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THE EFFECT OF MERGERS ON CONSUMER PRICES: EVIDENCE FROM FIVE SELECTED CASE STUDIES

Orley Ashenfelter
Daniel Hosken

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1050 Massachusetts Avenue
Cambridge, MA 02138
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ABSTRACT

In this paper we propose a method to evaluate the effectiveness of U.S. horizontal merger policy and apply it to the study of five recent consumer product mergers. We selected the mergers from those that, from the public record, seemed to be most problematic for the antitrust agencies. Thus we estimate an upper bound on the likely price effect of completed mergers. Our study employs retail scanner data and uses familiar panel data program evaluation procedures to measure price changes. Our results indicate that four of the five mergers resulted in some increases in consumer prices, while the fifth merger had little effect.

Orley Ashenfelter
Industrial Relations Section
Firestone Library
Princeton University
Princeton, NJ 08544
and NBER
c6789@princeton.edu

Daniel Hosken
Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, DC 20580
dhosken@ftc.gov

I. Introduction

In the last three decades federal review of proposed mergers has become the primary form of U.S. competition policy. Although it is not widely appreciated, thousands of merger requests are filed and allowed to proceed annually and a small number are blocked because they might result in higher, anticompetitive consumer prices. In this paper we propose a method to evaluate the effectiveness of the government policy to block mergers and apply it to the study of five recent consumer product mergers. The basic idea is to study the effect on consumer prices of those consummated mergers that would be most expected to result in anticompetitive price increases. The price increases from these mergers provide an upper bound on the price increases that other permitted mergers may have produced and a lower bound on the price increases that might otherwise have occurred in mergers that were blocked. We thus provide an indication of whether government merger policy may have been too hostile or too acquiescent.

Although very significant public and private resources are devoted to the administrative review of the potential anticompetitive effects of mergers before they are approved, there has been surprisingly little evaluation of whether the mergers that have been permitted are actually anticompetitive.[1] Absent this information it is impossible to determine whether government policies are either too stringent or too restrained, or to make rational adjustments to these policies. The Antitrust Modernization Committee's Final Report to the U.S. President and Congress specifically recommends more retrospective analysis of government merger enforcement.[2] More generally, the value and effectiveness of antitrust policy itself is the subject of intense debate that must rely on very little factual information. Crandall and Winston (2003), for example, argue that antitrust policy has not been beneficial for consumers, while Baker (2003) argues to the contrary.

[1] See Pautler (2003) and Whinston (2006) for reviews of merger studies and the concern they express regarding this issue.
[2] See the discussion of Recommendation 10 of the report, pages 61-63.

Our study employs retail scanner data and uses familiar panel data program evaluation estimation procedures to measure price increases following five mergers.[3] We selected the mergers to study from those that, based on the public record, appeared to be the most problematic from the antitrust agencies' point of view. Our empirical results indicate that four of the five mergers we study resulted in some increases in some consumer prices, while the fifth merger had little effect on prices. The estimated price increases might be considered relatively modest, as they are typically between 3% and 7%. However, given the large amount of commerce in these industries, the implied transfer from consumers to manufacturers is substantial. While the magnitude of some price effects varies with our empirical specification, the conclusion that consumer prices did not decrease, and most likely increased, was not altered when we changed the way we measured consumer prices or the control group, or when we changed the choice of the window of time surrounding the merger during which price changes might be implemented.

Our results have several limitations, and thus it would be premature to conclude either that the mergers we studied were, on net, harmful to consumers or that our evaluation is comprehensive. First, we do not measure the effects of the mergers on prices in the longer run when the effects of some efficiency in the operation of the merged firms may emerge. Second, some mergers resulted in the elimination of existing products and the creation of new products. We do not attempt to measure the benefits or costs to consumers of changes in product selection.[4] Third, we have restricted our analysis to consumer products mergers, which, although they attract much attention, constituted a small fraction of mergers in the period we study. A more complete analysis would require a more comprehensive sampling of mergers.

The structure of the paper is as follows: Section II provides a brief review of the merger review process and the evaluation studies that do exist; Section III sets out the selection method for the mergers studied and provides a discussion of the nature of each specific merger; Sections IV and V provided detailed descriptions of the scanner price

[3] The mergers are Pennzoil's purchase of Quaker State, Proctor and Gamble's purchase of Tambrands, General Mills purchase of Chex cereal brands, the combination of liquor giants Guiness and Grand Metropolitan, and Aurora's (Mrs. Butterworth) purchase of Log Cabin.

data we purchased for this study and the econometric model and control groups used for the evaluation; while Section VI reports the main empirical results, and Section VII provides some concluding comments.

II. Government Review of Mergers and Evidence on Its Effectiveness

As Table 1 indicates, from 1991 through 2004 37,201 mergers or acquisitions were filed with the U.S. government. As a result of the Hart-Scott-Rodino (HSR) Act, these mergers must be reviewed by either the Federal Trade Commission (FTC) or the Antitrust Division of the Department of Justice (DOJ). Approximately 97% of these mergers were reviewed and allowed to proceed without a full investigation by either of the antitrust agencies. Presumably the agencies decided that in these cases the likely effects of these mergers on consumer prices would be small. Still, 3% of mergers were investigated more carefully, and roughly 65% of these mergers were modified to satisfy government concerns, abandoned, or blocked.[5]

The legislative premise for the passage of the HSR Act in 1976 has been carefully articulated by Baer (1997). In effect, the government had little ability to analyze mergers prior to their consummation since the merging parties were under no obligation to announce their intent to merge or to delay consummation in time for a government investigation. The result was that anticompetitive mergers that did take place led to extremely costly government efforts to sue to restore competition. The "poster child" in the debate leading up to the passage of the HSR Act was apparently the case of the "United States vs. El Paso Natural Gas," which required 7 years to litigate and an additional 10 years to accomplish the divestiture that the Supreme Court had ordered. The costs of litigation thus include both those required to establish the anticompetitive effects of the merger and, because a merged company reconstructs itself as a single entity, the difficulty the government encounters in reconstituting two viable companies after a court ordered breakup.[6] The HSR Act was expected to remedy these problems by

[4] For empirical evidence that these issues can be important see Focarelli and Panetta (2003) on the first, and Hausman and Leonard (2002) and Berry and Waldfogel (2001) on the second.
[5] The ratio of enforcement actions to second requests can be larger than 100% in a fiscal year (as is the case in 2003) because investigations can extend across fiscal years.
[6] In the lexicon of antitrust law this is often called the problem of "unscrambling the eggs."

forcing the merging parties to announce their intention to merge to the government, and by requiring the parties to delay their transaction to allow time for investigation.

All mergers of significant asset size are governed by the HSR Act, which requires the merging parties to file certain basic information describing the transaction with the two antitrust agencies splitting jurisdiction in enforcing the antitrust laws: the FTC and the Antitrust Division of the DOJ.[7] After the merging parties file their proposed merger, the government has thirty days to decide whether to require the parties to submit additional information about the merger. During this time period the government decides which agency will investigate the merger, and that agency conducts a preliminary investigation to determine if there is a reasonable chance that the merger would violate the antitrust laws. If the merger appears to be problematic, the government issues a "second request" to the parties. This second request is essentially a detailed subpoena asking for all documentary information the parties have that may be relevant to determining the effects of the merger on the marketplace.[8] The second request would typically ask for all documents describing: competition between market participants, the cost and requirements to enter the market, information about the products the merging parties view as substitutes, and any claims that a merged company would operate more efficiently. The full investigation typically also consists of an extensive review of company documents, depositions of company executives, and interviews with competitors, customers, and other third parties whose opinions the government solicits. During the investigation the merging parties may also make presentations demonstrating why the merger is unlikely to have anticompetitive effects. After the parties have complied with the second request (typically within two or three months, but sometimes six months or more), the government has thirty days to decide whether to block the transaction, accept some type of remedy (typically a divestiture of assets or modification of the transaction), or allow the merger to proceed.[9]

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[7] Following the passage of the HSR act all mergers valued at more than 15 million dollars in assets were required to file with the FTC and DOJ. In February of 2001, the filing threshold was increased substantially to transactions valued at more than 50 million dollars, and the threshold was indexed to changes in GDP growth. The change in the filing threshold is responsible for much of the decrease in merger filings after 2001.

[8] The FTC's web site provides an example of a second request on its web site, www.ftc.gov.

[9] In most cases there is a thirty day waiting period in which the government can make its decision to challenge the transaction. However, in cash tender offers or bankruptcy cases the waiting periods are

The DOJ's and FTC's 1992 Horizontal Merger Guidelines[10] provide the analytic framework used by economists and lawyers to determine if mergers are likely to be anticompetitive. The Guidelines set out five tasks for agency staff to conduct as part of the investigation. The staff must define a product market (the set of close substitutes to the merging parties' products), define a geographic market (the narrowest area in which anticompetitive effects could occur, for the nationally distributed branded consumer products mergers like those studied here this is typically the entire U.S.), analyze likely competitive effects, analyze claims that the merged firms will operate more efficiently leading to lower prices, and determine if entry into the market would be likely and sufficient to maintain competition. While agency economists play a role in all parts of the investigation, their primary role is in defining product and geographic markets and analyzing the potential competitive effects of a merger.[11]

The Guidelines discuss two types of anticompetitive effects: coordinated effects and unilateral effects.[12] The investigation of possible coordinated anticompetitive effects focuses on how a specific transaction will increase the likelihood of collusion, either tacit or explicit, following the merger. Stigler's (1964) early article describing market characteristics that facilitate collusion still highlights the key issues.[13]

The investigation of possible unilateral anticompetitive effects focuses on how a merger changes the merged firm's incentives to price its products. If the merging firms' products are close substitutes, then the merged firm will have an incentive to increase the price of its products above pre-merger levels because it internalizes some of the substitution following the price increase. The workhorse model used in antitrust analysis assumes that the firms sell differentiated products and engage in Bertrand oligopoly price competition.[14] Assuming the economist knows the parameters of the demand system, information sufficient to calculate own- and cross-price elasticities, it is straightforward

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considerably shorter. The government has fifteen days for the preliminary investigation and ten days following the parties complying with the second request.

[10] The Merger Guidelines can be found at www.ftc.gov.

[11] See, e.g., Froeb et al. (2004) for a discussion of the type of work economists do.

[12] These phrases are used to describe concepts that are similar to cooperative and non-cooperative games.

[13] There has been considerable subsequent theoretical work, such as Green and Porter (1994), as well as empirical work that is formal, Porter and Zona (1999), and descriptive, Ashenfelter and Graddy (2005). Block et al. (1981), Newmark (1988), and Sproul (1993) each have examined a number of collusion cases to more generally evaluate the effectiveness of U.S. prosecution of cartels.

[14] See, for example, Deneckere and Davidson (1985).

to simulate the price effects of a merger, or to determine what level of efficiencies (decreases in marginal cost due to the increased efficiency of the merged firms) are required to maintain pre-merger prices.[15] Since the simulation approach focuses entirely on price competition and ignores issues of product repositioning and advertising, which can be very important in branded consumer products markets, it is our impression that many antitrust practitioners take the predictions from merger simulations as upper bounds on the likely price effects of a merger.

While estimating demand systems and using estimated elasticities to simulate the price effects of consumer products mergers has been a common component of merger analysis for the last decade, there is little direct evidence on how successful these models are in predicting price effects. Nevo (2000) uses demand parameter estimates to study the price effects of two mergers in the Ready to Eat (RTE) cereal industry, including the General Mills/Ralcorp merger studied here. Using highly aggregated data and assumptions about post-merger efficiency gains, Nevo concludes that his model does a good job predicting the price effects of the merger.[16] Pinske and Slade (2004) estimate the demand for beer sold on premise in Britain, and then simulate the price effects for two mergers (one consummated, one proposed). While Pinske and Slade find evidence supporting their assumption of Bertrand pricing, they do not have the data to determine how successful their model is in predicting post-merger pricing.

Hausman and Leonard (2002) study how the introduction of a new product (a novel toilet paper) affected equilibrium prices, and how the observed change in prices compared to the simulated price changes generated by different assumed forms of competitive behavior. They find that the observed changes in price following the entry of a new product are reasonably close to those predicted by Nash-Bertrand differentiated price competition. While the equilibrium response of firms to a merger may be different

[15] Many useful analyses of these models are the subject of confidentiality orders because they were produced as a part of on-going litigation. Published examples that show how these models work include Hausman, Leonard, and Zona (1994) and Nevo (2000). A standard approach is to estimate demand using a linear, constant-elasticity model, or a variation of the AIDS model. Alternatively, an increasingly popular method of estimating demand uses the discrete choice model suggested by Berry (1994) and Berry, Levinson, and Pakes (1995), which has been applied by Nevo (2000) to a merger simulation.

[16] Our results are significantly different from Nevo's predictions. See Section VI.

than the response to the introduction of a new product, these results provide some of the very limited evidence to support the demand estimation/simulation technique.

Despite being the major component of antitrust enforcement in the U.S., relatively few studies directly estimate the price effects of mergers. Most existing studies are in three historically regulated industries where pricing data are publicly available: airlines, banking, and hospitals.[17] The merger evaluation studies most similar to ours in these industries include Borenstein's (1990), Kim and Singal's (1993), Joskow, Werden, and Johnson's (1994), and Peter's (2006) studies of airline mergers, Vita and Sacher's (2001) study of a California hospital merger, and Prager and Hannan's (1998), Focarelli and Panetta's (2003), and Sapienza's (2002) studies of banking mergers.[18] The other major industry where the price effects of mergers have been examined is the petroleum industry, see Hastings and Gilbert (2005), Hastings (2004), Taylor and Hosken (2007), and Simpson and Taylor (forthcoming). Finally, Barton and Sherman (1984) studied two consummated mergers in the microfilm industry that were subsequently challenged by the FTC and McCabe (2002) studied mergers among publishes of academic journals. All but one of these studies finds some evidence of price increases following the mergers they study.[19] Focarelli and Panetta also conclude that the anticompetitive effects of the mergers they examined were dissipated after three years by large cost savings resulting in lower consumer prices.

An obvious problem with using any of the previous studies to assess government merger policy is that they are case studies selected primarily because of data availability. As a result it is impossible to generalize from these studies to determine in what way their results reflect the universe of potential mergers. Our goal has been to select mergers that provide at least a minimal basis for generalization. This is why we selected a group of mergers to analyze from (a) the set of branded products mergers that would (b) be considered problematic by an outsider observing the market structure of the industries the

[17] See Pautler (2003) for an extensive review of this literature.
[18] Prager and Hannan and Focarelli and Panneta study the interest rate consumers earn on deposits. Thus, other things equal, a higher interest rate benefits consumers. To parallel the discussion of other studies of how mergers affect consumer prices, we refer to an interest rate falling as a price increase.
[19] Simpson and Taylor do not find a price increase in their study. Taylor and Hosken find an increase in wholesale gasoline prices that is not passed-thru as an increase in retail prices. Sapienza finds prices fall in regions with small changes in market concentration (suggesting efficiencies dominate), but that large changes in concentration are associated with increased prices.

merging firms participated in. We chose branded products to study because of the now general availability of scanner price data for these products. Thus data limitations are no longer a primary consideration for selection. And we chose those mergers most likely to be anticompetitive to provide a known contact point with the universe of merging firms in the period we study.

III. Mergers Selected for Analysis

Our goal was to identify mergers that posed a significant risk of anticompetitive harm (so there was a reasonable probability of observing a post-merger price increase) but where the risk was not large enough to cause the antitrust agencies to block or substantially modify the transaction. Further, in order to purchase the price and quantity data needed to examine the post-acquisition effects of the merger, it was necessary to restrict our attention to mergers that occurred between 1997 and 1999.[20] All of the mergers we study involve products with significant "brand equity," which is the phrase used to describe the character of products that are imperfect substitutes because of their branding.[21]

We are limited to using public sources in identifying the mergers we study. While the antitrust authorities have access to a great deal of private information in reviewing mergers (e.g., documents from the merging parties, interviews with market participants), this material (and the government's interpretation of this material) is treated as highly confidential and does not typically leave the agencies. The major exception is when the government challenges a merger and a trial takes place in open court. If the government accepts a merger subject to modification (such as the divestiture of some assets), then it will publish a very limited description of the competitive issues being

[20] The firm that provided our data, Information Resources Incorporated (IRI), only maintains the required data in a form readily accessible to be provided at reasonable cost for 5 years. Because we wanted to have at least one year of data pre- and post-merger to analyze the price effects of the merger, given the date at which we started this project, it was necessary to restrict our sample to mergers occurring between 1997 and 1999.

[21] Each of the branded products in our sample sells at a substantial premium to its unbranded competition. General Mills Cheerios is, on average, 58% more expensive than its generically similar product. More generally, the branded cereals we study sell for more than 67% than the comparable unbranded cereals. The price premiums of the branded products in the other industries we study are similarly large. Branded scotches, vodkas, and gins are roughly 114% more expensive than their unbranded counterparts. Branded

addressed by the government's action.[22] Alternatively, if the merger is not challenged by the government, there is typically *no* public statement from the government describing the transaction.[23] Thus, in general, it is not possible to use information from the government's internal decision making process to determine what mergers it viewed as marginal. Instead researchers are required to use public information, typically press reports describing a transaction and measures of market concentration, to determine which mergers are likely to be problematic. In what follows, we describe the method we used to identify problematic consummated mergers in consumer products industries.

To identify potential mergers we first searched the Merger Yearbook, which reports mergers by the SIC codes of the merging parties. We then examined mergers in the SIC codes that corresponded to consumer products and identified five consummated mergers where the merging parties produced products that were substitutes in markets that appeared from press accounts to be somewhat concentrated. Three of these mergers were apparently allowed to be consummated with no government action, Proctor and Gamble's purchase of Tambrands (feminine hygiene products), Aurora Food's (Mrs. Butterworth) purchase of Kraft's Log Cabin breakfast syrup business, and Pennzoil's purchase of Quaker State motor oil. Two of the mergers we selected were modified by the FTC, but even with the modifications there still appeared to be a possibility of competitive harm from the transaction. These were General Mills' purchase of the branded cereal business of Ralcorp, and the merger of the distilled spirits businesses of Guinness and Grand Metropolitan. The market shares of the merging parties and measures of the level and change in market concentration (HHI and change in HHI) are presented in Table 2.[24] The five transactions we study all resulted in highly concentrated

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motor oil, breakfast syrups, and feminine hygiene products are 35%, 74%, and 54% more costly, respectively, than their corresponding generic products.

[22] This document is typically referred to as an "Aid to Public Comment."

[23] Recently the agencies have provided some public description of major antitrust investigations reviewed by the agencies where no action was taken, e.g., the FTC's 2002 investigation of mergers in the cruise ship industry in or the DOJ's review of the Whirlpool/Maytag merger in 2006.

[24] The antitrust agencies measure market concentration using the Herfindahl-Hirschman Index (HHI) which is defined as the sum of the squared market shares of the market participants. Appendix Table 1 contains a list of the market participants and their corresponding market shares used to calculate the HHI's in Table 2. In calculating the HHI, we treat the aggregate private label share as if it were a market participant. This assumption implies that within each store the retailer (who plays the role of the manufacturer in marketing a product under its name) is a market participant. We do not include products listed as "other" in

markets (HHI greater than 1800) with changes in market concentration greater than 100 points.[25]

The level and change in concentration associated with the mergers we examine appear to be near the median of mergers examined by the antitrust authorities and less than the median of mergers modified by the antitrust authorities. According to the FTC's report, "Horizontal Merger Investigation Data, Fiscal Years 1996-2003," 46% of the markets investigated by the FTC had a post-merger level of concentration (HHI) that was less than 3000 and 51% of markets had a change in concentration less than 800.[26] As shown in Table 2, the mergers we study all have a post-merger HHI less than 3000, and a change in HHI between 200 and 1000. The FTC, however, only took action to modify a merger in 25% of the markets it investigated that had a post-merger HHI of less than 2500 (4 of the 5 transactions we study have a post-merger HHI less than 2500). Similarly, the FTC took an enforcement action in 44% of markets that had a change in HHI less than 800 and 60% of markets that had a change in HHI of 1200. While market concentration only provides a crude measure of the competitive significance of a transaction, on net, this evidence suggests that the transactions we study were similar to the marginal mergers examined by the FTC and less competitively significant than the typical merger challenged or modified by the FTC. The remainder of this section provides some background information about each of the mergers.

Proctor and Gamble/Tambrands

The purchase of Tambrands for 1.85 billion dollars in July, 1997 by Proctor and Gamble (P&G) gave P&G the leading brand of tampons (Tampax) and sanitary pads (Always) in the U.S. At first glance, this merger did not appear likely to have been anticompetitive. Tampons and pads were two different types of feminine hygiene products, and many consumers likely felt that the products (while functionally similar)

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calculating the HHI. The other category contains many very small firms that we treat as being a competitive fringe in the calculation of HHI.

[25] According to the 1992 Horizontal Merger Guidelines (Section 1.51), "Where the post-merger HHI exceeds 1800, it will be presumed that mergers producing an increase in the HHI of 100 points are likely to create or enhance market power or facilitate its exercise."

[26] Authors' calculations using information from Table 3.1 of the report. These data correspond to mergers where the merging parties received second requests, where the anticompetitive theory being investigated was horizontal (merger of substitutes), and where data was available to estimate market shares.

were not close substitutes. However, both the tampon and pad markets (or a combined tampon/pad market) were highly concentrated before the acquisition with only five branded firms selling either type of product.[27] Hence, if pads and tampons were important substitutes, it would not be surprising to see a price increase post-acquisition. In fact, according to press reports, the Department of Justice's antitrust division did review the merger, but apparently took no action to block or modify the deal.[28]

Guinness/Grand Metropolitan

Guinness and Grand Metropolitan merged to become Diageo in a transaction valued at approximately 36 billion dollars.[29] This was a conglomerate merger involving many consumer businesses, e.g., Pillsbury, Burger King, and the Guinness brewery. The potential antitrust problems resulted from the combination of both firms very large portfolios of well known brands of distilled spirits, including Dewars scotch, Johnny Walker scotch, J&B scotch, Tanqueray gin, Bombay gin, Smirnoff vodka, Popov vodka, Gilbeys gin, Gordon's gin and vodka, Malibu rum, and Baileys Irish Cream. In addition to owning large portfolios of distilled spirits, the companies also were the sole U.S. distributors of many important liquor brands including Stolichnaya vodka, Wild Turkey bourbon, and Jose Cuervo tequila. The FTC investigated this merger and found that the merger would be anticompetitive in two product markets: premium scotch and premium gin.[30] In order to obtain FTC approval, Diageo agreed to divest its Bombay and Bombay Sapphire gin brands and Dewars scotch brand to another large spirits company, Bacardi, for 1.9 billion dollars. Despite this divestiture, the merger could still have led to anticompetitive effects. As mentioned above, the firms each had large portfolios of liquor brands. If substitution took place between broader sets of premium brands than the FTC alleged, it would not be surprising to observe a post-acquisition price increase. In fact, the distilled spirits business contains a relatively small number of players that control large portfolios of popular brands of distilled spirits. Because the companies

[27] As defined by the FTC/DOJ's 1992 Horizontal Merger Guidelines, Section 1.5.
[28] New York Times, June 7, 1997.
[29] http://www.ftc.gov/opa/1997/9712/scotch.htm
[30] See the FTC press release at http://www.ftc.gov/opa/1997/9712/scotch.htm.

owned a very large brand portfolio, we have decided to limit our attention to the price effects of three major types of spirits the two firms sold: scotches, gins, and vodkas.

Pennzoil/Quaker State

In December of 1998 Pennzoil bought Quaker State in an acquisition valued at 1 billion dollars.[31] While the two firms were also competitors in the quick lube market (Pennzoil's Jiffy Lube and Quaker State's Quick Lube), this study focuses on the competitive effects in the passenger car motor oil market. Passenger car motor oil is sold through a number of channels. Bulk motor oil is sold to quick lube operations and auto repair shops by all of the major motor oil companies. It is likely that branded motor oil sold through this channel does not command a premium price, as consumers who use special service stations to change their oil likely do not know (or perhaps care) what brand of motor oil is used in their car. In contrast, consumers who change their own oil, who account for roughly 45%[32] of all oil changes, appear to have strong brand preferences for motor oil.[33]

There are three primary types of motor oil sold in the U.S. Conventional motor oil, which sells for $1.00 to $1.75 a quart, is the most common form of motor oil for use in every day driving and accounts for about 88% of sales revenue (and 96% of the volume) in our data. Semi-synthetic and synthetic motor oils are considerably more expensive ($2.50-$4.00) and are marketed to people with heavy duty engines (such as 4 wheel drive trucks) or high performance engines (such as sports cars). Synthetic and semi-synthetic motor oils claim to reduce engine wear and can be used in the engine for longer periods of time between oil changes. Because synthetics and semi-synthetics represent a niche in the motor oil market and because neither Pennzoil nor Quaker State was very successful in this niche at the time of the merger, we focus on conventional motor oils in this study.[34]

Within the conventional motor oil market there are substantial differences (30%-50%) in the prices and perceived quality of the five "premium" motor oils (Castrol,

[31] *The Houston Chronicle*. September 19, 1998.

[32] *The Detroit News*. May 23, 2000.

[33] For example, the premium branded motor oil companies spent 127 million dollars on advertising in 2000.

Havoline, Pennzoil, Quaker State, and Valvoline) sold in the U.S. relative to the price and quality of the large number of regular brands (typically private label or branded with a gasoline company name, e.g., Exxon or Chevron). Hence, the merger represented the merger of two of the five brands of premium motor oil. However, competition from different types of motor oil (semi-synthetics and synthetics), a large number of generic or gasoline brand motor oils, and a general trend away from do-it-yourself oil changes to quick-lube facilities would likely mitigate the potential anticompetitive effects of the merger. Possibly for these reasons, the merger was approved without any modification required by the antitrust agencies.

General Mills/Ralcorp

In January 1997, General Mills purchased the branded cereal business of Ralcorp (primarily the Chex cereals and Chex snack mix) in a transaction valued at 570 million dollars. Ralcorp retained its private label cereal business (the largest private label cereal producer in the U.S.).[35] At the time of the merger, the RTE cereal market comprised only five major participants (General Mills, Kellogg's, Post, Quaker, and Ralcorp), and had long been subject to antitrust scrutiny.[36] In April 1996 (just prior to the merger's announcement) a widely reported price war broke out among the major manufacturers. Post lowered the prices of its cereals by 20%, and issued coupons that were good for discounts on the purchase of any Post cereal. General Mills and Kellogg's responded by lowering the prices on some of their cereal brands. It was in this newly competitive environment that the FTC reviewed the merger and allowed it to proceed with only minor revisions.[37] However, from a strictly structural perspective (that is, a highly concentrated market), there was reason to believe this merger could be anticompetitive.

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[34] Castrol and Mobil 1 were the leading brands of synthetic motor oils.
[35] *Milling & Baking News*. January 21, 1997.
[36] The industry was subject to a long investigation by the FTC, and was sued by the FTC for violating the antitrust laws the 1970's.

Aurora Foods' Purchase of Kraft's Breakfast Syrup Business

Aurora Foods is a holding company that owns a number of popular brands of food products, including Duncan Hines cake mix, Mrs. Pauls fish products, Lenders bagels, and Celeste pizzas. In July 1997, Aurora, which owned the Mrs. Butterworth brand of maple flavored breakfast syrup, purchased the Log Cabin syrup brand from Kraft for 222 million dollars. At the time of the acquisition, there were three major brands of breakfast syrup (Aunt Jemima, Log Cabin, and Mrs. Butterworth), a brand with strong regional distribution (Hungry Jack), and a number of small regional brands and private label brands (see table 1h for market shares). On the surface, this merger would appear to be problematic as it combined two of the three major branded products in one company. However, there were many substitutes for these products at lower price levels (private label syrups), at higher price levels (real maple syrups), and among other types of flavorings for breakfast foods, e.g., jams and jellies. According to the trade press, part of the justification for the transaction was that Log Cabin did not fit well into Phillip Morris's food portfolio, and that Aurora (which purchases and markets established brands of food products) could more effectively sell the product.[38] There does not appear to be any public mention of either of the antitrust agencies investigating the merger.

IV. Data Description

A. Source of Data

All of the price and quantity data used in this study were purchased from Information Resources Incorporated (IRI). For each merger we purchased data on weekly total revenue and unit sales for each specific Universal Product Code (UPC) in the relevant product category,[39] information sufficient to determine the manufacturers selling the products, and descriptions of the categories the products fell in. For example, in examining the RTE cereal market, we purchased data on each specific item of

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[37] The FTC's modifications gave Ralcorp the right to sell private label Chex immediately following the merger (instead of waiting 18 months), and gave Ralcorp the right to transfer its right to make private label Chex to a third party without General Mills permission. (FTC Press Release. May 27, 1997.)

[38] According to one press account Philip Morris spent just $7500 advertising Log Cabin in 1996. *Chicago Tribune*, October 20, 1997.

[39] A UPC describes each product and package size uniquely. For example, a 10 ounce box of Cheerios and a 15 ounce box of Cheerios have different UPCs. Similarly, the 15 ounce box of Honey Nut Cheerios has a different UPC than the 15 ounce box of Cheerios. A UPC forms the basis for scanning in a retail store.

Cheerios sold (i.e., data broken out separately for 10, 15, and 20 ounce box sizes). Further, to illustrate the product categorizations provided by IRI, RTE cereals are grouped into fairly specific groups, e.g., "Adult Fruit and Nut" and "All Family Wholesome." The other consumer products have similar descriptors in the data. IRI collects the revenue and unit sales data from the major retail channels of distribution (mass merchandise, drug stores, food stores, and convenience stores) at a sample of stores in a region and then (using proprietary methods) projects what the sales are within a metropolitan area for that channel. Since these data are obtained from the retail scanners that record consumer purchases, they are referred to as "scanner" data.

In purchasing data for this study, we chose the available channels that best represented consumer purchases of the relevant consumer products. For the two food product mergers (cereal and pancake syrup), the obvious channel choice was IRI's food channel (data from 64 InfoScan food markets which roughly correspond to metropolitan areas, see appendix table 2 for a list of the various InfoScan markets). For feminine hygiene products, the two choices were IRI's food channel and mass merchandiser channel. Both channels are important in the sale of these products. Because the mass merchandiser channel only covers 10 InfoScan markets, we elected to use the data from the food channel. In fact, sales through the IRI food channel are quite substantial. Annual dollar sales of feminine hygiene products were $1.7 billion in 1997[40] while sales in the IRI food channel during 1997 were approximately $570 million, accounting for 33% of sales during the time period.

Motor oil sales to the consumer market are primarily made through mass merchandisers and auto parts stores. For this reason, we used data from IRI's mass merchandiser channel for the 10 InfoScan markets where data is collected. While these 10 markets represent only a fraction of the U.S., they include the largest metropolitan areas.

For the liquor market, the only data set available for our time period was a drug store sample containing information from 10 InfoScan markets, and complete data were available for only 5 of the InfoScan markets from three states (San Francisco, CA, San

[40] Supermarket Business, January, 1998.

Diego, CA, Los Angeles, CA, Chicago, IL, and Phoenix, AZ). This data source has several shortcomings. Since we could only observe pricing behavior in a small number of markets, and since local liquor distributors have limited ability to transship products between states to eliminate any price discrimination attempted by distributors, our results may not be generalizeable to the U.S.

In addition, our data come from one only retail channel of distribution, drug stores, which is certainly not the main distribution channel for distilled spirits. It is likely that the product selection seen in drug stores is much narrower than in liquor stores. While the drug stores typically carry the major brands of spirits they do not appear to sell all the format sizes available. For example, in our data we found that the price series are incomplete for large bottle sizes for many scotches (e.g., Johnny Walker Black, Dewars White Label), which are almost certainly available in liquor stores. This could be an important issue if manufacturers offered substantial quantity discounts on large bottle sizes (1.75 liter bottles) relative to small bottle sizes (750 milliliters).[41] This would affect the results of our study if the merger caused firms to alter the pricing of large bottle sizes relative to small bottle sizes. In fact, for the products where we had data on both large and small package sizes, we found the price effects of the merger were different, although not in any systematic way.

B. Definition of Price

Since many consumer products come in different package sizes, often at very different prices (because of quantity discounts), it is not straightforward to define the price of a "product". In this study, we purchased data at the UPC level to examine how different aggregation techniques affected the measure of price, and the estimated price effect of the merger. The techniques we used to create measures of price vary by product type because of institutional factors specific to each market. In this section we describe in detail the methods used to construct price separately by product category.

[41] While distilled spirits are sold in a number of package sizes (single serving, 375 milliliters, 750 milliliters, 1 liter, and 1.75 liters), the vast majority of spirits are sold in the 750 milliliter and 1.75 liter bottle sizes.

The motor oil products in our data are sold in either one quart packages or five quart packages.[42] The vast majority of sales we observe are of the one quart package size, and we have an unbroken time series for prices for this package size. Since the per unit price discount is not large for purchasing one quart versus five quart units, we aggregate sales over the two package sizes. Thus, the measure of price we are using for motor oil is the average revenue per quart (motor oil revenue for all package sizes/ motor oil quarts for all package sizes). The other important institutional detail in the motor oil industry is a product's "weight." Each vehicle's engine is designed to take a certain weight of oil. The most popular weights of motor oil are 10W30, 5W30, and 10W40 and we have restricted our analysis to these weights.[43] As a practical matter, when one brand of motor oil goes on sale all of the popular weights of oil are also likely to go on sale, and most of the weights have about the same price point. However, to minimize measurement error we calculate separate measures of price for each brand and weight of motor oil.

Distilled spirits are sold in many bottle sizes, but the vast majority of sales are of 1.75 liter and 750 milliliter bottles. Because the two different bottle sizes are priced and promoted very differently (with the 1.75 liter bottle having more retail "sales"; i.e., temporary price discounts), it would not be appropriate to aggregate the two package sizes and create a single "price" for a brand of spirits. We analyze the price of the different bottle sizes separately. The only aggregation over UPCs we do is when there are multiple UPCs corresponding to the same brand and bottle size, e.g., a holiday version of a brand of spirits. For this aggregation, we calculate the price of a brand of spirits as the average revenue (revenue/units) for that brand and bottle size, e.g., all types of Johnny Walker Red Scotch sold in 750 milliliter bottles.

We have calculated five different measures of average price for breakfast syrups, cereals and feminine hygiene products. The exact calculation of each measure varies by product type due to institutional factors discussed in more detail below. To be comparable with research by others, such as Nevo (2000), we first calculate the standard measure of price, average revenue (total revenue/total units sold of a given brand, e.g.,

[42] A typical motor engine requires five quarts of oil, hence the 5 quart package size.

General Mills Cheerios). However, we are concerned about the accuracy of this measure of price because these products are sold in many different package sizes, often with substantial quantity discounts. Because a 10 ounce box of Cheerios may be perceived as a different good than a 15 ounce box of Cheerios, it may oversimplify matters to create an aggregate price of Cheerios across all package sizes. Unfortunately, there are too many brands and package sizes in these markets to calculate price separately by package size (unlike the case for spirits). However, in contrast to the spirits market, the pricing behavior of manufacturers does not appear to differ much across package sizes. Thus, we construct a price index for each product that explicitly accounts for the pricing of the different product's package sizes. Below we describe how each index is calculated for each market.

We calculated four different measures of price for syrup that accounted for different package sizes. The first two measures are variations on a simple weighted average price. We first calculated the proportion of revenue earned for each bottle size of a given brand during the first (last) year in our data. We then calculated price as the weighted average of the price of each bottle size of syrup using the revenue weights. The two measures of simple weighted average price use either first year or last year revenue weights. The second two measures of price use Stone price indexes using either the first or last year's revenue weights.[44]

We used the same general approach for aggregating RTE cereal as we used for maple flavored syrups. The added complications in aggregation come from the manufacturers changing or temporarily discontinuing package sizes. For those products (which accounted for roughly 10% of RTE cereal revenue) that changed package size during the sample period, for example, the standard box size changed from 14.5 ounces to 14 ounces, we redefined the UPC so it appears that the same package size appeared

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[43] Some weights of motor oil have specialty purposes, e.g., boat engine oil, are not sold in high volume, or are not carried in all locations. Hence, we limit the analysis to the three most popular weights.

[44] The stone price index is define as $\log P_{i,j,t} = \sum_k \omega_k^i * \log p_{k,i,j,t}$ where $p_{k,i,j,t}$ is the price of the kth variation of product i in city j at time t and ω_k^i is the revenue share of the kth variation of product i ($\sum_k \omega_k^i = 1$). See, e.g., Deaton and Muellbauer (1980) or Hausman and Leonard (2002) for a similar use of the Stone price index.

during the entire sample period, and we adjust the ounces sold appropriately. For box sizes that do not appear for the entire sample period (such as Chex cereals, which are periodically offered in a large box size a few months of the year), we calculate the price per ounce for the cereal, compare the price to the most popular size of the cereal, and if the price difference is not too large (less than a 25% difference) we ascribe the sales of that package size to the most popular package size and adjust the sales and price for that package size accordingly. After dealing with these two complications, we then use the techniques described for syrup to construct two measures of a simple weighted price and two measures of a Stone price index.

The general approach used to create an average price for feminine hygiene products is the same as for RTE cereal and syrup with a few additional complications. Feminine hygiene products, particularly sanitary pads, come in a number of different product variations that are marketed jointly. For example, sanitary pads are typically sold in thin, medium, and heavy variations. A particular brand of pads, such as P&G's Always, will use the same brand name for all sizes of its product, and will charge the same package price for each pad size (but alter the quantity in the package so that unit costs may vary), and will put the items on sale at the same time. Because of the joint marketing of the products it does not seem sensible to treat each variation of the product, such as Always thin pad vs. Always thick pad, as separate products. Instead, we want to create a single measure of price for each brand of pad. Thus, in constructing our price indices we calculate revenue shares for all package sizes and variations of feminine hygiene products. Thus, we again have four measures of price, two simple average prices (using revenue weights from either the first or last year of the sample period) and two Stone price indices.

V. Empirical Model

The major issue faced by any attempt to estimate the effect of a merger on prices, as with any evaluation of an intervention using non-experimental data, is the method used to control for other confounding factors that may also have changed at the time of the event. Of especial concern is the effect of possible changes in demand or costs on prices. The methods we use to control for these factors are familiar from the literature

on "difference-in-differences" estimation and focus on the selection of a control group and the selection of a window of data surrounding the events we study.[45] The former is important for dealing with permanent time-varying factors while the latter can be very useful in dealing with transitory time-varying factors.

We prefer an event window that is long enough to capture any change in price associated with the change in market structure, but short enough to avoid any contaminating effects from other changes in the market. We consider three different merger windows. Our preferred merger window drops the 3 months of data preceding and following the merger consummation and contains a symmetric amount of data pre- and post-merger.[46] By dropping the data very close to the merger date, we avoid the issue of exactly when the firms start coordinating their pricing behavior, leaving us with uncontaminated measures of the firms' pre- and post-merger pricing.[47] By using a symmetric difference-in differences estimator we also control for any unspecified transitory selection effects so long as the pricing error process is covariance stationary.[48]

We have also analyzed an alternative event window that includes data in the interval within 3 months of the merger date and contains an equal amount of data pre- and post-merger. This event window may suffer from contamination of the data around the time of the merger, but it does provide a larger sample for analysis. Finally, since for most of the mergers we have considerably more data post-merger than pre-merger, we also consider an event window that uses all of the data available to us, but still drops those observations within three months of the merger date. The advantage of this window is that if makes use of all the data, though it may suffer from transitory selection effects.

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[45] See Ashenfelter (1978) for an early discussion of these issues, Ashenfelter and Card (1985) for subsequent methods, and Heckman and Robb (1985) for a detailed survey of the key issues.

[46] As discussed earlier, the amount of data we have for each of our mergers varies because we were only able to purchase data up to 5 years old. For this reason, the length of the event window varies from merger to merger.

[47] By law, merging parties are strictly prohibited from coordinating their pricing behavior during the HSR waiting period (when merger review takes place). However, as a practical matter, there is some evidence that firms do change their pricing behavior following their announcement to merge. For example, Kim and Singal (1993) find that many of the airlines increased their fares before the mergers were consummated.

[48] This was first pointed out by Heckman and Robb (1985), and the method is used by Ashenfelter and Card (1985).

A potential disadvantage of our event windows is a result of the fact that some mergers that result in price increases may also result in a more efficient consolidation of resources and a reduction in marginal costs that is ultimately passed through to consumers. The timing of these two effects may differ, however. Our data only measure the relatively short-run price effects of consumer products mergers.[49]

We consider two different comparison groups as controls for permanent time-varying factors, such as input cost changes, which might affect prices. Our preferred control group consists of the private label products sold in each industry. The advantage of private label products as a control group is that they are likely to be distant substitutes to consumers for the higher quality branded products affected by the merger. Yet private label products should share many of the same inputs (with the exception of advertising) as are used to manufacture branded products. Assuming that these private label products are supplied perfectly elastically, the prices of these products should serve as good controls for costs, while at the same time they should be relatively unaffected by any anticompetitive price increase by the merging parties. The private label products in the control group we select are those with the characteristics closest to the products owned by the merging parties.

For three of the mergers the choice of the private label control group is straightforward: private label motor oil, private label tampons, sanitary pads and liners, and private label maple flavored syrup. For the liquor and RTE cereal mergers the choice is more difficult because of the wide variety of products. For the liquor merger we use private label gin as the control for gin brands, private label scotch as the control for scotch brands, and private label vodka as the control for the vodka brands owned by Diageo. For the RTE cereal market we use the private label cereals in the same IRI groupings as the different types of Chex, Wheaties, and Cheerios examined in our study.

[49] Even with additional post-acquisition data, it would be very difficult to control for the "but-for" world in the markets we are studying. For example, in the RTE cereal industry in any given year many new products are introduced. A new product changes the demand relationships facing those products that are substitutes for the new product, and likely changes equilibrium pricing for reasons unrelated to the merger, see e.g., Hausman and Leonard. Overtime, the net effect of these changes likely grows. Disentangling the price effects of a merger from the price effects resulting from changes in marketing, advertising, new product introduction, and exogenous shocks to supply and demand is increasingly difficult as the length of time following the merger grows in consumer products industries.

The second control group contains the branded products that are close substitutes to the products owned by the merging parties. The primary advantage of this control group is it should control for shocks to both demand and cost that affect branded products. An increase in income, for example, may increase the demand for all branded products relative to private label products. The prices of close substitutes to the products of the merging firms will thus also increase, serving as a control for the relative demand shift. The disadvantage of this control group is that these products are likely to be close enough substitutes to the merging parties' products that their prices will also increase as a result of the merger. Nevertheless, it is likely that the price increase of these competitors to the merged firm will be lower than the price increases of the merging parties.[50] Thus, while measuring price changes relative to this control group may understate any price increase due to the merger, the sign of the relative price increase should be correct. In view of this weakness of this control group, we primarily view results estimated with it as a specification check on the results our private label control group.

As with the private label control groups, we choose the products with the characteristics closest to the merging parties' products being studied for this second control group. For the feminine protection and syrup markets the control group is branded products sold in all 64 geographic markets. For motor oil, the control group consists of the 3 remaining premium brands of conventional motor oil (Havoline, Valvoline, and Castrol). The control group for the liquor merger is branded scotches for the scotch market, branded gins for the gin market, and branded vodka's for the vodka market. For the RTE cereal market we choose the branded cereals in the same IRI groupings as the different types of Chex, Wheaties, and Cheerios examined in our study.

We use the following regression specification fitted separately for *each* merging party product and its relevant control group:

$$(1)\ p_{i,j,t} = \alpha_{i,j} + \sum_{m=1}^{11} D_m M_{i,j,t} + \beta_1(\text{Post-Merger}_{i,j,t}) + \beta_2(\text{Post-Merger}_{i,j,t}) * (\text{Merging Party Product}_i) + \varepsilon_{i,j,t}$$

for the i_{th} product, in the j_{th} city, and the t_{th} time period, where M_{ijt} is a month of the year indicator, α_{ij} is a region-specific product fixed-effect, Post-Merger_{ijt} is an indicator equal

[50] This is a property of the model in Deneckere and Davidson (1985), for example.

to one following the merger consummation, and Merging Party Product$_i$ is an indicator equal to one if the product is owned by the parties. The price is measured in natural logs (either the log of average revenue, log of a weighted average price, or as a Stone price index, as noted above). The fixed-effects (α_{ij}) in equation 2 are allowed to vary by both product and region because a given product (e.g., Cheerios) may have a different permanent price in different regions (e.g., Chicago versus Knoxville) and different products may have different permanent price levels (Cheerios versus Wheaties). We include month effects ($M_{i,j,t}$) to control for seasonal pricing. The coefficient β_2 measures the approximate proportionate price increase of the merging firm's product relative to products in the control group. To examine how sensitive our results are to the choice of control groups, we also estimated regressions without control groups. Because we are observing the prices of the same products in many different markets in each time period, we estimate clustered standard errors where we cluster on the time period (Moulton (1987)).

We also measure changes in the merging parties' output following the merger as a basic specification test of our analysis. Though the effect of a price increase resulting from a merger will generally lead to a decline in quantity sold, in complex multi-product mergers these predicted effects depend heavily on the precise structure of the economic model used for prediction. We measure output using both revenue shares and quantity shares.[51] Regressions are estimated separately for each product owned by the merging parties and are of the form

$$(2)\ s_{j,t} = \alpha_j + \sum_{m=1}^{11} D_m M_{j,t} + \beta_1 (\text{Post-Merger}_{j,t}) + \varepsilon_{j,t}$$

To control for differences in market size each observation is weighted by the size of market output in a given region/time period. We also estimate clustered standard errors where we cluster on the time period.

[51] Both our price and output regressions are reduced forms of a potentially complex demand system, cost function, and equilibrium specification. A homothetic AID's model would lead to log price and revenue share as the appropriate specification for price and quantity in these reduced forms, but other demand systems would lead to other specifications.

VI. Results

Tables 3, 5, 7, 9, and 11 present the basic empirical results. These tables report results using our preferred definition of the merger window (equal amounts of data pre- and post-merger and dropping data within the 3 months of the merger consummation). The price measure used is average revenue. Tables 4, 6, 8, 10, and 12 present summary statistics describing the results using different definitions of the merger window, price, and control group. The results imply that there were consumer price increases for some of the products owned by the merging firms in motor oil, feminine hygiene products, RTE cereal, and distilled spirits industries. However, in the four mergers where we find substantial evidence of a price increase, manufacturers did not increase all of their prices uniformly. Instead, the merged firm chose to increase the price of one of its products (or a set of products) while holding the other prices more or less fixed. For example, the combined Pennzoil/Quaker State substantially increased the price of its Quaker State brand of motor oil, while leaving the Pennzoil brand's price essentially unchanged. In contrast, there is little evidence that the combination of two of the leading brands of maple-flavored syrup resulted in any meaningful price change following the merger.

With one exception (General Mills/Ralcorp), our analysis of the robustness of the results suggests that the choice of merger window is not very important for the results, but the choice of control group can be. While the choice of a branded or private label control group is not systematically associated with higher or lower estimated price changes, in those cases where the differences are most striking (Guinness/Grand Metropolitan and P&G/Tambrands) the price effects are larger with the private label control group. Finally, while the choice of a price measure (average revenue or a measure which accounts for differences in pricing across package sizes or product variations) does not affect the sign of the estimated price effects, the measure does have a significant effect on the magnitude of a price increase. We interpret this result as showing the importance of accounting for quantity discounts in studies using scanner data.

While we purchased weekly revenue and unit sales data from IRI, we have aggregated the data to monthly data for all of the analysis presented in this paper. Our

goal was to control for the possibility of inventory effects associated with retailer sales. If consumers purchase dramatically larger quantities of products during sales, they may take the excess they purchase into consumer inventory.[52] By aggregating to the monthly level, our goal was to at least partially control for intertemporal purchasing substitution, which is not the focus of our study. We have estimated all specifications of the models presented in the paper using monthly and weekly data and found the results to be essentially unchanged with one exception.[53]

Finally, we have estimated regressions without control groups for each of the products using the model specifications corresponding to tables 3, 5, 7, 9, and 11. The results appear in appendix tables 3-7. In virtually every merger, we observe that the price level has increased following the merger. Thus, it seems likely that the price increases we observe in our primary difference-in-difference results are not simply due to a poor choice of control group.

Because the estimated price effects associated with the mergers were not uniform across products, the aggregate impact of the mergers cannot readily be determined from the results presented in Tables 3-12. For this reason we have constructed an aggregate estimate of the price effect of each merger. We calculated the aggregate price effect of a merger as the (revenue) weighted average of the estimated price effects of the products owned by the merging parties using the estimated price effects from our preferred model specification (presented in Tables 3, 5, 7, 9, and 11) and the pre-merger relative revenues of the affected products. The exact calculation is specified in equation (3) below.

$$(3)\quad \text{Merger Effect} = \sum_{i=1}^{P} \pi_i \hat{\beta}_i$$

Where π_i is product i's pre-merger revenue share ($\sum_{i=1}^{P} \pi_i = 1$), $\hat{\beta}_i$ is the estimated price effect for product i, and P is the number of estimated price effects associated with the

[52] See Hendel and Nevo (2006) and Pessendorfer (2002) for evidence on the importance of inventory effects.

[53] The results with weekly and monthly data yielded very different results for the cereal merger, suggesting that consumers take cereal products into household inventory in response to consumer sales. In addition, with weekly data the choice of price measure and control group were very important in the cereal market. This is not true with the monthly data.

merger. The estimates are presented in Table 13.[54] Four of the five mergers have resulted in modest price increases, ranging from roughly 3% to 7%, when using the change in private label products' prices as a control. The estimated price effects are, however, sensitive to the choice of control group. The estimated cereal and breakfast syrup mergers price effects are larger when using a branded control group while the remaining mergers price effects are larger when using a private label control group. Finally, we estimated the aggregate price effects of the distilled spirits merger overall and separately by product type (gin, scotch, vodka) because the price effects varied so much by product type. In the remainder of this section we discuss the results from each of the mergers separately.

Pennzoil/Quaker State

Table 3 presents the primary results for this merger using the preferred definition of the merger window. The estimated price effects using a branded and private label control group are in the first two columns of the table. The rank of the product's price increase (relative to its respective control group) is in the next two columns. The final four columns contain the estimates of the change in the product's revenue and quantity market shares following the merger (in absolute share points and relative to the product's pre-merger market share).

Using the private label control group, the post-merger price change for Pennzoil is about 4%, for Quaker State 8%, and Quaker State Deluxe about 6%. The estimated price increases are smaller when using the other premium brands of motor oil as the control group (essentially no change for Pennzoil, a 2% price increase for Quaker State Deluxe, and a 4% price increase for Quaker State). Quaker State's price increase is larger than all but one of the brands in the control group, and Quaker State Deluxe's price increase is about equal to the median price increase for the control group (smaller than 6 of the 11 brands in the control group). The estimated declines in market share are broadly consistent with the price increases. While Pennzoil's market share increases, the Quaker

[54] The calculation of standard errors assumes negligible covariances among the component estimators.

State brands show a significant decrease, e.g., Quaker State loses 1.3 market share points that represents a 13.5% decrease of its pre-merger market share.[55]

Table 4 summarizes the results from 6 separate regressions run for each of the 3 brands studied (for a total of 18 estimated coefficients). The table shows how the results change relative to the event window used (the first three columns) and relative to the control group (the last two columns). For example, for the private label control group, all of the estimated price effects are positive (row 1) and statistically significant (row 2). Of the 9 price effects estimated with the private label control group, 3 are between 1% and 5% and 6 are greater than 5%. The results do not appear to be sensitive to the choice of merger window, and the price effects appear lower when using the premium brands as a control group. However, as can be seen from the frequency distributions, the price increases are not large, most being less than 5%. These results suggest that the combined Pennzoil/Quaker State chose to increase prices to those users loyal to Quaker State and to maintain stable prices on its much larger Pennzoil brand. However, given the large increase in Pennzoil's market share, it clearly grew at the expense of its rivals and not only from the market share diversion from Quaker State.

Proctor and Gamble/Tambrands

Table 5 presents the estimated price effects, rank of estimated price effects relative to control group, and corresponding changes in revenue and quantity market shares for the Proctor/Tambrands purchase, while Table 6 presents a summary of the results from the other specifications examined. While tampons and sanitary pads may not appear to be close substitutes to consumers, the results suggest that P&G increased the price of pads, liners, and possibly tampons following its acquisition of Tambrands. The results in Table 5 show that relative to private label products, Always liners and pads prices increased by 8% and Tampax Tampons prices increased by 4%. When compared to the price of branded products, Always liners and pads still increased (6%, 4%) but Tampax tampon prices appear to be unchanged (-0.9%). The Always liners and pad price increases are larger than the products in the branded control group. However, the change

[55] The market shares are calculated for using conventional passenger car motor oil sold through mass-merchants in the IRI sample using data from the time period 1/5/97 through 12/27/98.

in Tampax's price is smaller than the price changes of 2 of the 3 brands in the branded control group. The changes in market share are fairly consistent with the estimated price changes for Tampax and Always liners, with Tampax showing a loss of 3.08 share points (a roughly 6% decrease from its pre-merger share) and Always liners losing 2.98 share points. Always pads show a surprising gain of 1.81 share points despite an increase in its price relative to branded and private label pads.[56]

The summary of the results in Table 6 also suggests this merger resulted in a price increase. Using the private label control group, 92% of the estimated price effects are positive, and 70% of these are significantly different from zero. When the branded control group is used about 78% of the estimated price effects are positive and 59% of these are significantly different than zero. Only one of the 27 price changes estimated using the branded control group shows an economically significant (between 1% and 5%) post-merger price *decrease*. However, as noted above, the private label control group has important advantages, because private label producers are less likely to increase their prices in response to a price increase by the merging parties. Finally, the estimated price effects are larger when price is measured using average revenue rather than controlling for package size using the two weighted price indexes. While the results do not unambiguously show a price increase, on net, the evidence suggests that P&G increased the prices of its feminine hygiene products after purchasing Tambrands.

General Mills/Ralcorp

The merger of General Mills and Ralcorp involved many different brands of RTE cereal. We have estimated the price effects for the seven brands of General Mills cereals we believed were the closest substitutes for the four types of Ralcorp's Chex cereals. Table 7 presents the estimated price effects and changes in market share for our preferred event window and price measure, and Table 8 summarizes the pricing results for all specifications of the model run. The results in Table 7 suggest that any price increase following this acquisition was quite small for the Chex cereals (less than 1%), moderate for Cheerios, Multi-Grain Cheerios, and Wheaties (2%-4%), and highly variable for the

[56] Market shares for feminine hygiene products are calculated separately for pads, liners, and tampons using IRI's supermarket sample for the pre-merger time period 10/27/96 through 7/20/97.

remaining variations of Cheerios and Wheaties (3%-14%). The estimated price increases of Crispy-Raisin Wheaties, Honey-Frosted Wheaties, Apple-Cinnamon Cheerios, and Honey-Nut Cheerios are very sensitive to the choice of control group, and are roughly 5%-6% larger when using the branded control group. Further, most of the price changes for the non-Chex cereals are in the upper tail of price increases relative to the cereal products in either the private label or branded control group.

The estimated changes in market share following the merger for some cereal brands are difficult to reconcile with the post-merger price changes. Confounding factors may have played some roll in these changes in relative output. The most important factor in the RTE cereal category is probably non-price competition, particularly new product introductions. During our time period a number of new products were introduced, including two new Chex variations (Frosted and Honey-Nut). Substitution from existing brands of Chex to the new variants may explain the large decreases in market share for some types of Chex. More generally, product entry and exit may result in substantial share variation over time. In addition, some products experienced idiosyncratic changes in demand. For example, two of the Wheaties products (Crispy Raisin and Honey Frosted) were new at the beginning of our time period and may have experienced some drop in market share as a result of consumer experimentation. Cheerios had a modest increase in relative price (4%) and increased its market share by 0.5 share points, a roughly 13% increase over its pre-merger share.[57] This may have been the result of Cheerios rebuilding its share following a widely publicized incident where contractors accidentally sprayed raw oats with an unapproved pesticide which resulted in the destruction of 50 million boxes of Cheerios in 1994.[58]

The estimated price effects vary for two of the three types of robustness checks summarized in Table 8. The choice of event window has some effect on the magnitude of the estimated price effects of the merger. When using a symmetric event window and keeping the data around the merger consummation date, the proportion of economically significant price effects (a predicted price change greater than 1%) increases relative to the alternative event windows. In addition, the magnitude of the estimated price changes

[57] Market shares for the cereal merger are calculated over the entire set of RTE cereals using IRI's supermarket sample and pre-merger data from 7/2/95 through 1/26/97.

is somewhat smaller when using the private label control group rather than the branded control group (see Table 8, columns 7 and 8).

The choice of price measure does not appear to be very important when using monthly data (see first 3 columns of Table 8). However, when the same specifications were estimated using weekly data, the estimated price effects were much larger using the average revenue measure of price than with either of the weighted price indices (in fact, all estimated price effects were larger using weekly data). This sensitivity of the results to aggregation over time suggests that consumers may take RTE cereal products into inventory in response to retail sales. In addition, the sensitivity of the estimated price effects to the measure of price in weekly data suggests that consumers may substitute across package sizes in response to sales. Because larger package sizes are inferior goods (e.g., more difficult to store, increased likelihood of spoilage), these results suggest that controlling for package sizes in may be important.

While the magnitude of the price changes following the General Mills acquisition of the Chex brands varied significantly from specification to specification, some general conclusions can be drawn. First, the estimated price changes for the Chex products were always small, between a 1% price decrease and a 2% price increase. Second, the price changes of the variants of Wheaties (Crispy Raisin and Honey Frosted) and Cheerios brands (Honey-Nut and Apple-Cinnamon) were very sensitive to the choice of control group. Third, the results strongly suggest that General Mills cereal prices did not fall after its acquisition of the Chex brands. Virtually every estimated price effect summarized in Table 8 is positive (90%), and none of the estimated price decreases are economically significant; i.e., a price decrease of more than 1%. The merger apparently did not generate cost savings that were passed through to consumers in the form of lower prices in the time period studied.

The predicted price effects of General Mills purchase of the Chex brands from Nevo (2000) are very different from our findings. Nevo predicts price increases (before efficiencies) of 12.2% for Chex (all of the Chex brands combined), 1.1% for Cheerios,

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[58] The Wall Street Journal, August 22, 1994.

0.8% for Honey Nut Cheerios, and 0.1% for Wheaties.[59] The quantity responses (before efficiencies) are predicted to be –19% for Chex, -1.3% for Cheerios, -0.9% for Honey Nut Cheerios, and –0.1% for Wheaties. Clearly, these predicted price changes are very different from what we have found (measured relative to either control group). It is unclear why Nevo's predictions were so different than our estimates. Possible explanations include the use of a different data set (quarterly data from1988-1992), the confounding effect of new product introductions[60] or changes in market structure in the 1990s, and the form of the demand structure used.

Guinness /Grand Metropolitan

The distilled spirits merger involved many brands. For brevity, we refer to our results separately for the three major types of spirits affected by the transaction: vodkas, gins, and scotches. The results in Table 9 (and the summary statistics in Table 10) suggest that the scotch merger resulted in a price increase. For the four brands of scotch (three in two bottle sizes), all the model specifications show a significant price increase. The relative magnitude of the price increases are at or above the median of the branded control group (Table 10, column 3 for the scotch brands). The frequency distribution in Table 10 shows that 22 of the 42 estimated price increases are between 1% and 5% and 20 are greater than 5%.

The results for gins and vodkas are more ambiguous. The key factor appears to be the choice of control group. In Table 9 when using the private label control group, about 71% (15 of 21) of the estimated price effects for gins and vodkas are positive. However, when using the branded control group, all but one of the brands of gin and vodka show a price *decrease* following the merger. These results are also seen in the

[59] See Nevo (2000), Table 5. His study does not analyze the other varieties of Cheerios and Wheaties examined here (those brands had not been introduced in Nevo's sample period).

[60] In purchasing the Chex cereals from Ralcorp, General Mills likely knew that Ralcorp would begin selling private label Chex. As noted earlier, the consent decree reached between the FTC and Ralcorp gave Ralcorp the right to produce private label cereal immediately following the sale of its branded cereal business. While Ralcorp did not begin selling private label versions of Chex cereals during our sample period, private label Chex was on supermarket shelves within a few years following the close of the transaction (and is still available today). General Mills may not have changed Chex pricing because of this anticipated entry. Virtually all merger simulations (including Nevo's) are made assuming the set of existing set of products is constant; i.e., the simulations cannot account for unanticipated new product development.

summary statistics in Table 10. For the 21 types of gins and vodkas (brands and bottle sizes), 53 of the 63 price changes estimated with a private label control group are positive while only 18 of the 63 price changes estimated with the branded control group are positive.

The estimated share changes are not entirely consistent with the estimated price effects. For the scotches, J&B in the 750ml, Johnny Walker Red in the 750ml and 1.75L bottle, and Scoresby in the 1.75L bottle show share decreases. However, Johnny Walker Black 750ml, and Scoresby 750ml, show significant share increases. The only explanation we can find for this result is that the price increase in large bottle sizes caused consumers to substitute to the smaller bottle size.[61] The results for the gins and vodkas seem to be quite variable. The largest increases, for the citrus versions of Gordon's and Smirnoff vodkas can be explained by the large growth taking place during this time for flavored vodkas.

Aurora Foods/Kraft

The one merger where we find no strong evidence of a post-merger price increase is in the Aurora Foods (owner of Mrs. Butterworth) purchase of Kraft's Log Cabin brand of maple flavored breakfast syrup. The results in Table 11 show that neither the price of Mrs. Butterworth or Log Cabin changed much following the acquisition. While the estimated price of Log Cabin relative to other brands of maple flavored syrup increases by 3% in Table 11, this result is not robust to model specification. An examination of Table 12 shows that across control groups, measures of price, and merger window definitions about two-thirds of the price changes fall between a 1% price decrease and a 1% price increase. The results from the market share regressions are consistent with our conclusion that prices did not change significantly as a result of this merger. Neither of the estimated changes in market share for Mrs. Butterworth or Log Cabin is economically or statistically significant. From a market structure perspective, the results from this merger are the most surprising. Since the result of the merger was essentially a decrease from three to two competitors, most theoretical models would predict this merger to be

[61] This explanation may be correct, given the market shares for the large bottle sizes is much larger than the small bottle sizes; i.e., the small bottle sizes may, on net, be picking up some diversion.

anticompetitive. Apparently the wide variety of substitutes of both superior (real maple syrups) and inferior (private label brands) products, restrained Aurora Foods from increasing prices.

VII. Conclusions

Merger review makes up the largest component of antitrust enforcement in the U.S. In the late 1990's, the U.S. economy went through the largest merger wave in its history with the number of merger filings more than doubling between 1994 and 1999. Despite the increase in merger activity, the number of lawyers and economists employed at the antitrust agencies remained more or less constant. Given the huge increase in workload, the agencies clearly had to make difficult choices in deciding which cases to pursue during this time period.

In four of the five mergers we investigated, prices appeared to increase a small but significant amount, typically between 3% and 7%. However, our sample of mergers is deliberately not representative of the vast majority of transactions analyzed by the antitrust agencies during the late 1990s. We deliberately chose to study the effect on consumer prices of those consummated mergers that would be most expected to result in anticompetitive price increases in order to provide (1) an upper bound on the price increases that permitted mergers may have produced and (2) a lower bound on the price increases that might otherwise have occurred in mergers that were blocked. We thus provide an indication of whether government merger policy may have been too hostile or too acquiescent.

A complete evaluation of the appropriate level of governmental intervention in monitoring mergers is beyond the scope of this paper. We do think, however, that some advocates of less intervention may be surprised to learn that our best estimate of the price effects of the marginal merger are positive, not negative as would be the case if the marginal merger were producing large benefits to consumers through the efficiency of the enlarged firm. Likewise, we think that some advocates of more intervention may be surprised to learn that the marginal merger is not producing huge anticompetitive price increases either.

Our results have several limitations. First, we chose to study consumer products industries because the price and quantity data required to estimate the competitive effects of these consummated mergers are readily purchased. During the two-year period from which are sample is drawn (1997 and 1998) 8013 mergers were filed with the antitrust agencies. Of these, 20% were in industries that share the two digit SIC codes of the merging firms we study. Thus, the mergers we examine are from only a small, although economically important part of the universe of mergers that took place during the period we study.

Second, we are not able to analyze either the possible longer term effects of mergers on prices that may result from the increased economic efficiency of merged firms, nor are we able to study the role of mergers in the development of new products.

Finally, our study has only examined the implications of Type II errors, the failure to block a merger when it might be useful to do so. Our study does not analyze Type I errors, rejecting mergers that would not have resulted in higher prices or pro-competitive mergers that were never even attempted because of the merging parties' belief that the merger would be successfully challenged. It is possible that by allowing some anticompetitive mergers to take place, the government may also allow many efficient mergers to take place that would have been challenged by a stricter antitrust policy. A complete evaluation of optimal enforcement behavior must be based on a consideration of all these issues.

We also think that our results suggest the outline of much further additional research. First, it seems that the evaluation of merger simulation models by a comparison of predicted and actual outcomes is in its infancy. In view of the extensive use to which these models are put, a careful evaluation of their effectiveness seems long over due. Second, the advent of the wide availability of scanner and other proprietary price data could, with some organizational effort, be far more widely exploited by the research community. In principle, the companies that collect and sell these data have a natural interest in their wider use.[62]

[62] A natural analogy is to the development of the CRSP data so widely used in financial economics. The Center for Research on Security Prices apparently resulted from the collaboration of faculty at the Graduate School of Business at the University of Chicago with Merrill Lynch, whose data they used. See http://www.crsp.chicagogsb.edu/crsp/history.html.

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Table 1: Merger Filings by Fiscal Year

Fiscal Year	Mergers Filed	Number of Mergers Filed Where Second Request can be Issued	Number of Second Requests	Percentage Issued a Second Request	Number of Enforcement Actions	Ratio of Enforcement Actions to Second Requests	Mergers in SIC 20 (Food and Kindred Products)	Mergers in SIC 26 (Paper and Allied Products)	Mergers in SIC 29 (Petroleum Refining and Related Industries
1991	1529	1376	64	4.65%	42	65.63%	40	11	5
1992	1589	1451	44	3.03%	22	50.00%	36	19	5
1993	1846	1745	71	4.07%	32	45.07%	91	19	11
1994	2305	2128	73	3.43%	50	68.49%	81	21	11
1995	2816	2612	101	3.87%	60	59.41%	89	31	15
1996	3087	2864	99	3.46%	57	57.58%	99	47	18
1997	3702	3438	122	3.55%	57	46.72%	107	38	15
1998	4728	4575	125	2.73%	85	68.00%	160	59	23
1999	4642	4340	111	2.56%	76	68.47%	141	44	12
2000	4926	4749	98	2.06%	80	81.63%	93	52	26
2001	2376	2237	70	3.13%	55	78.57%	65	15	7
2002	1187	1142	49	4.29%	34	69.39%	32	11	9
2003	1014	968	33	3.41%	36	109.09%	29	8	7
2004	1454	1377	35	2.54%	24	68.57%	33	13	7
Total	37201	35002	1095	3.13%	710	64.84%	1096	388	171

Source: Table 5 Pautler (2003), HSR Annual Report, 1991-2004.
Mergers in SIC categories reported for the acquiring person.

Table 2: Market Concentration

Industry	Pre-Acquisition Owner of Brands	Primary Brands	Market Share	Post-Merger HHI	Change in HHI
Cereal[1]	General Mills	Cheerios, Wheaties	28%	2357	238
	Ralcorp	Chex	4%		
Liquor[2]	Guinness	Tanqueray, Scoresby	21%	2026	935
	Grand Metropolitian	J&B, Johnny Walker, Smirnoff	22%		
Motor Oil[3]	Pennzoil	Pennzoil Motor Oils	29%	2189	517
	Quaker State	Quaker State Motor Oils	9%		
Feminine Protection[4]	Proctor and Gamble	Always Pads and Liners	25%	2815	959
	Tambrands	Tampax Tampons	19%		
Pancake Syrup[5]	Philip Morris (Log Cabin)	Log Cabin	19%	1990	589
	Aurora Foods	Mrs. Butterworth	15%		

[1]Market shares and HHI's calculated using pre-merger revenue data from 64 regions in IRI's food channel data, 7/2/1995 - 1/26/97.

[2]Market shares and HHI's calculated using pre-merger revenue data from 5 regions in IRI's drug store channel data, 10/27/96 - 12/14/97.

[3]Market shares and HHI's calculated using pre-merger revenue data from 10 regions in IRI's mass merchandiser channel data, 1/05/97 - 12/27/98.

[4]Market shares and HHI's calculated using pre-merger revenue data from 64 regions in IRI's food channel data, 10/27/96 - 7/20/97.

[5]Market shares and HHI's calculated using pre-merger revenue data from 64 regions in IRI's food channel data, 10/27/96 - 6/29/97.

Table 3: Estimated Price and Quantity Effects of the Pennzoil/Quaker State Merger[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	**Other Brands**	**Private Label**	**Other Brands: Rank/Number of Products**	**Private Label: Rank/Number of Products**	**Change in Market Share**	**Percentage Change in Market Share**	**Change in Market Share**	**Percentage Change in Market Share**
PENNZOIL	**0.004**	**0.039**	**8/12**	**1/2**	**4.22**	**18.47%**	**4.46**	**21.01%**
	0.015	0.019			0.83		1.12	
QUAKER STATE	**0.035**	**0.081**	**1/12**	**1/2**	**-1.31**	**-13.58%**	**-1.32**	**-14.25%**
	0.016	0.015			0.47		0.53	
QUAKER STATE DELUXE	**0.021**	**0.061**	**4/12**	**1/2**	**-0.16**	**-5.95%**	**-0.13**	**-5.32%**
	0.021	0.022			0.13		0.14	

[1]Estimated coefficient in bold, standard errors in regular font.

[2]Ranked in descending order, e.g., 8/12 implies that 7 products in the control group had larger estimated price increases and 4 products had smaller price increases.

Based in part on Information Resources, Inc. data.
Data from 10 regions in IRI's mass merchandiser channel data.
Monthly data from 1/1997 - 12/2000 excluding 10/1998 – 03/1999.
An observation is a product-city-month. The number of observations varies by specification, however, the regressions using the branded (private label) control group have roughly 9,000 (2,000) observations.

Table 4: Summary of Estimated Price Effects for the Merger of Pennzoil and Quaker State[1]

	Event Windows			Control Groups	
	More Data Post-Acquisition, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop No Data	Branded Control Group	Private Label Control Group
Percent of positive price changes	100.00%	100.00%	100.00%	100.00%	100.00%
Percent of positive price changes with t-statistic>2	66.67%	66.67%	66.67%	33.33%	100.00%
Frequency Distribution of Price Changes:					
$\Delta p<-.05$	0	0	0	0	0
$-0.05<\Delta p<-0.01$	0	0	0	0	0
$-0.01<\Delta p<0.01$	1	1	1	3	0
$0.01<\Delta p<0.05$	3	3	3	6	3
$\Delta p>0.05$	2	2	2	0	6
Number of Estimated Price Effects	6	6	6	9	9

[1] A total of 18 regressions were estimated: 3 definitions of the event window, 2 control groups, and 3 products owned by the merging firms (3*2*3=18). Columns 2, 3, and 4 describe the changes that result from using a different event window (pooling the results from both control groups), columns 5 and 6 describe the changes that result from using a different control group (pooling the results from all event windows).

Table 5: Estimated Price and Quantity Effects of Proctor & Gamble's Purchase of Tambrands[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	**Other Brands**	**Private Label**	**Other Brands: Rank/Number of Products**	**Private Label: Rank/Number of Products**	**Change in Market Share**	**Percentage Change in Market Share**	**Change in Market Share**	**Percentage Change in Market Share**
	0.061	**0.080**	**1/4**	**1/2**	**-2.98**	**-11.05%**	**-3.81**	**-15.6%**
ALWAYS LINER	0.008	0.011			0.24		0.23	
	0.045	**0.078**	**1/3**	**1/2**	**1.81**	**4.17%**	**0.71**	**1.8%**
ALWAYS PAD	0.010	0.012			0.64		0.64	
	-0.009	**0.058**	**3/4**	**1/2**	**-3.08**	**-5.96%**	**-3.26**	**-6.3%**
TAMPAX TAMPON	0.010	0.012			0.52		0.45	

[1]Estimated coefficient in bold, standard errors in regular font.

[2]Ranked in descending order, e.g., 8/12 implies that 7 products in the control group had larger estimated price increases and 4 products had smaller price increases.

Based in part on Information Resources, Inc. data.
Data from 64 regions in IRI's food channel data.
Monthly data from 11/1996 - 4/1998 excluding 4/1997 – 10/1997.
An observation is a product-city-month. The number of observations varies by specification, however, the regressions with the branded (private label) control group have roughly 2,500 (1,500) observations.

Table 6: Summary of Estimated Price Effects for Proctor & Gamble's Purchase of Tambrands[1]

	Price Measure			Event Window			Control Group	
	Average Revenue	Weighted Average Price	Stone Price Index	More Data Post-Acquisition, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop No Data	Branded Control Group	Private Label Control Group
Percent of positive price changes	83.33%	83.33%	88.89%	88.89%	88.89%	77.78%	77.78%	92.60%
Percent of positive price changes with t-statistic>2	77.78%	55.56%	61.11%	72.22%	61.11%	61.11%	59.26%	70.40%
Frequency Distribution of Price Changes:								
$\Delta p<-.05$	0	0	0	0	0	0	0	0
$-0.05<\Delta p<-0.01$	1	1	0	1	0	1	1	1
$-0.01<\Delta p<0.01$	2	7	5	3	6	5	10	4
$0.01<\Delta p<0.05$	4	6	8	2	7	9	9	9
$\Delta p>0.05$	11	4	5	12	5	3	7	13
Number of Estimated Price Effects	18	18	18	18	18	18	27	27

[1] A total of 54 regressions were estimated: 3 definitions of the event window, 2 control groups, 3 measures of price and 3 products owned by the merging firms (3*2*3*3=54). Columns 2, 3, and 4 describe the changes that result from using different measures of price (pooling the results from both control groups and all event windows), columns 5, 6, and 7 describe the changes that result from using different event windows (pooling the results from both control groups and measures of price), columns 8 and 9 describe the changes that result from using a different control group (pooling the results from all event windows and measures of price).

Table 7: Estimated Price and Quantity Effects of General Mills' Purchase of Ralcorp[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	Other Brands	Private Label	Other Brands: Rank/Number of Products	Private Label: Rank/Number of Products	Change in Market Share	Percentage Change in Market Share	Change in Market Share	Percentage Change in Market Share
CHEERIOS	**0.046**	**0.044**	**27/67**	**2/11**	**0.50**	**12.84%**	**0.09**	**2.46%**
	0.011	0.010			0.08		0.08	
CHEERIOS APPLE CINN	**0.138**	**0.067**	**3/37**	**1/7**	**-0.21**	**-25.80%**	**-0.26**	**-33.04%**
	0.013	0.011			0.03		0.03	
CHEERIOS HONEY NUT	**0.105**	**0.035**	**3/37**	**1/7**	**-0.04**	**-1.47%**	**-0.25**	**-8.88%**
	0.012	0.011			0.07		0.07	
CHEERIOS MULTI-GRAIN	**0.029**	**0.027**	**31/67**	**4/11**	**-0.02**	**-2.22%**	**-0.06**	**-10.00%**
	0.009	0.007			0.02		0.02	
CORN CHEX	**0.005**	**0.003**	**26/67**	**1/11**	**-0.02**	**-2.50%**	**-0.06**	**-9.08%**
	0.017	0.017			0.03		0.03	
MULTI-GRAIN CHEX	**0.003**	**0.001**	**29/67**	**3/11**	**-0.04**	**-12.42%**	**-0.05**	**-17.10%**
	0.014	0.014			0.01		0.01	
RICE CHEX	**0.007**	**0.005**	**27/67**	**1/11**	**0.11**	**10.28%**	**0.00**	**-0.24%**
	0.017	0.016			0.04		0.03	
WHEAT CHEX	**0.008**	**0.006**	**25/67**	**1/11**	**0.01**	**1.13%**	**-0.04**	**-8.15%**
	0.017	0.017			0.02		0.02	
WHEATIES	**0.027**	**0.026**	**30/67**	**3/11**	**-0.04**	**-3.36%**	**-0.16**	**-13.17%**
	0.013	0.012			0.04		0.05	
WHEATIES CRISPY RAISIN	**0.090**	**0.028**	**16/45**	**3/8**	**-0.06**	**-19.38%**	**-0.09**	**-25.83%**
	0.020	0.019			0.03		0.03	
WHEATIES HONEY FROSTED	**0.110**	**0.048**	**9/45**	**3/8**	**-0.11**	**-26.43%**	**-0.14**	**-35.00%**
	0.017	0.014			0.03		0.03	

[1]Estimated coefficient in bold, standard errors in regular font.

[2]Ranked in descending order, e.g., 8/12 implies that 7 products in the control group had larger estimated price increases and 4 products had smaller price increases.

Based in part on Information Resources, Inc. data.
Data from 64 regions in IRI's food channel data.
Monthly data from 7/1995 - 8/1998 excluding 11/1996 – 04/1997.
An observation is a product-city-month. The number of observations in each regression varies significantly by specification and the size of the affected product's control group. The regressions with the branded (private label) control group range between roughly 36,000 and 55,000 (11,000 and 13,500) observations.

Table 8: Summary of Estimated Price Effects for General Mill's Purchase of Ralcorp's Branded Cereal Business[1]

	Price Measure			Event Window			Control Group	
	Average Revenue	Weighted Average Price	Stone Price Index	More Data Post-Acquisition, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop No Data	Branded Control Group	Private Label Control Group
Percent of positive price changes	93.93%	89.39%	89.39%	81.82%	90.91%	100.00%	98.99%	82.83%
Percent of positive price changes t>2	50.00%	60.61%	60.61%	59.09%	57.58%	54.55%	61.61%	52.53%
Frequency Distribution of Price Changes:								
$\Delta p<-.05$	0	0	0	0	0	0	0	0
$-0.05<\Delta p<-0.01$	0	0	0	0	0	0	0	0
$-0.01<\Delta p<0.01$	18	19	19	24	22	10	23	33
$0.01<\Delta p<0.05$	32	30	30	24	27	41	38	54
$\Delta p>0.05$	16	17	17	18	17	15	38	12
Number of Estimated Price Effects	66	66	66	66	66	66	99	99

[1] A total of 198 regressions were estimated: 3 definitions of the event window, 2 control groups, 3 measures of price and 11 products owned by the merging firms (3*2*3*11=198). Columns 2, 3, and 4 describe the changes that result from using different measures of price (pooling the results from both control groups and all event windows), columns 5, 6, and 7 describe the changes that result from using different event windows (pooling the results from both control groups and measures of price), columns 8 and 9 describe the changes that result from using a different control group (pooling the results from all event windows and measures of price).

Table 9: Estimated Price and Quantity Effects of the Guinness/Grand Metropolitan Merger[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	Other Brands	Private Label	Other Brands: Rank/Number of Products	Private Label: Rank/Number of Products	Change in Market Share	Percentage Change in Market Share	Change in Market Share	Percentage Change in Market Share
BOOTH 1.75 GIN	-0.021	0.026	5/11	1/2	0.037	2.37%	0.029	1.84%
	0.007	0.014			0.10		0.110	
GILBEY .75 GIN	-0.017	0.044	3/11	1/2	-0.395	-39.88%	-0.336	-43.04%
	0.006	0.011			0.05		0.050	
GILBEY 1.75 GIN	-0.028	-0.004	9/11	1/2	-0.285	-4.75%	-0.186	-2.84%
	0.007	0.01			0.22		0.230	
GORDONS .75 GIN	-0.026	0.004	9/11	1/2	0.115	3.56%	0.160	6.04%
	0.006	0.012			0.12		0.120	
GORDONS 1.75 GIN	-0.024	0.011	9/11	1/2	-0.254	-1.55%	0.078	0.41%
	0.007	0.011			0.31		0.420	
POPOV 1.75 GIN	-0.025	0	8/11	1/2	-0.879	-77.68%	-1.230	-76.40%
	0.008	0.038			0.38		0.630	
TANQUERY .75 GIN	-0.017	0.038	4/11	1/2	0.538	5.52%	0.209	4.56%
	0.007	0.012			0.26		0.150	
TANQUERY 1.75 GIN	-0.01	0.067	3/11	1/2	0.247	4.51%	0.064	2.02%
	0.006	0.007			0.15		0.100	
J&B .75 SCOTCH	0.037	0.098	6/18	1/2	-0.435	-2.77%	-0.349	-10.87%
	0.006	0.019			0.17		0.110	
J&B 1.75 SCOTCH	0.029	0.064	10/18	1/2	0.016	0.41%	-0.025	-0.95%
	0.007	0.023			0.12		0.100	
JOHNNY WALKER BLACK .75L SCOTCH	0.03	0.067	8/18	1/2	0.556	11.98%	0.193	10.00%
	0.005	0.02			0.08		0.040	
JOHNNY WALKER RED .75 SCOTCH	0.034	0.088	4/18	1/2	-0.046	-1.07%	-0.092	-3.82%
	0.005	0.022			0.16		0.100	
JOHNNY WALKER RED 1.75 SCOTCH	0.029	0.065	8/18	1/2	-0.157	-3.86%	-0.144	-4.86%
	0.006	0.017			0.15		0.130	
SCORESBY .75 SCOTCH	0.029	0.062	8/18	1/2	0.380	42.58%	0.352	45.13%
	0.005	0.014			0.02		0.020	
SCORESBY 1.75 SCOTCH	0.027	0.055	9/18	1/2	-1.555	-15.47%	-2.285	-15.57%
	0.006	0.016			0.39		0.640	

Table 9: Estimated Price and Quantity Effects of the Guinness/Grand Metropolitan Merger[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	Other Brands	Private Label	Other Brands: Rank/Number of Products	Private Label: Rank/Number of Products	Change in Market Share	Percentage Change in Market Share	Change in Market Share	Percentage Change in Market Share
GILBEYS VODKA .75L	**-0.038**	**-0.026**	**15/20**	**2/2**	**-0.191**	**-70.74%**	**-0.165**	**-74.55%**
	0.02	0.032			0.02		0.020	
GILBEYS VODKA 1.75L	**-0.011**	**0.032**	**5/20**	**1/2**	**-0.421**	**-20.79%**	**-0.425**	**-18.01%**
	0.013	0.017			0.19		0.250	
GORDON CITRUS	**-0.02**	**0.016**	**11/20**	**1/2**	**-0.002**	**-0.67%**	**0.011**	**4.58%**
VODKA .75L	0.012	0.02			0.02		0.020	
GORDON CITRUS	**-0.034**	**-0.015**	**20/20**	**2/2**	**0.149**	**28.46%**	**0.225**	**37.97%**
VODKA 1.75L	0.012	0.01			0.04		0.050	
GORDON REGULAR	**-0.002**	**0.046**	**4/20**	**1/2**	**0.488**	**22.59%**	**0.431**	**24.46%**
VODKA .75L	0.009	0.007			0.09		0.090	
GORDON REGULAR	**-0.027**	**0.001**	**17/20**	**2/2**	**0.926**	**10.12%**	**1.553**	**14.45%**
VODKA 1.75L	0.011	0.007			0.31		0.400	
POPOV VODKA .75L	**-0.008**	**0.035**	**9/20**	**1/2**	**0.141**	**15.33%**	**0.167**	**20.24%**
	0.009	0.011			0.02		0.020	
POPOV VODKA 1.75L	**-0.017**	**0.02**	**9/20**	**1/2**	**-1.285**	**-22.61%**	**-1.489**	**-22.16%**
	0.01	0.008			0.28		0.380	
SMIRNOFF CITRUS	**0.003**	**0.054**	**3/20**	**1/2**	**0.109**	**21.80%**	**0.069**	**21.25%**
VODKA .75L	0.011	0.007			0.02		0.020	
SMIRNOFF CITRUS	**-0.036**	**-0.018**	**18/20**	**2/2**	**0.187**	**28.33%**	**0.212**	**38.36%**
VODKA 1.75L	0.013	0.006			0.04		0.040	
SMIRNOFF REGULAR	**-0.006**	**0.032**	**5/20**	**1/2**	**-0.060**	**-1.13%**	**-0.033**	**-0.95%**
VODKA .75L	0.01	0.011			0.06		0.040	
SMIRNOFF REGULAR	**-0.03**	**-0.004**	**15/20**	**2/2**	**1.081**	**7.91%**	**1.461**	**12.67%**
VODKA 1.75L	0.011	0.006			0.23		0.250	
TANQUERAY VODKA	**-0.011**	**0.03**	**8/20**	**1/2**	**0.044**	**5.24%**	**0.025**	**7.81%**
.75L	0.014	0.017			0.03		0.010	

[1]Estimated coefficient in bold, standard errors in regular font.

[2]Ranked in descending order, e.g., 8/12 implies that 7 products in the control group had larger estimated price increases and 4 products had smaller price increases.

Based in part on Information Resources, Inc. data

Data from 5 regions in IRI's drug store channel data.

Monthly data 11/1996 - 2/1999 excluding 09/1997 – 02/1998.

An observation is a product-city month. The number of observations in each regression varies significantly by specification and the size of the affected product's control group. The regressions with the branded (private label) control group range between roughly 1,700 and 3,000 (300 and 600) observations.

Table 10: Summary of Estimated Price Effects for the Merger of Grand Metropolitan and Guinness[1]

	Product Type			Event Window			Control Group	
	Gin	Scotch	Vodka	More Data Post-Acquisition, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop No Data	Branded Control Group	Private Label Control Group
Percent of positive price changes	43.75%	100.00%	58.97%	80.36%	53.57%	60.71%	44.05%	85.71%
Percent of positive price changes t-statistic>2	25.00%	100.00%	29.49%	55.36%	39.29%	48.26%	28.57%	63.10%
Frequency Distribution of Price Changes:								
$\Delta p<-.05$	0	0	0	0	0	0	0	0
$-0.05<\Delta p<-0.01$	23	0	18	8	20	13	37	4
$-0.01<\Delta p<0.01$	9	0	27	10	9	17	20	16
$0.01<\Delta p<0.05$	11	22	28	24	18	19	27	34
$\Delta p>0.05$	5	20	5	14	9	7	0	30
Number of Estimated Price Effects	48	42	78	56	56	56	84	84

[1] A total of 168 regressions were estimated: 3 definitions of the event window, 2 control groups, 28 products owned by the merging firms (3*2*28=168). Columns 2, 3, and 4 describe the results separately for gins, scotches, and vodkas (pooling the results from both control groups and all event windows), columns 5, 6, and 7 describe the changes that result from using different event windows (pooling the results from both control groups), columns 8 and 9 describe the changes that result from using a different control group (pooling the results from all event windows).

Table 11: Estimated Price and Quantity Effects of Aurora's Purchase of Kraft's Syrup Business[1]

	Price Effects		Relative Rank of Brand's Price Increase to Control Group[2]		Revenue Share		Quantity Share	
Product	Other Brands	Private Label	Other Brands: Rank/Number of Products	Private Label: Rank/Number of Products	Change in Market Share	Percentage Change in Market Share	Change in Market Share	Percentage Change in Market Share
LOG CABIN	**0.028**	**0.020**	**17/62**	**2/4**	**0.08**	**0.40%**	**-0.22**	**-1.20%**
	0.008	0.016			0.74		0.77	
MRS BUTTERWORTH	**-0.007**	**-0.015**	**36/62**	**3/4**	**-0.09**	**-0.57%**	**0.26**	**1.89%**
	0.006	0.015			0.53		0.53	

[1]Estimated coefficient in bold, standard errors in regular font.

[2]Ranked in descending order, e.g., 8/12 implies that 7 products in the control group had larger estimated price increases and 4 products had smaller price increases.

Based in part on Information Resources, Inc. data.
Data from 64 regions in IRI's food channel data.
Monthly data from 11/1996 - 4/1998 excluding 4/1997 – 10/1997.
An observation is a product-city-month. The number of observations varies by specification, however, the regressions using the branded (private label) control group have roughly 11,000 (1,500) observations.

Table 12: Summary of Estimated Price Effects for Aurora's Purchase of Kraft's Breakfast Syrup Business[1]

	Price Measure			Event Window			Control Group	
	Average Revenue	Weighted Average Price	Stone Price Index	More Data Post-Acquisition, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop Data Within 3 Months of Merger	Symmetric Event Window, Drop No Data	Branded Control Group	Private Label Control Group
Percent of positive price changes	66.67%	66.67%	66.67%	58.33%	66.67%	75.00%	61.11%	72.22%
Percent of positive price changes t>2	25.00%	8.33%	8.33%	25.00%	8.33%	8.33%	27.78%	0.00%
Frequency Distribution of Price Changes:								
$\Delta p<-.05$	0	0	0	0	0	0	0	0
$-0.05 <\Delta p < -0.01$	3	1	2	4	1	1	1	5
$-0.01 <\Delta p < 0.01$	5	7	8	4	6	10	11	9
$0.01 <\Delta p < 0.05$	3	4	2	3	5	1	5	4
$\Delta p > 0.05$	1	0	0	1	0	0	1	0
Number of Estimated Price Effects	12	12	12	12	12	12	18	18

[1] A total of 36 regressions were estimated: 3 definitions of the event window, 2 control groups, 3 measures of price and 2 products owned by the merging firms (3*2*3*2=36). Columns 2, 3, and 4 describe the changes that result from using different measures of price (pooling the results from both control groups and all event windows), columns 5, 6, and 7 describe the changes that result from using different event windows (pooling the results from both control groups and measures of price), columns 8 and 9 describe the changes that result from using a different control group (pooling the results from all event windows and measures of price).

Table 13: Aggregate Price Effects[1]

Transaction	Estimated Price Effect[2]	
	Private Label Control Group	**Branded Control Group**
General Mills/Chex[3]	**0.032**	**0.057**
	0.005	0.005
Pennzoil/Quaker State[4]	**0.052**	**0.014**
	0.013	0.011
P&G/Tambrands[5]	**0.070**	**0.023**
	0.008	0.007
Aurora Foods/Log Cabin[6]	**0.004**	**0.012**
	0.011	0.005
Guinness/Grand Metropolitan[7]: Overall	**0.027**	**-0.010**
	0.003	0.003
Guinness/Grand Metropolitan:		
Gin	**0.022**	**-0.021**
	0.005	0.003
Scotch	**0.071**	**0.031**
	0.006	0.002
Vodka	**0.011**	**-0.021**
	0.003	0.005

[1]Estimated coefficient in bold, standard errors in regular font. The calculation of standard errors assumes negligible covariances among the component estimators.

[2]Aggregate Price Effects are calculated as the (revenue) weighted average of the individual price effects from our preferred specification (see Tables 3, 5, 7, 9, and 11 for coefficient estimates)

[3]Estimated price effects calculated using monthly price data from 64 regions in IRI's food channel data (7/1995 - 8/1998 excluding 11/1996 – 04/1997).

[4]Estimated price effects calculated using monthly price data from 10 regions in IRI's mass merchandiser data (1/1997 - 12/2000 excluding 10/1998 – 03/1999).

[5]Estimated price effects calculated using monthly price data from 64 regions in IRI's food channel data (11/1996 - 4/1998 excluding 4/1997 – 10/1997).

[6]Estimated price effects calculated using monthly price data from 64 regions in IRI's food channel data (11/1996 - 4/1998 excluding 4/1997 – 10/1997).

[7]Estimated price effects calculated using monthly price data from 5 regions in IRI's drug store channel data (11/1996 - 2/1999 excluding 09/1997 – 02/1998).

Appendix Table 1: Market Shares

Feminine Protection Market

by Manufacturer:

Manufacturer	Dollar Share	Volume Share
P&G	**25%**	**24%**
Kimberly Clark	24%	28%
Tambrands	**19%**	**15%**
J&J	14%	15%
Playtex	9%	6%
Other	9%	12%

Based in part on Information Resources, Inc. data

Data from 64 regions in IRI's food channel data. 10/27/96 - 7/20/97.

Cereal Market

by Manufacturer:

Manufacturer	Dollar Share	Volume Share
General Mills	**28%**	**25%**
Kellogg USA	29%	27%
Post	19%	19%
Quaker	10%	10%
Ralston/Chex	**4%**	**4%**
Storebrands	7%	10%
Other	4%	5%

Based in part on Information Resources, Inc. data

Data from 64 regions in IRI's food channel data. 7/2/1995 - 1/26/97.

Pancake Syrup Market

by Brand:

Brand	Dollar Share	Volume Share
Aunt Jemima	21%	19%
Log Cabin	**19%**	**18%**
Private Label	19%	28%
Mrs. Butterworth	**15%**	**14%**
Hungry Jack	4%	4%
Other	22%	18%

Based in part on Information Resources, Inc. data

Data from 64 regions in IRI's food channel data. 10/27/96 - 6/29/97.

Liquor Market

Scotch Whiskey, Gin, and Vodka - by Owner:

Owner	Dollar Share	Volume Share
Guinness	**24%**	**21%**
Grand Metropolitan	**22%**	**23%**
American Brands, USA	9%	11%
Seagram Company Ltd, Canada	7%	8%
Grant Wm & Sons Ltd, UK	5%	4%
Other	33%	34%

Based in part on Information Resources, Inc. data

Data from 5 regions in IRI's drug store channel data. 10/27/96 - 12/14/97.

Motor Oil Market

Conventional Motor Oil Market by Brand:

Brand	Dollar Share	Volume Share
Pennzoil	**29%**	**27%**
Castrol	18%	16%
Mobil	14%	17%
Valvoline	13%	12%
Quaker State	**9%**	**8%**
Havoline	7%	8%
Other	10%	12%

Based in part on Information Resources, Inc. data

Data from 10 regions in IRI's mass merchandiser channel data. 1/05/97 - 12/27/98.

Appendix Table 2: Regions in IRI Datasets

	MASS MERCHANDISER AND DRUGSTORE MARKETS (10)		FOOD MARKETS(64)		
1	BALTIMORE/WASHINGTON	1	ALBANY	33	MISSISSIPPI
2	CHICAGO*	2	ATLANTA	34	NASHVILLE
3	DALLAS/FT WORTH	3	BALTIMORE/WASHINGTON DC	35	NEW ENGLAND(NORTH)
4	HOUSTON	4	BIRMINGHAM/MONTGOMERY	36	NEW ORLEANS/MOBILE
5	LOS ANGELES*	5	BOISE	37	NEW YORK (NEW)
6	MINNEAPOLS/ST PAUL	6	BOSTON	38	OKLAHOMA CITY
7	NEW YORK (NEW)	7	BUFFALO/ROCHESTER	39	OMAHA
8	PHOENIX/TUCSON*	8	CHARLOTTE	40	ORLANDO
9	SAN DIEGO*	9	CHICAGO	41	PEORIA/SPRINGFIELD
10	SAN FRANCISCO/OAKLAND*	10	CINCINNATI/DAYTON	42	PHILADELPHIA
		11	CLEVELAND	43	PHOENIX/TUCSON
		12	COLUMBUS	44	PITTSBURGH
		13	DALLAS/FT. WORTH	45	PORTLAND
		14	DENVER	46	PROVIDENCE
		15	DES MOINES	47	RALEIGH/GREENSBORO
		16	DETROIT	48	RICHMOND/NORFOLK
		17	GRAND RAPIDS	49	ROANOKE
		18	GREEN BAY	50	SACRAMENTO
		19	HARRISBURG/SCRANTON	51	SALT LAKE CITY
		20	HARTFORD/SPRINGFIELD	52	SAN ANTONIO/CORPUS CHR
		21	HOUSTON	53	SAN DIEGO
		22	INDIANAPOLIS	54	SAN FRANCISCO/OAKLAND
		23	JACKSONVILLE	55	SEATTLE/TACOMA
		24	KANSAS CITY	56	SOUTH CAROLINA
		25	KNOXVILLE	57	SPOKANE
		26	LITTLE ROCK	58	ST. LOUIS
		27	LOS ANGELES	59	SYRACUSE
		28	LOUISVILLE	60	TAMPA/ST PETERSBURG
		29	MEMPHIS	61	TOLEDO
		30	MIAMI/FT LAUDERDALE	62	TULSA
		31	MILWAUKEE	63	WEST TEXAS/NEW MEXICO
		32	MINNEAPOLIS/ST PAUL	64	WICHITA

*Cities Included in the Guinness/Grand Metropolitan Merger Data

Appendix Table 3: Estimated Price Effects for Pennzoil/Quaker State Merger
No Control Group

BRAND	MERGE COEFFICIENT	ST ERROR	T STAT
PENNZOIL	0.025	0.019	1.344
QUAKER STATE	0.061	0.016	3.922
QUAKER STATE DELUXE	0.038	0.021	1.831

Based in part on Information Resources, Inc. data
Data from 10 regions in IRI's mass merchandiser channel data.
Monthly data from 1/1997 - 1/2001 excluding 10/1998 – 03/1999

Appendix Table 4: Estimated Price Effects for Proctor and Gamble/Tambrands State Merger
No Control Group

NAME	MERGE COEFFICIENT	ST ERROR	T STAT
ALWAYS LINER	0.052	0.003	17.179
ALWAYS PAD	0.053	0.003	17.547
TAMPAX TAMPON	0.045	0.004	11.293

Based in part on Information Resources, Inc. data
Data from 64 regions in IRI's food channel data.
Monthly 11/1996 - 4/1998 excluding 4/1997 – 10/1997

Appendix Table 5: Estimated Price Effects for General Mills Purchase of Ralcorp's Chex Cereals
No Control Group

BRAND	MERGE COEFFICIENT	ST ERROR	T STAT
CHEERIOS	0.051	0.007	7.700
CHEERIOS APPLE CINN	0.060	0.009	7.017
CHEERIOS HONEY NUT	0.024	0.005	4.428
CHEERIOS MULTI-GRAIN	0.037	0.006	6.555
CORN CHEX	0.014	0.010	1.494
MULTI-BRAN CHEX	0.012	0.008	1.412
RICE CHEX	0.015	0.009	1.682
WHEAT CHEX	0.017	0.010	1.742
WHEATIES	0.034	0.009	3.872
WHEATIES CRSP 'N RSN	0.017	0.011	1.490
WHEATIES HONEY FROSTED	0.035	0.008	4.435

Based in part on Information Resources, Inc. data
Data from 64 regions in IRI's food channel data.
Monthly data from 7/1995 - 8/1998 excluding 11/1996 – 04/1997

Appendix Table 6: Estimated Price Effects for Guinness/Grand Metropolitan Merger
No Control Group

CATEGORY	BRAND	SUB-BRAND	LITERS	MERGE COEFFICIENT	ST ERROR	T STAT
GIN	BOOTHS	REGULAR	1.75	0.030	0.008	3.819
GIN	GILBEYS	REGULAR	0.75	0.052	0.008	6.487
GIN	GILBEYS	REGULAR	1.75	0.003	0.005	0.493
GIN	GORDONS	REGULAR	0.75	0.007	0.005	1.544
GIN	GORDONS	REGULAR	1.75	0.016	0.005	3.191
GIN	POPOV	REGULAR	1.75	0.016	0.028	0.563
GIN	TANQUERAY	REGULAR	0.75	0.042	0.006	6.667
GIN	TANQUERAY	REGULAR	1.75	0.075	0.003	25.125
SCOTCH WHISKY	J & B	J & B RARE	0.75	0.079	0.008	10.017
SCOTCH WHISKY	J & B	J & B RARE	1.75	0.045	0.011	4.025
SCOTCH WHISKY	JOHNNIE WALKER	JOHNNIE WALKER BLACK LABEL	0.75	0.053	0.010	5.530
SCOTCH WHISKY	JOHNNIE WALKER	JOHNNIE WALKER RED LABEL	0.75	0.063	0.007	9.044
SCOTCH WHISKY	JOHNNIE WALKER	JOHNNIE WALKER RED LABEL	1.75	0.047	0.008	6.232
SCOTCH WHISKY	SCORESBY	SCORESBY	0.75	0.047	0.006	8.411
SCOTCH WHISKY	SCORESBY	SCORESBY	1.75	0.037	0.008	4.889
VODKA	GILBEYS	REGULAR	0.75	-0.005	0.017	-0.287
VODKA	GILBEYS	REGULAR	1.75	0.032	0.014	2.334
VODKA	GORDONS	CITRUS	0.75	0.011	0.017	0.628
VODKA	GORDONS	REGULAR	0.75	0.047	0.006	7.384
VODKA	GORDONS	CITRUS	1.75	-0.010	0.008	-1.234
VODKA	GORDONS	REGULAR	1.75	0.006	0.006	1.065
VODKA	POPOV	REGULAR	0.75	0.038	0.010	3.840
VODKA	POPOV	REGULAR	1.75	0.025	0.007	3.485
VODKA	SMIRNOFF	CITRUS	0.75	0.063	0.006	10.025
VODKA	SMIRNOFF	REGULAR	0.75	0.040	0.011	3.525
VODKA	SMIRNOFF	CITRUS	1.75	-0.013	0.004	-3.335
VODKA	SMIRNOFF	REGULAR	1.75	0.002	0.004	0.351
VODKA	TANQUERAY	REGULAR	0.75	0.029	0.010	2.957

Based in part on Information Resources, Inc. data
Data from 5 regions in IRI's drug store channel data.
Monthly data 11/1996 - 2/1999 excluding 09/1997 – 02/1998

Appendix Table 7: Estimated Price Effects for Aurora Foods Purchase of Log Cabin
No Control Group

BRAND	MERGE COEFFICIENT	ST ERROR	T STAT
LOG CABIN	0.027	0.007	3.689
MRS BUTTERWORTH	-0.007	0.006	-1.179

Based in part on Information Resources, Inc. data
Data from 64 regions in IRI's food channel data.
11/1996 - 4/1998 excluding 4/1997 – 10/1997