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# The Impact of Big-Box Stores on Retail Food Prices and the Consumer Price Index

Ephraim Leibtag



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# The Impact of Big-Box Stores on Retail Food Prices and the Consumer Price Index

**Ephraim Leibtag**

## Abstract

Over the past 10 years, the growth of nontraditional retail food outlets has transformed the food market landscape, increasing the variety of shopping and food options available to consumers, as well as price variation in retail food markets. This report focuses on these dynamics and how they affect food price variation across store format types. The differences in prices across store formats are especially noteworthy when compared with standard measures of food price inflation over time. Over the past 20 years, annual food price changes, as measured by the Consumer Price Index (CPI), have averaged just 3 percent per year, while food prices for similar products can vary by more than 10 percent across store formats at any one point in time. Since the current CPI for food does not fully take into account the lower price option of nontraditional retailers, a gap exists between price change as measured using scanner data versus the CPI estimate, even for the relatively low food inflation period of 1998-2003.

**Keywords:** food prices, retail markets, CPI, dairy, nontraditional retailers

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## Summary

Nontraditional retailers such as Wal-Mart, Costco, and Target have gained more of the consumer food dollar over the past 10 years. The share of sales going to traditional retailers (conventional supermarkets, superstores, and food-drug combination stores) fell from 82 percent in 1998 to 69 percent in 2003.

### What Is the Issue?

Over the past 20 years, annual food price changes, as measured by the Consumer Price Index (CPI), have averaged 3 percent per year. Meanwhile, food prices for the same item can vary by more than 10 percent from one type of store to another in a given year. The CPI measure of food price inflation is based on a sample of food items selected from a sample of retail food outlets, and the selection of stores has not been updated quickly enough to reflect the volume of food now sold through big-box stores. Since the current CPI for food does not fully account for the lower prices offered by these nontraditional retailers, including prices from all store formats would likely indicate a lower rate of price inflation than the CPI estimate.

### What Did the Study Find?

Previous studies have demonstrated that food prices at nontraditional retailers are 8-27 percent lower than at large supermarket chains. However, these comparisons across store formats did not account for quality or package-size differences for some food products. To address these concerns, comparisons in this report are for similar package sizes and more specifically defined food items: namely, dairy products and eggs.

Even when controlling for similar-sized packages, dairy prices are 5 to 25 percent lower at nontraditional retailers than at traditional supermarkets. For example, skim and low-fat milk prices are consistently 5-12 percent lower at nontraditional stores. Even more price variation exists in random-weight cheese products; a pound of Swiss cheese averaged \$4.71 at grocery stores in 2003, but just \$3.77 at nontraditional retailers and mass merchandisers.

Since food-at-home inflation averaged 2.2 percent per year over 1998-2003, a discrepancy of 5-25 percent in price between store formats is relatively large. If the difference in food prices across store formats applies to many food categories, the official estimates of price changes might be overstating the actual rate of change. If that is the case, another way to estimate price change might be to track consumer purchase behavior and adjust observed price changes in a given category. This could be accomplished using an expenditure-weighted measure of price change, with frequently updated measures from scanner data sources.

## How Was the Study Conducted?

This study uses ACNielsen Fresh Foods Homescan scanner panel data for 1998-2003. The annual data are from a consumer panel consisting of about 8,000 representative households across the United States; the data included purchase as well as demographic information. Panelists recorded both their UPC-coded transactions and their random-weight (non-Universal Product Code (UPC)) food purchases over the year(s) that they participate in the survey.

Average prices were calculated for a wide variety of dairy products (24 fixed-weight and 8 random-weight) commonly purchased at both traditional and nontraditional stores. The average prices were calculated by taking the total weighted expenditures for a given product and dividing by the total weighted quantity that was purchased. These average prices were then weighted using the projection factors for each household in the sample to arrive at a national average in each food category. The average prices were then used to calculate an average annual price change for each food category to compare with price change in the corresponding CPI categories.

## Introduction

One of the biggest changes in the retail food market landscape over the past 10 years has been the growth of nontraditional food outlets. Firms such as Wal-Mart, Costco, and Target—big-box stores—sell both food and nonfood products in several store formats. The supercenter, a combined mass merchandiser/full-line grocery store, is having the largest impact nationally. These stores, often over 150,000 square feet, enable the consumer to buy grocery and food staples along with clothing, electronics, and other household goods.

The supercenter, however, is not the only nontraditional format with exceptional growth over the past few years. Dollar stores, which usually sell a limited assortment of discounted products, have also expanded their food offerings with some even introducing refrigerated and frozen sections to their stores. Warehouse club stores and drugstores have also increased their food offerings and taken market share from traditional supermarkets.

These nontraditional retailers have helped to increase the variety of shopping and food options available to consumers, and variation in retail food prices has widened. Food prices can differ for a variety of reasons based on where you live, your demographic characteristics, and where you shop. Differences in labor costs, operating costs, and wholesale cost of goods sold affect the prices that retailers charge as does the competitive environment in which they operate. Competition for the U.S. consumer food dollar has intensified, and traditional retailers have been forced to lower prices, increase the number of services they provide, or improve the quality of their offerings.

Food items purchased by the average consumer span a wide range of raw and processed products. Although many features of retail food prices hold across all food categories, focusing on a specific subcategory enables one to incorporate industrywide phenomenon and commodity-specific changes into the same analysis. This report uses ACNielsen Fresh Foods Homescan scanner panel data for 1998-2003 to examine variation in dairy prices across retail store formats. Changes in the price of dairy products such as milk or cheese are often a concern for both producers and consumers.

## Previous Work on Food Price Variation

The possible differences in food prices across geographic locations and/or consumer demographics have long been investigated. Findings have been mixed, but much of the available evidence indicates that shopping opportunities for the poor are more limited than for higher income consumers and that prices are slightly higher in stores whose patrons are chiefly low-income consumers.

A review of 14 store surveys conducted between 1966 and 1996 (Kaufman et al, 1997) indicates that food prices are generally higher in smaller grocery stores than in larger supermarkets and also higher in inner-city and rural locations than in suburban locations. Costs are generally higher in these stores and locations, and it follows that prices are often higher as well.



After controlling for store type and location, however, there is little evidence of a significant relationship between neighborhood income and food prices.

But previous studies fail to account for store format as a determinant of average prices paid, and this factor has grown in significance over the past 10 years as consumers buy more of their food at nontraditional food stores. Despite significant consolidation in recent years in the supermarket industry, nontraditional retailers continue to grow much faster than supermarket chains. Various studies have demonstrated that food items at nontraditional retailers are 8-27 percent lower in price than at large supermarket chains, even after loyalty card and other special discounts are taken into account.<sup>1</sup>

The Bureau of Labor Statistics (BLS) currently calculates the Consumer Price Index (CPI) for food without fully accounting for the expansion of nontraditional food stores.<sup>2</sup> The BLS employs a linking procedure that assumes quality-adjusted prices at nontraditional retailers are exactly equal to prices at conventional supermarkets. Thus, when a supercenter or other nontraditional store replaces a conventional supermarket in the sample, BLS links the lower nontraditional price to the higher supermarket price to remove any difference. Even though packaged food items are physically identical at the two stores, the BLS procedure does not recognize any price difference between the stores. Of course, this assumption is inconsistent with actual market outcomes in which nontraditional retailers have expanded very quickly in new markets by offering substantially lower prices for a wide variety of food products. Thus, the market impacts of nontraditional retailers are understated in the CPI for food. Since the CPI for food is used as a basis for inflation in a variety of government and industry measures, this oversight has implications for estimated cost-of-living adjustments.

Hausman and Leibtag (2004), for example, compare average prices for 20 food products over a 4-year period and find that nontraditional retailers charge 27 percent lower prices, on average. This implies an upward bias of 0.32 to 0.42 percentage points in the CPI for food at home. Given that average food price inflation was 2 to 3 percent per year, this upward bias in the estimated inflation rate amounts to about 15 percent per year.

One concern with this finding is that comparisons across store formats do not account for quality or package size differences for some food products. For example, the quality of ground beef sold may differ across outlets or the package sizes available at a nontraditional outlet may be much larger than at a traditional store. To address these concerns, food product comparisons in this report are for similar package sizes and more specifically defined food products.

## Data

This study uses ACNielsen Fresh Foods Homescan scanner panel data for 1998-2003. The data consist of about 8,000 representative U.S. households per year and include purchase and demographic information for each household in the sample. Participating panelists record both their UPC-coded transactions and their random-weight<sup>3</sup> (non-UPC coded) food purchases over the year(s) that they participate in the panel. This sample was used to measure the entire market basket of household purchases of food for at-home consumption.<sup>4</sup>

<sup>1</sup> A December 2003 study by UBS Investment Research found a price gap of 17.3 percent to 26.2 percent. The previous year UBS found a price gap of 20.8 percent to 39.1 percent. For a specified identical market basket, UBS found Wal-Mart supercenters to have an average price 19.1 percent lower in Tampa and 22.8 percent lower in Las Vegas.

<sup>2</sup> When customers shift from conventional supermarkets to nontraditional retailers, no change occurs in the food CPI. To the extent that prices at these outlets decrease (or increase) at a different rate than conventional stores, the food CPI will take account of this change with a lagged effect over time.

<sup>3</sup> If only UPC-coded products were used to measure food-at-home expenditures, many food purchases would not be recorded in the data and food-at-home expenditure shares by store type would not accurately measure true household and market expenditure shares. This is especially true when nontraditional stores sell fewer random-weight items than traditional retailers. Leaving out random-weight items would then tend to overstate the shares of food expenditures captured by nontraditional retail outlets.

<sup>4</sup> In total, there were over 17,000 unique households in the data with some subset participating each year creating a total of 48,005 household-by-year observations. In 1998, there were 7,624 households, 7,124 households in 1999, 7,523 in 2000, 8,216 in 2001, 8,685 in 2002, and 8,833 in 2003. Some households participated in the panel for more than 1 year with 35 percent participating in only 1 year, 19 percent participating for 2 years, 14 percent for 3 years, 10 percent for 4 years, 9 percent for 5 years, and 13 percent for all 6 years.

Homescan households are recruited based on their demographic information to ensure sufficient representation for demographic variables such as household income, family composition, education, and household location. Each household is equipped with an electronic home-scanning unit, and household members record every food purchase they make by scanning in the appropriate codes of the food products that they purchase for home consumption. The panel is recruited on a permanent basis, subject to turnover from normal attrition or adjustments to demographic targets necessitated by census revisions.<sup>5</sup> The panel is geographically dispersed and is demographically balanced to match the U.S. population as closely as possible. Homescan data are unique in that panelists record food purchases across all outlet channels, including grocery, drug, mass-merchandise, club, supercenter, and convenience stores.

Since Homescan data include no information on food bought away from home (primarily restaurant meals), one needs to assume that such purchases do not bias the average prices paid by a household for its food-at-home purchases. Once this assumption is made, Homescan data can be used for analysis of the impact of store choice on average prices paid for food-at-home items. Average price paid can be aggregated across households and/or across time to measure price change for different product categories.

Standard demographic information is collected annually from each household and each household's home market/city and census region is identified for stratification purposes. Each household is then assigned a projection factor (weight) based on its demographics<sup>6</sup> in order to aggregate the data to be representative at the market, regional, and national level.

The information captured on a transaction level includes date of purchase, store name and channel type identifier,<sup>7</sup> store department identifier,<sup>8</sup> item description, brand name, number of units purchased, price paid, and promotions/sales/coupons used (if any). For retail stores tracked by ACNielsen in its store-level scanner data,<sup>9</sup> prices are taken from the store-level data to improve price accuracy.

Warehouse shipment data are used to supplement scanner-generated data collected from households or via store-level scanning, and indicate the balance of sales moving through other food retailers. This information is from census data (nonprojected, actual shipment data) supplied to ACNielsen by wholesale co-operators.

Some question the quality of household panel data when they try to reconcile it with store-level scanner data. There is a perception that the volumetric data from each source should be the same. However, panel data and store data are not always equal because measurement methodologies differ. Store-level data record millions of shopping transactions while panel data record a specific group of shoppers. In addition, panel data represent household-based purchases only, forgoing small business or institutional purchases. Panel data were used in this report in order to capture the store choice made by households. This variable would not be captured in store-level data that does not include some of the major nontraditional retailers.

<sup>5</sup> Households lost through attrition are replaced with others having similar key characteristics.

<sup>6</sup> Age, gender, education, occupation of head(s) of household, number of household members, household income, household composition, race, and ethnicity.

<sup>7</sup> Grocery, drug, mass merchandiser, supercenter, club, convenience, other (including dollar stores, bakeries, military stores, online purchases, health food stores, and vending machines).

<sup>8</sup> Dry grocery, dairy, frozen-produce-meat, random weight.

<sup>9</sup> The ACNielsen store-level sample is updated through both replacement of canceled or closed stores and a Continuous Sample Improvement Program, whereby the sample is changed intentionally to ensure that changes in the universe are reflected in the sample.

## Consumers Shift to Nontraditional Retailers

Since the Homescan data track consumer food purchases across all stores, expenditure shares can be calculated for seven broad retail store formats for 1998-2003. The traditional retail group consists of conventional supermarkets, superstores, food-drug combination stores, and convenience stores. The share of sales going to this group fell from 82.3 percent in 1998 to 69.2 percent in 2003. Nontraditional outlets—including supercenters, warehouse club stores, mass merchandisers, and dollar stores—increased their share of consumer expenditures from 17.7 percent to 30.8 percent.

Within the nontraditional retail group, supercenters (primarily Wal-Mart) posted the largest increase in share from just over 3 percent in 1998 to nearly 11 percent in 2003. Warehouse club stores and dollar stores also saw significant increases in their share of the consumer food dollar as time-crunched and deal-seeking U.S. consumers look to find the best combination of prices and services at their retailer of choice.

These expenditure patterns vary by region with nontraditional retailers carving out larger shares in the Central and South regions (table 1). For example, in 2003, Wal-Mart became the top food retailer in the Dallas, Texas, market rising from sixth, in terms of market share, in less than 6 years. These shifts in the retail food market can have a large impact on the variety of foods available and average prices paid for food. And in an industry in which market leaders are usually long-time participants in a market, a dramatic change over a short period of time affects both consumers and retail food workers.

How do these changing shopping patterns impact the prices paid by consumers? Hausman and Leibtag (2004) calculated average price ratios across different types of outlets for 20 food categories and compared the prices for the food categories in traditional supermarkets versus nontraditional stores (table 2). The largest difference in average price was for lettuce. Nontraditional store prices were about 50 percent lower than traditional supermarkets over the 48-month study period. The narrowest price difference was for bottled water (5 percent less expensive in nontraditional stores). Soda was the only item with a lower price in traditional supermarkets than in nontraditional stores. Across all of the food categories, nontraditional store prices were 27 percent lower than traditional supermarkets.

These results do not account for the different mix of products that might be sold in nontraditional stores versus supermarkets; for example, types of apples could differ across stores. This quality and variety difference is difficult to quantify in consumer panel data. This report, which concentrates on dairy products, makes more restrictive comparisons in the varieties and types of products compared.

Table 1

**Consumer food expenditures at traditional versus nontraditional retailers, 1998-2003**

Expenditure share	1998	1999	2000	2001	2002	2003
	<i>Percent</i>					
<b>East</b>						
Traditional	84	83	82	80	79	80
Nontraditional	16	17	18	20	21	20
<b>Central</b>						
Traditional	84	82	80	78	74	74
Nontraditional	16	18	20	22	26	26
<b>South</b>						
Traditional	80	77	73	70	66	65
Nontraditional	20	23	27	30	34	35
<b>West</b>						
Traditional	81	80	77	76	72	72
Nontraditional	19	20	23	24	28	28

Source: ERS calculations using ACNielsen Homescan data.

Table 2

**Ratio of supermarket and other outlet prices to nontraditional store prices**

Product	Supermarkets/ Traditional retailers	All other/ Nontraditional retailers
Apples	1.546	1.531
Apple Juice	1.585	1.596
Bananas	1.384	1.368
Bread	1.108	1.098
Butter/Margarine	1.096	1.096
Cereal	1.172	1.166
Chicken Breast	1.408	1.411
Coffee	1.373	1.383
Cookies	1.223	1.214
Eggs	1.312	1.305
Ground Beef	1.372	1.367
Ham	1.967	1.984
Ice Cream	1.320	1.331
Lettuce	2.117	2.107
Milk	1.207	1.199
Potatoes	1.412	1.402
Soda	0.891	0.974
Tomatoes	1.358	1.321
Bottled Water	1.058	1.165
Yogurt	1.413	1.411
Average	1.300	1.306

Source: Hausman and Leibtag (2004), calculations using ACNielsen Homescan data.

## Food Prices Differ Between and Within Markets

To better understand the price differences across different store formats, average prices are calculated for a wide variety of dairy products that are commonly purchased at both traditional and nontraditional stores. Annual (1998-2003) average price estimates are calculated for 24 fixed-weight dairy products and 8 random-weight products. Average prices (tables 3, 4) are calculated by taking the total weighted expenditures for a given product and dividing by the total weighted quantity (in ounces) purchased. These average prices are then weighted using the projection factors for each household in the sample to arrive at the national average.

For the most part, average prices follow well-known patterns. Less processed products are subject to greater variation in price from year to year as they are more closely tied to changes in commodity prices at earlier stages of production. For example, butter and eggs vary most from year to year (12 and 8 percent), while more processed products such as ice cream vary by 2 percent per year.<sup>10</sup> Another interesting trend is the impact of increased sales of new products on average prices. For example, yogurt shakes and drinks, a relatively new product category with insufficient sample size to even be reported in 1998, had declining average prices for three of the four years in the sample as increased availability of the product drove its average price down 14 percent. These general price trends show the importance of defining the food categories for comparison, as trends differ across different cheese varieties, different types of milk,<sup>11</sup> and different package sizes. This report presents results for similar package sizes across all groups and for well-defined food products.

### Nontraditional Retailers Drive Price Variation

The growth of nontraditional retailers increases the options available to consumers and is one factor affecting price variation both within and across markets. Given that the difference in dairy prices paid is smaller across income groups (see appendix) than across regions and markets, a store's format—including physical characteristics, product offerings, business practices, and marketing strategies—is a likely determinant of variation retail food prices.

Even when controlling for similar-sized packages, dairy prices are 5-25 percent lower at nontraditional retailers than at traditional supermarkets (tables 5-8). For example, skim and low-fat milk prices are consistently 5-12 percent lower at nontraditional stores (table 5). Traditional store prices are 9.1 percent above nontraditional store prices for a representative basket of dairy products. Most dairy products are priced lower at nontraditional retailers except for Muenster cheese, butter, frozen yogurt, and sherbet categories. These products may be more heavily promoted at traditional retailers or they may not yet be sold in sufficient quantities at nontraditional retailers to have lower prices. More price variation exists in random-weight cheese products and while traditional retailers have lower prices for some

<sup>10</sup> Annual average price variation was calculated by taking the weighted average in a given year and calculating the percentage change with respect to the weighted average of the previous year.

<sup>11</sup> The skim milk category includes all gallon containers of milk purchased with a UPC description that includes some fat-free, no-fat, or skim label. The low-fat milk category includes all gallon containers of milk purchased with a UPC description that includes low fat, ½%, 1%, or 2%. The whole-milk category includes all gallon containers of milk with a UPC description that includes “whole” in the descrip-

Table 3

**Average U.S. dairy prices, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
	<i>Dollars</i>					
American cheese (Pound)	2.73	2.87	2.82	2.83	2.75	2.67
Butter (Pound)	2.63	2.40	2.19	2.71	2.28	2.12
Cheddar cheese (Pound)	3.58	3.75	3.44	3.58	3.57	3.62
Colby cheese (Pound)	3.13	3.28	3.14	3.32	3.26	3.21
Cottage cheese (Pound)	1.43	1.50	1.51	1.54	1.53	1.50
Cream cheese (Pound)	2.46	2.60	2.51	2.59	2.54	2.52
Extra large eggs (Dozen)	1.10	1.00	0.99	1.02	1.03	1.22
Farmers cheese (Pound)	4.10	3.94	4.16	3.92	3.97	4.84
Frozen yogurt (Half-Gallon)	3.26	3.68	3.37	3.63	3.80	3.52
Ice cream (Half-Gallon)	3.07	3.17	3.18	3.34	3.31	3.26
Jumbo eggs (Dozen)	1.21	1.08	1.10	1.14	1.12	1.34
Large eggs (Dozen)	1.01	0.92	0.94	0.96	0.98	1.16
Low-fat milk (Gallon)	2.32	2.48	2.42	2.50	2.35	2.37
Margarine (Pound)	0.83	0.83	0.83	0.84	0.78	0.81
Medium eggs (Dozen)	0.76	0.69	0.72	0.77	0.71	0.93
Mozzarella cheese (Pound)	3.19	3.26	3.29	3.34	3.49	3.46
Muenster cheese (Pound)	3.63	3.83	3.60	4.03	4.74	4.82
Ricotta cheese (Pound)	1.64	1.70	1.72	1.76	1.78	1.76
Sherbet (Half-Gallon)	2.65	2.78	2.79	2.84	2.93	2.91
Skim milk (Gallon)	2.25	2.40	2.37	2.38	2.27	2.25
Swiss cheese (Pound)	4.28	4.13	4.22	4.25	4.48	4.31
Whole milk (Gallon)	2.53	2.67	2.61	2.72	2.56	2.60
Yogurt (6 ounces)	0.46	0.47	0.48	0.49	0.51	0.49
Yogurt shakes (16 ounces)	NA	2.26	2.20	2.15	2.18	1.94

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Table 4

**Average random weight cheese prices, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
	<i>Dollars</i>					
American cheese (Pound)	2.82	3.61	3.45	3.72	3.81	3.83
Cheddar cheese (Pound)	3.89	3.32	3.35	3.50	3.64	3.60
Colby cheese (Pound)	3.24	3.25	3.11	3.47	3.40	3.26
Cream cheese (Pound)	2.49	3.59	3.34	3.72	3.15	3.72
Mozzarella cheese (Pound)	3.02	3.27	3.30	3.67	3.74	3.87
Muenster cheese (Pound)	2.14	3.91	3.76	3.84	3.77	3.75
Ricotta cheese (Pound)	NA	NA	2.78	2.89	2.40	2.88
Swiss cheese (Pound)	4.73	4.55	4.42	4.63	4.71	4.70

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Table 5

**Average milk price per gallon by store type, 1998-2003**

Milk type	1998	1999	2000	2001	2002	2003
<b>Skim:</b>						
	<i>Dollars</i>					
Grocery stores	2.27	2.41	2.39	2.42	2.30	2.32
Drug and convenience stores	2.38	2.55	2.45	2.54	2.40	2.33
Nontraditional retailers	1.99	2.29	2.27	2.20	2.17	2.07
<b>Lowfat:</b>						
Grocery stores	2.34	2.51	2.45	2.54	2.38	2.41
Drug and convenience stores	2.35	2.49	2.58	2.54	2.45	2.36
Nontraditional retailers	2.18	2.34	2.24	2.33	2.25	2.28
<b>Whole:</b>						
Grocery stores	2.55	2.67	2.60	2.73	2.57	2.63
Drug and convenience stores	2.66	2.73	2.75	2.82	2.76	2.55
Nontraditional retailers	2.45	2.58	2.59	2.71	2.52	2.53

Source: ERS calculations using ACNielsen Homescan data.

Table 6

**Average egg prices per dozen by store type, 1998-2003**

Egg type	1998	1999	2000	2001	2002	2003
<b>Medium:</b>						
	<i>Dollars</i>					
Grocery stores	0.77	0.70	0.74	0.80	0.73	0.94
Drug and convenience stores	0.75	0.82	0.88	0.86	0.61	1.05
Nontraditional retailers	0.67	0.58	0.63	0.62	0.61	0.87
<b>Large:</b>						
Grocery stores	1.01	0.93	0.94	0.97	0.99	1.18
Drug and convenience stores	1.04	0.94	0.92	1.05	1.02	1.02
Nontraditional retailers	0.85	0.72	0.80	0.82	0.82	1.07
<b>Extra large:</b>						
Grocery stores	1.12	1.03	1.03	1.07	1.08	1.29
Drug and convenience stores	1.11	1.10	1.07	1.11	0.97	1.10
Nontraditional retailers	0.90	0.79	0.79	0.82	0.86	1.11
<b>Jumbo:</b>						
Grocery stores	1.22	1.11	1.14	1.21	1.19	1.41
Drug and convenience stores	1.40	1.28	0.89	1.21	1.12	1.21
Nontraditional retailers	1.00	0.85	0.89	0.89	0.90	1.11

Source: ERS calculations using ACNielsen Homescan data.

Table 7

**Average dairy prices by store type, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
<b>American cheese (Pound):</b>						
			<i>Dollars</i>			
Grocery stores	2.75	2.89	2.86	2.88	2.80	2.74
Drug and convenience stores	2.82	3.70	3.43	3.12	2.90	2.35
Nontraditional retailers	2.55	2.59	2.45	2.57	2.55	2.43
<b>Butter (Pound):</b>						
Grocery stores	2.63	2.37	2.16	2.79	2.28	2.14
Drug and convenience stores	2.61	2.35	2.30	2.04	2.52	2.39
Nontraditional retailers	2.63	2.61	2.39	2.41	2.32	2.09
<b>Cheddar cheese (Pound):</b>						
Grocery stores	3.59	3.76	3.52	3.61	3.60	3.65
Drug and convenience stores	4.46	5.77	5.57	4.43	3.85	4.32
Nontraditional retailers	3.45	3.45	2.76	3.49	3.40	3.39
<b>Colby cheese (Pound):</b>						
Grocery stores	3.23	3.39	3.25	3.44	3.30	3.29
Drug and convenience stores	4.17	3.70	3.25	3.38	4.26	4.39
Nontraditional retailers	2.68	2.77	2.61	2.84	3.06	3.01
<b>Cottage cheese (Pound):</b>						
Grocery stores	1.43	1.52	1.52	1.56	1.56	1.52
Drug and convenience stores	1.57	1.66	1.71	1.93	1.78	1.65
Nontraditional retailers	1.28	1.29	1.28	1.39	1.35	1.37
<b>Cream cheese (Pound):</b>						
Grocery stores	2.48	2.64	2.54	2.64	2.57	2.58
Drug and convenience stores	2.67	2.45	2.61	2.17	2.23	1.88
Nontraditional retailers	2.17	2.14	2.16	2.30	2.28	2.26
<b>Farmers cheese (Pound):</b>						
Grocery stores	4.22	4.38	4.24	3.96	4.12	4.83
Drug and convenience stores	NA	NA	NA	NA	NA	NA
Nontraditional retailers	2.97	2.84	3.20	3.19	3.17	5.44
<b>Frozen yogurt (Half-Gallon):</b>						
Grocery stores	3.22	3.68	3.36	3.61	3.79	3.48
Drug and convenience stores	6.82	5.31	5.45	5.79	5.66	8.30
Nontraditional retailers	4.38	3.68	3.37	4.28	3.61	4.00
<b>Ice cream (Half-Gallon):</b>						
Grocery stores	3.05	3.16	3.17	3.33	3.30	3.22
Drug and convenience stores	3.73	3.75	3.55	3.79	3.84	4.18
Nontraditional retailers	3.05	2.93	2.98	3.20	3.15	3.19
<b>Margarine (Pound):</b>						
Grocery stores	0.84	0.84	0.84	0.86	0.81	0.84
Drug and convenience stores	0.91	0.89	0.83	0.75	0.80	0.68
Nontraditional retailers	0.68	0.70	0.71	0.68	0.65	0.66
<b>Mozzarella cheese (Pound):</b>						
Grocery stores	3.21	3.28	3.32	3.39	3.55	3.53
Drug and convenience stores	3.43	3.79	3.89	3.50	4.07	2.90
Nontraditional retailers	3.11	3.25	3.16	3.07	3.23	3.14
<b>Muenster cheese (Pound):</b>						
Grocery stores	3.57	3.85	3.58	4.06	4.75	4.86
Drug and convenience stores	NA	NA	2.50	3.58	NA	NA
Nontraditional retailers	4.26	4.61	4.04	3.78	4.68	4.71
<b>Ricotta cheese (Pound):</b>						
Grocery stores	1.66	1.71	1.74	1.80	1.83	1.82
Drug and convenience stores	2.20	2.13	2.11	2.35	1.54	2.32
Nontraditional retailers	1.32	1.38	1.59	1.35	1.43	1.40

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Table 7

**Average dairy prices by store type, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Sherbet (Half-Gallon):</b>						
Grocery stores	2.65	2.77	2.78	2.81	2.90	2.88
Drug and convenience stores	2.88	2.62	3.03	3.43	2.63	3.06
Nontraditional retailers	2.43	2.88	2.82	3.06	3.19	3.03
<b>Swiss cheese (Pound):</b>						
Grocery stores	4.45	4.49	4.42	4.60	4.86	4.71
Drug and convenience stores	5.80	5.68	7.98	4.24	7.61	5.23
Nontraditional retailers	3.63	3.58	3.90	3.70	3.82	3.77
<b>Yogurt (6 ounces):</b>						
Grocery stores	0.47	0.47	0.49	0.50	0.52	0.51
Drug and convenience stores	0.47	0.61	0.60	0.57	0.59	0.47
Nontraditional retailers	0.41	0.40	0.38	0.41	0.44	0.44
<b>Yogurt shakes (16 ounces):</b>						
Grocery stores	NA	2.26	2.25	2.24	2.23	1.98
Drug and convenience stores	NA	NA	1.94	2.41	2.02	2.41
Nontraditional retailers	NA	NA	2.04	1.93	2.07	1.90

Source: ERS calculations using ACNielsen Homescan data.

NA = Not available.

products, in aggregate, nontraditional stores still have slightly lower prices even for these specialty items.

These price differences are statistically significant when modeled in an analysis of variance, and the differences between store formats are significant even after controlling for region, household income, and time.<sup>12</sup> For example, milk prices are analyzed using price per gallon of milk as the dependent variable in a weighted generalized regression, with store format (S), region (R), fat content of milk (M), household income (I), and a time dummy for each quarter in a given year (T).

$$P_{ijt} = F(S, R, M, I, T) \quad i \sim \text{household}, j \sim \text{store}, t \sim \text{date} \quad (1)$$

Average prices across formats are significantly different from one another at the 10-percent level for most items and usually at the 5-percent level or better (table 9).

Tests were run while controlling for each individual market, along with separate regressions for each market, with similar results. For example, milk prices were modeled using dummy variables for each U.S. region, household income group, milk (fat) content type, and quarter, along with the store format variables of interest. Results showed milk prices to be 6 percent lower in nontraditional retailers than in traditional stores.

<sup>12</sup> Average prices across region, income, and market are presented in the appendix.

Table 8

**Average prices for random-weight cheeses by store type, 1998-2003**

Product/retailer	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound):</b>						
Grocery stores	2.79	3.66	3.50	3.77	3.85	3.93
Drug and convenience stores	2.30	2.86	3.18	3.31	2.85	3.14
Nontraditional retailers	NA	3.29	3.21	3.30	2.97	3.19
<b>Cheddar cheese (Pound):</b>						
Grocery stores	3.86	3.30	3.36	3.47	3.65	3.54
Drug and convenience stores	1.73	3.52	3.04	4.43	3.55	4.00
Nontraditional retailers	NA	3.60	3.34	3.65	3.55	3.57
<b>Colby cheese (Pound):</b>						
Grocery stores	3.12	3.27	3.14	3.49	3.43	3.29
Drug and convenience stores	5.15	2.97	3.02	2.89	4.05	2.87
Nontraditional retailers	NA	3.21	2.76	3.38	3.03	3.05
<b>Cream cheese (Pound):</b>						
Grocery stores	1.87	3.06	3.12	3.50	2.81	3.54
Drug and convenience stores	4.04	1.74	3.99	NA	3.49	NA
Nontraditional retailers	NA	3.38	1.85	1.65	2.91	3.41
<b>Mozzarella cheese (Pound):</b>						
Grocery stores	2.93	3.31	3.41	3.72	3.85	3.96
Drug and convenience stores	2.85	4.31	4.09	2.05	4.02	4.80
Nontraditional retailers	NA	2.64	2.72	3.24	2.88	2.82
<b>Muenster cheese (Pound):</b>						
Grocery stores	2.10	4.13	3.85	3.95	3.83	3.88
Drug and convenience stores	1.19	4.08	4.56	4.23	3.09	1.36
Nontraditional retailers	NA	3.41	3.07	3.42	3.42	3.19
<b>Ricotta cheese (Pound):</b>						
Grocery stores	NA	1.43	2.39	3.02	2.43	2.92
Drug and convenience stores	NA	NA	NA	NA	NA	NA
Nontraditional retailers	NA	NA	4.57	6.73	NA	3.29
<b>Swiss cheese (Pound):</b>						
Grocery stores	4.67	4.63	4.49	4.71	4.84	4.79
Drug and convenience stores	4.05	3.93	3.25	4.23	4.51	4.30
Nontraditional retailers	NA	4.30	3.76	3.98	3.65	4.23

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Table 9

**Regression results for milk prices, 1998-2003**

Dependent variable:		
Price per gallon of milk	Parameter estimate	Standard error
<b>Independent variables:</b>		
Intercept	2.76	0.003
<b>Store format:</b>		
Grocery stores	Reference format	
Drug and convenience stores	0.04	0.002
Nontraditional retailers	-0.16	0.002
Other	-0.20	0.003
<b>Milk type:</b>		
Skim	-0.24	0.002
Lowfat	-0.17	0.001
Whole	Reference type	
<b>Region:</b>		
East	0.12	0.002
South	-0.08	0.002
Central	0.21	0.002
West	Reference region	
<b>Household income:</b>		
< \$25,000	-0.04	0.002
\$25,000 - \$49,999	-0.03	0.002
\$50,000 - \$70,000	-0.01	0.002
> \$70,000	Reference income group	
Quarter time dummy variables	Jointly significant at the 5% level	
R <sup>2</sup>	0.12	

Source: ERS calculations using ACNielsen Homescan data.

## Dairy CPI Estimates Overstate Price Change

Price differences across store formats are especially noteworthy when compared with standard measures of food price inflation over time. Over the past 20 years, annual food price changes, as measured by the CPI, have averaged just 3 percent per year. Differences of more than 5 percent in food prices are driven by differences in store formats, which largely account for the regional and market variation in prices observed across the United States. Since price differences are larger across store formats than over time, it is instructive to investigate the impact of cross-outlet variation on estimates of food price inflation.

The standard measure of food price inflation, as calculated in the CPI, is based on a sample of food items selected from a sample of retail food outlets. The selection of stores has not been updated as fast as the change in shopping behavior, so some of the price differences between outlet types are not accounted for in the CPI for food.

Three aggregate CPI indices can be compared with the outlet-specific price calculations in this report—dairy, eggs, and butter/margarine. The overall dairy CPI has four subgroups—milk, cheese, ice cream, and other dairy (table 10). In general, average price change as measured by scanner data show lower levels of price change than reported by BLS. This result is consistent with earlier work by MacDonald (1995) and echoes the often-cited criticism by many in the food industry that increased competition from nontraditional retail outlets dampens inflationary price increases as measured in the CPI.

In 4 of the 5 years compared in this study, dairy and egg price inflation are smaller in the scanner data than the CPI data (table 10). An exception is found in the butter and margarine category in which the scanner data shows lower rates of inflation (or greater rates of deflation) in just 2 of the 5 years. Also interesting is that the large recorded increase in butter and margarine prices in the 2001 CPI was almost completely unobserved in the scanner data, implying that consumers react quickly to sharp price increases by changing their shopping behavior to minimize the impact of large price increases. Overall, these comparisons imply that the CPI values published by BLS are 0.5 to 2.5 percentage points above scanner data estimates of annual price change. This is especially noteworthy considering that annual food-at-home price inflation averaged just 2.2 percent over 1999-2003.

For these dairy categories, then, the CPI would seem to overstate food price inflation, but the exact magnitude is more difficult to quantify given differences in these data sources. The CPI is derived from store-based price information and does not fully take into account changes in consumer shopping behavior. This may cause some price changes to be missed in the CPI calculation. On the other hand, Homescan data tracks consumer shopping behavior and picks up changes as they occur, but may understate food price inflation if consumers in the panel are more price sensitive and/or deal savvy in their shopping behavior than the average U.S. household. A hybrid approach that uses scanner data to track current shopping patterns but

Table 10

**Average annual change in prices, ACNielsen Homescan versus BLS, 1999-2003**

	1999	2000	2001	2002	2003
	<i>Percent</i>				
ACN Dairy total	6.0	-1.6	3.5	-1.2	-0.1
BLS Dairy total	5.8	0.7	4.0	0.6	-0.1
ACN Milk	2.3	-0.8	1.0	-1.9	0.2
BLS Milk	6.2	0.2	4.5	-1.9	0.8
ACN Cheese	3.0	-0.8	1.9	0.3	0.3
BLS Cheese	6.8	0.1	2.9	1.4	-0.4
ACN Other dairy	0.0	0.1	0.0	0.2	-0.3
BLS Other dairy	5.2	2.1	2.8	1.8	0.4
ACN Ice cream	0.6	-0.2	0.5	0.0	-0.3
BLS Ice cream	4.0	1.7	5.5	3.3	-2.0
ACN Eggs	-0.4	0.1	0.2	0.0	1.1
BLS Eggs	-5.4	3.0	3.4	1.3	13.8
ACN Butter and margarine	-0.3	-0.3	1.0	-0.7	-0.2
BLS Butter and margarine	-0.1	-3.1	14.9	-2.6	-1.2

ACN = ACNielsen; BLS = Bureau of Labor Statistics

Source: ERS calculations using ACNielsen Homescan data, BLS-CPI data.

quality adjusts the current CPI for food by incorporating information on shopping behavior from other sources may be the best solution to this discrepancy. For a more detailed discussion of these issues, see Hausman and Leibtag (2004, 2005).

## Conclusion

Changes in food retailing affect food prices, as well as the variety of products and services available to consumers. With average dairy food prices 5-25 percent lower at nontraditional retailers, the growing presence of these stores will decrease the average prices paid by consumers for these products. While different product mixes may exist at different stores, the price differences estimated in this analysis across different outlet types are unlikely to arise primarily from different product mixes since comparisons are made for similar package sizes and product characteristics. These lower prices and increased options should provide a net welfare benefit to U.S. consumers, but it remains to be seen if the overall economy will benefit from these new retail formats, particularly when taking into account the impact on traditional retailers, food retail workers, food manufacturers, and agricultural producers.

As consumers turn in greater numbers to nontraditional stores for their common grocery items, the prices and variety of products available at those stores will have an increasingly important role in retail food markets. A nontraditional store's entry into a new geographic market creates a direct price effect by offering a lower price option to consumers and an indirect price effect by causing traditional supermarkets to lower their prices because of the increased competition.

The current CPI for food does not fully take into account the lower price offered by a nontraditional retailer. Currently, the BLS links out the lower prices of a nontraditional retailer by assuming that any price variation between a traditional and nontraditional retailer is a store-based difference in quality of service versus simply a lower price for similar (or even identical) products. If this assumption were correct, the gain in market share by nontraditional outlets would not be so significant and ongoing.

A more appropriate approach to price change estimation would be to track consumer purchase behavior and adjust observed price changes in a given category. This could be accomplished using an expenditure-weighted measure of price change with frequently updated measures from scanner data sources. A frequently updated expenditure-weighted price calculation could be applied to industries in which consumer purchase information is readily available, such as the grocery industry. This system could be applied elsewhere as better tracking information is developed across other sectors.

A significant difference exists between price change as measured using scanner data and the CPI estimate of price change, even for the relatively low food inflation period of 1998-2003 covered in this report. This study estimates that the CPI for dairy products overstates change in food prices by 0.5 to 2.5 percentage points per year for the dairy, eggs, and butter/margarine categories. Future research is necessary to estimate whether these differences are as pronounced in other food categories. The more common this difference is, the more important a correction to the official estimates of price change is to getting an accurate measure of food price inflation.

Traditional food retailers that have lowered prices and/or increased the quality and variety of the services they provide have remained competitive, while those that have not adapted have struggled. Retailers that do not adjust quickly lose market share and may choose to exit a market where they once were dominant; in some cases, they exit food retailing entirely. For food wholesalers, distributors, and others involved in the food supply chain, expanding and maintaining relationships with nontraditional retailers will be crucial to ensuring that their products are available to the U.S. consumer in the future.

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## **Appendix:**

# **Food Price Differences Across Regions, Markets, and Income Levels**

Since the Homescan data were constructed based on a stratified random sample, with households as the primary sampling unit and the sample of households matching census-based demographic/geographic targets, one can estimate average prices by region and major market for cross-market comparison.<sup>1</sup> There was no known or intentional clustering in the sample construction.

### **Regional Differences**

A common question regarding retail food prices is the extent to which they vary across regions. Appendix tables 1 and 2 show average dairy prices across 4 regions for 24 commonly purchased dairy department products. In general, dairy prices are lowest in the Midwest and highest in the West.<sup>2</sup> Prices in the South are 3.5 percent below those in the East. Although the magnitude of these differences varies from product to product, regional differences in food prices are important for any policy or program that adjusts for food costs. A national average price or cost may be inappropriate measure for a particular region or market. Regional adjustments that take into account these differences would improve any benefits or welfare program attempting to account for cost-of-living differences both over time and across markets.

These differences are highlighted by looking at average milk prices per gallon across regions. Both skim and low-fat milk prices were highest in the South, while whole-milk prices were highest in the West for three of the study years and highest in the South for two of the study years. Interestingly, price variation is widest, on average, for skim milk, with the difference between highest and lowest regional price per year ranging from 15 to 30 percent (8-15 percent for low-fat and 7-17 percent for whole). The wider regional price range for skim milk may be due to differences in milk content and wholesale costs, in demand for various milk products, or pricing strategies practiced by retailers.

Price differences across regions are especially noteworthy given the relatively stable level of price inflation in each region over 1998-2003. The highest average annual inflation rate was in the East (1.78 percent), while the West, South, and Midwest regions averaged 1.77, 1.52, and 0.84 percent, respectively.

There are a variety of possible explanations for the difference in dairy prices across regions. Regional price variation may be a function of differences in production and transportation costs, consumer preferences and/or demographics, and level of retail competition in a given market. Due to the unique nature of the ACNielsen Homescan data, one can compare average prices across major U.S. markets, store types, or household demographics to better illuminate possible causes of the observed regional price variation.

<sup>1</sup> Atlanta, Baltimore/Washington, Chicago, Los Angeles, New York, Philadelphia, San Antonio, and San Francisco.

<sup>2</sup> Midwest prices were 8.4 percent below East prices, while West prices were 8.2 percent above East prices.

## Market Differences

Appendix tables 3 and 4 present average dairy prices in eight major U.S. markets, as well as the average price for nonmetro consumers.<sup>3</sup> For the most part, the major markets follow the general regional patterns. Chicago (Midwest) has the lowest average market prices, while Los Angeles and San Francisco (West) have the highest. The only exception to the regional patterns is in Philadelphia where prices were second lowest, on average, and not statistically different from average prices in Chicago and Atlanta.<sup>4</sup> Nonmetro consumers pay lower average prices for dairy products than do consumers in any of the eight major markets.

These statistically significant differences in prices across U.S. markets indicate differences in both food costs and consumer behavior. Price variation at the retail level may be a function of both supply and demand conditions in a given market. On the supply side, differences in transaction, marketing, or operating costs may explain some of the retail price variation. On the demand side, consumer preferences for different retail store formats will generate differences in average prices across markets.

## Household Income Differences

Consumers can affect the price they pay for foods through their purchase behavior: this can include using coupons, checking the newspaper for sale items, or traveling to a store offering lower prices. Do average prices paid differ across income groups? How do these differences compare with geographical price differences? Households in the ACNielsen data were placed into four income groups (appendix tables 5 and 6). Overall, higher income households pay higher average prices for dairy products, but some of this difference may be due to differences in purchase choices within a category. However, these differences are smaller than the regional and market differences in prices. Low-income households (income less than \$25,000) pay an average of 3.4 percent less for their dairy products, and high-income households pay 6.0 percent more than middle-income households.

Since regional and market differences are larger than differences in prices paid by income groups, there must be more behind the geographical differences than just the demographic makeup of a region or market. The retail food stores available to consumers in a given market will affect average prices paid for food since stores use price differences as one way to differentiate themselves from competitors.

<sup>3</sup> In the ACNielsen Homescan data, nonmetro consumers are defined as any household not living in the top 50 U.S. markets and comprise approximately 15 percent of the sample each year.

<sup>4</sup> At the 5-percent level.

Appendix table 1

**Average dairy prices by U.S. region, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound)</b>						
East	2.72	2.84	2.75	2.89	2.84	2.83
Midwest	2.65	2.64	2.55	2.67	2.56	2.41
South	2.69	2.91	2.89	2.73	2.66	2.58
West	3.05	3.17	3.26	3.38	3.31	3.25
<b>Butter (Pound)</b>						
East	2.64	2.40	2.20	2.71	2.24	2.03
Midwest	2.48	2.22	2.09	2.55	2.08	2.03
South	2.74	2.58	2.25	2.76	2.30	2.12
West	2.66	2.41	2.23	2.84	2.54	2.34
<b>Cheddar cheese (Pound)</b>						
East	3.57	3.70	3.62	3.70	3.67	3.71
Midwest	3.25	3.47	3.21	3.28	3.27	3.34
South	3.61	3.83	3.38	3.59	3.61	3.61
West	4.12	3.96	3.77	4.01	3.92	4.01
<b>Colby cheese (Pound)</b>						
East	3.34	3.59	3.40	3.78	4.02	3.04
Midwest	3.16	3.37	3.07	3.21	3.10	3.10
South	2.99	3.09	3.15	3.40	3.32	3.25
West	3.47	3.42	3.27	3.37	3.44	3.79
<b>Cottage cheese (Pound)</b>						
East	1.52	1.61	1.63	1.66	1.70	1.65
Midwest	1.29	1.37	1.36	1.39	1.38	1.40
South	1.44	1.46	1.49	1.50	1.50	1.45
West	1.60	1.73	1.75	1.79	1.72	1.66
<b>Cream cheese (Pound)</b>						
East	2.53	2.62	2.55	2.66	2.50	2.56
Midwest	2.34	2.44	2.36	2.45	2.35	2.33
South	2.4	2.59	2.40	2.47	2.44	2.38
West	2.64	2.83	2.83	2.97	3.11	3.11
<b>Extra large eggs (Dozen)</b>						
East	1.18	1.11	1.09	1.10	1.09	1.28
Midwest	0.97	0.85	0.86	0.90	0.89	1.05
South	1.04	0.96	0.93	0.96	1.00	1.18
West	1.32	1.16	1.20	1.18	1.20	1.47
<b>Farmers cheese (Pound)</b>						
East	3.41	3.52	4.21	4.05	3.87	4.24
Midwest	4.24	3.10	3.40	3.22	2.79	3.85
South	3.76	5.37	5.56	4.42	4.41	4.43
West	5.76	5.14	4.35	3.18	5.87	6.67
<b>Frozen yogurt (Half-Gallon)</b>						
East	3.09	4.36	3.02	3.52	4.55	3.83
Midwest	3.54	3.33	3.50	3.89	3.52	3.08
South	2.96	3.05	3.30	3.33	3.08	3.18
West	4.44	4.07	4.30	4.67	5.21	4.80
<b>Ice cream (Half-Gallon)</b>						
East	2.88	3.13	3.02	3.22	3.28	3.25
Midwest	2.85	2.99	3.07	3.19	3.01	2.88
South	3.09	3.19	3.2	3.37	3.33	3.32
West	3.42	3.37	3.43	3.60	3.61	3.62

--Continued

Appendix table 1

**Average dairy prices by U.S. region, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Jumbo eggs (Dozen)</b>						
East	1.35	1.32	1.22	1.31	1.30	1.51
Midwest	1.10	1.00	1.02	1.09	1.02	1.21
South	1.14	0.95	1.03	1.05	1.07	1.26
West	1.28	1.23	1.20	1.25	1.21	1.49
<b>Large eggs (Dozen)</b>						
East	1.11	1.04	1.04	1.05	1.06	1.28
Midwest	0.87	0.77	0.80	0.82	0.84	1.02
South	0.96	0.87	0.89	0.92	0.92	1.11
West	1.17	1.09	1.13	1.19	1.25	1.40
<b>Low-fat milk (Gallon)</b>						
East	2.34	2.52	2.45	2.61	2.47	2.50
Midwest	2.18	2.39	2.32	2.34	2.22	2.22
South	2.48	2.57	2.54	2.63	2.54	2.55
West	2.30	2.47	2.34	2.47	2.22	2.26
<b>Margarine (Pound)</b>						
East	0.94	0.91	0.94	0.92	0.91	0.92
Midwest	0.80	0.78	0.79	0.81	0.76	0.76
South	0.78	0.79	0.77	0.76	0.71	0.73
West	0.86	0.89	0.89	0.93	0.88	0.95
<b>Medium eggs (Dozen)</b>						
East	0.86	0.78	0.83	0.90	0.85	1.01
Midwest	0.67	0.58	0.66	0.68	0.60	0.82
South	0.72	0.68	0.68	0.73	0.70	0.89
West	1.02	0.84	0.89	0.90	0.79	1.08
<b>Mozzarella cheese (Pound)</b>						
East	2.84	2.89	2.91	3.01	3.07	3.09
Midwest	3.09	3.27	3.12	3.14	3.50	3.48
South	3.19	3.30	3.25	3.41	3.42	3.42
West	3.73	3.84	3.90	3.89	4.18	4.13
<b>Muenster cheese (Pound)</b>						
East	3.74	4.01	3.94	4.26	4.49	4.26
Midwest	3.29	3.88	3.34	3.41	4.17	4.04
South	3.53	3.55	3.23	4.00	4.78	5.37
West	4.66	4.61	5.49	5.00	5.73	5.31
<b>Ricotta cheese (Pound)</b>						
East	1.47	1.57	1.53	1.59	1.65	1.64
Midwest	1.94	2.07	2.01	2.03	1.99	2.02
South	1.67	1.64	1.74	1.74	1.70	1.7
West	2.16	2.17	2.27	2.33	2.33	2.3
<b>Sherbet (Half-Gallon)</b>						
East	2.74	3.02	3.07	2.92	3.03	3.21
Midwest	2.50	2.41	2.50	2.48	2.62	2.63
South	2.75	2.84	2.96	3.03	3.10	3.02
West	2.63	2.83	2.67	3.05	2.94	2.86
<b>Skim milk (Gallon)</b>						
East	2.29	2.47	2.38	2.50	2.44	2.46
Midwest	2.11	2.30	2.28	2.27	2.15	2.14
South	2.43	2.57	2.58	2.60	2.53	2.55
West	2.16	2.23	2.21	2.29	2.10	1.95

--Continued

Appendix table 1

**Average dairy prices by U.S. region, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Swiss cheese (Pound)</b>						
East	4.07	4.30	4.36	4.35	4.54	4.63
Midwest	4.19	4.21	4.48	4.16	4.31	4.12
South	4.38	4.02	4.23	4.31	4.53	4.40
West	4.30	4.26	3.97	4.13	4.49	4.14
<b>Whole milk (Gallon)</b>						
East	2.55	2.73	2.67	2.76	2.59	2.72
Midwest	2.38	2.53	2.49	2.57	2.43	2.34
South	2.56	2.66	2.65	2.73	2.68	2.74
West	2.59	2.75	2.55	2.81	2.38	2.45
<b>Yogurt (6 ounces)</b>						
East	0.48	0.49	0.50	0.51	0.54	0.52
Midwest	0.46	0.48	0.49	0.51	0.51	0.49
South	0.45	0.44	0.45	0.45	0.48	0.46
West	0.46	0.45	0.48	0.49	0.52	0.50
<b>Yogurt shakes (16 ounces)</b>						
East	NA	NA	2.22	2.37	2.34	1.84
Midwest	NA	2.25	2.14	2.18	2.17	1.87
South	NA	2.26	2.19	2.15	2.09	1.90
West	NA	NA	2.27	2.02	2.18	2.15

Source: ERS calculations using ACNielsen Homescan data.  
 NA = Not available.

Appendix table 2

**Average random-weight cheese prices by U.S. region, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
	<i>Dollars</i>					
<b>American cheese (Pound)</b>						
East	2.73	3.57	3.40	3.68	3.81	3.83
Midwest	2.82	3.72	3.70	4.26	3.92	3.66
South	3.06	3.75	3.43	3.72	3.84	3.84
West	2.81	3.44	3.82	3.49	3.73	3.96
<b>Cheddar cheese (Pound)</b>						
East	3.76	3.76	3.74	3.98	4.22	4.34
Midwest	3.53	3.65	3.41	3.70	3.68	3.47
South	3.83	3.09	3.23	3.38	3.46	3.39
West	4.19	3.18	3.24	3.28	3.48	3.43
<b>Colby cheese (Pound)</b>						
East	3.31	3.37	3.82	3.93	3.77	3.48
Midwest	3.10	3.38	3.19	3.49	3.43	3.43
South	3.18	3.27	2.97	3.75	3.65	3.37
West	3.60	2.95	2.90	3.03	2.94	2.72
<b>Cream cheese (Pound)</b>						
East	4.03	5.02	3.42	3.94	3.69	3.99
Midwest	2.26	2.77	3.06	3.77	2.67	3.43
South	1.30	3.14	3.96	3.06	3.36	2.71
West	1.97	3.35	3.18	3.80	2.71	4.71
<b>Mozzarella cheese (Pound)</b>						
East	3.05	3.75	3.99	4.44	4.60	4.42
Midwest	3.17	3.05	2.92	3.07	3.06	3.28
South	2.79	3.08	3.09	3.86	3.36	3.54
West	2.96	3.19	3.23	3.19	3.91	3.63
<b>Muenster cheese (Pound)</b>						
East	2.01	3.98	3.84	3.63	4.06	3.86
Midwest	1.92	3.62	3.86	4.09	3.78	3.51
South	2.41	3.98	3.46	3.77	3.47	3.62
West	2.65	4.33	3.98	4.17	4.01	4.52
<b>Swiss cheese (Pound)</b>						
East	4.78	4.65	4.54	4.73	4.73	4.61
Midwest	4.68	4.24	4.29	4.33	4.52	4.82
South	4.60	4.69	4.34	4.76	4.89	4.74
West	4.90	4.63	4.40	4.58	4.67	4.71

Source: ERS calculations using ACNielsen Homescan data.

Appendix table 3

**Average dairy prices in major U.S. markets, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound)</b>						
Chicago	2.65	2.76	2.81	2.65	2.67	2.43
Los Angeles	3.08	3.20	3.29	3.48	3.37	3.38
New York	2.95	2.95	2.89	3.07	2.99	3.03
San Francisco	3.37	3.29	3.63	3.82	4.03	4.33
Atlanta	2.70	2.76	2.70	2.73	2.64	2.50
Philadelphia	2.71	2.72	2.85	2.96	2.81	2.78
Baltimore-Washington	2.87	3.09	3.11	3.03	2.99	2.99
San Antonio	2.95	3.14	3.22	3.01	2.89	2.70
Nonmetro	2.74	2.77	2.86	2.71	2.62	2.49
<b>Butter (Pound)</b>						
Chicago	2.61	2.33	2.16	2.71	2.44	2.20
Los Angeles	2.62	2.48	2.32	3.00	3.27	2.77
New York	2.94	2.66	2.46	3.00	2.51	2.20
San Francisco	2.78	2.56	2.62	3.44	3.24	3.04
Atlanta	2.85	2.62	2.33	2.79	2.29	2.14
Philadelphia	2.59	2.30	2.10	2.63	2.16	2.06
Baltimore-Washington	2.71	2.45	2.22	2.84	2.21	2.09
San Antonio	2.48	2.50	2.28	2.68	2.53	2.23
Nonmetro	2.52	2.28	2.07	2.58	2.15	2.03
<b>Cheddar cheese (Pound)</b>						
Chicago	3.27	3.61	3.26	3.24	3.40	3.46
Los Angeles	3.98	4.10	3.73	4.27	4.11	3.85
New York	3.91	3.84	3.80	3.89	3.88	3.76
San Francisco	4.08	4.98	4.19	4.31	4.86	5.12
Atlanta	3.40	3.54	3.24	3.51	3.59	3.44
Philadelphia	3.43	3.76	3.65	3.73	3.61	3.71
Baltimore-Washington	3.68	3.92	3.82	3.83	3.71	3.83
San Antonio	3.65	3.63	3.76	3.86	3.64	3.88
Nonmetro	3.45	3.65	3.2	3.42	3.38	3.48
<b>Colby cheese (Pound)</b>						
Chicago	3.20	3.61	3.27	3.38	2.92	3.20
Los Angeles	3.50	3.16	3.02	3.73	3.89	3.81
New York	3.98	4.27	3.98	3.30	2.97	3.08
San Francisco	NA	NA	2.69	3.65	3.19	2.67
Atlanta	2.82	3.16	2.78	3.14	3.08	3.15
Philadelphia	2.89	2.93	3.79	3.27	3.09	2.94
Baltimore-Washington	3.51	3.19	3.17	3.43	3.52	3.23
San Antonio	3.05	3.52	3.06	3.23	3.08	3.10
Nonmetro	3.13	3.30	3.09	3.28	3.15	3.19
<b>Cottage cheese (Pound)</b>						
Chicago	1.42	1.57	1.54	1.59	1.53	1.58
Los Angeles	1.66	1.78	1.71	1.90	1.75	1.76
New York	1.78	1.82	1.91	1.95	1.93	1.97
San Francisco	1.90	1.92	1.87	1.84	2.04	2.13
Atlanta	1.40	1.47	1.41	1.39	1.41	1.46
Philadelphia	1.57	1.72	1.70	1.73	1.71	1.71
Baltimore-Washington	1.65	1.74	1.74	1.73	1.76	1.76
San Antonio	1.54	1.58	1.66	1.68	1.62	1.42
Nonmetro	1.36	1.43	1.42	1.43	1.44	1.42

--Continued



Appendix table 3

**Average dairy prices in major U.S. markets, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Cream cheese (Pound)</b>						
Chicago	2.33	2.55	2.42	2.64	2.55	2.60
Los Angeles	2.59	2.86	2.83	2.96	3.06	3.18
New York	2.93	2.85	2.83	2.80	2.69	2.70
San Francisco	2.83	2.92	3.15	3.41	3.69	3.88
Atlanta	2.48	2.52	2.47	2.57	2.50	2.39
Philadelphia	2.36	2.39	2.41	2.54	2.39	2.37
Baltimore-Washington	2.49	2.65	2.54	2.66	2.54	2.58
San Antonio	2.27	2.27	2.23	2.33	2.36	2.22
Nonmetro	2.41	2.55	2.44	2.56	2.5	2.43
<b>Extra large eggs (Dozen)</b>						
Chicago	1.10	1.00	1.00	1.07	0.93	1.13
Los Angeles	1.21	1.30	1.33	1.21	1.25	1.37
New York	1.29	1.11	1.06	1.09	1.10	1.23
San Francisco	1.75	1.45	1.55	1.66	1.64	1.92
Atlanta	1.01	0.94	1.08	1.17	1.29	1.41
Philadelphia	1.07	1.13	1.08	1.06	1.08	1.19
Baltimore-Washington	1.09	0.97	1.01	0.99	1.03	1.23
San Antonio	1.00	0.96	1.01	1.07	1.16	1.30
Nonmetro	1.05	0.92	0.94	0.93	0.94	1.19
<b>Farmers cheese (Pound)</b>						
Chicago	3.48	3.22	4.81	3.34	3.58	3.28
Los Angeles	3.91	5.24	4.28	3.14	5.69	7.28
New York	3.38	3.52	4.29	4.06	3.86	4.19
San Francisco	NA	NA	NA	6.78	5.36	4.75
Atlanta	3.71	4.07	7.98	3.29	6.26	4.10
Philadelphia	NA	NA	4.00	4.84	5.09	4.57
Baltimore-Washington	3.90	4.62	5.11	3.35	3.41	4.20
San Antonio	4.48	4.58	NA	4.47	6.31	6.73
Nonmetro	4.99	3.05	3.28	4.48	5.77	5.11
<b>Frozen yogurt (Half-Gallon)</b>						
Chicago	4.13	4.22	3.92	4.24	5.66	5.82
Los Angeles	4.86	5.38	5.25	7.05	6.19	9.37
New York	3.53	3.49	3.28	3.59	3.66	4.22
San Francisco	6.92	4.90	5.26	5.84	6.79	7.97
Atlanta	2.91	3.57	3.13	3.13	3.01	2.70
Philadelphia	3.31	3.19	3.61	3.52	3.39	3.45
Baltimore-Washington	3.40	3.57	3.69	3.94	3.94	4.71
San Antonio	3.71	3.80	5.17	5.07	3.47	3.95
Nonmetro	3.16	3.16	3.24	3.39	3.21	3.35
<b>Ice cream (Half-Gallon)</b>						
Chicago	3.00	3.03	3.16	3.23	3.57	3.36
Los Angeles	3.76	4.02	3.97	4.08	3.99	4.26
New York	3.09	3.44	3.26	3.50	3.69	3.88
San Francisco	3.48	4.08	4.24	4.31	4.70	4.65
Atlanta	3.11	3.28	3.14	3.44	3.26	3.13
Philadelphia	2.74	3.02	3.00	3.02	2.96	3.00
Baltimore-Washington	3.11	3.34	3.27	3.36	3.51	3.54
San Antonio	3.30	3.59	3.63	3.72	3.68	3.86
Nonmetro	2.90	3.01	2.99	3.06	3.05	3.03

--Continued

Appendix table 3

**Average dairy prices in major U.S. markets, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Jumbo eggs (Dozen)</b>						
Chicago	1.20	1.25	1.29	1.35	1.25	1.48
Los Angeles	2.11	1.65	1.49	1.62	1.43	1.79
New York	1.45	1.35	1.33	1.36	1.37	1.54
San Francisco	1.91	1.87	1.86	1.83	2.06	2.10
Atlanta	1.12	1.01	1.09	1.13	1.07	1.28
Philadelphia	1.23	0.93	1.09	1.22	1.26	1.35
Baltimore-Washington	1.23	1.09	1.13	1.10	1.14	1.29
San Antonio	1.11	1.10	0.93	1.06	1.19	1.33
Nonmetro	1.14	0.92	1.01	1.03	1.03	1.20
<b>Large eggs (Dozen)</b>						
Chicago	0.94	0.82	0.89	0.92	0.91	1.15
Los Angeles	1.53	1.40	1.39	1.54	1.59	1.68
New York	1.35	1.27	1.30	1.37	1.35	1.56
San Francisco	1.36	1.29	1.41	1.47	1.68	2.00
Atlanta	0.96	0.86	0.91	0.99	0.94	1.11
Philadelphia	1.03	0.93	0.98	0.98	1.00	1.16
Baltimore-Washington	1.01	0.90	0.91	0.93	0.96	1.17
San Antonio	0.99	0.95	0.93	0.97	0.94	1.08
Nonmetro	0.94	0.86	0.85	0.90	0.91	1.09
<b>Low-fat milk (Gallon)</b>						
Chicago	2.17	2.35	2.34	2.28	2.16	2.14
Los Angeles	2.61	2.69	2.37	2.66	2.16	2.32
New York	2.46	2.61	2.52	2.58	2.49	2.50
San Francisco	2.77	2.49	2.45	2.64	2.47	2.60
Atlanta	2.49	2.68	2.80	2.85	2.73	2.68
Philadelphia	2.36	2.49	2.51	2.74	2.70	2.75
Baltimore-Washington	2.44	2.45	2.44	2.62	2.56	2.51
San Antonio	2.28	2.41	2.61	2.77	2.59	2.74
Nonmetro	2.32	2.48	2.48	2.51	2.40	2.38
<b>Margarine (Pound)</b>						
Chicago	0.85	0.85	0.87	0.93	0.78	0.83
Los Angeles	0.88	0.96	0.94	0.97	0.97	0.99
New York	1.11	0.96	0.96	0.96	0.96	1.07
San Francisco	1.12	1.00	0.97	1.11	0.99	1.09
Atlanta	0.75	0.79	0.72	0.75	0.69	0.77
Philadelphia	0.86	0.97	0.91	0.95	0.89	0.92
Baltimore-Washington	0.92	0.90	0.91	0.94	0.86	0.88
San Antonio	0.76	0.74	0.71	0.73	0.67	0.64
Nonmetro	0.82	0.80	0.80	0.79	0.75	0.74
<b>Medium eggs (Dozen)</b>						
Chicago	0.88	0.75	0.80	0.81	0.68	0.90
Los Angeles	1.21	1.06	1.09	1.27	1.08	1.38
New York	1.25	0.83	0.86	0.93	0.93	1.10
San Francisco	1.62	1.73	1.16	1.45	1.30	1.42
Atlanta	0.70	0.67	0.71	0.74	0.63	0.83
Philadelphia	0.74	0.74	0.85	0.88	0.84	0.99
Baltimore-Washington	0.74	0.69	0.78	0.76	0.74	0.96
San Antonio	0.79	0.75	0.78	0.87	0.78	0.90
Nonmetro	0.69	0.63	0.66	0.70	0.68	0.89

--Continued

Appendix table 3

**Average dairy prices in major U.S. markets, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Mozzarella cheese (Pound)</b>						
Chicago	3.00	3.26	3.43	3.41	3.73	3.80
Los Angeles	4.05	4.06	3.89	4.01	4.47	4.22
New York	2.79	2.89	2.78	2.99	2.95	3.05
San Francisco	3.61	4.07	3.76	4.49	4.65	4.92
Atlanta	3.23	3.65	3.60	3.48	3.49	3.40
Philadelphia	2.97	2.81	3.28	3.39	3.27	3.12
Baltimore-Washington	3.05	3.32	3.78	3.73	3.50	3.72
San Antonio	3.24	3.59	3.28	3.92	3.65	3.73
Nonmetro	3.31	3.40	3.24	3.40	3.45	3.52
<b>Muenster cheese (Pound)</b>						
Chicago	3.50	3.89	3.47	3.88	4.02	4.44
Los Angeles	4.30	4.87	6.96	5.54	5.98	5.78
New York	4.01	4.26	4.24	4.56	4.94	4.79
San Francisco	NA	NA	NA	7.72	5.81	5.20
Atlanta	3.62	3.53	3.16	3.58	5.05	4.83
Philadelphia	6.78	2.81	3.99	4.13	4.05	3.85
Baltimore-Washington	4.13	3.91	4.34	4.77	5.44	5.59
San Antonio	6.38	6.30	NA	4.02	4.85	5.35
Nonmetro	3.67	3.53	3.42	3.62	4.11	4.21
<b>Ricotta cheese (Pound)</b>						
Chicago	1.77	1.91	1.95	1.99	1.99	2.02
Los Angeles	2.15	2.17	2.08	2.33	2.35	2.29
New York	1.45	1.53	1.52	1.59	1.62	1.62
San Francisco	2.07	2.44	2.42	2.56	2.65	2.66
Atlanta	1.61	1.65	1.66	1.70	1.68	1.68
Philadelphia	1.47	1.53	1.58	1.65	1.66	1.60
Baltimore-Washington	1.70	1.63	1.82	1.86	1.80	1.88
San Antonio	2.08	2.29	2.08	2.10	2.11	1.86
Nonmetro	1.80	1.84	1.79	1.84	1.92	1.80
<b>Sherbet (Half-Gallon)</b>						
Chicago	2.84	2.76	2.99	3.29	3.30	3.34
Los Angeles	2.90	3.04	2.85	3.31	3.04	3.11
New York	3.02	3.10	3.46	3.08	3.07	3.23
San Francisco	2.63	2.73	3.03	3.37	3.67	3.60
Atlanta	2.16	2.25	2.38	2.51	2.61	2.67
Philadelphia	2.93	3.06	3.29	3.39	2.99	3.30
Baltimore-Washington	3.20	3.40	3.73	3.82	3.70	3.42
San Antonio	3.24	3.89	3.43	3.82	3.81	3.74
Nonmetro	2.53	2.51	2.57	2.68	2.75	2.76
<b>Skim milk (Gallon)</b>						
Chicago	2.25	2.43	2.43	2.28	2.15	2.2
Los Angeles	2.40	2.32	2.20	2.32	1.99	1.99
New York	2.58	2.65	2.54	2.52	2.53	2.55
San Francisco	2.22	2.24	2.13	2.35	2.15	2.22
Atlanta	2.49	2.62	2.71	2.75	2.65	2.69
Philadelphia	2.36	2.51	2.41	2.59	2.56	2.61
Baltimore-Washington	2.31	2.32	2.38	2.47	2.46	2.43
San Antonio	2.22	2.38	2.57	2.73	2.52	2.64
Nonmetro	2.10	2.27	2.26	2.28	2.25	2.22

--Continued

Appendix table 3

**Average dairy prices in major U.S. markets, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Swiss cheese (Pound)</b>						
Chicago	4.03	4.47	4.31	4.26	4.41	4.12
Los Angeles	4.14	4.17	4.44	5.01	4.58	4.83
New York	4.32	4.78	4.55	4.35	4.95	5.11
San Francisco	4.82	5.04	4.16	4.19	4.96	4.85
Atlanta	4.12	4.27	4.08	4.19	4.80	4.34
Philadelphia	4.03	4.63	4.23	4.17	4.00	4.72
Baltimore-Washington	4.04	4.16	4.08	4.12	4.40	4.49
San Antonio	4.53	4.56	3.63	4.57	4.35	4.83
Nonmetro	4.38	4.12	4.48	4.18	4.39	4.11
<b>Whole milk (Gallon)</b>						
Chicago	2.35	2.56	2.69	2.47	2.31	2.20
Los Angeles	2.70	2.86	2.43	2.92	2.18	2.32
New York	2.53	2.77	2.69	2.70	2.61	2.68
San Francisco	2.73	2.48	2.50	2.92	2.57	2.72
Atlanta	2.54	2.68	2.75	2.85	2.77	2.77
Philadelphia	2.60	2.69	2.59	2.92	2.82	2.84
Baltimore-Washington	2.52	2.62	2.61	2.76	2.65	2.65
San Antonio	2.29	2.45	2.66	2.86	2.68	2.79
Nonmetro	2.48	2.56	2.58	2.67	2.58	2.60
<b>Yogurt (6 ounces)</b>						
Chicago	0.51	0.49	0.50	0.51	0.54	0.52
Los Angeles	0.47	0.47	0.50	0.51	0.52	0.52
New York	0.51	0.52	0.54	0.53	0.56	0.55
San Francisco	0.49	0.49	0.52	0.55	0.59	0.61
Atlanta	0.47	0.46	0.47	0.46	0.50	0.47
Philadelphia	0.47	0.46	0.48	0.50	0.51	0.50
Baltimore-Washington	0.49	0.49	0.49	0.49	0.54	0.54
San Antonio	0.44	0.42	0.41	0.41	0.48	0.46
Nonmetro	0.46	0.46	0.47	0.46	0.49	0.48
<b>Yogurt shakes (16 ounces)</b>						
Chicago	NA	NA	2.30	2.36	2.19	2.09
Los Angeles	NA	NA	2.18	2.16	1.92	2.10
New York	NA	NA	2.38	2.51	2.72	2.14
San Francisco	NA	NA	2.35	2.53	2.67	2.53
Atlanta	NA	NA	2.21	2.16	2.16	2.00
Philadelphia	NA	NA	2.01	2.09	2.15	1.85
Baltimore-Washington	NA	NA	2.19	2.30	2.10	1.98
San Antonio	NA	NA	2.02	2.28	1.70	1.84
Nonmetro	NA	NA	2.20	2.15	2.16	1.94

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Appendix table 4

**Average random-weight cheese prices in major U.S. markets,  
1998-2003**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound)</b>						
Chicago	2.90	4.38	3.37	5.06	4.40	4.19
Los Angeles	2.85	3.93	4.24	3.15	3.65	3.98
New York	2.86	3.89	3.71	4.03	3.88	4.23
San Francisco	NA	NA	4.56	4.07	4.41	4.74
Atlanta	2.80	4.08	4.18	3.88	4.43	4.39
Philadelphia	2.90	3.33	3.30	3.63	3.71	3.76
Baltimore-Washington	2.87	3.78	3.61	3.76	4.09	4.36
San Antonio	2.71	3.33	2.73	2.68	3.59	2.98
Nonmetro	2.80	3.10	3.38	3.83	4.08	3.97
<b>Cheddar cheese (Pound)</b>						
Chicago	3.09	4.31	4.14	3.65	4.00	3.45
Los Angeles	4.20	3.23	3.31	3.37	4.00	3.61
New York	4.16	3.79	3.74	4.20	4.19	3.95
San Francisco	4.06	3.97	3.69	3.98	3.93	4.09
Atlanta	3.96	3.28	3.13	3.25	3.27	3.58
Philadelphia	2.86	3.77	3.83	3.89	4.07	4.18
Baltimore-Washington	3.44	3.43	3.69	3.79	4.16	4.41
San Antonio	3.70	3.27	3.00	3.57	3.70	3.83
Nonmetro	3.98	3.32	3.25	3.47	3.48	3.39
<b>Colby cheese (Pound)</b>						
Chicago	2.81	3.73	3.66	3.61	4.16	3.82
Los Angeles	3.13	3.33	3.56	3.18	3.28	3.55
New York	4.97	4.34	5.10	4.35	4.06	4.53
San Francisco	4.06	3.05	1.78	3.38	3.44	2.80
Atlanta	3.19	3.66	3.26	3.63	3.85	3.36
Philadelphia	3.98	3.57	3.58	3.50	2.91	3.70
Baltimore-Washington	2.89	3.48	3.16	3.07	3.94	3.77
San Antonio	3.29	2.86	2.56	2.90	3.28	3.65
Nonmetro	2.93	3.12	2.86	3.37	3.29	3.30
<b>Cream cheese (Pound)</b>						
Chicago	2.35	3.57	3.49	3.05	2.96	3.23
Los Angeles	2.37	3.21	3.28	3.99	5.01	4.96
New York	4.08	5.22	4.22	4.26	4.43	4.35
San Francisco	8.33	3.52	2.60	3.19	3.53	4.29
Atlanta	1.85	1.81	NA	NA	NA	NA
Philadelphia	NA	NA	NA	NA	NA	NA
Baltimore-Washington	NA	4.02	4.72	3.91	3.74	3.29
San Antonio	NA	3.42	3.58	3.02	2.79	4.65
Nonmetro	1.88	2.95	3.30	3.34	2.26	3.97
<b>Mozzarella cheese (Pound)</b>						
Chicago	2.57	3.52	2.99	2.96	2.99	3.24
Los Angeles	3.12	3.71	3.71	3.63	3.84	3.50
New York	3.07	4.25	5.02	4.83	5.10	4.83
San Francisco	2.83	4.06	3.55	3.81	4.04	4.28
Atlanta	3.03	3.61	3.48	3.82	3.25	4.13
Philadelphia	2.97	2.67	3.81	4.50	3.81	3.42
Baltimore-Washington	2.87	3.25	3.22	3.67	4.08	4.07
San Antonio	2.86	2.75	3.66	3.97	4.26	3.43
Nonmetro	2.67	2.97	2.96	3.13	3.09	3.29

--Continued

Appendix table 4

**Average random-weight cheese prices in major U.S. markets,  
1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Muenster cheese (Pound)</b>						
Chicago	1.58	4.25	4.31	4.70	3.64	3.63
Los Angeles	2.70	3.52	4.55	3.62	3.89	4.40
New York	2.56	4.05	3.91	3.79	4.30	4.19
San Francisco	3.76	1.60	4.54	4.66	4.27	3.94
Atlanta	1.65	4.13	3.66	3.96	4.60	4.20
Philadelphia	1.61	3.56	3.60	3.59	3.79	3.61
Baltimore-Washington	1.96	3.81	3.99	4.16	4.51	4.62
San Antonio	2.52	3.88	3.78	4.13	3.75	3.86
Nonmetro	2.13	3.77	3.72	3.01	3.37	3.54
<b>Swiss cheese (Pound)</b>						
Chicago	4.88	4.66	4.60	5.02	4.73	4.60
Los Angeles	4.98	4.14	5.08	4.53	4.90	5.15
New York	5.02	4.70	4.51	4.75	4.58	4.90
San Francisco	4.95	5.04	3.33	4.94	5.45	5.30
Atlanta	5.26	4.79	4.63	5.20	5.47	5.04
Philadelphia	4.20	4.37	4.64	4.75	4.84	4.93
Baltimore-Washington	4.29	4.62	4.49	4.62	5.02	5.21
San Antonio	4.77	4.67	4.44	4.64	4.45	4.46
Nonmetro	4.95	4.52	4.15	4.59	4.56	4.74

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Appendix table 5

**Average dairy prices by income group, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound)</b>						
Income < \$25,000	2.64	2.83	2.67	2.74	2.66	2.60
\$25,000-\$49,999	2.72	2.84	2.86	2.81	2.70	2.55
\$50,000-\$69,999	2.76	2.89	2.85	2.82	2.81	2.76
Income > \$70,000	2.98	3.01	2.97	3.07	2.93	2.94
<b>Butter (Pound)</b>						
Income < 25,000	2.56	2.44	2.13	2.64	2.16	2.02
\$25,000-\$49,999	2.60	2.32	2.14	2.67	2.21	2.07
\$50,000-\$69,999	2.60	2.41	2.23	2.69	2.27	2.13
Income > \$70,000	2.78	2.47	2.30	2.84	2.45	2.30
<b>Cheddar cheese (Pound)</b>						
Income < 25,000	3.46	3.60	3.11	3.44	3.46	3.57
\$25,000-\$49,999	3.63	3.71	3.54	3.54	3.53	3.52
\$50,000-\$69,999	3.43	3.75	3.50	3.61	3.57	3.65
Income > \$70,000	3.84	4.06	3.80	3.84	3.80	3.90
<b>Colby cheese (Pound)</b>						
Income < 25,000	3.37	3.11	3.10	3.51	3.20	3.30
\$25,000-\$49,999	2.98	3.37	3.22	3.24	3.40	3.12
\$50,000-\$69,999	3.11	3.27	2.98	2.96	2.92	3.29
Income > \$70,000	3.22	3.59	3.21	3.46	3.52	3.19
<b>Cottage cheese (Pound)</b>						
Income < 25,000	1.40	1.47	1.49	1.54	1.48	1.47
\$25,000-\$49,999	1.43	1.50	1.49	1.50	1.54	1.49
\$50,000-\$69,999	1.43	1.51	1.52	1.53	1.51	1.48
Income > \$70,000	1.48	1.55	1.59	1.61	1.62	1.58
<b>Cream cheese (Pound)</b>						
Income < 25,000	2.45	2.62	2.48	2.55	2.46	2.48
\$25,000-\$49,999	2.41	2.53	2.45	2.52	2.52	2.47
\$50,000-\$69,999	2.42	2.60	2.49	2.59	2.50	2.48
Income > \$70,000	2.63	2.72	2.66	2.72	2.66	2.66
<b>Extra large eggs (Dozen)</b>						
Income < 25,000	1.11	1.01	0.94	0.98	1.00	1.20
\$25,000-\$49,999	1.06	0.97	0.99	1.01	1.03	1.20
\$50,000-\$69,999	1.08	0.99	0.99	0.99	1.00	1.22
Income > \$70,000	1.18	1.09	1.09	1.14	1.11	1.28
<b>Farmers cheese (Pound)</b>						
Income < 25,000	3.53	3.38	4.35	3.93	3.84	4.25
\$25,000-\$49,999	4.93	4.83	3.67	3.95	4.09	5.14
\$50,000-\$69,999	4.54	3.99	4.37	3.79	4.16	5.11
Income > \$70,000	3.68	3.15	3.79	3.89	4.77	5.39
<b>Frozen yogurt (Half-Gallon)</b>						
Income < 25,000	3.16	3.95	3.13	3.44	3.38	3.15
\$25,000-\$49,999	3.41	3.41	3.26	3.57	3.44	3.16
\$50,000-\$69,999	3.09	3.34	3.37	3.51	3.16	3.32
Income > \$70,000	3.38	3.43	4.06	4.08	4.87	4.32
<b>Ice cream (Half-Gallon)</b>						
Income < 25,000	3.02	3.02	3.02	3.25	3.09	3.23
\$25,000-\$49,999	2.99	3.15	3.10	3.24	3.26	3.14
\$50,000-\$69,999	3.08	3.25	3.17	3.34	3.32	3.16
Income > \$70,000	3.35	3.41	3.54	3.60	3.67	3.62

--Continued

Appendix table 5

**Average dairy prices by income group, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Jumbo eggs (Dozen)</b>						
Income < 25,000	1.18	1.10	1.07	1.14	1.17	1.35
\$25,000-\$49,999	1.18	1.01	1.07	1.13	1.10	1.27
\$50,000-\$69,999	1.24	1.11	1.10	1.07	1.08	1.32
Income > \$70,000	1.32	1.26	1.24	1.22	1.14	1.46
<b>Large eggs (Dozen)</b>						
Income < 25,000	0.98	0.90	0.90	0.92	0.92	1.10
\$25,000-\$49,999	1.00	0.90	0.92	0.95	0.96	1.14
\$50,000-\$69,999	1.00	0.92	0.92	0.95	0.99	1.17
Income > \$70,000	1.1	0.98	1.04	1.06	1.07	1.29
<b>Low-fat milk (Gallon)</b>						
Income < 25,000	2.34	2.46	2.41	2.43	2.33	2.34
\$25,000-\$49,999	2.30	2.48	2.41	2.50	2.34	2.38
\$50,000-\$69,999	2.32	2.47	2.41	2.52	2.35	2.36
Income > \$70,000	2.36	2.54	2.44	2.54	2.40	2.40
<b>Margarine (Pound)</b>						
Income < 25,000	0.79	0.78	0.76	0.75	0.70	0.74
\$25,000-\$49,999	0.82	0.84	0.83	0.83	0.79	0.80
\$50,000-\$69,999	0.87	0.87	0.87	0.90	0.84	0.86
Income > \$70,000	0.92	0.92	0.95	0.98	0.89	0.94
<b>Medium eggs (Dozen)</b>						
Income < 25,000	0.77	0.70	0.73	0.77	0.70	0.94
\$25,000-\$49,999	0.77	0.68	0.68	0.78	0.72	0.91
\$50,000-\$69,999	0.72	0.65	0.75	0.73	0.71	0.97
Income > \$70,000	0.80	0.75	0.79	0.84	0.75	0.95
<b>Mozzarella cheese (Pound)</b>						
Income < 25,000	3.08	3.23	3.33	3.31	3.27	3.34
\$25,000-\$49,999	3.16	3.22	3.23	3.26	3.50	3.39
\$50,000-\$69,999	3.19	3.19	3.36	3.44	3.62	3.59
Income > \$70,000	3.33	3.48	3.27	3.38	3.61	3.56
<b>Muenster cheese (Pound)</b>						
Income < 25,000	3.40	3.98	3.09	3.43	4.14	4.48
\$25,000-\$49,999	3.72	3.83	3.65	4.09	4.80	4.58
\$50,000-\$69,999	3.55	3.89	3.36	4.00	5.43	4.73
Income > \$70,000	3.81	3.70	3.99	4.36	4.85	5.48
<b>Ricotta cheese (Pound)</b>						
Income < 25,000	1.67	1.75	1.67	1.85	1.85	1.71
\$25,000-\$49,999	1.66	1.71	1.74	1.75	1.72	1.71
\$50,000-\$69,999	1.58	1.65	1.87	1.73	1.77	1.81
Income > \$70,000	1.67	1.70	1.63	1.73	1.79	1.80
<b>Sherbet (Half-Gallon)</b>						
Income < 25,000	2.77	2.73	2.79	2.71	2.80	2.91
\$25,000-\$49,999	2.62	2.56	2.77	2.79	2.72	2.83
\$50,000-\$69,999	2.49	2.93	2.74	3.00	3.12	2.97
Income > \$70,000	2.76	3.01	2.86	2.88	3.23	3.00
<b>Skim milk (Gallon)</b>						
Income < 25,000	2.25	2.46	2.42	2.39	2.28	2.23
\$25,000-\$49,999	2.25	2.37	2.35	2.38	2.29	2.29
\$50,000-\$69,999	2.21	2.39	2.36	2.38	2.25	2.21
Income > \$70,000	2.28	2.37	2.35	2.38	2.27	2.26

--Continued



Appendix table 5

**Average dairy prices by income group, 1998-2003, continued**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>Swiss cheese (Pound)</b>						
Income < 25,000	4.21	4.04	4.29	4.24	4.47	4.30
\$25,000-\$49,999	4.36	4.27	4.20	4.16	4.42	4.39
\$50,000-\$69,999	4.30	4.12	4.31	4.19	4.28	4.25
Income > \$70,000	4.20	4.12	4.07	4.40	4.64	4.28
<b>Whole milk (Gallon)</b>						
Income < 25,000	2.59	2.69	2.64	2.70	2.49	2.59
\$25,000-\$49,999	2.49	2.66	2.58	2.73	2.60	2.59
\$50,000-\$69,999	2.53	2.66	2.64	2.73	2.64	2.63
Income > \$70,000	2.48	2.63	2.53	2.77	2.55	2.61
<b>Yogurt (6 ounces)</b>						
Income < 25,000	0.44	0.44	0.46	0.46	0.47	0.48
\$25,000-\$49,999	0.47	0.46	0.46	0.48	0.49	0.47
\$50,000-\$69,999	0.46	0.47	0.48	0.49	0.52	0.50
Income > \$70,000	0.50	0.50	0.51	0.52	0.54	0.52
<b>Yogurt shakes (16 ounces)</b>						
Income < 25,000	NA	2.18	2.17	1.78	2.02	1.78
\$25,000-\$49,999	NA	2.66	2.20	2.22	2.18	1.89
\$50,000-\$69,999	NA	2.83	2.14	2.28	2.09	2.01
Income > \$70,000	NA	2.55	2.35	2.16	2.29	2.04

NA = Not available.

Source: ERS calculations using ACNielsen Homescan data.

Appendix table 6

**Average random-weight cheese prices by income group, 1998-2003**

Product	1998	1999	2000	2001	2002	2003
<i>Dollars</i>						
<b>American cheese (Pound)</b>						
Income <\$25,000	2.99	3.32	3.15	3.41	3.49	3.43
\$25,000-\$49,999	2.88	3.57	3.37	3.46	3.85	3.90
\$50,000-\$69,999	2.59	3.62	3.77	3.94	3.84	3.83
Income > \$70,000	2.86	3.97	3.61	3.95	3.92	4.08
<b>Cheddar cheese (Pound)</b>						
Income <\$25,000	3.70	3.30	3.15	3.29	3.33	3.19
\$25,000-\$49,999	3.95	3.23	3.34	3.34	3.47	3.61
\$50,000-\$69,999	4.05	3.36	3.36	3.40	3.74	3.51
Income > \$70,000	3.91	3.52	3.60	3.96	3.98	4.03
<b>Colby cheese (Pound)</b>						
Income <\$25,000	3.15	3.12	2.71	3.08	3.08	2.90
\$25,000-\$49,999	3.24	3.06	3.30	3.54	3.26	3.38
\$50,000-\$69,999	3.32	3.53	3.31	3.58	3.58	3.15
Income > \$70,000	3.15	3.65	3.27	3.89	3.69	3.60
<b>Cream cheese (Pound)</b>						
Income <\$25,000	3.89	4.29	2.71	3.50	3.20	3.30
\$25,000-\$49,999	2.00	3.08	3.41	3.53	3.33	3.38
\$50,000-\$69,999	1.82	3.62	4.07	3.77	2.32	3.60
Income > \$70,000	1.93	4.02	3.65	4.05	3.74	5.11
<b>Mozzarella cheese (Pound)</b>						
Income <\$25,000	2.90	2.94	2.94	3.43	3.08	3.26
\$25,000-\$49,999	2.93	3.33	3.26	3.39	3.52	3.92
\$50,000-\$69,999	3.20	3.04	3.42	3.91	4.00	3.87
Income > \$70,000	3.19	4.03	3.48	3.91	4.40	4.07
<b>Muenster cheese (Pound)</b>						
Income <\$25,000	2.58	4.02	3.82	3.57	3.59	3.61
\$25,000-\$49,999	2.29	3.94	3.98	3.65	3.69	3.65
\$50,000-\$69,999	1.72	3.71	3.34	4.01	4.12	3.87
Income > \$70,000	1.96	3.99	3.84	4.08	3.76	3.86
<b>Swiss cheese (Pound)</b>						
Income <\$25,000	4.48	4.42	3.83	4.07	4.27	4.27
\$25,000-\$49,999	4.78	4.43	4.49	4.72	4.65	4.62
\$50,000-\$69,999	4.57	4.69	4.69	4.71	4.76	4.45
Income > \$70,000	5.09	4.74	4.77	4.87	4.99	5.22

Source: ERS calculations using ACNielsen Homescan data.