo (LTPRO_CO)	-0.0013	-0.0014	0.0031	0.0051	0.0021	0.0117
	(-0.64)	(-3.80)*	(1.56)	(1.84)	(1.20)	(5.34)*
Log RB Coupons (LCOUP_RB)	0.2558	0.0079	-0.0139	-0.0680	-0.0121	0.0041
	(2.92)*	(0.68)	(-1.64)	(5.75)*	(-1.62)	(0.44)
Log PR Coupons (LCOUP_PR)	0.0216	-0.0184	-0.0172	0.0011	0.0096	0.0125
	(5.39)*	(-3.48)*	(-4.44)*	(0.20)	(2.82)*	(2.93)*
Log MW Coupons (LCOUP_MW)	-0.0367	0.0024	0.0359	0.0186	0.0124	0.0293
	(-3.84)*	(0.19)	(3.88)*	(1.44)	(1.52)	(2.88)*
Log FW Coupons (LCOUP_FW)	-0.0116	-0.0009	0.0135	0.0799	-0.0071	-0.0237

	(2.65)*	(-0.15)	(3.17)*	(13.52)*	(-1.90)	(-5.07)*
Log QN Coupons (LCOUP_QN)	-0.0034	-0.0089	-0.0270	0.0084	0.0956	0.0273
	(-0.47)	(-0.95)	(-3.91)*	(0.87)	(15.75)*	(3.61)*
Log CO Coupons (LCOUP_CO)	0.0279	-0.0235	-0.0067	0.0438	-0.0132	0.0068
	(2.78)*	(-1.77)	(-0.68)	(3.24)*	(-1.54)	(0.63)
Log RB Advertising (LADV_RB)	0.0431	-0.0488	-0.0075	0.1883	-0.0019	-0.0361
	(2.85)*	(-2.24)*	(-0.51)	(9.25)*	(-0.15)	(-2.24)**
Log PR Advertising (LADV_PR)	0.0130	-0.0164	-0.0266	-0.0806	-0.0287	0.0178
	(1.31)	(-1.25)	(-2.78)*	(-6.06)*	(-3.41)*	(1.69)
Log MW Advertising (LADV_MW)	-0.1051	0.0048	-0.1234	0.0168	0.1212	0.1124
	(-5.57)*	(0.20)	(6.86)*	(0.67)	(7.66)*	(5.70)*
Log FW Advertising (LADV_FW)	-0.0020	-0.0302	0.0242	0.0780	-0.0396	-0.0389
	(-0.16)	(-1.86)	(2.04)*	(4.73)*	(-3.79)*	(-2.98)*
Log QN Advertising (LADV_QN)	-0.0075	-0.0156	0.0070	0.0061	0.0183	0.0253
	(-1.71)	(-2.69)*	(1.65)	(1.04)	(4.90)*	(5.41)*
Log CO Advertising (LADV_CO)	-0.0163	-0.0788	0.0178	0.0858	0.0722	0.0400
	(-1.10)	(-0.40)	(1.24)	(4.32)*	(5.73)*	(2.55)*
$\overline{R}^2$	0.9002	0.8277	0.8864	0.7784	0.9624	0.8312

Note: Own brand strategic variables are underlined.
* significant at the 1% level
** significant at the 5% level

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because GRP (Advertising) data ends April 16 1994, coupons ends May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at the start of the data so regression started then in attempt to keep the same sample at brand level. Lost an additional 7 weeks because quit selling Nabisco Frosted Wheat Squares in one or more cities (Chicago). The city binaries and the constant are not reported in this table to keep its size manageable.

Table 10 Taste Enhanced Wholesome Individual Brand Regressions: Weighted Average Price Model

Dependent Variables: Logarithm of Weekly Quantity of Kellogg's Raisin Bran (L_RB_QTY), Post Raisin Bran (L_PR_QTY), Kellogg's Frosted Mini Wheats (L_MW_QTY), Nabisco Frosted Wheat Squares (L_FW_QTY), Quaker 100% Natural (L_QN_QTY), and Kellogg's Cracklin' Oat Bran (L_CO_QTY).
Sample: 1170 observations from December 7, 1991 to February 26, 1994[1]
Estimation Method: 2 Stage (Generalized Least Squares)

	1	2	3	4	5	6
	L_RB_QTY	L_PR_QTY	L_MW_QTY	L_FW_QTY	L_QN_QTY	L_CO_QTY
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Independent Variable	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)
Log RB Price (LNP_RB)	-1.1975	0.8655	0.5331	0.1599	-0.0029	0.0799
	(-12.67)*	(7.10)*	(5.90)*	(1.35)	(-0.04)	(3.01)*
Log PR Price (LNP_PR)	1.4932	-2.7742	0.3153	-0.2400	0.1268	0.3569
	(12.80)*	(-18.43)*	(2.83)*	(-1.64)	(1.34)	(3.01)*
Log MW Price (LNP_MW)	0.9565	0.4961	-1.7438	0.2532	0.1112	-0.0600
	(8.90)*	(3.58)*	(-16.96)*	(1.88)	(1.28)	(-0.55)
Log FW Price (LNP_FW)	-0.3564	0.1995	0.3844	-1.3634	-0.4079	0.0864
	(-2.99)*	(0.99)	(2.58)*	(-6.99)*	(-3.22)*	(0.55)
Log QN Price (LNP_QN)	0.3517	-0.3106	1.2936	-0.4563	-2.9966	-0.8792
	(-1.82)	(-1.25)	(7.00)*	(1.89)	(-19.11)*	(-4.48)*
Log CO Price (LNP_CO)	0.0772	0.7927	0.2511	-0.2040	-0.0956	-2.5678
	(0.57)	(4.54)*	(1.94)	(-1.20)	(-0.87)	(-18.67)*
Log Qty TEW Cereal (LN_TEWQ)	1.3786	0.6414	0.7085	0.2341	0.2231	0.2798
	(38.26)*	(13.80)*	(20.56)*	(5.19)*	(7.63)*	(7.65)*
Log RB Coupons (LCOUP_RB)	0.0333	0.0092	-0.0212	-0.0647	-0.0143	0.0007
	(3.52)*	(0.76)	(-2.34)**	(-5.47)*	(-1.86)	(0.07)
Log PR Coupons (LCOUP_PR)	0.0134	-0.0166	-0.0103	-0.0013	0.0108	0.0132
	(3.13)*	(-3.00)*	(-2.51)**	(-0.25)	(3.09)*	(3.04)*

Log MW Coupons (LCOUP_MW)	-0.0310	-0.0149	0.0318	0.0255	0.0162	0.0418
	(-3.01)*	-1.13)	(3.23)*	(1.98)**	(1.94)	(4.00)*
Log FW Coupons (LCOUP_FW)	-0.0095	-0.0030	0.0149	0.0751	-0.0057	-0.0261
	(-2.02)*	(-0.49)	(3.32)*	(12.77)*	(-1.50)	(-5.48)*
Log QN Coupons (LCOUP_QN)	-0.0086	-0.0184	-0.0250	0.0164	0.0991	-0.0389
	(-1.13)	(-1.88)	(-3.44)*	(1.73)	(16.09)*	(5.05)*
Log CO Coupons (LCOUP_CO)	0.0213	-0.0121	-0.0102	0.0529	-0.0165	-0.0090
	(1.97)**	(-0.87)	(-0.99)	(3.90)*	(-1.88)	(0.82)
Log RB Advertising (LADV_RB)	0.0408	-0.0404	0.0009	0.1921	-0.0096	-0.0357
	(2.54)**	(-1.95)	(0.06)	(9.56)*	(-0.74)	(-2.19)**
Log PR Advertising (LADV_PR)	0.0108	-0.0299	-0.0190	-0.0867	-0.0231	0.0210
	(1.01)	(-2.19)*	(-1.88)	(-6.56)*	(-2.70)*	(1.96)*
Log MW Advertising (LADV_MW)	-0.1346	0.0116	0.1344	0.0257	0.1315	0.1263
	(-6.73)*	(0.45)	(7.02)*	(1.03)	(8.10)*	(6.22)*
Log FW Advertising (LADV_FW)	-0.0124	-0.0152	-0.0049	0.0815	-0.0348	-0.0514
	(0.96)	(-0.91)	(-0.40)	(5.04)*	(-3.32)*	(-3.92)*
Log QN Advertising (LADV_QN)	-0.0121	-0.0163	0.0110	0.0058	0.0194	0.0266
	(-2.55)**	(-2.65)*	(2.42)**	(0.97)	(5.04)*	(5.51)*
Log CO Advertising (LADV_CO)	-0.0322	0.0049	0.0209	0.0894	0.0743	0.0432
	(-2.01)**	(0.24)	(1.36)	(4.46)*	(5.71)*	(2.66)*
$\overline{R}^2$	0.8812	0.8042	0.8685	0.7722	0.9595	0.8171

Note: Own brand strategic variables are underlined.
* significant at the 1% level ** significant at the 5% level

[1] Lost 11 weeks at the outset due to 12 week lags. Lose April 16, 1994 to June 11, 1994 because GRP (Advertising) data ends April 16 1994, coupons ends May 14, 1994. Lost an additional 12 weeks because Nabisco Big Biscuit GRP was missing at the start of the data so regression started then in attempt to keep the same sample at brand level. Lost an additional 7 weeks because quit selling Nabisco Frosted Wheat Squares in one or more cities (Chicago). The city binaries and the constant are not reported in this table to keep its size manageable.

Table 11 Total Own and Cross Price Elasticities: Full Model

Market Level Elasticities

		Quantity	
		Adult	Kid
Price	Adult	-0.8657	0.4962
	Kid	0.0346	-0.6502

Segment Level Elasticities – Full Model

	Quantity			
Price	Simple Health Nutrition	All Family Basic	Taste Enhanced Wholesome	All Private Label
Simple Health Nutrition	-1.2175	-0.0200	-0.0062	0.5584
All Family Basic	-0.1375	-0.6026	-0.2270	0.0383
Taste Enhanced Whole	0.1064	0.0107	-0.9937	0.1703
All Private Label	0.1208	-0.3249	-0.1540	-0.2659

Brand Level Elasticities: Simple Health Nutrition (SHN) – Full Model

	Quantity					
Price	Shredded Wheat Line	Grape Nuts	Gen Mills Total	Nutri Grain	Natural Bran Flakes	Kellogg's Special K
Shredded Wheat Line	-1.6930	1.0211	-1.0722	0.8063	-0.0576	0.5228
Grape Nuts	0.5339	-1.9571	-0.3488	0.0934	-0.4197	0.5468
General Mills Total	0.1733	0.0738	-1.3430	0.0249	-0.0572	0.1473
NutriGrain	0.2547	0.4519	-0.2497	-2.2228	0.2885	0.3455
Natural Bran Flakes	0.0820	0.0306	0.0613	-0.4495	-1.5522	-0.0331
Kellogg's Special K	0.2359	0.0469	0.2895	0.2934	0.2880	-1.9810

Brand Level Elasticities: All Family Basic (AFB) – Full Model

Price	Quantity Kellogg's Corn Flakes	Post Toasties	Cheerios	Wheaties	Ralston Chex	Kel. Rice Krispies	Kellogg's Crispix	Quaker Oat Squares
Kellogg's Corn Flakes	-1.0332	0.3947	0.1248	0.1210	0.4206	-0.0070	0.4306	0.1419
Post Toasties	-0.1662	-2.9490	0.1069	0.4287	-0.0149	-0.2647	0.0770	0.1400
Cheerios	0.2836	0.8975	-0.8553	0.4767	0.2482	-0.1394	-0.0506	-0.0147
Wheaties	0.3074	-1.5715	0.0748	-2.1687	-0.0014	0.0944	0.1735	0.0476
Ralston Chex Line	0.0885	1.7088	0.1350	0.0071	-1.3826	0.1272	0.0456	0.3313
Kel Rice Krispies	0.1359	0.4142	0.1764	-0.0051	0.0562	-1.4102	0.2365	0.1362
Kellogg's Crispix	0.0653	-0.2211	-0.0168	-0.0164	-0.0292	0.02954	-2.5116	0.2855
Quaker Oat Squares	-0.2817	3.2438	0.0644	0.6624	0.7679	-0.5476	0.2986	-1.3047

Brand Level Elasticities: Taste Enhanced Wholesome (TEW) – Full Model

Price	Quantity Kellogg's Rais Bran	Post Rais Bran	Kel Frosted Mini Wht	Nab Frosted Wht Sqrs	Quaker 100% Natural	Kel. Crack. Oat Bran
Kellogg's Raisin Bran	-1.3477	0.4999	0.1645	-0.0110	-0.1824	-0.1520
Post Raisin Bran	0.9169	-2.2549	0.3122	-0.2692	-0.0732	0.0918
Kel Frosted Mini Whts	0.2269	0.4038	-1.4553	-0.0090	-0.0369	-0.1667
Nab Frosted Wht Sqrs	-0.3388	0.0500	0.2935	-1.2308	-0.3982	0.2037
Quaker 100% Natural	0.0272	-0.5925	0.5591	-0.2293	-2.8391	-0.8237
Kel Cracklin' Oat Bran	0.1265	0.3991	0.1275	-0.0623	-0.0293	-2.3137

Table 12 Total Own and Cross Price Elasticities: Weighted Average Price Model

Market Level Elasticities

		Quantity	
		Adult	Kid
Price	Adult	-1.1675	1.2796
	Kid	0.3383	-1.3357

Segment Level Elasticities – Weighted Average Price Model

	Quantity			
Price	Simple Health Nutrition	All Family Basic	Taste Enhanced Wholesome	All Private Label
Simple Health Nutrition	-2.1498	0.3256	0.1156	0.3558
All Family Basic	0.0105	-1.2372	0.1729	0.1503
Taste Enhanced Whole	0.2398	0.3612	-2.1403	0.3151
All Private Label	-0.0426	-0.0505	-0.2484	-0.9092

Brand Level Elasticities: Simple Health Nutrition (SHN) – Weighted Average Price Model

	Quantity					
Price	Shredded Wheat Line	Grape Nuts	Gen Mills Total	Nutri Grain	Natural Bran Flakes	Kellogg's Special K
Shredded Wheat Line	-2.1317	0.7656	-1.0350	0.5824	-0.0473	0.3425
Grape Nuts	0.3707	-2.4799	-0.3202	-0.0824	-0.4957	0.4345
General Mills Total	0.1010	0.1634	-2.0924	0.0405	-0.0813	0.0624
NutriGrain	0.2459	0.4414	-0.3194	-2.6844	0.2246	0.2928
Natural Bran Flakes	0.0391	-0.1194	0.1424	-0.3515	-1.7665	-0.1380
Kellogg's Special K	0.1087	-0.0522	0.2436	0.3152	0.1612	-2.4382

Brand Level Elasticities: All Family Basic (AFB) – Weighted Average Price Model

Price	Quantity Kellogg's Corn Flakes	Post Toasties	Cheerios	Wheaties	Ralston Chex	Kel. Rice Krispies	Kellogg's Crispix	Quaker Oat Squares
Kellogg's Corn Flakes	-2.0247	1.0372	0.1944	0.2197	0.6222	0.1970	0.6361	0.1831
Post Toasties	-0.0924	-3.5215	0.0686	0.2748	-0.0022	-0.3100	0.1245	0.1198
Cheerios	0.4251	1.1721	-1.6969	0.2954	0.3644	0.0261	-0.0591	-0.0497
Wheaties	0.5769	-1.6053	-0.1430	-2.6637	-0.1987	0.1169	0.3316	0.1321
Ralston Chex Line	0.6286	0.6449	-0.1200	-0.0922	-2.3582	0.0581	0.0181	0.4043
Kel Rice Krispies	0.2198	0.5359	0.3107	0.0988	-0.0103	-2.2108	0.0550	0.2245
Kellogg's Crispix	0.2583	-0.3368	-0.2332	-0.0639	-0.1171	0.2374	-2.9375	0.4159
Quaker Oat Squares	0.1729	3.3446	0.0517	0.6732	0.8012	-1.2606	0.2146	-1.4923

Brand Level Elasticities: Taste Enhanced Wholesome (TEW) – Weighted Average Price Model

Price	Quantity Kellogg's Rais Bran	Post Rais Bran	Kel Frosted Mini Wht	Nab Frosted Wht Sqrs	Quaker 100% Natural	Kel. Crack. Oat Bran
Kellogg's Raisin Bran	-2.2854	0.3593	-0.0260	-0.0248	-0.1790	-0.1409
Post Raisin Bran	0.9932	-3.0068	0.0583	-0.3249	0.0459	0.2254
Kel Frosted Mini Whts	0.1378	0.1152	-2.1646	0.1142	-0.0213	-0.2262
Nab Frosted Wht Sqrs	-0.4278	0.1663	0.3477	-1.3755	-0.4195	0.0719
Quaker 100% Natural	0.0660	-0.4435	1.1468	-0.5048	-3.0428	-0.9372
Kel Cracklin' Oat Bran	-0.1096	0.7058	0.1551	-0.2357	-0.1258	-2.6057

Table 13. Complete Own and Cross Price Elasticity Matrix: Full Model

	Adult	Kid	Simple Health Nutrition	All Family Basic	Taste Enhanced Wholesome	All Private Label	Shredded Wheat Line	Grape Nuts	General Mills Total	Nutri Grain	Natural Bran Flks	Kel. Special K	Kel. Corn F.
Adult	-0.8657	0.4962	-0.6489	-0.9305	-0.9413	-0.6082	-0.4947	-0.5717	-0.6334	-0.5113	-0.4456	-0.7291	-0.9735
Kid	0.0346	-0.6502	0.0260	0.0372	0.0377	0.0243	0.0198	0.0229	0.0253	0.0205	0.0178	0.0292	0.0390
Simple Health Nut.	-0.1921	-0.1443	-1.2175	-0.0200	-0.0062	0.5584	-0.9281	-1.0726	-1.1884	-0.9593	-0.8360	-1.3680	-0.0209
All Family Basic	-0.3451	-0.2592	-0.1375	-0.6026	-0.2270	0.0383	-0.1048	-0.1211	-0.1342	-0.1083	-0.0944	-0.1545	-0.6305
Taste Enhanced Wholesome	-0.2039	-0.1531	0.1064	0.0107	-0.9937	0.1703	0.0811	0.0937	0.1039	0.0838	0.0731	0.1195	0.0112
All Private Label	-0.1247	-0.0937	0.1208	-0.3249	-0.1540	-0.2659	0.0921	0.1064	0.1179	0.0952	0.0830	0.1358	-0.3400
Shredded Wheat Line	-0.0475	-0.0356	-0.3008	-0.0049	-0.0015	0.1380	-1.6930	1.0211	-1.0722	0.8063	-0.0576	0.5228	-0.0052
Grape Nuts	-0.0419	-0.0315	-0.2659	-0.0044	-0.0013	0.1220	0.5339	-1.9571	-0.3488	0.0934	-0.4197	0.5468	-0.0046
General Mills Total	-0.0431	-0.0324	-0.2731	-0.0045	-0.0014	0.1253	0.1733	0.0738	-1.3430	0.0249	-0.0572	0.1473	-0.0047
Nutri Grain	-0.0197	-0.0148	-0.1251	-0.0021	-0.0006	0.0574	0.2547	0.4519	-0.2497	-2.2228	0.2885	0.3455	-0.0021
Natural Bran Flks	-0.0104	-0.0078	-0.0662	-0.0011	-0.0003	0.0304	0.0820	0.0306	0.0613	-0.4495	-1.5522	-0.0331	-0.0011
Kellogg's Special K	-0.0294	-0.0221	-0.1865	-0.0031	-0.0009	0.0855	0.2359	0.0469	0.2895	0.2924	0.2880	-1.9810	-0.0032
Kellogg's Corn Flks	-0.1065	-0.0800	-0.0424	-0.1859	-0.0700	0.0118	-0.0323	-0.0374	-0.0414	-0.0334	-0.0291	-0.0477	-1.0332
Post Toasties	-0.0051	-0.0038	-0.0020	-0.0089	-0.0034	0.0006	-0.0016	-0.0018	-0.0020	-0.0016	-0.0014	-0.0023	-0.1662
Cheerios	-0.0748	-0.0562	-0.0298	-0.1306	-0.0492	0.0083	-0.0227	-0.0262	-0.0291	-0.0235	-0.0205	-0.0335	0.2836
Wheaties	-0.0228	-0.0171	-0.0091	-0.0398	-0.0150	0.0025	-0.0069	-0.0080	-0.0089	-0.0071	-0.0062	-0.0102	0.3074
Ralston Chex Line	-0.0505	-0.0379	-0.0201	-0.0882	-0.0332	0.0056	-0.0153	-0.0177	-0.0196	-0.0158	-0.0138	-0.0226	0.0885
Kelllogg's Rice Krispies	-0.0583	-0.0438	-0.0232	-0.1018	-0.0383	0.0065	-0.0177	-0.0205	-0.0227	-0.0183	-0.0159	-0.0261	0.1359
Kellogg's Crispix	-0.0159	-0.0120	-0.0064	-0.0278	-0.0105	0.0018	-0.0048	-0.0056	-0.0062	-0.0050	-0.0044	-0.0071	0.0653
Quaker Oat Squares	-0.0112	-0.0084	-0.0045	-0.0196	-0.0074	0.0012	-0.0034	-0.0039	-0.0044	-0.0035	-0.0031	-0.0050	-0.2817
Kellogg's Raisin Bran	-0.0752	-0.0565	0.0392	0.0039	-0.3664	0.0628	0.0299	0.0346	0.0383	0.0309	0.0269	0.0441	0.0041
Post Raisin Bran	-0.0345	-0.0259	0.0180	0.0018	-0.1684	0.0289	0.0137	0.0159	0.0176	0.0142	0.0124	0.0203	0.0019
Kel. Frosted Mini Wheats	-0.0566	-0.0425	0.0295	0.0030	-0.2757	0.0472	0.0225	0.0260	0.0288	0.0233	0.0203	0.0332	0.0031
Nab. Frosted Wheat Squares	-0.0049	-0.0037	0.0026	0.0003	-0.0241	0.0041	0.0020	0.0023	0.0025	0.0020	0.0018	0.0029	0.0003
Quaker 100% Natural	-0.0197	-0.0148	0.0103	0.0010	-0.0962	0.0165	0.0079	0.0091	0.0101	0.0081	0.0071	0.0116	0.0011
Kellogg's Cracklin' Oat Bran	-0.0129	-0.0097	0.0067	0.0007	-0.0629	0.0108	0.0051	0.0059	0.0066	0.0053	0.0046	0.0076	0.0007

(continues)

Table 13. (continued)

	Post Toasties	Cheerios	Wheaties	Ralson Chex	Kel. Rice Krispies	Kellogg's Crispix	Quaker Oat Squares	Kellogg's Raisin B	Post Raisin B	Kellogg's Frosted Mini Wh.	Nabisco Frosted Wht. Sqr	Quaker 100% Nat.	Kel. Cracklin' Oat B
Adult	-0.4629	-0.6112	-0.6579	-0.4366	-0.9524	-0.5143	-0.2683	-1.2106	-0.6262	-0.6509	-0.3037	-0.2463	-0.3402
Kid	0.0185	0.0245	0.0263	0.0175	0.0381	0.0206	0.0107	0.0484	0.0251	0.0260	0.0122	0.0099	0.0136
Simple Health Nut.	-0.0099	-0.0131	-0.0141	-0.0094	-0.0204	-0.0110	-0.0058	-0.0079	-0.0041	-0.0043	-0.0020	-0.0016	-0.0022
All Family Basic	-0.2998	-0.3958	-0.4261	-0.2827	-0.6168	-0.3330	-0.1738	-0.2919	-0.1510	-0.1570	-0.0732	-0.0594	-0.0820
Taste Enhanced Wholesome	0.0053	0.0070	0.0076	0.0050	0.0110	0.0059	0.0031	-1.2781	-0.6611	-0.6872	-0.3206	-0.2601	-0.3591
All Private Label	-0.1671	-0.2134	-0.2298	-0.1525	-0.3326	-0.1796	-0.0937	-0.1980	-0.1024	-0.1065	-0.0497	-0.0403	-0.0557
Shredded Wheat Line	-0.0025	-0.0032	-0.0035	-0.0023	-0.0050	-0.0027	-0.0014	-0.0020	-0.0010	-0.0011	-0.0005	-0.0004	-0.0005
Grape Nuts	-0.0022	-0.0029	-0.0031	-0.0020	-0.0045	-0.0024	-0.0013	-0.0017	-0.0009	-0.0009	-0.0004	-0.0004	-0.0005
General Mills Total	-0.0022	-0.0029	-0.0032	-0.0021	-0.0046	-0.0025	-0.0013	-0.0018	-0.0009	-0.0010	-0.0004	-0.0004	-0.0005
Nutri Grain	-0.0010	-0.0013	-0.0014	-0.0010	-0.0021	-0.0011	-0.0006	-0.0008	-0.0004	-0.0004	-0.0002	-0.0002	-0.0002
Natural Bran Flks	-0.0005	-0.0007	-0.0008	-0.0005	-0.0011	-0.0006	-0.0003	-0.0004	-0.0002	-0.0002	-0.0001	-0.0001	-0.0001
Kellogg's Special K	-0.0015	-0.0020	-0.0022	-0.0014	-0.0031	-0.0017	-0.0009	-0.0012	-0.0006	-0.0007	-0.0003	-0.0002	-0.0003
Kellogg's Corn Flks	0.3947	0.1248	0.1210	0.4206	-0.0070	0.4306	0.1419	-0.0901	-0.0466	-0.0484	-0.0226	-0.0183	-0.0253
Post Toasties	-2.9490	0.1069	0.4287	-0.0149	-0.2647	0.0770	0.1400	-0.0043	-0.0022	-0.0023	-0.0011	-0.0009	-0.0012
Cheerios	0.8975	-0.8553	0.4767	0.2482	-0.1394	-0.0506	-0.0147	-0.0633	-0.0327	-0.0340	-0.0159	-0.0129	-0.0178
Wheaties	-1.5715	0.0748	-2.1687	-0.0014	0.0944	0.1735	0.0476	-0.0193	-0.0100	-0.0104	-0.0048	-0.0039	-0.0054
Ralston Chex Line	1.7088	0.1350	0.0071	-1.3826	0.1272	0.0456	0.3313	-0.0427	-0.0221	-0.0230	-0.0107	-0.0087	-0.0120
Kelllogg's Rice Krispies	0.4142	0.1764	-0.0051	0.0562	-1.4102	0.2365	0.1632	-0.0493	-0.0255	-0.0265	-0.0124	-0.0100	-0.0139
Kellogg's Crispix	-0.2211	-0.0168	-0.0164	-0.0292	0.2954	-2.5116	0.2855	-0.0135	-0.0070	-0.0073	-0.0034	-0.0027	-0.0038
Quaker Oat Squares	3.2438	0.0664	0.6624	0.7679	-0.5476	0.2986	-1.3047	-0.0095	-0.0049	-0.0051	-0.0024	-0.0019	-0.0027
Kellogg's Raisin Bran	0.0020	0.0026	0.0028	0.0019	0.0040	0.0022	0.0011	-1.3477	0.4999	0.1645	-0.0110	-0.1824	-0.1520
Post Raisin Bran	0.0009	0.0012	0.0013	0.0009	0.0019	0.0010	0.0005	0.9169	-2.2549	0.3122	-0.2692	-0.0732	0.0918
Kel. Frosted Mini Wheats	0.0015	0.0020	0.0021	0.0014	0.0030	0.0016	0.0009	0.2269	0.4038	-1.4553	-0.0090	-0.0369	-0.1667
Nab. Frosted Wheat Squares	0.0001	0.0002	0.0002	0.0001	0.0003	0.0001	0.0001	-0.3388	0.0500	0.2935	-1.2308	-0.3982	0.2037
Quaker 100% Natural	0.0005	0.0007	0.0007	0.0005	0.0011	0.0006	0.0003	0.0272	-0.5925	0.5591	-0.2293	-2.8391	-0.8237
Kellogg's Cracklin' Oat Bran	0.0003	0.0004	0.0005	0.0003	0.0007	0.0004	0.0002	0.1265	0.3991	0.1275	-0.0623	-0.0293	-2.3137

Table 14. Complete Own and Cross Price Elasticity Matrix: Weighted Average Price Model

	Adult	Kid	Simple Health Nutrition	All Family Basic	Taste Enhanced Wholesome	All Private Label	Shredded Wheat Line	Grape Nuts	General Mills Total	Nutri Grain	Natural Bran Flks	Kel. Special K	Kel. Corn F.
Adult	-1.1675	1.2796	-0.7435	-1.3984	-1.1985	-0.7553	-0.5587	-0.6474	-0.7671	-0.5499	-0.4606	-0.8543	-1.5899
Kid	0.3383	-1.3357	0.2154	0.4051	0.3472	0.2188	0.1619	0.1876	0.2223	0.1593	0.1334	0.2475	0.4606
Simple Health Nut.	-0.2591	0.2839	-2.1498	0.3256	0.1151	0.3558	-1.6156	-1.8718	-2.2181	-1.5900	-1.3318	-2.4703	0.3702
All Family Basic	-0.4654	0.5100	0.0105	-1.2372	0.1729	0.1503	0.0079	0.0092	0.0109	0.0078	0.0065	0.0121	-1.4067
Taste Enhanced Wholesome	-0.2749	0.3013	0.2398	0.3612	-2.1403	0.3151	0.1802	0.2088	0.2475	0.1774	0.1486	0.2756	0.4107
All Private Label	-0.1682	0.1843	-0.0426	-0.0505	-0.2484	-0.9092	-0.0320	-0.0371	-0.0440	-0.0315	-0.0264	-0.0489	-0.0575
Shredded Wheat Line	-0.0640	0.0701	-0.5311	0.0804	0.0284	0.0879	-2.1317	0.7656	-1.0350	0.5824	-0.0473	0.3425	0.0915
Grape Nuts	-0.0566	0.0620	-0.4695	0.0711	0.0251	0.0777	0.3707	-2.4799	-0.3202	-0.0824	-0.4957	0.4345	0.0809
General Mills Total	-0.0581	0.0637	-0.4822	0.0730	0.0258	0.0798	0.1010	0.1634	-2.0924	0.0405	-0.0813	0.0624	0.0830
Nutri Grain	-0.0266	0.0292	-0.2209	0.0335	0.0118	0.0366	0.2459	0.4414	-0.3194	-2.6844	0.2246	0.2928	0.0380
Natural Bran Flks	-0.0141	0.0154	-0.1168	0.0177	0.0063	0.0193	0.0391	-0.1194	0.1424	-0.3515	-1.7665	-0.1380	0.0201
Kellogg's Special K	-0.0397	0.0435	-0.3293	0.0499	0.0176	0.0545	0.1087	-0.0522	0.2436	0.3152	0.1612	-2.4382	0.0567
Kellogg's Corn Flks	-0.1436	0.1574	0.0033	-0.3818	0.0533	0.0464	0.0024	0.0028	0.0034	0.0024	0.0020	0.0037	-2.0247
Post Toasties	-0.0069	0.0076	0.0002	-0.0184	0.0026	0.0022	0.0001	0.0001	0.0002	0.0001	0.0001	0.0002	-0.0924
Cheerios	-0.1009	0.1105	0.0023	-0.2681	0.0375	0.0326	0.0017	0.0020	0.0024	0.0017	0.0014	0.0026	0.4251
Wheaties	-0.0307	0.0337	0.0007	-0.0817	0.0114	0.0099	0.0005	0.0006	0.0007	0.0005	0.0004	0.0008	0.5769
Ralston Chex Line	-0.0681	0.0746	0.0015	-0.1810	0.0253	0.0220	0.0012	0.0013	0.0016	0.0011	0.0010	0.0018	0.6286
Kellogg's Rice Krispies	-0.0786	0.0861	0.0018	-0.2089	0.0292	0.0254	0.0013	0.0016	0.0018	0.0013	0.0011	0.0020	0.2189
Kellogg's Crispix	-0.0215	0.0236	0.0005	-0.0572	0.0080	0.0069	0.0004	0.0004	0.0005	0.0004	0.0003	0.0006	0.2583
Quaker Oat Squares	-0.0151	0.0166	0.0003	-0.0402	0.0056	0.0049	0.0003	0.0003	0.0004	0.0003	0.0002	0.0004	0.1729
Kellogg's Raisin Bran	-0.1014	0.1111	0.0884	0.1332	-0.7892	0.1162	0.0665	0.0770	0.0912	0.0654	0.0548	0.1016	0.1514
Post Raisin Bran	-0.0466	0.0511	0.0406	0.0612	-0.3627	0.0534	0.0305	0.0354	0.0419	0.0301	0.0252	0.0467	0.0696
Kel. Frosted Mini Wheats	-0.0763	0.0836	0.0665	0.1002	-0.5939	0.0874	0.0500	0.0579	0.0687	0.0492	0.0412	0.0765	0.1140
Nab. Frosted Wheat Squares	-0.0067	0.0073	0.0058	0.0087	-0.0518	0.0076	0.0044	0.0051	0.0060	0.0043	0.0036	0.0067	0.0099
Quaker 100% Natural	-0.0266	0.0292	0.0232	0.0350	-0.2073	0.0305	0.0175	0.0202	0.0240	0.0172	0.0144	0.0267	0.0398
Kellogg's Cracklin' Oat Bran	-0.0174	0.0191	0.0152	0.0229	-0.1355	0.0200	0.0114	0.0132	0.0157	0.0112	0.0094	0.0174	0.0260

(continues)

Table 14. (continued)

	Post Toasties	Cheerios	Wheaties	Ralson Chex	Kel. Rice Krispies	Kellogg's Crispix	Quaker Oat Squares	Kellogg's Raisin B	Post Raisin B	Kellogg's Frosted Mini Wh.	Nabisco Frosted Wht. Sqr	Quaker 100% Nat.	Kel. Cracklin' Oat B
Adult	-0.7442	-0.9601	-0.8857	-0.6298	-1.4677	-0.6323	-0.3046	-1.6522	-0.7687	-0.8491	-0.2806	-0.2674	-0.3353
Kid	0.2156	0.2782	0.2566	0.1825	0.4252	0.1832	0.0882	0.4787	0.2227	0.2460	0.0813	0.0775	0.0972
Simple Health Nut.	0.1733	0.2236	0.2063	0.1467	0.3418	0.1472	0.0709	0.1586	0.0738	0.0815	0.0269	0.0257	0.0322
All Family Basic	-0.6584	-0.8495	-0.7836	-0.5572	-1.2986	-0.5595	-0.2695	0.2383	0.1109	0.1225	0.0405	0.0386	0.0484
Taste Enhanced Wholesome	0.1922	0.2480	0.2288	0.1627	0.3791	0.1633	0.0787	-2.9506	-1.3728	-1.5164	-0.5010	-0.4775	-0.5989
All Private Label	-0.0269	-0.0347	-0.0320	-0.0228	-0.0530	-0.0229	-0.0110	-0.3425	-0.1593	-0.1760	-0.0582	-0.0554	-0.0695
Shredded Wheat Line	0.0428	0.0552	0.0510	0.0362	0.0844	0.0364	0.0175	0.0392	0.0182	0.0201	0.0067	0.0063	0.0080
Grape Nuts	0.0378	0.0488	0.0450	0.0320	0.0746	0.0322	0.0155	0.0346	0.0161	0.0178	0.0059	0.0056	0.0070
General Mills Total	0.0389	0.0501	0.0463	0.0329	0.0767	0.0330	0.0159	0.0356	0.0166	0.0183	0.0060	0.0058	0.0072
Nutri Grain	0.0178	0.0230	0.0212	0.0151	0.0351	0.0151	0.0073	0.0163	0.0076	0.0084	0.0028	0.0026	0.0033
Natural Bran Flks	0.0094	0.0122	0.0112	0.0080	0.0186	0.0080	0.0039	0.0086	0.0040	0.0044	0.0015	0.0014	0.0017
Kellogg's Special K	0.0265	0.0342	0.0316	0.0225	0.0523	0.0226	0.0109	0.0243	0.0113	0.0125	0.0041	0.0039	0.0049
Kellogg's Corn Flks	1.0372	0.1944	0.2197	0.6222	0.1970	0.6361	0.1831	0.0735	0.0342	0.0378	0.0125	0.0119	0.0149
Post Toasties	-3.5215	0.0686	0.2748	-0.0022	-0.3100	0.1245	0.1198	0.0035	0.0016	0.0018	0.0006	0.0006	0.0007
Cheerios	1.1721	-1.6969	0.2954	0.3644	0.0261	-0.0591	-0.0497	0.0517	0.0240	0.0265	0.0088	0.0084	0.0105
Wheaties	-1.6053	-0.1430	-2.6637	-0.1987	0.1169	0.3316	0.1321	0.0157	0.0073	0.0081	0.0027	0.0025	0.0032
Ralston Chex Line	0.6449	-0.1200	-0.0922	-2.3582	0.0581	0.0180	0.4043	0.0349	0.0162	0.0179	0.0059	0.0056	0.0071
Kellogg's Rice Krispies	0.5359	0.3107	0.0988	-0.0103	-2.2108	0.0550	0.2245	0.0402	0.0187	0.0207	0.0068	0.0065	0.0082
Kellogg's Crispix	-0.3368	-0.2332	-0.0639	-0.1171	0.2374	-2.9375	0.4159	0.0110	0.0051	0.0057	0.0019	0.0018	0.0022
Quaker Oat Squares	3.3446	0.0517	0.6732	0.8012	-1.2606	0.2146	-1.4923	0.0077	0.0036	0.0040	0.0013	0.0013	0.0016
Kellogg's Raisin Bran	0.0709	0.0914	0.0844	0.0600	0.1398	0.0602	0.0290	-2.2854	0.3593	-0.0260	-0.0248	-0.1790	-0.1409
Post Raisin Bran	0.0326	0.0420	0.0388	0.0276	0.0642	0.0277	0.0133	0.9932	-3.0068	0.0583	-0.3249	0.0459	0.2554
Kel. Frosted Mini Wheats	0.0533	0.0688	0.0635	0.0451	0.1052	0.0453	0.0218	0.1378	0.1152	-2.1646	0.1142	-0.0213	-0.2262
Nab. Frosted Wheat Squares	0.0047	0.0060	0.0055	0.0039	0.0092	0.0040	0.0019	-0.4278	0.1663	0.3477	-1.3755	-0.4195	0.0719
Quaker 100% Natural	0.0186	0.0240	0.0222	0.0158	0.0367	0.0158	0.0076	0.0660	-0.4435	1.1468	-0.5048	-3.0428	-0.9372
Kellogg's Cracklin' Oat Bran	0.0122	0.0157	0.0145	0.0103	0.0240	0.0103	0.0050	-0.1096	0.7058	0.1551	-0.2357	-0.1258	-2.6057

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