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# Food-at-Home Expenditures: Comparing Commercial Household Scanner Data From IRI and Government Survey Data

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## Abstract

USDA's Economic Research Service (ERS) purchased proprietary household and retail scanner data from market research firm IRI for use in economic research. In a series of studies, ERS and collaborators evaluated the statistical properties of the IRI scanner data for the years 2008 to 2012. This report compares the IRI Consumer Network household panel data to nationally representative Government survey data and describes implications for using the IRI data in analyses. The results show that expenditures in IRI are lower than those in the Consumer Expenditure Survey (CE) and the National Food Acquisition and Purchase Survey (FoodAPS) for all food categories across all years.

**Keywords:** IRI, Consumer Network, scanner data, food at home, food expenditures

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## What Is the Issue?

USDA's Economic Research Service (ERS) purchased proprietary household and retail scanner data from market research firm IRI. These data are a valuable resource for food economics research, but it is important for researchers to understand the coverage and representativeness of these data. Previous ERS research examined the survey methodology and the representativeness of the demographic makeup of the IRI Consumer Network household scanner data. This report extends that research by comparing the IRI Consumer Network household data to nationally representative Government survey data and describing implications for using the data in food economics research. This report examines the IRI data for 2008 to 2012—the initial years of data obtained by ERS.

## What Did the Study Find?

Across 18 food-at-home (FAH) categories, average weekly household expenditures in the IRI Consumer Network survey were lower than those in the Consumer Expenditure Survey (CE), conducted by the U.S. Department of Labor's Bureau of Labor Statistics, and in USDA's National Household Food Acquisition and Purchase Survey (FoodAPS), with the magnitude of the differences varying among categories, over time, and by household demographic factors.

- In the IRI Consumer Network, households reported spending less per week on food categories containing unpackaged or random-weight items, including fresh fruits, fresh vegetables, and fish and seafood. For example, in 2012, average weekly expenditures on fresh vegetables in the IRI Consumer Network were 47 percent of those in CE and 45 percent of those in FoodAPS.
- Expenditures in IRI were more comparable for packaged and Universal Product Code (UPC)-labeled products, such as sugar and other sweets, other dairy products, and miscellaneous foods. In 2012, average weekly expenditures on sugar and other sweets in the IRI Consumer Network were 90 percent of those in CE and 86 percent of those in FoodAPS.
- Expenditures in IRI were consistently lower than in CE for each year in the 5-year study period, but the differences varied in size across years. Some differences could be meaningful in analyses, while others are economically insignificant. For example,

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poultry expenditures in IRI ranged from 66 percent of CE expenditures in 2008 to 76 percent in 2010, a 10-percent difference; while IRI expenditures on fresh milk and cream were between 69 and 72 percent of CE expenditures each year, a 3-percent disparity.

- Expenditures in IRI were lower than in CE for some demographic groups, and the size of the differences varied across groups. In particular, as income and household size increased, households in IRI showed smaller corresponding increases in expenditures than similar households in CE.

The results suggest that IRI encounters more difficulty capturing purchases of unpackaged or random-weight items than packaged products. Differences in each survey's design and length of reporting period also likely contribute to differences in reported expenditures. The shorter reference periods for the FoodAPS and CE surveys appear to lead to a more complete record of household food expenditures, although the panel design and level of detail contained in the IRI Consumer Network confer other benefits for economic research. Researchers should be aware of these differences when using the IRI Consumer Network for studies focusing on such topics as fresh fruits and vegetables or on particular demographic populations, and for those that draw conclusions about the overall composition of households' purchases or diets. Understanding the differences in data coverage, the nature of reported differences, and the advantages and disadvantages of using the IRI Consumer Network will allow researchers to design suitable studies and draw appropriate conclusions when using these data for food economics research.

## **How Was the Study Conducted?**

Researchers from ERS and RTI International compared household expenditures from IRI's Consumer Network to expenditures from the CE and FoodAPS surveys. Food products from IRI and FoodAPS were matched to 18 CE food categories to allow consistent comparisons across datasets. The researchers also determined the appropriate method for calculating mean and variance estimates in IRI, taking into account the survey design. Mean and variance estimates for weekly household expenditures on the 18 food categories were calculated for each survey.

# Food-at-Home Expenditures: Comparing Commercial Household Scanner Data From IRI and Government Survey Data

## Introduction

Proprietary commercial food-purchase data are an increasingly integral resource for food economics research. These data, collected through household panels and retail store scanners, have applications in USDA research projects and in policy, program, and regulatory analyses. They are an important component of research projects studying food demand, food prices, food choices, and diet quality. USDA's Economic Research Service (ERS) purchased household and retail scanner data from market research firm IRI for the years 2008 to 2012,<sup>1</sup> but little information was available about the statistical properties and representativeness of these data.

This study is one of a series examining the characteristics and properties of the IRI data and establishing necessary public documentation on the datasets. The studies will help researchers determine whether the data are suitable for testing certain study hypotheses and facilitate the proper interpretation of empirical results. In an initial ERS report on the IRI data, Muth et al. (2016) examined IRI's survey methodology and the representativeness of the demographic makeup of the household panel. This report builds on that work by exploring the IRI household-based scanner data, called Consumer Network, in greater detail.

In this study, the IRI household data are compared to nationally representative Government surveys with known sampling designs. Household expenditures from the IRI Consumer Network household panel are compared to expenditures from the Bureau of Labor Statistics' Consumer Expenditures Survey (CE) and USDA's National Household Food Acquisition and Purchase Survey (FoodAPS) for 18 food product categories. This report also documents the methodology for calculating mean and variance estimates from the IRI data, taking into account the survey design. Results of this study can aid researchers in understanding the properties and coverage of the IRI data relative to other datasets when using the data for economic and policy research.<sup>2</sup>

## Literature Review

Studies have compared household scanner data with data from other sources to understand differences in reporting and other characteristics of households. A set of studies, similar to these examining the IRI data, evaluated the Nielsen Homescan data purchased by ERS for 1998-2010. Zhen et al. (2009) found discrepancies in reported expenditures between Nielsen Homescan and CE for 2002-05, with the largest differences in unpackaged, random-weight foods. Einav, Leibtag, and Nevo (2010) compared purchase transactions recorded in Nielsen Homescan to a large grocery

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<sup>1</sup> ERS's initial purchase of data covered 2008-12, with the option to acquire updates for subsequent years of data through 2016. ERS commissioned five studies to examine the statistical properties of the IRI data using these initial 2008-12 data. As of publication, data for 2008-15 were available for use, and ERS will receive data updates through at least 2016.

<sup>2</sup> In another forthcoming study, the authors compare whether differences in expenditures between IRI and CE matter in a food demand system.

chain's database of the same households and found the degree of measurement error in Homescan prices to be similar to those identified in other datasets commonly used by social scientists. Comparing results from two choice-based conjoint experiments, Lusk and Brooks (2011) found IRI Consumer Network and Nielsen Homescan respondents to be slightly more price sensitive than a random sample of the U.S. population. Finally, Boonsaeng and Carpio (2014) estimated a structural food demand system for eight food-at-home (FAH) categories using Homescan and the CE Diary Survey (the weekly diary component of CE) from 2002 to 2006 and found that estimated demand curves based on Homescan are more price elastic than those based on CE. In the United Kingdom, Leicester and Oldfield (2009) compared expenditures on 13 food and beverage categories in the 2005 TNS Worldpanel household scanner data to the 2005 UK Expenditure and Food Survey (EFS). The ratio of TNS expenditures to EFS expenditures ranged between 0.576 for alcohol to 0.859 for butter, oils, and fats. On average, TNS expenditures are about three-quarters of those reported in EFS.

Other studies have compared expenditure estimates across Government datasets, including those from the CE Diary Survey. Bee, Meyer, and Sullivan (2012) compared expenditures in the CE Diary Survey and the CE Quarterly Interview Survey (the quarterly recall component of CE) separately with Personal Consumption Expenditure (PCE) data from the U.S. Department of Commerce, Bureau of Economic Analysis National Income and Product Accounts. The authors found aggregate FAH expenditures in the CE Diary Survey to be lower than those in the CE Quarterly Interview Survey. The ratio of Diary Survey FAH expenditures to those in PCE ranged between 0.66 and 0.73 in 1986-2010 (Bee et al., 2012, appendix table 2). The corresponding ratio for the Interview Survey was between 0.79 and 0.90 for the same period. The lower aggregate FAH expenditures reported in the Diary Survey can be partly attributed to the higher recordkeeping burden on respondents compared to participants in the recall-based Interview Survey. Indeed, much higher proportions of Diary Survey respondents reported zero expenditures at the category level than those in the Interview Survey. In addition, reported expenditures are typically lower in the second week of the 2-week Diary Survey. These results are consistent with expenditure surveys in other developed countries (Browning, Crossley, and Winter, 2014). The authors found that the high respondent burden of recording purchases in diaries may lead to more underreporting in diary surveys, compared to the level of underreporting from memory issues in recall surveys.

Clay et al. (2016) compared total FAH spending estimates from the IRI Consumer Network, FoodAPS, CE, and the National Health and Nutrition Examination Survey (a program of the National Center for Health Statistics) by household size, household composition, and income group for 2012. They found expenditures in IRI were significantly lower than the other surveys for most types of households. Overall, mean FAH spending in IRI was about 26 percent lower than FAH expenditures in FoodAPS, with greater differences among larger and higher income households. However, that study did not examine differences across types of foods or over time.

Overall, previous studies on commercial household scanner data have shown that estimates of expenditures from scanner data are consistently lower than those from Government surveys. This report results in similar findings for the IRI Consumer Network data and describes the nature of these differences by food category. With these findings, researchers using the IRI data can design appropriate studies that account for the coverage, characteristics, and survey design of the data.



## Data Description and Methods

This section describes the datasets and methods used to compare food expenditures across IRI, CE, and FoodAPS for 18 FAH categories. For each dataset, it explains the data files and methods used to compute weighted mean weekly expenditures and standard errors for each of the 18 food categories. The weighted weekly mean expenditures are estimates of the per household mean food expenditures per week for the U.S. population, excluding Alaska and Hawaii.

Limited public documentation is available on the design and statistical properties of the IRI Consumer Network survey; therefore, this report also documents the appropriate methods for calculating total and mean expenditures and standard errors in IRI, given the survey design. For the CE and FoodAPS surveys, detailed documentation describing the appropriate methods for computing standard errors is publicly available from the Bureau of Labor Statistics (BLS) and ERS, respectively, so those methods are not described in detail in this report.<sup>3</sup>

### Mapping Food Categories Among Datasets

To allow equivalent comparisons of expenditures across datasets, FAH products in IRI and FoodAPS were mapped to 18 food categories from the CE survey. Edible products in the IRI product dictionary were identified by Universal Product Code (UPC) and grouped into 575 IRI-designated food categories. Each IRI category was matched to the corresponding CE food category (appendix table 1). Items in FoodAPS were also grouped into CE categories using a combination of identifying item information, including IRI categories, ERS food groups, and USDA food categories and food codes.

The number of unique IRI UPCs is highest for the miscellaneous foods, bakery products, sugar and other sweets, and nonalcoholic beverages categories (table 1). This is a factor of both the quantity of products households purchase in these categories and the variability of products within the categories. For instance, a comparable product may be offered by multiple brands in many sizes and flavors, all combinations of which would have a distinct UPC.

Table 1

**Mapping IRI UPCs to Consumer Expenditure Survey (CE) food categories**

| CE category                | Number of Unique IRI UPCs | Percent of IRI UPCs | Types of products   |
|----------------------------|---------------------------|---------------------|---|
| Cereal and cereal products | 36,552                    | 5.7                 | Baking mixes, dry noodles, dry rice, and breakfast cereals                |
| Bakery products            | 87,370                    | 13.6                | Fresh, refrigerated, and frozen baked goods; cookies, crackers, and bread |
| Beef                       | 2,895                     | 0.5                 | Refrigerated and frozen beef  |
| Pork                       | 10,561                    | 1.6                 | Refrigerated, frozen, and canned pork, ham, and pork sausage              |
| Other meats                | 9,855                     | 1.5                 | Refrigerated, frozen, and shelf-stable deli meats and frankfurters        |

—continued

<sup>3</sup> Documentation for the CE Survey is available on the BLS website under “Consumer Expenditures and Income” in the *BLS Handbook of Methods*. Documentation for the FoodAPS survey is available on the ERS website in the FoodAPS User’s Guide.

Table 1

**Mapping IRI UPCs to Consumer Expenditure Survey (CE) food categories—continued**

| CE category            | Number of Unique IRI UPCs | Percent of IRI UPCs | Types of products  |
|------------------------|---------------------------|---------------------|--|
| Poultry                | 4,969                     | 0.8                 | Refrigerated and frozen poultry  |
| Fish and seafood       | 14,549                    | 2.3                 | Refrigerated, frozen, and canned seafood   |
| Eggs                   | 3,531                     | 0.5                 | Fresh eggs and egg substitutes   |
| Fresh milk and cream   | 14,349                    | 2.2                 | Refrigerated and shelf-stable milk and creamers  |
| Other dairy products   | 55,573                    | 8.6                 | Cheese, yogurt, ice cream, and butter  |
| Fresh fruits           | 6,810                     | 1.1                 | Fresh fruits (uniform weight)  |
| Fresh vegetables       | 10,595                    | 1.6                 | Fresh vegetables (uniform weight)  |
| Processed fruits       | 24,308                    | 3.8                 | Refrigerated, frozen, and canned fruits and juices, and dried fruits                               |
| Processed vegetables   | 29,552                    | 4.6                 | Refrigerated, frozen, and canned vegetables, and dried beans                                       |
| Sugar and other sweets | 72,492                    | 11.3                | Candy, gum, jam, jelly, preserves, and syrups  |
| Fats and oils          | 16,025                    | 2.5                 | Cooking oils, sandwich spreads, and salad dressings  |
| Nonalcoholic beverages | 64,267                    | 10.0                | Carbonated beverages, coffee, tea, and juice drinks and mixes                                      |
| Miscellaneous foods    | 178,884                   | 27.8                | Fresh, frozen, and shelf-stable prepared meals; seasonings and sauces; snack foods; and baby foods |
| Total                  | 643,137                   | 100                 | All products   |

UPC= Universal Product Code

Source: USDA, Economic Research Service calculations using IRI and CE data, 2008-12.

Conversely, the categories with the fewest unique IRI UPCs are beef, eggs, poultry, and fresh fruits. These categories generally have fewer varieties of products or a higher number of random-weight items. Random-weight items are not labeled with manufacturer UPCs and are, instead, grouped into 176 aggregated products. IRI assigns each of these aggregated random-weight products a unique UPC. Therefore, random-weight products account for very few UPCs in table 1, despite representing about 20 percent of household FAH expenditures.

## IRI Consumer Network Data

The IRI Consumer Network household panel data are drawn from the National Consumer Panel (NCP), a joint venture between IRI and Nielsen to collect consumer data to provide consumer and marketing insights. The NCP collects purchase data from a panel of about 120,000 households per year. Panelists record their purchases of consumer packaged goods and may also complete surveys of consumer behaviors, attitudes, and preferences. The IRI Consumer Network data do not include food-away-from-home (FAFH) spending, so the purchase data acquired by ERS contain only FAH items.

Households report their purchases by scanning each product's UPC using an NCP-provided scanning device or smartphone application. After scanning a product UPC, panelists record the price, quantity, and whether there was a promotion on the product (e.g., sale, coupon, or buy-one-get-one

offer). To reduce respondent burden, consumers are not asked to report prices or expenditures for purchases made at retailers for which IRI has the retailer's sales data. Instead, IRI estimates prices using the retail sales data and assigns an estimated expenditure value for these purchases using the chain-average price or the outlet-average price for that UPC in the household's geographic market area. About 70 percent of purchase records have IRI-assigned expenditure values, and 30 percent have panelist-input expenditures.

A subset of households in the panel also reports purchases of products without a UPC—random-weight products that are sold by the pound or count, including fresh fruits and vegetables, meat, cheese, baked goods, prepared foods, coffee, and bulk candy/nuts/seeds. For these items, panelists choose from a list of products in the app or scan a barcode that corresponds to the product from a list of products in a reference booklet. They report expenditures on random-weight products but do not report the quantity purchased. Therefore, it is not possible to calculate unit prices for random-weight items. IRI does not use the retail data to assign prices for random-weight products, so the panelist-input expenditure is always used for these purchases. The larger respondent burden associated with reporting random-weight products accounts for the inclusion of only a subset of the panel.

About 60,000 of the 120,000 households in the panel are included in the IRI static panel, a subset of the full panel used to weight the panel data to be representative of the full U.S. population. To qualify for inclusion in the static panel, households must meet certain thresholds for consistent reporting. The following criteria are used by IRI:

- The household reported purchases at least once every 4 weeks for 11 of the 13, 4-week reporting periods of the year.
- The household met IRI's designated minimum average weekly spending levels: \$25 for a one-person household, \$35 for a two-person household, and \$45 for a three-person or larger household.

IRI considers households with this level of expenditures and reporting frequency to be reliable reporters. IRI develops a set of projection factors (i.e., survey weights) that can be used to weight the qualifying static households to be representative of the full U.S. population on a number of demographic targets. Households that do not qualify for the static panel, identified by a projection factor equal to zero, were excluded from this analysis.<sup>4</sup> For a comprehensive description of IRI's data collection, sampling, and weighting methodology, see Muth et al. (2016).

Because only a subset of the panel is asked to report random-weight purchases, IRI uses a separate set of projection factors to weight these households to be representative of the full population. These households are sometimes referred to as the "random-weight panel." The number of static households reporting random-weight purchases has risen each year, from about 21,000 in 2008 to almost 34,000 households in 2012.

The data used to compute the IRI total and mean weekly household expenditures were constructed from the "trip" dataset, which contains the households' purchase logs. The data were transformed to create a record for each week of expenditures by each household. That is, for each week of expendi-

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<sup>4</sup> Transaction records from nonstatic households may provide value in research focusing on prices or products instead of household purchases.

tures by each household, a unique record was created containing the calculated expenditure amounts in each of the 18 food categories.

As explained above, the IRI datasets contain several sets of survey weights (called “projection factors”) that can be used to produce estimates for the total U.S. population, with separate sets of survey weights for the full panel and for the subset random-weight panel. Therefore, for each year, each household has a “fixed-weight” survey weight and a separate “random-weight” survey weight. Households not in the random-weight panel have a “random-weight” weight of zero. The weight is applied at the UPC level. For “random-weight” UPCs to obtain the weighted expenditure amount, the item expenditure is multiplied by the “random-weight” survey weight; for “fixed-weight” UPCs, the item expenditure is multiplied by the “fixed-weight” survey weight. To adjust the projections to be at the weekly, instead of annual, level, the weights were divided by the number of weeks in the year. For 2009-11, the weights were divided by (365/7); for 2008 and 2012, the weights were divided by (366/7) to account for the leap day in those years.

IRI standard errors were computed using the Taylor series variance estimation method. Taylor series linearization is a commonly practiced method that estimates the variance of a nonlinear estimate by approximating the estimator with a linear function (Woodruff, 1971).<sup>5</sup> To use Taylor series estimation, pseudo sampling strata and primary sampling units (PSUs) were developed within the IRI data to approximate IRI’s nonprobability sample design because the actual sampling strata and PSUs are not provided with the IRI data, and the IRI data do not contain replicate weights for standard error estimation. For IRI households in a ZIP Code within the 21 Metropolitan Statistical Areas (MSAs) identifiable in the CE public use data, the MSA functioned as the strata. The 21 MSAs were chosen as strata to try to replicate the IRI sample selection and because they are the most precise level of geographic identification available in the CE public use data. For households outside the 21 MSAs, county size (4-levels) within a census region was used to form the strata. If this combination of region and county size yielded too small a stratum, that combination was collapsed with an adjacent county size level in the same region to form a stratum. In total, there were 52 strata. The random group method, detailed by Wölter (1985), was used to form PSUs, such that the number of households randomly assigned to each PSU was minimized to 10 or 11,<sup>6</sup> with each stratum having at least two PSUs.<sup>7</sup>

The detailed methods and formulas used to compute total and mean expenditures and standard errors using the IRI data are included in the appendix.

## Consumer Expenditure Survey Data

The Consumer Expenditure Survey (CE) is a household survey conducted by the U.S. Department of Labor’s Bureau of Labor Statistics (BLS) to collect information on consumers’ expenditures, as well as the income and demographic characteristics of those consumers. The CE comprises two components: a Quarterly Interview Survey and a weekly Diary Survey. The data used for this comparison are from the weekly Diary Survey component, which is designed to collect data on

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<sup>5</sup> The procedure takes the first-order Taylor series approximation of the nonlinear statistic and then substitutes the linear representation into the variance formula appropriate for the sample design.

<sup>6</sup> Ten to eleven households per PSU are sufficient to ensure at least one participating household over time, which is necessary for variance estimation.

<sup>7</sup> A minimum of two PSUs per stratum is common statistical practice and was followed to assign PSUs to the IRI data, but more than two PSUs is acceptable for a simple random sample.

small, frequently purchased items. The Diary Survey is well suited for examining food purchasing behaviors because respondents record detailed food-related expenditures that can be difficult to capture accurately in recall surveys.

CE Diary Survey data are collected from a cross-sectional sample of about 6,900 households representing the U.S. civilian noninstitutionalized population. Participating households complete a diary of daily expenses for two consecutive 1-week periods, and each weekly record is treated as statistically independent. Households record both FAH and FAFH expenditures. For comparability with the IRI Consumer Network data, only FAH expenditures were included in this analysis.

The data used to compute the total and mean weekly household expenditures for CE were the Consumer Unit Characteristics and Income File (FMLD). The FMLD data contain one record for every week each household was a participant in the Diary Survey. That is, if a household was in the survey for 2 weeks, there will be two unique records for the household, one for each week's expenditures. The maximum number of weeks a household participates in the survey is two. Every record (household week) in the data has a unique weight. Therefore, a household's first week may have a different weight than the household's second week. The weights are constructed in such a way that a quarter of the year's data represents the annual total. Because our analysis used the entirety of each year's data, we divided the analytic weight (named FINLWT21) and all replicate weights by four. The CE data contain 44 replicate weights that are used for variance estimation and that account for CE's complex sample design.

## FoodAPS Data

The USDA's National Household Food Acquisition and Purchase Survey (FoodAPS) is a household survey that collects information about household food purchases and acquisitions, along with factors that influence household food choices. FoodAPS is unique in that it provides comprehensive data on both FAH and FAFH purchases, as well as all acquisitions of free or nonpurchased food. Because IRI data cover only FAH purchases, only FAH expenditures from FoodAPS were included in this analysis.

FoodAPS is a nationally representative sample of 4,826 households, including representative data on households participating in the USDA's Supplemental Nutrition Assistance Program (SNAP), low-income households who are eligible for SNAP but do not participate in the program, and higher income households. Participating households reported all food purchases and acquisitions by all household members over a 1-week period. Members recorded the information in food books, in which they distinguished the food item as FAH or FAFH, identified the item, and recorded quantities, prices, and expenditures. FoodAPS data were collected between April 2012 and January 2013. Therefore, the period of coverage for FoodAPS is similar to that of the 2012 estimates from IRI and CE, which are the average weekly estimates from the full calendar year.

The data file used to compute the total and mean weekly household expenditures for FoodAPS was the household-level FAH item file. The item-level data file contains one record for each item purchased or acquired by all household members over the course of the reporting week. Because households in the FoodAPS survey also recorded acquisitions of nonpurchased food, only items for which there were expenditures were included in the analysis. For purchased items without

recorded prices, an imputed expenditure value was used.<sup>8</sup> The item-level expenditures were aggregated to create unique records of the expenditure amounts by each household in each of the 18 food categories.

FoodAPS standard errors were computed using Taylor series variance estimation. The FoodAPS survey used a multistage sample design. PSUs were defined as counties or groups of contiguous counties, and a stratified sample of 50 PSUs was selected using probability proportional to size (PPS) selection, with stratification based on metropolitan status and region. Within each PSU, eight second sampling units (SSUs), defined as a census block group or group of contiguous block groups, were selected using PPS.

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<sup>8</sup> Deterministic methods were used to impute missing item costs. Each item was assigned the within-sample median item cost and ratio-adjusted to equal the total amount paid for the trip.

## Results

The comparison results show that FAH expenditures in IRI are lower than those in CE and FoodAPS for all 18 food product categories. They are also lower than in CE across all years and across most demographic groups studied. However, variation exists across each of these dimensions as described in this section.

### Comparisons by Product Category

The largest differences in estimated expenditures between IRI and CE are for eggs, fresh vegetables, fresh fruits, and fish and seafood. These four product categories have the lowest IRI expenditures relative to CE in each year from 2008 to 2012 (tables 2a-2e). In 2012, for example, reported household expenditures on fresh vegetables in IRI were about 47 percent of those in CE, with an average expenditure of \$2.05 per week in IRI, compared to an average of \$4.34 per week in CE (fig. 1). Similarly, households in IRI reported an average expenditure of \$2.49 per week on fresh fruits in 2012, which was about 50 percent of the \$5.01 average weekly expenditure of CE households.

Table 2a

#### Average weighted weekly household food expenditures by product category, IRI and Consumer Expenditure Survey (CE), 2008

| Food category              | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | IRI as percent of CE |
|----------------------------|---------------|-------------|--------------|------------|----------------------|
| Sugar and other sweets     | 2.39          | 0.02        | 2.48         | 0.06       | 96.4                 |
| Other dairy products       | 4.28          | 0.03        | 5.03         | 0.10       | 85.1                 |
| Other meats                | 1.67          | 0.02        | 2.05         | 0.05       | 81.5                 |
| Miscellaneous foods        | 10.63         | 0.09        | 13.06        | 0.23       | 81.4                 |
| Cereal and cereal products | 2.49          | 0.02        | 3.26         | 0.07       | 76.4                 |
| Processed fruits           | 1.59          | 0.01        | 2.23         | 0.05       | 71.3                 |
| Nonalcoholic beverages     | 4.69          | 0.04        | 6.58         | 0.11       | 71.3                 |
| Bakery products            | 4.61          | 0.05        | 6.48         | 0.12       | 71.1                 |
| Fresh milk and cream       | 2.23          | 0.02        | 3.23         | 0.05       | 69.0                 |
| Processed vegetables       | 1.39          | 0.01        | 2.05         | 0.05       | 67.8                 |
| Poultry                    | 2.02          | 0.03        | 3.06         | 0.07       | 66.0                 |
| Fats and oils              | 1.24          | 0.01        | 2.01         | 0.05       | 61.7                 |
| Pork                       | 1.91          | 0.03        | 3.13         | 0.08       | 61.0                 |
| Beef                       | 2.80          | 0.04        | 4.59         | 0.10       | 61.0                 |
| Fresh fruits               | 2.40          | 0.04        | 4.26         | 0.09       | 56.3                 |
| Eggs                       | 0.51          | 0.00        | 0.98         | 0.02       | 52.0                 |
| Fresh vegetables           | 2.10          | 0.04        | 4.06         | 0.07       | 51.7                 |
| Fish and seafood           | 1.16          | 0.02        | 2.45         | 0.08       | 47.3                 |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2008.

Table 2b

**Average weighted weekly household food expenditures by product category, IRI and Consumer Expenditure Survey (CE), 2009**

| Food category              | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | IRI as percent of CE |
|----------------------------|---------------|-------------|--------------|------------|----------------------|
| Sugar and other sweets     | 2.47          | 0.02        | 2.70         | 0.09       | 91.5                 |
| Other dairy products       | 4.23          | 0.03        | 5.04         | 0.10       | 83.9                 |
| Miscellaneous foods        | 11.03         | 0.08        | 13.74        | 0.29       | 80.3                 |
| Other meats                | 1.69          | 0.02        | 2.18         | 0.05       | 77.5                 |
| Cereal and cereal products | 2.56          | 0.02        | 3.31         | 0.06       | 77.3                 |
| Nonalcoholic beverages     | 4.78          | 0.03        | 6.47         | 0.11       | 73.9                 |
| Bakery products            | 4.66          | 0.04        | 6.42         | 0.11       | 72.6                 |
| Fresh milk and cream       | 1.93          | 0.01        | 2.77         | 0.05       | 69.7                 |
| Poultry                    | 2.01          | 0.03        | 2.96         | 0.08       | 67.9                 |
| Processed fruits           | 1.54          | 0.01        | 2.27         | 0.05       | 67.8                 |
| Processed vegetables       | 1.42          | 0.01        | 2.11         | 0.04       | 67.3                 |
| Fats and oils              | 1.27          | 0.01        | 1.97         | 0.05       | 64.5                 |
| Beef                       | 2.78          | 0.03        | 4.35         | 0.10       | 63.9                 |
| Pork                       | 1.89          | 0.02        | 3.24         | 0.07       | 58.3                 |
| Fresh fruits               | 2.39          | 0.03        | 4.22         | 0.11       | 56.6                 |
| Eggs                       | 0.44          | 0.00        | 0.84         | 0.02       | 52.4                 |
| Fresh vegetables           | 2.09          | 0.03        | 4.01         | 0.06       | 52.1                 |
| Fish and seafood           | 1.21          | 0.02        | 2.58         | 0.07       | 46.9                 |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2009.

Table 2c

**Average weighted weekly household food expenditures by product category, IRI and Consumer Expenditure Survey (CE), 2010**

| Food category              | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | IRI as percent of CE |
|----------------------------|---------------|-------------|--------------|------------|----------------------|
| Sugar and other sweets     | 2.49          | 0.02        | 2.54         | 0.07       | 98.0                 |
| Other dairy products       | 4.25          | 0.03        | 4.60         | 0.09       | 92.4                 |
| Miscellaneous foods        | 10.96         | 0.08        | 12.80        | 0.22       | 85.6                 |
| Cereal and cereal products | 2.44          | 0.02        | 3.16         | 0.07       | 77.2                 |
| Poultry                    | 2.01          | 0.03        | 2.66         | 0.07       | 75.6                 |
| Other meats                | 1.68          | 0.02        | 2.26         | 0.06       | 74.3                 |
| Nonalcoholic beverages     | 4.70          | 0.03        | 6.40         | 0.13       | 73.4                 |
| Fresh milk and cream       | 1.95          | 0.01        | 2.71         | 0.04       | 72.0                 |
| Bakery products            | 4.58          | 0.04        | 6.48         | 0.13       | 70.7                 |
| Processed fruits           | 1.47          | 0.01        | 2.17         | 0.05       | 67.7                 |
| Pork                       | 1.86          | 0.02        | 2.86         | 0.07       | 65.0                 |

—continued



Table 2c

**Average weighted weekly household food expenditures by product category, IRI and Consumer Expenditure Survey (CE), 2010—continued**

| Food category        | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | IRI as percent of CE |
|----------------------|---------------|-------------|--------------|------------|----------------------|
| Beef                 | 2.67          | 0.03        | 4.17         | 0.19       | 64.0                 |
| Fats and oils        | 1.20          | 0.01        | 1.97         | 0.04       | 60.9                 |
| Processed vegetables | 1.40          | 0.01        | 2.39         | 0.07       | 58.6                 |
| Fish and seafood     | 1.20          | 0.02        | 2.25         | 0.08       | 53.3                 |
| Fresh vegetables     | 2.14          | 0.03        | 4.04         | 0.07       | 53.0                 |
| Fresh fruits         | 2.36          | 0.03        | 4.46         | 0.10       | 52.9                 |
| Eggs                 | 0.45          | 0.00        | 0.89         | 0.02       | 50.6                 |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2010.

Table 2d

**Average weighted weekly household food expenditures by product category, IRI and Consumer Expenditure Survey (CE), 2011**

| Food category              | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | IRI as percent of CE |
|----------------------------|---------------|-------------|--------------|------------|----------------------|
| Sugar and other sweets     | 2.60          | 0.02        | 2.77         | 0.07       | 93.9                 |
| Other dairy products       | 4.51          | 0.03        | 4.94         | 0.09       | 91.3                 |
| Miscellaneous foods        | 11.01         | 0.07        | 13.27        | 0.16       | 83.0                 |
| Cereal and cereal products | 2.46          | 0.02        | 3.36         | 0.07       | 73.2                 |
| Other meats                | 1.71          | 0.02        | 2.36         | 0.06       | 72.5                 |
| Fresh milk and cream       | 2.08          | 0.02        | 2.88         | 0.05       | 72.2                 |
| Nonalcoholic beverages     | 4.97          | 0.03        | 6.94         | 0.14       | 71.6                 |
| Poultry                    | 2.06          | 0.02        | 2.97         | 0.06       | 69.4                 |
| Bakery products            | 4.72          | 0.06        | 6.84         | 0.11       | 69.0                 |
| Processed fruits           | 1.45          | 0.01        | 2.22         | 0.05       | 65.3                 |
| Beef                       | 2.75          | 0.03        | 4.27         | 0.11       | 64.4                 |
| Pork                       | 1.98          | 0.02        | 3.11         | 0.07       | 63.7                 |
| Fats and oils              | 1.28          | 0.01        | 2.11         | 0.04       | 60.7                 |
| Processed vegetables       | 1.40          | 0.01        | 2.46         | 0.05       | 56.9                 |
| Eggs                       | 0.50          | 0.00        | 0.96         | 0.02       | 52.1                 |
| Fish and seafood           | 1.19          | 0.01        | 2.31         | 0.08       | 51.5                 |
| Fresh fruits               | 2.44          | 0.03        | 4.75         | 0.09       | 51.4                 |
| Fresh vegetables           | 2.17          | 0.03        | 4.30         | 0.07       | 50.5                 |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2011.

Table 2e

**Average weighted weekly household food expenditures by product category, IRI, Consumer Expenditure Survey (CE), and FoodAPS, 2012**

| Food category              | IRI Mean (\$) | IRI SE (\$) | CE Mean (\$) | CE SE (\$) | FoodAPS Mean (\$) | FoodAPS SE (\$) | IRI as percent of CE | IRI as percent of FoodAPS |
|----------------------------|---------------|-------------|--------------|------------|-------------------|-----------------|----------------------|---------------------------|
| Sugar and other sweets     | 2.53          | 0.02        | 2.82         | 0.08       | 2.95              | 0.13            | 89.7                 | 85.8                      |
| Other dairy products       | 4.60          | 0.03        | 5.13         | 0.08       | 6.47              | 0.29            | 89.7                 | 71.1                      |
| Miscellaneous foods        | 10.94         | 0.07        | 13.43        | 0.27       | 15.53             | 0.58            | 81.5                 | 70.4                      |
| Other meats                | 1.77          | 0.02        | 2.35         | 0.06       | 2.54              | 0.12            | 75.3                 | 69.8                      |
| Nonalcoholic beverages     | 5.15          | 0.03        | 7.11         | 0.11       | 7.39              | 0.29            | 72.4                 | 69.7                      |
| Cereal and cereal products | 2.48          | 0.02        | 3.50         | 0.07       | 3.53              | 0.15            | 70.9                 | 70.2                      |
| Fresh milk and cream       | 2.05          | 0.01        | 2.92         | 0.05       | 2.95              | 0.11            | 70.2                 | 69.5                      |
| Poultry                    | 2.13          | 0.02        | 3.07         | 0.06       | 3.43              | 0.17            | 69.4                 | 62.2                      |
| Bakery products            | 4.63          | 0.04        | 6.84         | 0.14       | 7.52              | 0.21            | 67.7                 | 61.6                      |
| Processed fruits           | 1.44          | 0.01        | 2.18         | 0.05       | 2.01              | 0.08            | 66.1                 | 71.6                      |
| Pork                       | 2.00          | 0.02        | 3.18         | 0.09       | 2.81              | 0.15            | 62.9                 | 71.3                      |
| Fats and oils              | 1.36          | 0.01        | 2.19         | 0.04       | 1.97              | 0.07            | 62.1                 | 69.1                      |
| Beef                       | 2.68          | 0.02        | 4.35         | 0.12       | 4.28              | 0.21            | 61.6                 | 62.6                      |
| Processed vegetables       | 1.39          | 0.01        | 2.50         | 0.06       | 2.59              | 0.10            | 55.6                 | 53.8                      |
| Fish and seafood           | 1.23          | 0.01        | 2.40         | 0.09       | 2.13              | 0.22            | 51.3                 | 57.7                      |
| Fresh fruits               | 2.49          | 0.02        | 5.01         | 0.09       | 4.79              | 0.26            | 49.7                 | 52.0                      |
| Eggs                       | 0.50          | 0.00        | 1.02         | 0.02       | 0.84              | 0.05            | 49.0                 | 59.4                      |
| Fresh vegetables           | 2.05          | 0.02        | 4.34         | 0.07       | 4.61              | 0.24            | 47.2                 | 44.5                      |

SE = Standard error

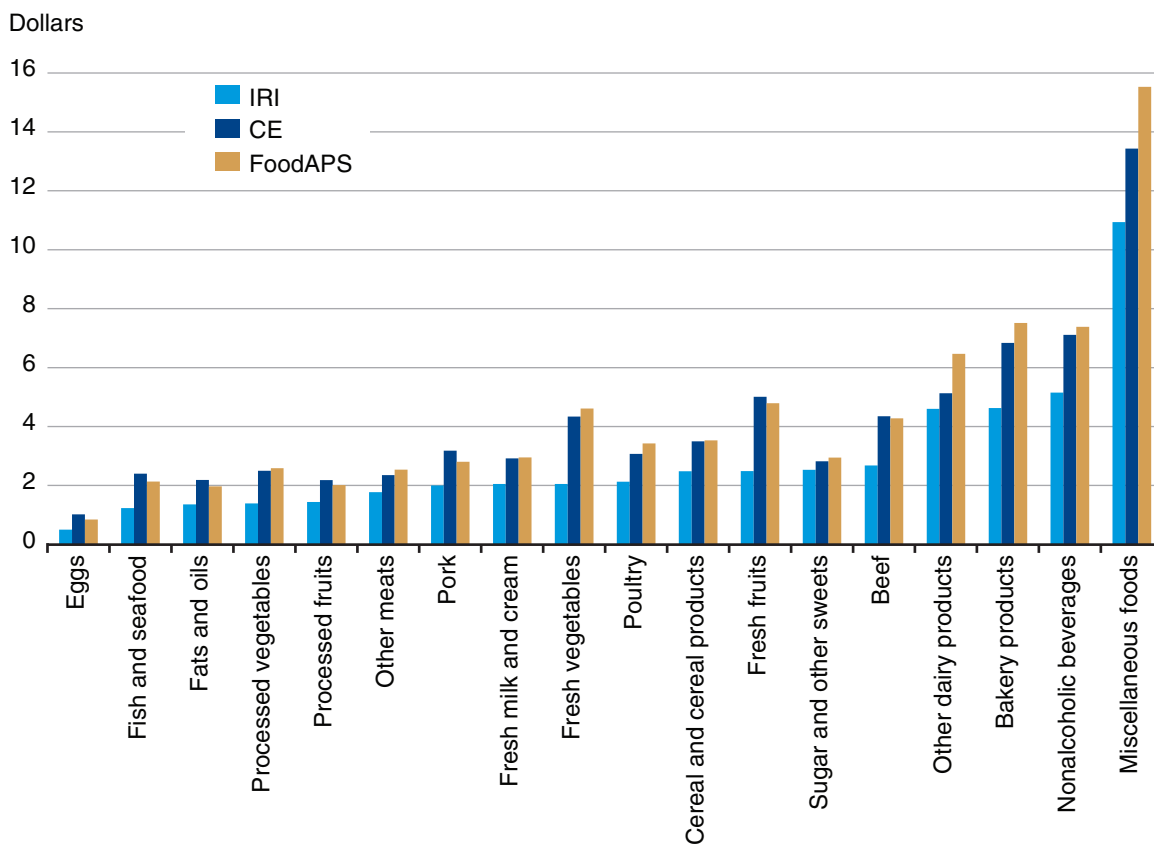
Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

Many of the same patterns exist when comparing IRI and FoodAPS expenditures. There, the product categories with the largest differences in expenditures in 2012 were fresh vegetables, fresh fruits, and processed vegetables (table 2e). For example, the average weekly expenditure on fresh vegetables was \$2.05 in IRI, about 45 percent of the FoodAPS average weekly expenditure of \$4.61.

Several of the product categories with relatively lower expenditures in IRI are those containing a large proportion of random-weight items, particularly fresh fruits, fresh vegetables, and meat. Because these items are not labeled with a UPC that can be scanned, these types of items may be more burdensome for IRI household panelists to record when reporting purchases and, therefore, may be subject to more underreporting. As mentioned previously, only a subset of households report random-weight data, and one contributing factor is the difficulty of recording these data.

Expenditures are lower in random-weight categories despite a separate set of “random-weight” projection factors. IRI’s projection factors weight households to be representative of the population; they do not weight purchases to meet spending targets. Therefore, the projection factors do not account for the quality or completeness of household reporting beyond the minimum reporting requirements described previously.

Figure 1  
**Average weekly expenditures in IRI, Consumer Expenditure Survey (CE), and FoodAPS by product category, 2012**



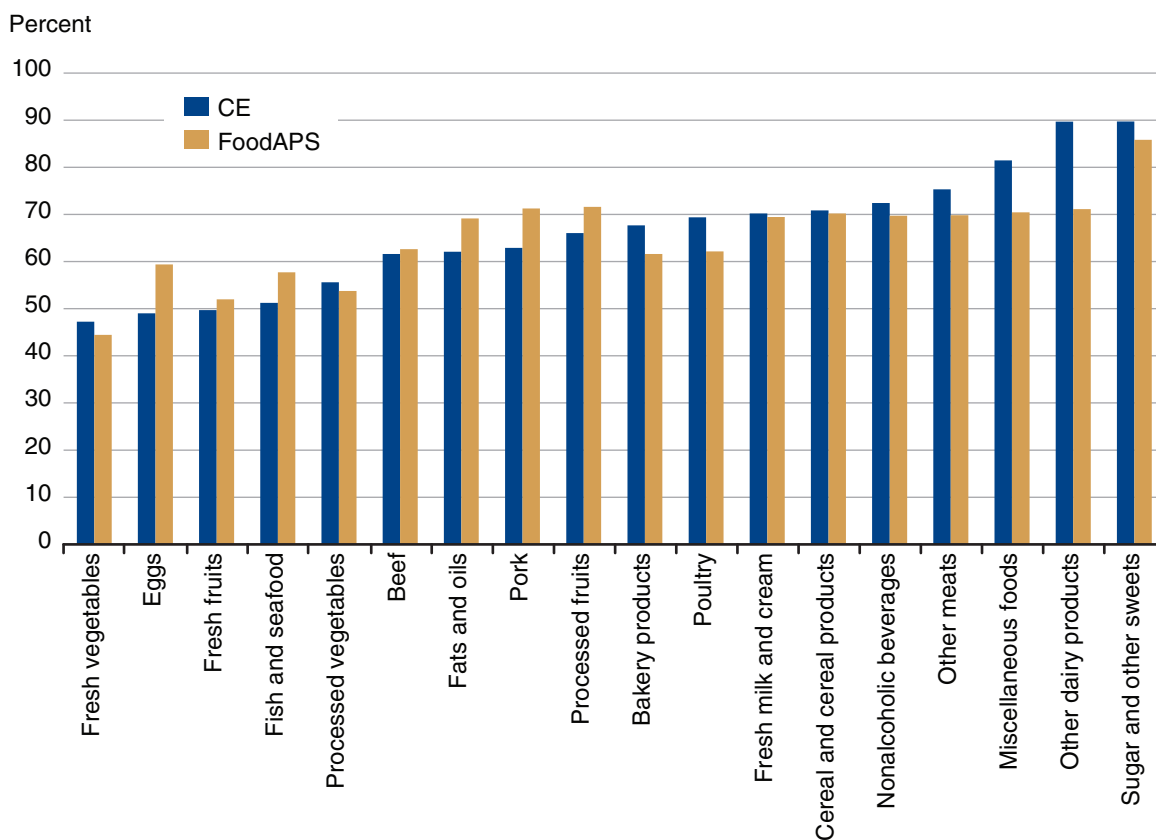
Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

The product categories in which IRI's estimated expenditures were most similar to CE were sugar and other sweets, other dairy products, and miscellaneous foods (figs. 1 and 2). The majority of products in these categories are packaged and UPC-labeled items. In 2012, for example, IRI households reported spending an average of \$2.53 per week on sugar and other sweets, about 90 percent of the \$2.82 spent by CE households. With the exception of sugar and other sweets in 2008 and 2010, all differences in expenditures between IRI and CE are statistically significant at the 5-percent level.

Similarly, the category with the smallest difference between IRI and FoodAPS was sugar and other sweets. The average weekly expenditure on sugar and other sweets in IRI was about 86 percent of the average weekly expenditure of \$2.95 in FoodAPS. All differences in expenditures between IRI and FoodAPS are also statistically significant at the 5-percent level.

Figure 2

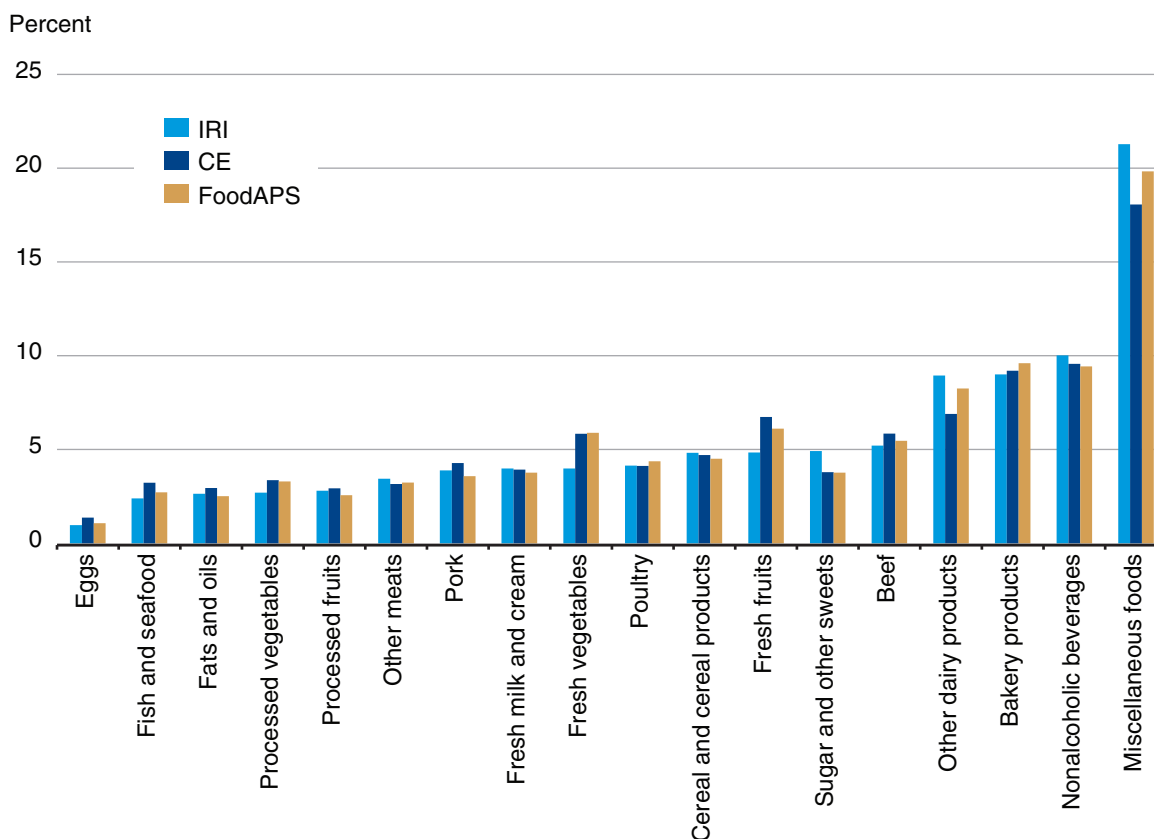
**Average weekly expenditures in IRI as a percentage of Consumer Expenditure Survey (CE) and FoodAPS expenditures by product category, 2012**



Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

Expenditures in IRI are lower overall; however, examining the distribution of FAH expenditure shares by product category across surveys reveals largely similar patterns in expenditures (fig. 3). Across surveys, households' largest shares of FAH expenditures were on miscellaneous foods, nonalcoholic beverages, bakery products, and other dairy products. Households' purchases in these four categories accounted for almost 50 percent of FAH spending. Eggs, fish and seafood, fats and oils, processed vegetables, and processed fruits were among the categories with the lowest expenditure shares for each survey.

Figure 3  
**Product category food-at-home expenditure shares in IRI, Consumer Expenditure Survey (CE), and FoodAPS, 2012**



Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

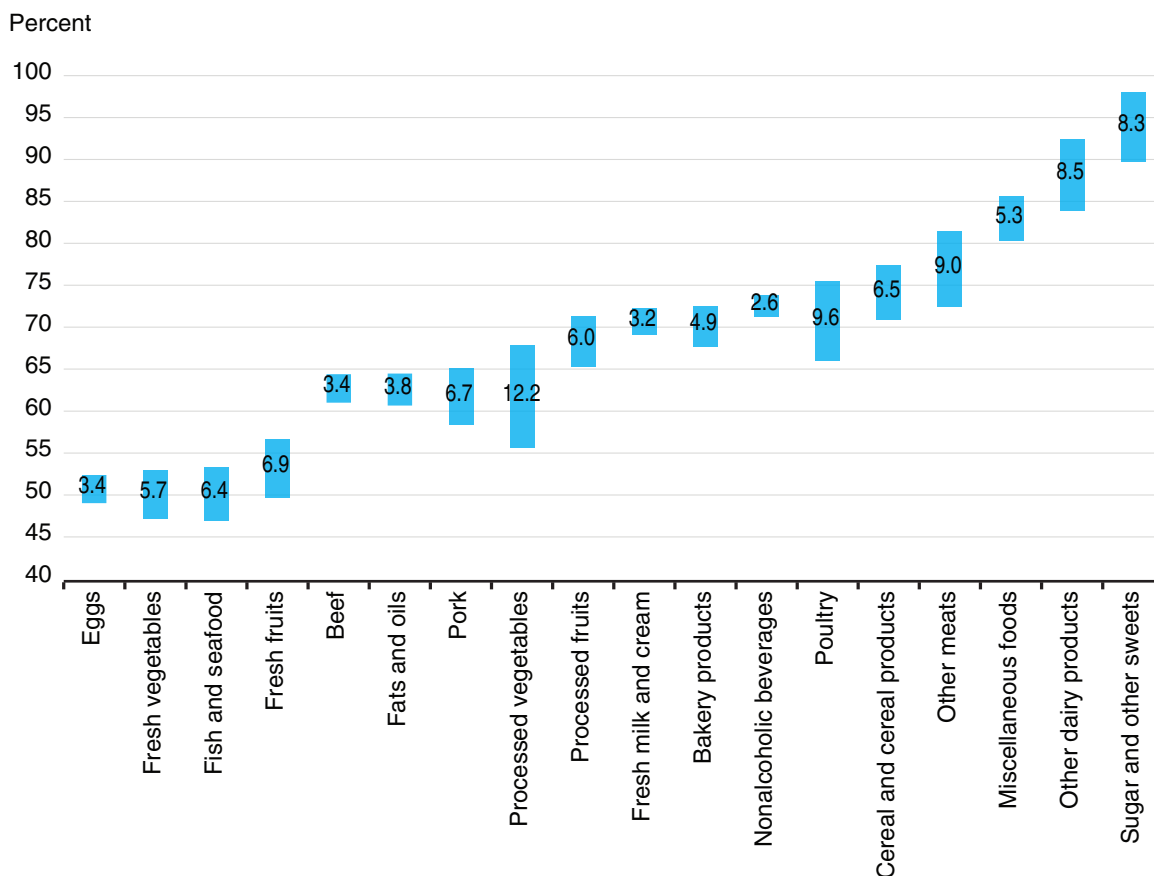
## Comparisons Over Time

Examining the consistency of the IRI data over time is another way to understand how to apply the data in research studies. The relationship between IRI expenditures and CE expenditures over time can be used to assess whether IRI estimates exhibit potentially concerning trends such as high volatility or a consistent decline relative to CE. Overall, IRI expenditures were lower than CE expenditures for almost every product category in each year from 2008 to 2012 (fig. 4). Over this period, IRI expenditures were a relatively consistent percentage of CE expenditures. Expenditures in IRI as a percentage of CE varied by less than 10 percentage points for most categories over the 5-year period.

Some categories had a greater variation relative to CE by year, such as processed vegetables and poultry, while others had smaller differences, such as nonalcoholic beverages and fresh milk and cream. The bars in figure 4 show the range of IRI expenditures as a percentage of CE expenditures over time for each category from 2008-12. Over the 5-year period, all categories except processed vegetables remained within a 10-percentage-point range of values. For example, IRI spending on nonalcoholic beverages showed the smallest variation relative to CE, ranging from a high of 74 percent of CE spending in 2009 to a low of 71 percent in 2008, with little variation by year. IRI spending on processed vegetables showed the largest variation relative to CE, ranging from 68 percent of CE spending in 2008 to 56 percent in 2012. Additionally, processed vegetables was the only category in IRI to show a consistent decline relative to CE for each year from 2008 to 2012. No other categories showed a steady pattern of increase or decrease relative to CE for each year over the 5-year period.

Figure 4

**Range of IRI expenditures as a percentage of Consumer Expenditure Survey (CE) expenditures over time, 2008-12**



Note: For each category, IRI expenditures as a percentage of CE expenditures showed some variation over time. The bars show how IRI ranged as a percentage of CE for each category over the 5-year period.

Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.

Examining differences in reported expenditures over time can also provide insights into how households that participate in the IRI panel react to macroeconomic conditions, compared to households that participate in CE. The data can be used to corroborate patterns across data sources or to understand how they differ.

Expenditures over 2008-12 show that IRI had a slightly dampened level of variation in expenditures, compared to CE (table 3). CE showed a decrease in expenditures in 2009-10 for several categories following the end of the 2007-09 recession, particularly in the meat, poultry, and seafood categories. CE showed a subsequent increase in expenditures across most categories during the 2010-11 recovery. IRI showed similar trends, but the magnitude of both the decline and the rebound were smaller than CE for most categories. In addition, IRI showed fewer significant differences across these years despite having a larger sample size and smaller standard errors. For example, 12 categories showed a significant increase in expenditures in CE in 2010-11, compared to 7 in IRI.

Table 3

**Year-to-year percentage change in average weekly expenditures by category, IRI and Consumer Expenditure Survey (CE), 2008-12**

|                            | 2008-09 (%) |       | 2009-10 (%) |      | 2010-11 (%) |      | 2011-12 (%) |      |
|----------------------------|-------------|-------|-------------|------|-------------|------|-------------|------|
|                            | CE          | IRI   | CE          | IRI  | CE          | IRI  | CE          | IRI  |
| Cereal and cereal products | 1.5         | 2.8   | -4.5        | -4.7 | 6.3         | 0.8  | 4.2         | 0.8  |
| Bakery products            | -0.9        | 1.1   | 0.9         | -1.7 | 5.6         | 3.1  | 0.0         | -1.9 |
| Beef                       | -5.2        | -0.7  | -4.1        | -4.0 | 2.4         | 3.0  | 1.9         | -2.6 |
| Pork                       | 3.5         | -1.1  | -11.7       | -1.6 | 8.7         | 6.5  | 2.3         | 1.0  |
| Other meats                | 6.3         | 1.2   | 3.7         | -0.6 | 4.4         | 1.8  | -0.4        | 3.5  |
| Poultry                    | -3.3        | -0.5  | -10.1       | 0.0  | 11.7        | 2.5  | 3.4         | 3.4  |
| Fish and seafood           | 5.3         | 4.3   | -12.8       | -0.8 | 2.7         | -0.8 | 3.9         | 3.4  |
| Eggs                       | -14.3       | -13.7 | 6.0         | 2.3  | 7.9         | 11.1 | 6.3         | 0.0  |
| Fresh milk and cream       | -14.2       | -13.5 | -2.2        | 1.0  | 6.3         | 6.7  | 1.4         | -1.4 |
| Other dairy products       | 0.2         | -1.2  | -8.7        | 0.5  | 7.4         | 6.1  | 3.9         | 2.1  |
| Fresh fruits               | -0.9        | -0.4  | 5.7         | -1.3 | 6.5         | 3.4  | 5.5         | 2.0  |
| Fresh vegetables           | -1.2        | -0.5  | 0.8         | 2.4  | 6.4         | 1.4  | 0.9         | -5.5 |
| Processed fruits           | 1.8         | -3.1  | -4.4        | -4.6 | 2.3         | -1.4 | -1.8        | -0.7 |
| Processed vegetables       | 2.9         | 2.2   | 13.3        | -1.4 | 2.9         | 0.0  | 1.6         | -0.7 |
| Sugar and other sweets     | 8.9         | 3.4   | -5.9        | 0.8  | 9.1         | 4.4  | 1.8         | -2.7 |
| Fats and oils              | -2.0        | 2.4   | 0.0         | -5.5 | 7.1         | 6.7  | 3.8         | 6.3  |
| Nonalcoholic beverages     | -1.7        | 1.9   | -1.1        | -1.7 | 8.4         | 5.7  | 2.5         | 3.6  |
| Miscellaneous foods        | 5.2         | 3.8   | -6.8        | -0.6 | 3.7         | 0.5  | 1.2         | -0.6 |

Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.

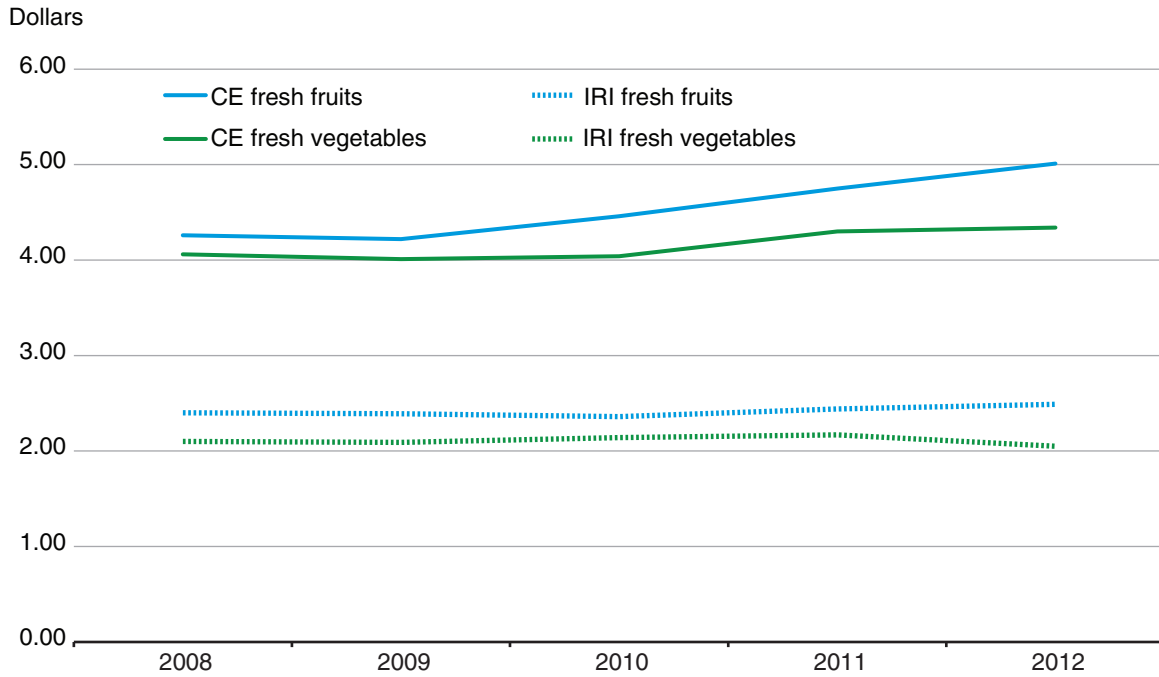
In each year from 2008 to 2012, the fresh fruits and fresh vegetables categories were among those with the lowest expenditures relative to CE (fig. 5). For fresh vegetables, IRI expenditures relative to CE ranged from a high of 53 percent in 2010 to a low of 47 percent in 2012. IRI's expenditures for fresh fruits ranged from a high of 57 percent in 2009 to a low of 50 percent in 2012. This is largely a result of IRI expenditures remaining relatively flat in 2008-12, while expenditures in CE rose over the period.

Across all years, IRI expenditures relative to CE were more comparable in categories composed primarily of packaged goods, such as sugar and other sweets, other dairy products, miscellaneous foods, and other meats (fig. 6).

The meat, poultry, and seafood categories were among those with the largest year-over-year variation in spending between IRI and CE from 2008 to 2012 (fig. 7). In the CE data, these categories showed a decrease in expenditures in 2010 and a rebound in 2011. In the IRI data, expenditures were more stable over the 5-year period. For example, expenditures on pork, poultry, and fish and seafood all declined by more than 10 percent between 2009-10 in CE, while expenditures in those categories in IRI showed no significant changes over that period.

Figure 5

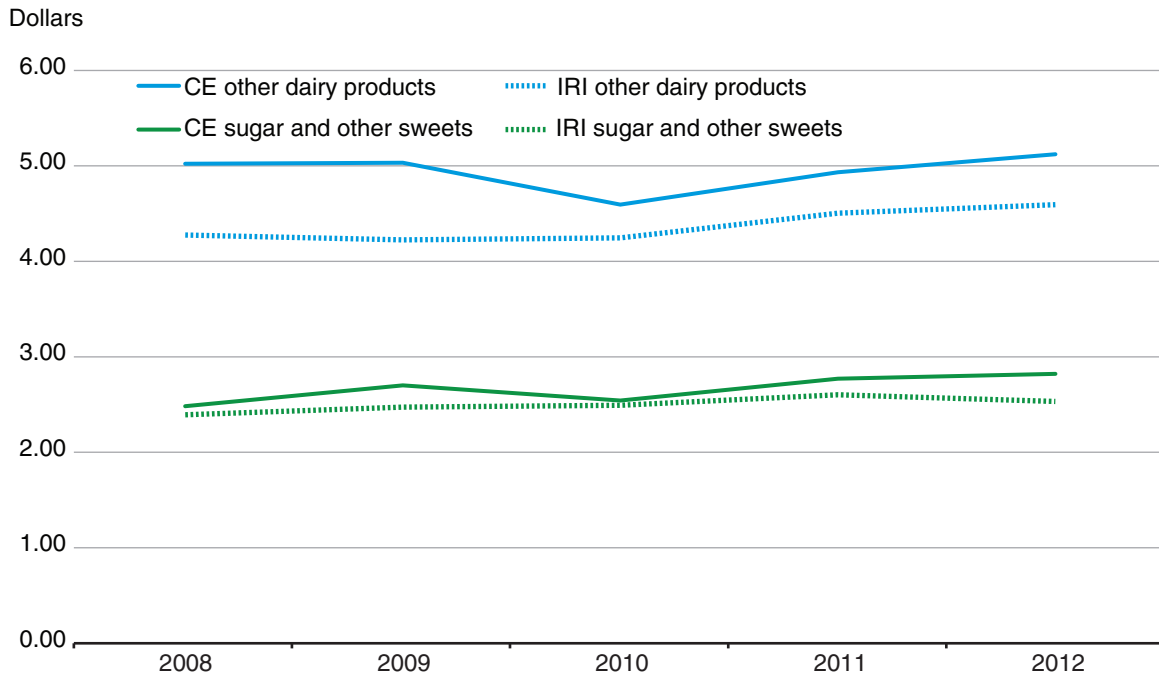
**Average weekly household expenditures on fresh fruits and vegetables, IRI and Consumer Expenditure Survey (CE), 2008-12**



Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.

Figure 6

**Average weekly household expenditures on sugar and other sweets and other dairy products, IRI and Consumer Expenditure Survey (CE), 2008-12**

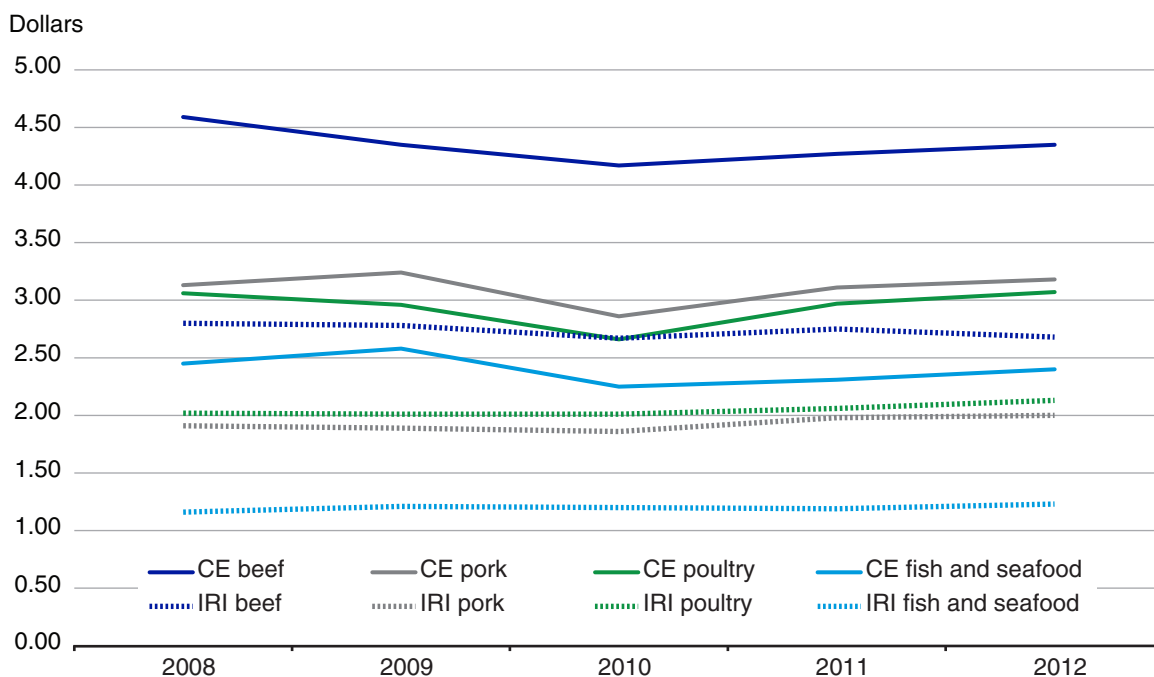


Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.



Figure 7

**Average weekly household expenditures on meat, poultry, and seafood, IRI and Consumer Expenditure Survey (CE), 2008-12**



Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.

Overall, in the 5 years from 2008 to 2012, expenditures in IRI as a percentage of expenditures in CE showed some variation across years and categories but did not show a high level of volatility or inconsistency. Household spending in IRI also showed a slightly dampened response to macroeconomic trends over the time period, compared to the changes in spending observed in CE.

### Comparisons Across Demographic Groups

Differences in household demographic characteristics likely contributed to variations in household FAH expenditure patterns across datasets. This section compares IRI expenditures to CE expenditures for a number of demographic subpopulations and shows how IRI's data coverage varies by demographic groups. These results may be useful for determining whether the data are appropriate for research focusing on certain populations.

#### *By Income*

Household FAH expenditures increased as a function of income across the 18 food categories in both CE and IRI (table 4; 2012 data only). However, as household income increased, expenditures in IRI did not increase at a rate similar to the rate of increase in expenditures in CE. Lower income households in IRI had expenditures that were more comparable to their counterparts in CE, while higher income households in IRI showed a larger difference in expenditures compared to CE. The largest difference in coverage was between the highest and second-highest income groups (\$70,000+ and \$50,000-\$69,999); differences between other income groups were less pronounced.

For the lowest income group (\$0-\$9,999), expenditures in IRI were not significantly different from expenditures in CE for over half of the categories from 2008 to 2012. Household spending on sugar and other sweets and other dairy in IRI surpassed spending in CE for the lowest two income groups. However, as household income increased, the magnitude of the difference in expenditures between CE and IRI increased as well. In the highest income group (\$70,000+), expenditures in CE were significantly higher than those in IRI across all categories and all years. The size of the differences across income groups also varied by category. The differences were larger for higher expenditure categories such as miscellaneous food, nonalcoholic beverages, and other dairy.

Table 4

**Average weekly household expenditures by category and household income, Consumer Expenditure Survey (CE) and IRI, 2012**

| Income                         | Cereal and Cereal Products (\$) | Bakery Products (\$) | Beef (\$) | Pork (\$) | Other Meat (\$) | Poultry (\$) |
|--------------------------------|---------------------------------|----------------------|-----------|-----------|-----------------|--------------|
| <b>CE</b>                      |                                 |                      |           |           |                 |              |
| \$0-9,999                      | 2.05                            | 4.06                 | 2.53      | 2.48      | 1.39            | 1.86         |
| SE                             | 0.16                            | 0.33                 | 0.24      | 0.30      | 0.14            | 0.17         |
| \$10,000-19,999                | 2.36                            | 4.35                 | 2.51      | 2.17      | 1.43            | 2.17         |
| SE                             | 0.12                            | 0.20                 | 0.17      | 0.20      | 0.07            | 0.15         |
| \$20,000-49,000                | 2.88                            | 5.63                 | 3.75      | 2.67      | 2.08            | 2.59         |
| SE                             | 0.10                            | 0.18                 | 0.17      | 0.13      | 0.08            | 0.10         |
| \$50,000-69,999                | 3.40                            | 7.12                 | 4.27      | 3.23      | 2.24            | 2.93         |
| SE                             | 0.16                            | 0.32                 | 0.23      | 0.20      | 0.14            | 0.16         |
| \$70,000+                      | 4.92                            | 9.50                 | 6.12      | 4.24      | 3.25            | 4.22         |
| SE                             | 0.14                            | 0.21                 | 0.29      | 0.16      | 0.12            | 0.12         |
| <b>IRI</b>                     |                                 |                      |           |           |                 |              |
| \$0-9,999                      | 1.84                            | 4.14                 | 2.18      | 1.75      | 1.35            | 1.70         |
| SE                             | 0.08                            | 0.46                 | 0.13      | 0.09      | 0.07            | 0.09         |
| \$10,000-19,999                | 1.82                            | 3.71                 | 2.13      | 1.65      | 1.35            | 1.55         |
| SE                             | 0.06                            | 0.09                 | 0.10      | 0.06      | 0.04            | 0.06         |
| \$20,000-49,000                | 2.28                            | 4.35                 | 2.55      | 1.96      | 1.63            | 1.93         |
| SE                             | 0.03                            | 0.04                 | 0.04      | 0.03      | 0.02            | 0.03         |
| \$50,000-69,999                | 2.66                            | 4.83                 | 2.74      | 2.07      | 1.82            | 2.21         |
| SE                             | 0.05                            | 0.07                 | 0.05      | 0.03      | 0.03            | 0.04         |
| \$70,000+                      | 2.86                            | 5.10                 | 3.00      | 2.13      | 2.06            | 2.49         |
| SE                             | 0.03                            | 0.05                 | 0.04      | 0.03      | 0.03            | 0.03         |
| <b>IRI as percentage of CE</b> |                                 |                      |           |           |                 |              |
| \$0-9,999                      | 90%                             | 102%                 | 86%       | 71%       | 97%             | 91%          |
| \$10,000-19,999                | 77%                             | 85%                  | 85%       | 76%       | 94%             | 71%          |
| \$20,000-49,000                | 79%                             | 77%                  | 68%       | 73%       | 78%             | 75%          |
| \$50,000-69,999                | 78%                             | 68%                  | 64%       | 64%       | 81%             | 75%          |
| \$70,000+                      | 58%                             | 54%                  | 49%       | 50%       | 63%             | 59%          |

—continued

Table 4

**Average weekly household expenditures by category and household income, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Income                         | Fish and seafood (\$) | Eggs (\$) | Fresh milk and cream (\$) | Other dairy (\$) | Fresh fruit (\$) | Fresh vegetables (\$) |
|--------------------------------|-----------------------|-----------|---------------------------|------------------|------------------|-----------------------|
| <b>CE</b>                      |                       |           |                           |                  |                  |                       |
| \$0-9,999                      | 1.35                  | 0.71      | 1.74                      | 2.42             | 2.39             | 2.31                  |
| SE                             | 0.24                  | 0.06      | 0.11                      | 0.20             | 0.18             | 0.18                  |
| \$10,000-19,999                | 1.72                  | 0.80      | 2.07                      | 2.88             | 2.92             | 2.78                  |
| SE                             | 0.20                  | 0.04      | 0.12                      | 0.16             | 0.18             | 0.18                  |
| \$20,000-49,000                | 1.75                  | 0.90      | 2.52                      | 3.90             | 3.83             | 3.56                  |
| SE                             | 0.11                  | 0.03      | 0.07                      | 0.11             | 0.13             | 0.13                  |
| \$50,000-69,999                | 2.20                  | 0.97      | 2.91                      | 5.05             | 5.02             | 4.16                  |
| SE                             | 0.15                  | 0.04      | 0.15                      | 0.22             | 0.26             | 0.17                  |
| \$70,000+                      | 3.65                  | 1.31      | 3.92                      | 7.90             | 7.59             | 6.25                  |
| SE                             | 0.20                  | 0.04      | 0.09                      | 0.13             | 0.21             | 0.15                  |
| <b>IRI</b>                     |                       |           |                           |                  |                  |                       |
| \$0-9,999                      | 0.97                  | 0.40      | 1.62                      | 3.38             | 1.58             | 1.39                  |
| SE                             | 0.05                  | 0.02      | 0.07                      | 0.13             | 0.08             | 0.07                  |
| \$10,000-19,999                | 0.86                  | 0.39      | 1.63                      | 3.42             | 1.64             | 1.45                  |
| SE                             | 0.03                  | 0.01      | 0.04                      | 0.08             | 0.05             | 0.04                  |
| \$20,000-49,000                | 1.02                  | 0.48      | 1.95                      | 4.11             | 2.07             | 1.78                  |
| SE                             | 0.02                  | 0.01      | 0.02                      | 0.04             | 0.03             | 0.02                  |
| \$50,000-69,999                | 1.24                  | 0.53      | 2.15                      | 4.85             | 2.63             | 2.11                  |
| SE                             | 0.03                  | 0.01      | 0.04                      | 0.07             | 0.05             | 0.04                  |
| \$70,000+                      | 1.53                  | 0.55      | 2.26                      | 5.41             | 3.15             | 2.51                  |
| SE                             | 0.02                  | 0.01      | 0.03                      | 0.05             | 0.04             | 0.03                  |
| <b>IRI as percentage of CE</b> |                       |           |                           |                  |                  |                       |
| \$0-9,999                      | 72%                   | 56%       | 93%                       | 140%             | 66%              | 60%                   |
| \$10,000-19,999                | 50%                   | 49%       | 79%                       | 119%             | 56%              | 52%                   |
| \$20,000-49,000                | 58%                   | 53%       | 77%                       | 105%             | 54%              | 50%                   |
| \$50,000-69,999                | 56%                   | 55%       | 74%                       | 96%              | 52%              | 51%                   |
| \$70,000+                      | 42%                   | 42%       | 58%                       | 68%              | 42%              | 40%                   |

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Table 4

**Average weekly household expenditures by category and household income, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Income                         | Processed fruit (\$) | Processed vegetables (\$) | Sugar and other sweets (\$) | Fats and oils (\$) | Nonalcoholic beverages (\$) | Miscellaneous food (\$) |
|--------------------------------|----------------------|---------------------------|-----------------------------|--------------------|-----------------------------|-------------------------|
| <b>CE</b>                      |                      |                           |                             |                    |                             |                         |
| \$0-9,999                      | 1.40                 | 1.57                      | 1.58                        | 1.44               | 4.19                        | 7.90                    |
| SE                             | 0.12                 | 0.12                      | 0.15                        | 0.13               | 0.35                        | 0.60                    |
| \$10,000-19,999                | 1.27                 | 1.85                      | 1.80                        | 1.51               | 4.65                        | 8.32                    |
| SE                             | 0.07                 | 0.14                      | 0.12                        | 0.12               | 0.24                        | 0.52                    |
| \$20,000-49,000                | 1.82                 | 2.14                      | 2.29                        | 1.92               | 6.00                        | 10.83                   |
| SE                             | 0.08                 | 0.08                      | 0.10                        | 0.06               | 0.22                        | 0.23                    |
| \$50,000-69,999                | 2.18                 | 2.45                      | 2.92                        | 2.21               | 7.43                        | 13.57                   |
| SE                             | 0.11                 | 0.16                      | 0.17                        | 0.13               | 0.34                        | 0.58                    |
| \$70,000+                      | 3.08                 | 3.33                      | 3.98                        | 2.89               | 9.68                        | 19.20                   |
| SE                             | 0.10                 | 0.12                      | 0.14                        | 0.10               | 0.26                        | 0.47                    |
| <b>IRI</b>                     |                      |                           |                             |                    |                             |                         |
| \$0-9,999                      | 1.01                 | 1.10                      | 2.20                        | 1.16               | 4.49                        | 8.76                    |
| SE                             | 0.05                 | 0.05                      | 0.10                        | 0.05               | 0.19                        | 0.37                    |
| \$10,000-19,999                | 1.04                 | 1.09                      | 2.18                        | 1.16               | 4.35                        | 8.58                    |
| SE                             | 0.04                 | 0.03                      | 0.06                        | 0.03               | 0.12                        | 0.26                    |
| \$20,000-49,000                | 1.27                 | 1.34                      | 2.41                        | 1.32               | 4.80                        | 10.08                   |
| SE                             | 0.02                 | 0.02                      | 0.03                        | 0.01               | 0.05                        | 0.11                    |
| \$50,000-69,999                | 1.54                 | 1.49                      | 2.66                        | 1.43               | 5.30                        | 11.45                   |
| SE                             | 0.03                 | 0.02                      | 0.04                        | 0.02               | 0.08                        | 0.17                    |
| \$70,000+                      | 1.73                 | 1.51                      | 2.71                        | 1.45               | 5.71                        | 12.44                   |
| SE                             | 0.02                 | 0.02                      | 0.03                        | 0.01               | 0.06                        | 0.12                    |
| <b>IRI as percentage of CE</b> |                      |                           |                             |                    |                             |                         |
| \$0-9,999                      | 72%                  | 70%                       | 139%                        | 81%                | 107%                        | 111%                    |
| \$10,000-19,999                | 82%                  | 59%                       | 121%                        | 77%                | 94%                         | 103%                    |
| \$20,000-49,000                | 70%                  | 63%                       | 105%                        | 69%                | 80%                         | 93%                     |
| \$50,000-69,999                | 71%                  | 61%                       | 91%                         | 65%                | 71%                         | 84%                     |
| \$70,000+                      | 56%                  | 45%                       | 68%                         | 50%                | 59%                         | 65%                     |

SE = Standard error

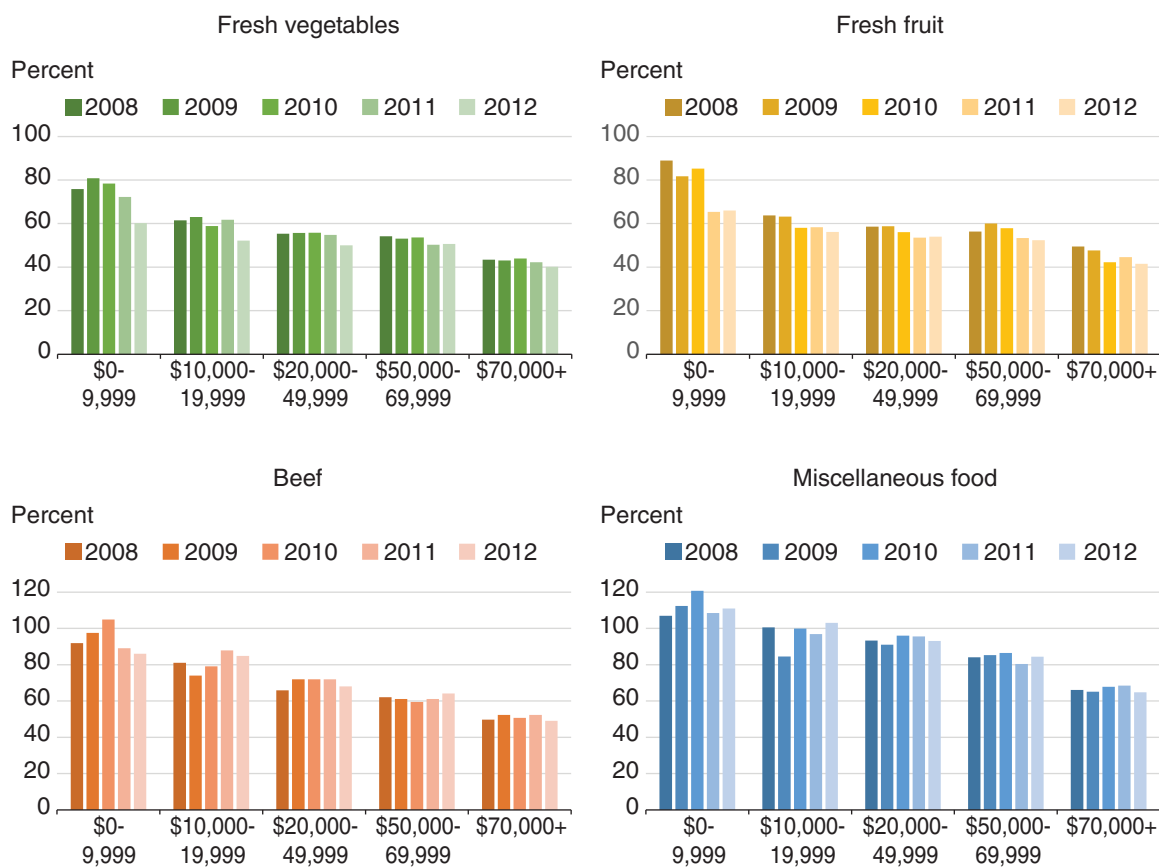
Source: USDA, Economic Research Service estimates using IRI and CE data, 2012.

Examples of these spending differences across income groups are also illustrated in figure 8, which shows spending in IRI as a percentage of CE across years for four food categories: fresh vegetables, fresh fruit, beef, and miscellaneous food.

Some differences in spending among income groups may be due to quality of household reporting. Low-income households may respond better to the rewards and incentives offered by IRI to report their purchases. For example, households collect points for reporting each trip, so rewards-focused households may be better incentivized to report all trips, including small purchases such as candy or beverages, food categories that showed larger discrepancies among income groups. Alternatively, high-income households may report a less complete record of expenditures due to the voluntary nature of the survey and the high cost of time devoted to reporting.

Figure 8

**Expenditures in IRI as a percentage of those in Consumer Expenditure Survey (CE) by income group, 2008-12**



Source: USDA, Economic Research Service estimates using IRI and CE data, 2008-12.

Another possibility is that low-income households in IRI may not be representative of low-income households in the population. Households in IRI self-report income and are not drawn from a statistical sampling frame. IRI weights the households to be representative of the population, but expenditures from very-low-income households in IRI are projected out from a relatively small number of households. If these households are nonrepresentative in a way that results in higher expenditure patterns, expenditures for low-income households would be overstated in the IRI data. However, overall, it is very difficult to discern the reasons for these differences among income groups.

*By Race and Ethnicity*

Expenditures in IRI were lower than those in CE across racial groups for almost all food categories (table 5; 2012 data only). The majority of households in the IRI panel are headed by a White household member, so IRI’s coverage of expenditures relative to CE for White-headed households was similar to the average for all races. In general, IRI covered a higher percentage of expenditures relative to CE for Black-headed households and a lower percentage of expenditures relative to CE for households headed by a member of another race (non-Black, non-White).

Table 5

**Average weekly household expenditures by category and race, Consumer Expenditure Survey (CE) and IRI, 2012**

| Race                           | Cereal and cereal products (\$) | Bakery products (\$) | Beef (\$) | Pork (\$) | Other Meat (\$) | Poultry (\$) |
|--------------------------------|---------------------------------|----------------------|-----------|-----------|-----------------|--------------|
| <b>CE</b>                      |                                 |                      |           |           |                 |              |
| White                          | 3.50                            | 7.17                 | 4.46      | 3.10      | 2.45            | 2.94         |
| SE                             | 0.07                            | 0.16                 | 0.14      | 0.08      | 0.07            | 0.06         |
| Black                          | 3.06                            | 4.70                 | 3.62      | 3.44      | 1.86            | 3.64         |
| SE                             | 0.14                            | 0.25                 | 0.22      | 0.31      | 0.16            | 0.26         |
| Other                          | 4.54                            | 6.78                 | 4.38      | 3.89      | 2.01            | 3.65         |
| SE                             | 0.51                            | 0.44                 | 0.40      | 0.37      | 0.23            | 0.36         |
| <b>IRI</b>                     |                                 |                      |           |           |                 |              |
| White                          | 2.54                            | 4.80                 | 2.77      | 1.94      | 1.85            | 2.02         |
| SE                             | 0.02                            | 0.03                 | 0.03      | 0.02      | 0.02            | 0.02         |
| Black                          | 2.05                            | 4.02                 | 2.18      | 2.46      | 1.47            | 2.71         |
| SE                             | 0.05                            | 0.24                 | 0.07      | 0.06      | 0.07            | 0.08         |
| Other                          | 2.51                            | 4.07                 | 2.60      | 1.89      | 1.55            | 2.28         |
| SE                             | 0.07                            | 0.10                 | 0.09      | 0.06      | 0.05            | 0.07         |
| <b>IRI as percentage of CE</b> |                                 |                      |           |           |                 |              |
| White                          | 73%                             | 67%                  | 62%       | 63%       | 76%             | 69%          |
| Black                          | 67%                             | 86%                  | 60%       | 72%       | 79%             | 75%          |
| Other                          | 55%                             | 60%                  | 59%       | 49%       | 77%             | 62%          |

—continued

Table 5

**Average weekly household expenditures by category and race, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Race                           | Fish and seafood (\$) | Eggs (\$) | Fresh milk and cream (\$) | Other dairy (\$) | Fresh fruit (\$) | Fresh vegetables (\$) |
|--------------------------------|-----------------------|-----------|---------------------------|------------------|------------------|-----------------------|
| <b>CE</b>                      |                       |           |                           |                  |                  |                       |
| White                          | 2.24                  | 1.02      | 3.06                      | 5.53             | 5.18             | 4.43                  |
| SE                             | 0.09                  | 0.02      | 0.05                      | 0.08             | 0.10             | 0.08                  |
| Black                          | 2.64                  | 0.87      | 1.85                      | 3.01             | 3.18             | 2.85                  |
| SE                             | 0.29                  | 0.05      | 0.09                      | 0.18             | 0.16             | 0.16                  |
| Other                          | 4.42                  | 1.32      | 3.41                      | 4.07             | 6.89             | 6.49                  |
| SE                             | 0.41                  | 0.09      | 0.28                      | 0.31             | 0.49             | 0.34                  |
| <b>IRI</b>                     |                       |           |                           |                  |                  |                       |
| White                          | 1.13                  | 0.50      | 2.20                      | 4.93             | 2.52             | 2.10                  |
| SE                             | 0.01                  | 0.00      | 0.02                      | 0.03             | 0.02             | 0.02                  |
| Black                          | 1.69                  | 0.48      | 1.16                      | 3.04             | 2.14             | 1.55                  |
| SE                             | 0.06                  | 0.01      | 0.03                      | 0.07             | 0.06             | 0.04                  |
| Other                          | 1.44                  | 0.52      | 1.88                      | 3.92             | 2.62             | 2.23                  |
| SE                             | 0.05                  | 0.01      | 0.05                      | 0.10             | 0.08             | 0.07                  |
| <b>IRI as percentage of CE</b> |                       |           |                           |                  |                  |                       |
| White                          | 50%                   | 49%       | 72%                       | 89%              | 49%              | 47%                   |
| Black                          | 64%                   | 55%       | 63%                       | 101%             | 67%              | 54%                   |
| Other                          | 33%                   | 39%       | 55%                       | 96%              | 38%              | 34%                   |

—continued

Table 5

**Average weekly household expenditures by category and race, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Race                           | Processed fruit (\$) | Processed vegetables (\$) | Sugar and other sweets (\$) | Fats and oils (\$) | Nonalcoholic beverages (\$) | Miscellaneous food (\$) |
|--------------------------------|----------------------|---------------------------|-----------------------------|--------------------|-----------------------------|-------------------------|
| <b>CE</b>                      |                      |                           |                             |                    |                             |                         |
| White                          | 2.23                 | 2.52                      | 2.94                        | 2.27               | 7.46                        | 14.08                   |
| SE                             | 0.05                 | 0.07                      | 0.10                        | 0.05               | 0.13                        | 0.30                    |
| Black                          | 1.87                 | 2.28                      | 1.98                        | 1.77               | 5.13                        | 8.96                    |
| SE                             | 0.09                 | 0.14                      | 0.10                        | 0.10               | 0.24                        | 0.44                    |
| Other                          | 2.25                 | 2.58                      | 2.91                        | 2.07               | 6.36                        | 14.14                   |
| SE                             | 0.14                 | 0.30                      | 0.34                        | 0.20               | 0.43                        | 0.94                    |
| <b>IRI</b>                     |                      |                           |                             |                    |                             |                         |
| White                          | 1.44                 | 1.44                      | 2.66                        | 1.41               | 5.33                        | 11.25                   |
| SE                             | 0.01                 | 0.01                      | 0.02                        | 0.01               | 0.04                        | 0.07                    |
| Black                          | 1.47                 | 1.28                      | 1.97                        | 1.22               | 4.33                        | 9.39                    |
| SE                             | 0.04                 | 0.03                      | 0.05                        | 0.03               | 0.10                        | 0.24                    |
| Other                          | 1.43                 | 1.10                      | 2.16                        | 1.17               | 4.76                        | 10.46                   |
| SE                             | 0.04                 | 0.03                      | 0.06                        | 0.03               | 0.12                        | 0.27                    |
| <b>IRI as percentage of CE</b> |                      |                           |                             |                    |                             |                         |
| White                          | 65%                  | 57%                       | 90%                         | 62%                | 71%                         | 80%                     |
| Black                          | 79%                  | 56%                       | 99%                         | 69%                | 84%                         | 105%                    |
| Other                          | 63%                  | 43%                       | 74%                         | 56%                | 75%                         | 74%                     |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2012.

For most categories, reported expenditures by Black households were more similar to their counterparts in CE than those by White households or households of other races. For other dairy, sugar and other sweets, and miscellaneous food, Black households' reported expenditures in IRI were not significantly different from those in CE.

Households of other races in IRI had particularly low expenditures for fresh fruits and vegetables, eggs, and fish and seafood compared to CE. For these categories, reported expenditures by these households in IRI were less than 40 percent of CE spending.

Expenditures in IRI were also lower than CE in most categories for both Hispanic and non-Hispanic households. There were no clear, systemic differences in how well IRI captured expenditures of Hispanic households compared to non-Hispanic households. However, the number of Hispanic households is relatively small in both the CE and IRI surveys; therefore, estimates of household spending by category were more variable for these households, and differences were less likely to be significant.



## By Region

Expenditures in IRI were lower than those in CE for most categories in each census region (table 6; 2012 data only). There was some variation, but no regions showed a consistent pattern of higher or lower expenditures relative to CE across categories.

Table 6

### Average weekly household expenditures by category and region, Consumer Expenditure Survey (CE) and IRI, 2012

| Region                         | Cereal and cereal products (\$) | Bakery products (\$) | Beef (\$) | Pork (\$) | Other meat (\$) | Poultry (\$) |
|--------------------------------|---------------------------------|----------------------|-----------|-----------|-----------------|--------------|
| <b>CE</b>                      |                                 |                      |           |           |                 |              |
| Northeast                      | 3.73                            | 7.49                 | 4.18      | 3.04      | 2.76            | 3.40         |
| SE                             | 0.14                            | 0.23                 | 0.18      | 0.11      | 0.16            | 0.07         |
| Midwest                        | 3.59                            | 7.26                 | 4.40      | 3.01      | 2.52            | 2.70         |
| SE                             | 0.18                            | 0.32                 | 0.32      | 0.24      | 0.13            | 0.14         |
| South                          | 3.15                            | 6.20                 | 4.39      | 3.43      | 2.09            | 2.96         |
| SE                             | 0.13                            | 0.28                 | 0.23      | 0.18      | 0.10            | 0.12         |
| West                           | 3.83                            | 7.03                 | 4.42      | 3.06      | 2.24            | 3.36         |
| SE                             | 0.18                            | 0.27                 | 0.30      | 0.14      | 0.13            | 0.16         |
| <b>IRI</b>                     |                                 |                      |           |           |                 |              |
| Northeast                      | 2.65                            | 5.30                 | 2.72      | 1.84      | 2.23            | 2.50         |
| SE                             | 0.04                            | 0.07                 | 0.06      | 0.04      | 0.05            | 0.05         |
| Midwest                        | 2.46                            | 4.51                 | 2.47      | 2.00      | 1.69            | 1.80         |
| SE                             | 0.03                            | 0.05                 | 0.04      | 0.03      | 0.02            | 0.03         |
| South                          | 2.32                            | 4.56                 | 2.70      | 2.09      | 1.68            | 2.14         |
| SE                             | 0.03                            | 0.08                 | 0.04      | 0.03      | 0.03            | 0.03         |
| West                           | 2.66                            | 4.31                 | 2.85      | 1.96      | 1.64            | 2.14         |
| SE                             | 0.04                            | 0.06                 | 0.06      | 0.03      | 0.03            | 0.04         |
| <b>IRI as percentage of CE</b> |                                 |                      |           |           |                 |              |
| Northeast                      | 71%                             | 71%                  | 65%       | 61%       | 81%             | 74%          |
| Midwest                        | 69%                             | 62%                  | 56%       | 66%       | 67%             | 67%          |
| South                          | 74%                             | 74%                  | 61%       | 61%       | 80%             | 72%          |
| West                           | 70%                             | 61%                  | 65%       | 64%       | 73%             | 64%          |

—continued

Table 6

**Average weekly household expenditures by category and region, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Region                         | Fish and seafood (\$) | Eggs (\$) | Fresh milk and cream (\$) | Other dairy (\$) | Fresh fruit (\$) | Fresh vegetables (\$) |
|--------------------------------|-----------------------|-----------|---------------------------|------------------|------------------|-----------------------|
| <b>CE</b>                      |                       |           |                           |                  |                  |                       |
| Northeast                      | 2.75                  | 1.06      | 2.94                      | 5.66             | 5.48             | 4.79                  |
| SE                             | 0.15                  | 0.04      | 0.08                      | 0.13             | 0.28             | 0.16                  |
| Midwest                        | 2.00                  | 0.96      | 2.81                      | 5.41             | 5.07             | 4.00                  |
| SE                             | 0.21                  | 0.05      | 0.09                      | 0.21             | 0.15             | 0.18                  |
| South                          | 2.24                  | 0.96      | 2.84                      | 4.48             | 4.19             | 3.80                  |
| SE                             | 0.14                  | 0.03      | 0.12                      | 0.16             | 0.15             | 0.15                  |
| West                           | 2.81                  | 1.15      | 3.17                      | 5.53             | 6.05             | 5.26                  |
| SE                             | 0.25                  | 0.03      | 0.13                      | 0.15             | 0.30             | 0.17                  |
| <b>IRI</b>                     |                       |           |                           |                  |                  |                       |
| Northeast                      | 1.52                  | 0.54      | 2.17                      | 5.22             | 2.63             | 2.39                  |
| SE                             | 0.03                  | 0.01      | 0.03                      | 0.07             | 0.05             | 0.04                  |
| Midwest                        | 0.90                  | 0.45      | 2.07                      | 4.63             | 2.46             | 1.77                  |
| SE                             | 0.02                  | 0.01      | 0.03                      | 0.05             | 0.04             | 0.02                  |
| South                          | 1.25                  | 0.50      | 1.97                      | 4.16             | 2.29             | 1.93                  |
| SE                             | 0.02                  | 0.01      | 0.02                      | 0.04             | 0.03             | 0.02                  |
| West                           | 1.28                  | 0.52      | 2.04                      | 4.80             | 2.73             | 2.26                  |
| SE                             | 0.02                  | 0.01      | 0.03                      | 0.06             | 0.05             | 0.04                  |
| <b>IRI as percentage of CE</b> |                       |           |                           |                  |                  |                       |
| Northeast                      | 55%                   | 51%       | 74%                       | 92%              | 48%              | 50%                   |
| Midwest                        | 45%                   | 47%       | 74%                       | 86%              | 49%              | 44%                   |
| South                          | 56%                   | 52%       | 69%                       | 93%              | 55%              | 51%                   |
| West                           | 45%                   | 45%       | 64%                       | 87%              | 45%              | 43%                   |

—continued

Table 6

**Average weekly household expenditures by category and region, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Region                         | Processed fruit (\$) | Processed vegetables (\$) | Sugar and other sweets (\$) | Fats and oils (\$) | Non-alcoholic beverages (\$) | Miscellaneous food (\$) |
|--------------------------------|----------------------|---------------------------|-----------------------------|--------------------|------------------------------|-------------------------|
| <b>CE</b>                      |                      |                           |                             |                    |                              |                         |
| Northeast                      | 2.43                 | 2.61                      | 2.59                        | 2.19               | 7.08                         | 12.57                   |
| SE                             | 0.10                 | 0.12                      | 0.12                        | 0.11               | 0.23                         | 0.23                    |
| Midwest                        | 2.33                 | 2.70                      | 3.07                        | 2.29               | 7.08                         | 14.22                   |
| SE                             | 0.12                 | 0.18                      | 0.15                        | 0.10               | 0.32                         | 0.49                    |
| South                          | 1.87                 | 2.40                      | 2.60                        | 2.04               | 7.10                         | 12.35                   |
| SE                             | 0.08                 | 0.11                      | 0.13                        | 0.07               | 0.22                         | 0.46                    |
| West                           | 2.36                 | 2.39                      | 3.15                        | 2.36               | 7.24                         | 15.31                   |
| SE                             | 0.10                 | 0.11                      | 0.21                        | 0.10               | 0.25                         | 0.81                    |
| <b>IRI</b>                     |                      |                           |                             |                    |                              |                         |
| Northeast                      | 1.56                 | 1.38                      | 2.45                        | 1.43               | 5.37                         | 10.42                   |
| SE                             | 0.03                 | 0.02                      | 0.03                        | 0.02               | 0.08                         | 0.15                    |
| Midwest                        | 1.44                 | 1.37                      | 2.72                        | 1.31               | 5.04                         | 11.04                   |
| SE                             | 0.02                 | 0.02                      | 0.03                        | 0.01               | 0.06                         | 0.13                    |
| South                          | 1.35                 | 1.48                      | 2.41                        | 1.35               | 5.13                         | 10.84                   |
| SE                             | 0.02                 | 0.02                      | 0.02                        | 0.01               | 0.05                         | 0.12                    |
| West                           | 1.51                 | 1.25                      | 2.59                        | 1.38               | 5.13                         | 11.47                   |
| SE                             | 0.03                 | 0.02                      | 0.04                        | 0.02               | 0.08                         | 0.16                    |
| <b>IRI as percentage of CE</b> |                      |                           |                             |                    |                              |                         |
| Northeast                      | 64%                  | 53%                       | 95%                         | 65%                | 76%                          | 83%                     |
| Midwest                        | 62%                  | 51%                       | 89%                         | 57%                | 71%                          | 78%                     |
| South                          | 72%                  | 62%                       | 93%                         | 66%                | 72%                          | 88%                     |
| West                           | 64%                  | 52%                       | 82%                         | 58%                | 71%                          | 75%                     |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2012.

*By Household Size*

Household FAH expenditures increased as a function of household size across the 18 food categories in both CE and IRI (table 7; 2012 data only). Just as with income, however, expenditures in IRI did not increase as much as those by corresponding households in CE as household size increased. The largest difference in IRI coverage of expenditures occurred between one-person and two-person households, and each increase in the size of household led to cumulatively larger differences in spending between IRI and CE.

Table 7

**Average weekly household expenditures by category and household size, Consumer Expenditure Survey (CE) and IRI, 2012**

| Household size                 | Cereal and cereal products (\$) | Bakery products (\$) | Beef (\$) | Pork (\$) | Other meat (\$) | Poultry (\$) |
|--------------------------------|---------------------------------|----------------------|-----------|-----------|-----------------|--------------|
| <b>CE</b>                      |                                 |                      |           |           |                 |              |
| 1                              | 1.62                            | 3.57                 | 1.77      | 1.47      | 1.18            | 1.48         |
| SE                             | 0.06                            | 0.11                 | 0.10      | 0.09      | 0.06            | 0.08         |
| 2                              | 3.20                            | 6.65                 | 4.33      | 3.25      | 2.30            | 2.98         |
| SE                             | 0.09                            | 0.21                 | 0.16      | 0.14      | 0.09            | 0.12         |
| 3                              | 4.18                            | 7.87                 | 5.77      | 3.86      | 2.65            | 3.72         |
| SE                             | 0.21                            | 0.28                 | 0.37      | 0.21      | 0.13            | 0.14         |
| 4                              | 5.19                            | 9.83                 | 5.58      | 4.64      | 3.42            | 4.38         |
| SE                             | 0.17                            | 0.37                 | 0.26      | 0.25      | 0.19            | 0.17         |
| 5+                             | 6.68                            | 11.45                | 8.26      | 4.98      | 4.04            | 5.24         |
| SE                             | 0.33                            | 0.48                 | 0.76      | 0.29      | 0.22            | 0.28         |
| <b>IRI</b>                     |                                 |                      |           |           |                 |              |
| 1                              | 1.30                            | 2.97                 | 1.40      | 1.16      | 1.05            | 1.17         |
| SE                             | 0.02                            | 0.04                 | 0.03      | 0.02      | 0.02            | 0.02         |
| 2                              | 2.27                            | 4.72                 | 2.92      | 2.19      | 1.83            | 2.01         |
| SE                             | 0.02                            | 0.09                 | 0.04      | 0.02      | 0.02            | 0.03         |
| 3                              | 2.78                            | 5.09                 | 3.16      | 2.24      | 2.07            | 2.59         |
| SE                             | 0.05                            | 0.08                 | 0.07      | 0.04      | 0.05            | 0.06         |
| 4                              | 3.46                            | 5.76                 | 3.18      | 2.34      | 2.26            | 2.82         |
| SE                             | 0.06                            | 0.10                 | 0.07      | 0.05      | 0.07            | 0.06         |
| 5+                             | 4.29                            | 6.26                 | 3.75      | 2.64      | 2.31            | 3.28         |
| SE                             | 0.10                            | 0.14                 | 0.13      | 0.07      | 0.06            | 0.09         |
| <b>IRI as percentage of CE</b> |                                 |                      |           |           |                 |              |
| 1                              | 80%                             | 83%                  | 79%       | 79%       | 89%             | 79%          |
| 2                              | 71%                             | 71%                  | 67%       | 67%       | 79%             | 67%          |
| 3                              | 66%                             | 65%                  | 55%       | 58%       | 78%             | 70%          |
| 4                              | 67%                             | 59%                  | 57%       | 50%       | 66%             | 64%          |
| 5+                             | 64%                             | 55%                  | 45%       | 53%       | 57%             | 63%          |

—continued

Table 7

**Average weekly household expenditures by category and household size, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Household size                 | Fish and seafood (\$) | Eggs (\$) | Fresh milk and cream (\$) | Other dairy (\$) | Fresh fruit (\$) | Fresh vegetables (\$) |
|--------------------------------|-----------------------|-----------|---------------------------|------------------|------------------|-----------------------|
| <b>CE</b>                      |                       |           |                           |                  |                  |                       |
| 1                              | 1.08                  | 0.56      | 1.45                      | 2.53             | 2.56             | 2.27                  |
| SE                             | 0.10                  | 0.02      | 0.05                      | 0.08             | 0.09             | 0.08                  |
| 2                              | 2.70                  | 1.01      | 2.63                      | 5.34             | 5.04             | 4.67                  |
| SE                             | 0.18                  | 0.03      | 0.07                      | 0.16             | 0.16             | 0.17                  |
| 3                              | 2.58                  | 1.19      | 3.40                      | 5.97             | 5.76             | 4.86                  |
| SE                             | 0.16                  | 0.05      | 0.12                      | 0.19             | 0.19             | 0.14                  |
| 4                              | 3.51                  | 1.34      | 4.44                      | 7.42             | 7.40             | 6.09                  |
| SE                             | 0.19                  | 0.07      | 0.15                      | 0.26             | 0.32             | 0.22                  |
| 5+                             | 3.55                  | 1.69      | 5.45                      | 7.73             | 7.77             | 6.12                  |
| SE                             | 0.36                  | 0.08      | 0.26                      | 0.34             | 0.45             | 0.32                  |
| <b>IRI</b>                     |                       |           |                           |                  |                  |                       |
| 1                              | 0.87                  | 0.32      | 1.17                      | 2.99             | 1.79             | 1.43                  |
| SE                             | 0.02                  | 0.00      | 0.02                      | 0.04             | 0.03             | 0.03                  |
| 2                              | 1.40                  | 0.54      | 1.96                      | 4.71             | 2.64             | 2.35                  |
| SE                             | 0.02                  | 0.01      | 0.02                      | 0.04             | 0.03             | 0.03                  |
| 3                              | 1.34                  | 0.54      | 2.34                      | 5.10             | 2.69             | 2.25                  |
| SE                             | 0.03                  | 0.01      | 0.04                      | 0.08             | 0.06             | 0.05                  |
| 4                              | 1.30                  | 0.59      | 2.77                      | 5.73             | 2.90             | 2.21                  |
| SE                             | 0.04                  | 0.01      | 0.05                      | 0.10             | 0.07             | 0.05                  |
| 5+                             | 1.34                  | 0.64      | 3.10                      | 5.97             | 2.91             | 2.14                  |
| SE                             | 0.04                  | 0.02      | 0.08                      | 0.14             | 0.09             | 0.06                  |
| <b>IRI as percentage of CE</b> |                       |           |                           |                  |                  |                       |
| 1                              | 80%                   | 57%       | 81%                       | 118%             | 70%              | 63%                   |
| 2                              | 52%                   | 53%       | 75%                       | 88%              | 52%              | 50%                   |
| 3                              | 52%                   | 46%       | 69%                       | 85%              | 47%              | 46%                   |
| 4                              | 37%                   | 44%       | 62%                       | 77%              | 39%              | 36%                   |
| 5+                             | 38%                   | 38%       | 57%                       | 77%              | 37%              | 35%                   |

—continued

Table 7

**Average weekly household expenditures by category and household size, Consumer Expenditure Survey (CE) and IRI, 2012—continued**

| Household size                 | Processed fruit (\$) | Processed vegetables (\$) | Sugar and other sweets (\$) | Fats and oils (\$) | Nonalcoholic beverages (\$) | Miscellaneous food (\$) |
|--------------------------------|----------------------|---------------------------|-----------------------------|--------------------|-----------------------------|-------------------------|
| <b>CE</b>                      |                      |                           |                             |                    |                             |                         |
| 1                              | 1.23                 | 1.30                      | 1.43                        | 1.13               | 3.85                        | 6.80                    |
| SE                             | 0.07                 | 0.07                      | 0.07                        | 0.05               | 0.16                        | 0.23                    |
| 2                              | 2.09                 | 2.45                      | 2.88                        | 2.22               | 7.27                        | 13.16                   |
| SE                             | 0.08                 | 0.10                      | 0.13                        | 0.08               | 0.23                        | 0.46                    |
| 3                              | 2.56                 | 3.01                      | 3.20                        | 2.56               | 8.51                        | 15.99                   |
| SE                             | 0.08                 | 0.13                      | 0.20                        | 0.11               | 0.32                        | 0.56                    |
| 4                              | 3.11                 | 3.43                      | 3.91                        | 2.99               | 9.35                        | 19.85                   |
| SE                             | 0.18                 | 0.16                      | 0.26                        | 0.14               | 0.37                        | 0.69                    |
| 5+                             | 3.45                 | 4.13                      | 4.64                        | 3.59               | 11.02                       | 21.18                   |
| SE                             | 0.20                 | 0.28                      | 0.28                        | 0.20               | 0.51                        | 1.00                    |
| <b>IRI</b>                     |                      |                           |                             |                    |                             |                         |
| 1                              | 0.89                 | 0.84                      | 1.79                        | 0.87               | 3.39                        | 7.49                    |
| SE                             | 0.01                 | 0.01                      | 0.02                        | 0.01               | 0.05                        | 0.11                    |
| 2                              | 1.35                 | 1.47                      | 2.61                        | 1.43               | 5.39                        | 10.83                   |
| SE                             | 0.01                 | 0.01                      | 0.02                        | 0.01               | 0.05                        | 0.10                    |
| 3                              | 1.61                 | 1.59                      | 2.71                        | 1.51               | 5.95                        | 12.42                   |
| SE                             | 0.03                 | 0.03                      | 0.04                        | 0.02               | 0.10                        | 0.21                    |
| 4                              | 1.99                 | 1.65                      | 2.90                        | 1.58               | 6.15                        | 13.33                   |
| SE                             | 0.04                 | 0.03                      | 0.05                        | 0.03               | 0.11                        | 0.23                    |
| 5+                             | 2.13                 | 1.83                      | 3.32                        | 1.84               | 6.30                        | 14.50                   |
| SE                             | 0.06                 | 0.04                      | 0.08                        | 0.04               | 0.15                        | 0.34                    |
| <b>IRI as percentage of CE</b> |                      |                           |                             |                    |                             |                         |
| 1                              | 72%                  | 65%                       | 125%                        | 77%                | 88%                         | 110%                    |
| 2                              | 65%                  | 60%                       | 90%                         | 64%                | 74%                         | 82%                     |
| 3                              | 63%                  | 53%                       | 85%                         | 59%                | 70%                         | 78%                     |
| 4                              | 64%                  | 48%                       | 74%                         | 53%                | 66%                         | 67%                     |
| 5+                             | 62%                  | 44%                       | 72%                         | 51%                | 57%                         | 68%                     |

SE = Standard error

Source: USDA, Economic Research Service estimates using IRI and CE data, 2012.

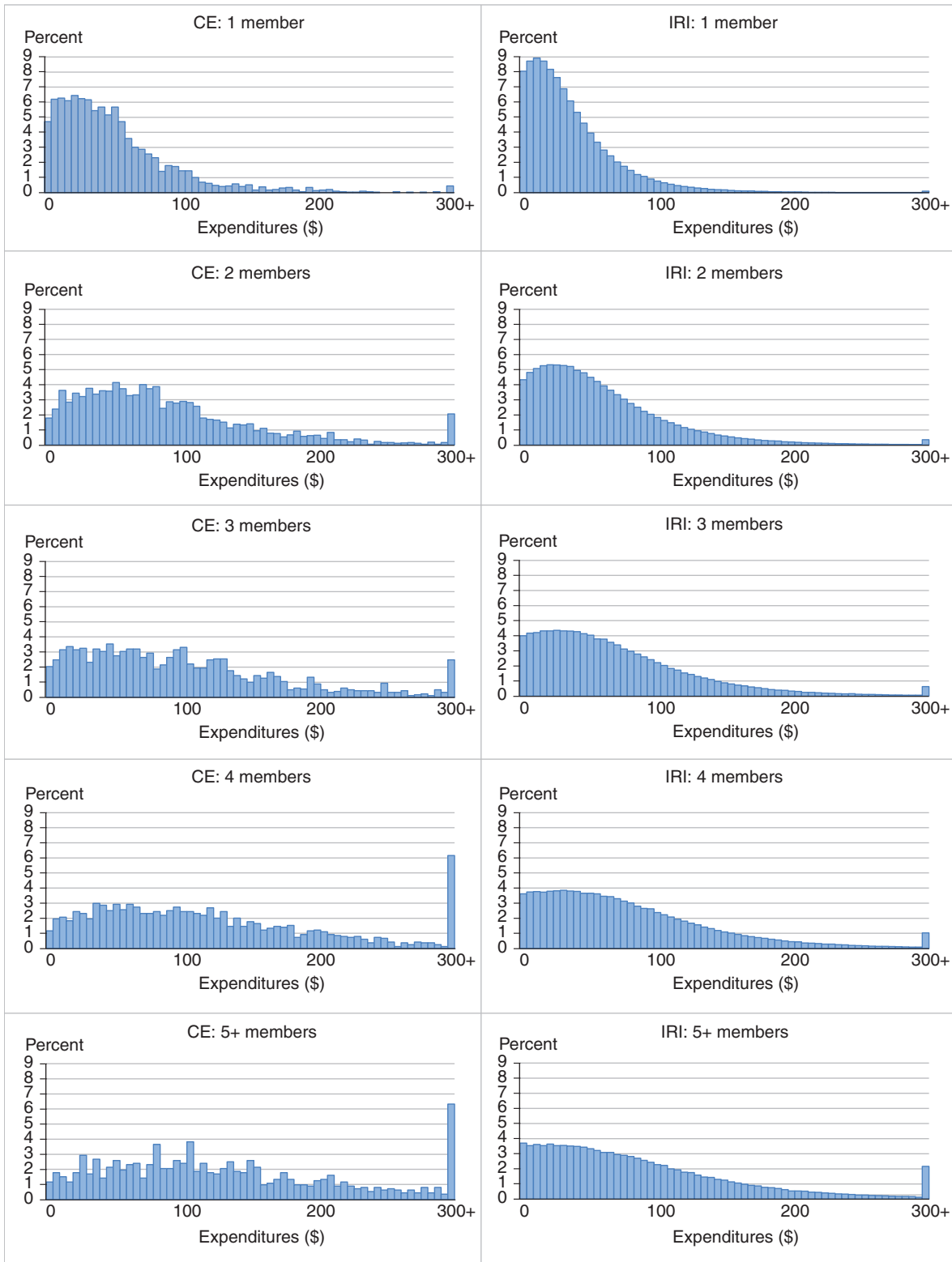
Expenditures were more similar between surveys for one-member households, where IRI spending was around 80 percent or greater of CE spending for most categories. Additionally, spending on sugar and other sweets, other dairy, and miscellaneous food in IRI surpassed spending in CE for one-person households.

For larger households (4 and 5+ members), expenditures in IRI were particularly low for fresh fruit, fresh vegetables, eggs, and fish and seafood. For these larger household sizes, IRI spending was less than 40 percent of CE spending for most of these categories.

Across all household sizes, weekly expenditures were more concentrated at lower expenditure levels in IRI than CE, but this effect was especially pronounced for larger households (fig. 9; 2012 data only). These differences among household sizes may have implications for research using IRI to understand larger households or households with children.

Figure 9

**Distribution of weekly food-at-home expenditures by household size, Consumer Expenditure Survey (CE) and IRI, 2012**



Source: USDA, Economic Research Service estimates using IRI and CE data, 2012.



Overall, across almost all demographic groups, IRI expenditures were lower than CE expenditures for most food categories. IRI expenditures relative to CE did show variation across demographic groups, with lower relative spending by certain demographic groups in IRI. In particular, as income and household size increased, households in IRI showed smaller corresponding increases in expenditures compared to similar households in CE.

However, the patterns in IRI spending relative to CE by category were consistent across demographic groups. For all demographic groups, IRI expenditures on eggs, fresh fruit and vegetables, fish and seafood, and processed fruits and vegetables were among the lowest relative to CE. IRI expenditures on sugar and other sweets, other dairy, and miscellaneous food were the highest relative to CE across demographic groups.

## Conclusion

Estimates of household food expenditures from the IRI Consumer Network survey were compared to two Government surveys, CE and FoodAPS. The results show that expenditures in IRI were lower than expenditures in CE and FoodAPS for all food categories. The magnitude and variation of these differences across food categories, years, and household demographic characteristics may have implications for research using the data.

IRI expenditures across all product groups were consistently, but not uniformly, lower than those in CE and FoodAPS. The differences in estimated expenditures varied by product group, with comparatively lower expenditures in IRI for many of the food categories containing random-weight items, including fresh fruits, fresh vegetables, and fish and seafood. Expenditures in IRI were more comparable to CE and FoodAPS for food categories comprising UPC-labeled products. Therefore, researchers should be cautious when drawing conclusions based on purchases of random-weight items, particularly fresh fruits and vegetables.

These expenditure trends also held across time, as expenditures in IRI were also lower than CE for all food categories across all years studied—2008 to 2012. IRI expenditures showed some variation relative to CE across years but were relatively consistent overall. IRI expenditures as a percent of CE expenditures varied by less than 10 percentage points over the 5-year period for 17 of the 18 categories. However, the year-over-year comparison also showed that households' responses to macroeconomic conditions over the period were slightly more muted in the IRI data compared to CE.

Expenditures in IRI also varied by household demographic characteristics. Expenditures in IRI were lower than those in CE across almost all demographic groups studied, but some demographic groups showed larger relative differences. In particular, as income and household size increased, IRI showed larger differences in expenditures relative to corresponding groups in CE. Despite this variation across demographic groups, the patterns in IRI's expenditures relative to CE by category were consistent across demographic groups. That is, random-weight categories, such as produce and meat, had comparatively lower expenditures in IRI for all demographic groups, and packaged food, including sugar, other dairy, and miscellaneous food, had comparatively higher expenditures in IRI for all demographic groups.

Compared to the cross-sectional CE and FoodAPS surveys, the panel design of the IRI survey confers unique benefits for conducting economic research. Almost 27,000 households are in the static panel continuously across all 5 years of the IRI data purchased by ERS (2008-12). However, the long-term nature of the panel is likely a factor in the greater level of underreporting, as households must report their expenditures for the majority of a calendar year to be included in the static panel. This results in a longer record of expenditures for each household, but households may be less diligent about recording every trip. The 1- and 2-week reporting periods of the FoodAPS and CE surveys appear to lead to a more complete reporting of household food expenditures over the reference week(s).

In addition, differences in the level of item detail, scope of purchases, and data-recording process for each survey may impact households' responses. IRI panelists recorded purchases of FAH and other consumer packaged goods at the UPC level using a scanning device. FoodAPS respondents recorded only food items, but reported both purchases and free acquisitions for all FAH and FAFH events. FoodAPS used a combination of scanning device and paper booklets and also collected data at the

UPC or item level. CE respondents recorded a range of household expenditures using a paper diary, but expenditures were collected at a less detailed product or category level. Resulting differences in the data-collection tools, respondent burden, privacy concerns, or other factors associated with the data-collection process may affect the degree of compliance and reporting across sources.

These comparison results show that researchers should be cautious when using the IRI household data for certain types of studies, such as research focusing on fresh fruits and vegetables, or on high-income or large households, and for those studies that draw conclusions about the overall composition of consumers' purchases or diets. Alternatively, research that draws on the strengths of the IRI data may take advantage of the detailed product characteristics and prices for UPC-labeled food items, large sample size, and panel design. Understanding differences in data coverage, in the nature of reported differences, as well as the advantages and disadvantages of using the IRI Consumer Network data versus other data sources will allow researchers to design suitable studies and draw appropriate conclusions when using these data for food economics research.

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## Appendix

### IRI Weighted Weekly Total Expenditure and Standard Errors

Using IRI Consumer Network data, the weighted weekly total expenditure was computed as follows:

$$X_{i,j}^{IRI} = \sum_{l=1}^{L_i} z_{i,j,l}, \quad (1)$$

where  $X_{i,j}^{IRI}$  is the IRI weighted weekly total expenditure for category  $j$  in year  $i$ ;

$L_i$  is the number of records of household weekly food expenditures in year  $i$ ; and

$z_{i,j,l}$  is the weighted expenditure amount spent on food category  $j$  in household weekly expenditure record  $l$  in year  $i$ .

$z_{i,j,l}$  can similarly be written as

$$z_{i,j,l} = (r_{i,l} \cdot e_{i,j,l}) + (q_{i,l} \cdot f_{i,j,l}), \quad (2)$$

where  $r_{i,l}$  is the “random-weight” weight for the household record  $l$  in year  $i$ ;

$e_{i,j,k}$  is the amount spent on “random-weight” UPCs in food category  $j$  in household weekly expenditure record  $k$  in year  $i$ ;

$q_{i,l}$  is the “fixed-weight” weight for the household record  $l$  in year  $i$ ; and

$f_{i,j,k}$  is the amount spent on fixed-weight UPCs in food category  $j$  in household weekly expenditure record  $k$  in year  $i$ .

Because strata and PSUs are used to compute standard errors, the method for computing standard errors differs from the methods for the Consumer Expenditure Survey (CE), which use replicate weights. The method described below was provided by Cochran (1977) for computing variance of a sample with strata and PSUs selected with unequal probabilities and with replacement.<sup>9</sup> RTI International (2012) describes how the Taylor linearization is represented in the variance formulas below.

The standard error of the weighted weekly total expenditure was computed as follows:

$$SE(X_{i,j}^{IRI}) = \sqrt{\sum_{h=1}^{H_i} \frac{n(i,h)}{n(i,h)-1} \sum_{a=1}^{nh} \left( \left( \sum_{b=1}^{mha} X_{(i,j),h,a,b}^{IRI} \right) - \bar{X}_{(i,j),h}^{IRI} \right)^2}, \quad (3)$$

<sup>9</sup> Unequal probabilities of selection are assumed, given IRI’s nonprobability sample design that targets certain groups, and the unequal weights are similar to having unequal probabilities. Sampling with replacement is assumed for variance estimation purposes when the sampling fractions are small (RTI International, 2012).

where  $SE(X_{i,j}^{IRI})$  is the standard error of the weighted weekly total expenditure estimate for subcategory  $j$  in year  $i$ ;

$H_i$  is the number of strata in year  $i$ ;

$n_{(i)h}$  is the number of PSUs in year  $i$  within stratum  $h$ ;

$m_{h,a}$  is the number of records of household weekly food expenditures within PSU  $a$  and stratum  $h$ ;

$X_{(i,j),h,a,b}^{IRI}$  is the IRI total expenditure for subcategory  $j$  in year  $i$  by household weekly food expenditure record  $b$  within PSU  $a$  and stratum  $h$ ; and

$\bar{X}_{(i,j),h}^{IRI}$  is the IRI weighted weekly mean household expenditure for subcategory  $j$  in year  $i$  within stratum  $h$ .

## IRI Weighted Weekly Mean Household Expenditure and Standard Errors

Because the weights are assigned at the item level in IRI data, the weighted weekly mean expenditure per household was calculated by computing the weighted weekly total expenditure and dividing it by the sum of the “fixed-weight” weights among the static panel. Thus, this is dividing the total weekly weighted expenditure by the number of households it is projecting to.

For the standard error computation, the weekly expenditures were divided by the sum of the “fixed-weight” weights. The standard error of the resulting quotient was computed by modifying the statistic input into the standard error computation described above in equation 3 for the IRI total weekly expenditure estimates.

The weighted weekly mean expenditure per household was computed as follows:

$$\bar{X}_{i,j}^{IRI} = \frac{\sum_{l=1}^{L_i} z_{i,j,l}}{\sum_{m=1}^{M_i} q_{i,m}} \quad (4)$$

where  $\bar{X}_{i,j}^{IRI}$  is the IRI weighted weekly mean expenditure per household for subcategory  $j$  in year  $i$ ;

$L_i$  is the number of records of household weekly food expenditures in year  $i$ ;

$z_{i,j,l}$  is the weighted expenditure amount spent on food subcategory  $j$  in household weekly expenditure record  $l$  in year  $i$  as defined above in equation 2;

$M_i$  is the number of households in the static panel for year  $i$ ; and

$q_{i,m}$  is the “fixed-weight” weight for household record  $m$  in year  $i$ .

The standard error of the weighted weekly mean household expenditure for subcategory  $j$  in year  $i$  was computed as follows:

$$SE(\bar{X}_{i,j}^{IRI}) = \sqrt{\sum_{h=1}^{H_i} \frac{n^{(i),h}}{n^{(i),h} - 1} \sum_{a=1}^{n_h} \left( \sum_{b=1}^{m_{ha}} Y_{(i,j),h,a,b}^{IRI} - \bar{Y}_{(i,j),h}^{IRI} \right)^2}, \quad (5)$$

where  $H_i$  is the number of strata in year  $i$ ;

$n^{(i),h}$  is the number of PSUs in year  $i$  within stratum  $h$ ;

$Y_{(i,j),h,a,b}^{IRI}$  is the IRI total expenditure, divided by the sum of the weights, for subcategory  $j$  in year  $i$  by household weekly food expenditure record  $b$  within PSU  $a$  and stratum  $h$ ; and

$\bar{Y}_{(i,j),h}^{IRI}$  is the IRI weighted weekly mean household expenditure, divided by the sum of the weights, for subcategory  $j$  in year  $i$  within stratum  $h$ .

$Y_{(i,j),h,a,b}^{IRI}$  can be rewritten as:

$$Y_{(i,j),h,a,b}^{IRI} = \frac{Z_{i,j,h,a,b}}{\sum_{m=1}^{M_i} q_{i,m}}, \quad (6)$$

where  $Z_{i,j,h,a,b}$  is the weighted expenditure amount spent on food subcategory  $j$  in year  $i$  by household weekly expenditure record  $b$  within PSU  $a$  and stratum  $h$  as defined above in equation 2;

$M_i$  is the number of households in the static panel for year  $i$ ; and

$q_{i,m}$  is the “fixed-weight” weight for household record  $m$  in year  $i$ .

When computing subpopulation estimates, the preceding formulas were applied only to the data for the subpopulation of interest.

Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories**

| CE CATEGORY                | KEYCAT (IRI VARIABLE)   | # UPCs |
|----------------------------|---|--------|
| CEREAL AND CEREAL PRODUCTS | ALL OTHER BAKING MIXES  | 384    |
| CEREAL AND CEREAL PRODUCTS | BREAD MIXES   | 382    |
| CEREAL AND CEREAL PRODUCTS | BREADING/BATTER/COATING MIXES (BATTER MIX, COATING, COATING FLOUR, COATING MIX, TEMPURA BATTER MIX) | 402    |
| CEREAL AND CEREAL PRODUCTS | BROWNIE MIX   | 414    |
| CEREAL AND CEREAL PRODUCTS | CAKE/CUPCAKE/PIE MIX  | 1095   |
| CEREAL AND CEREAL PRODUCTS | CHOW MEIN NOODLES   | 82     |
| CEREAL AND CEREAL PRODUCTS | COFFEE CAKE/GINGERBREAD/PASTRY MIX  | 225    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY                | KEYCAT (IRI VARIABLE)   | # UPCs |
|----------------------------|---|--------|
| CEREAL AND CEREAL PRODUCTS | COOKING STARCHES/RENNET (CORNSTARCH, FOOD THICKENER, STARCH)  | 151    |
| CEREAL AND CEREAL PRODUCTS | CORNMEAL/BAKING OAT BRAN (CORNMEAL, FLAXSEED MEAL, FLOUR, MASA, OAT BRAN, POLENTA, RICE BRAN, RYE MEAL, WHEAT BRAN) | 530    |
| CEREAL AND CEREAL PRODUCTS | DRIED BEANS/GRAINS (BARLEY, GRAIN, WHEAT)   | 304    |
| CEREAL AND CEREAL PRODUCTS | DRY NOODLES   | 1371   |
| CEREAL AND CEREAL PRODUCTS | DRY RICE  | 2777   |
| CEREAL AND CEREAL PRODUCTS | DRY RICE MIXES  | 1408   |
| CEREAL AND CEREAL PRODUCTS | DRY SALAD/SIDE DISH MIX (PASTA SIDE DISH)   | 4      |
| CEREAL AND CEREAL PRODUCTS | DRY SPAGHETTI/MACARONI/PASTA  | 8040   |
| CEREAL AND CEREAL PRODUCTS | FLOUR   | 1112   |
| CEREAL AND CEREAL PRODUCTS | FZ PASTA/NOODLES  | 1657   |
| CEREAL AND CEREAL PRODUCTS | HOMINY GRITS  | 222    |
| CEREAL AND CEREAL PRODUCTS | HOT CEREAL/OATMEAL  | 2321   |
| CEREAL AND CEREAL PRODUCTS | MUFFIN MIX  | 471    |
| CEREAL AND CEREAL PRODUCTS | PANCAKE/FRENCH TOAST/WAFFLE MIX   | 711    |
| CEREAL AND CEREAL PRODUCTS | PIECRUST MIX  | 21     |
| CEREAL AND CEREAL PRODUCTS | PIZZA CRUST MIX   | 54     |
| CEREAL AND CEREAL PRODUCTS | READY TO EAT CEREAL   | 8312   |
| CEREAL AND CEREAL PRODUCTS | RFG/DELI PASTA/NOODLE   | 827    |
| CEREAL AND CEREAL PRODUCTS | RICE CAKES/POPCORN CAKE   | 585    |
| CEREAL AND CEREAL PRODUCTS | SS HARD/SOFT TORTILLAS/TACO KIT   | 2667   |
| CEREAL AND CEREAL PRODUCTS | WHEAT GERM  | 23     |
| BAKERY PRODUCTS            | ALL OTHER CRACKERS  | 5680   |
| BAKERY PRODUCTS            | BREADCRUMBS   | 657    |
| BAKERY PRODUCTS            | BREADING/BATTER/COATING MIXES (BATTER AND BREADING MIX, BREADING MIX, CRACKER MEAL, CRUSTING BLEND)                 | 179    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY     | KEYCAT (IRI VARIABLE)                   | # UPCs |
|-----------------|---|--------|
| BAKERY PRODUCTS | CHRISTMAS CANDY (COOKIE)                | 7      |
| BAKERY PRODUCTS | COOKIE/COOKIE BAR MIX                   | 396    |
| BAKERY PRODUCTS | COOKIES                                 | 19217  |
| BAKERY PRODUCTS | CORNMEAL/BAKING OAT BRAN (CRACKER MEAL) | 2      |
| BAKERY PRODUCTS | CROUTONS-NO STUFFING CROUTONS           | 565    |
| BAKERY PRODUCTS | FZ BAGELS                               | 302    |
| BAKERY PRODUCTS | FZ COOKIE DOUGH                         | 94     |
| BAKERY PRODUCTS | FZ DOUGH BREAD/ROLLS/PASTRY             | 387    |
| BAKERY PRODUCTS | FZ FRESH BAKED BREAD/ROLLS/BISCUIT      | 1003   |
| BAKERY PRODUCTS | FZ HARD/SOFT TORTILLA                   | 27     |
| BAKERY PRODUCTS | FZ PIE/PASTRY SHELLS                    | 210    |
| BAKERY PRODUCTS | FZ PIES                                 | 513    |
| BAKERY PRODUCTS | FZ PIZZA (DOUGH)                        | 2      |
| BAKERY PRODUCTS | FZ PIZZA CRUSTS/DOUGH                   | 103    |
| BAKERY PRODUCTS | FZ PREBAKED MUFFINS                     | 57     |
| BAKERY PRODUCTS | FZ READY TO EAT COOKIES                 | 15     |
| BAKERY PRODUCTS | FZ SWEET GOODS - NO CHEESECAKE          | 835    |
| BAKERY PRODUCTS | FZ WAFFLES                              | 919    |
| BAKERY PRODUCTS | GRAHAM CRACKER CRUMBS                   | 16     |
| BAKERY PRODUCTS | GRAHAM CRACKERS                         | 522    |
| BAKERY PRODUCTS | ICE CREAM CONES                         | 280    |
| BAKERY PRODUCTS | MATZOH CRACKERS                         | 199    |
| BAKERY PRODUCTS | MATZOH MEAL                             | 77     |
| BAKERY PRODUCTS | RFG BAGELS/BIALYS                       | 278    |
| BAKERY PRODUCTS | RFG BISCUIT DOUGH                       | 723    |
| BAKERY PRODUCTS | RFG BREAD                               | 46     |
| BAKERY PRODUCTS | RFG CAKE (NO SNACK/COFFEE CAKE)         | 1090   |
| BAKERY PRODUCTS | RFG CHEESECAKE                          | 817    |
| BAKERY PRODUCTS | RFG COOKIE/BROWNIE DOUGH                | 732    |
| BAKERY PRODUCTS | RFG DINNER/SANDWICH ROLL/CROISSANT      | 35     |
| BAKERY PRODUCTS | RFG DOUGH (BREAD/ROLLS/BUN)             | 352    |
| BAKERY PRODUCTS | RFG DOUGH (PASTRY/DUMPLING)             | 322    |
| BAKERY PRODUCTS | RFG EGGROLL/WONTON WRAPPER              | 69     |
| BAKERY PRODUCTS | RFG ENGLISH MUFFIN                      | 72     |
| BAKERY PRODUCTS | RFG HARD/SOFT TORTILLA                  | 504    |
| BAKERY PRODUCTS | RFG MUFFIN                              | 5      |
| BAKERY PRODUCTS | RFG PASTRY/DANISH/COFFEE CAKE           | 119    |
| BAKERY PRODUCTS | RFG PIE (NO SNACK PIE)                  | 360    |
| BAKERY PRODUCTS | RFG PIZZA CRUST/DOUGH                   | 191    |
| BAKERY PRODUCTS | RFG SNACK CAKE/DOUGHNUT < 5OZ           | 102    |
| BAKERY PRODUCTS | SALTINE CRACKERS                        | 418    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY      | KEYCAT (IRI VARIABLE)                                 | # UPCs |
|------------------|---|--------|
| BAKERY PRODUCTS  | SS BAGELS/BIALYS                                      | 1545   |
| BAKERY PRODUCTS  | SS BREAD (NO CANNED BREAD)                            | 13538  |
| BAKERY PRODUCTS  | SS BREADSTICK   | 540    |
| BAKERY PRODUCTS  | SS CAKE (NO SNACK/COFFEE CAKE)                        | 7695   |
| BAKERY PRODUCTS  | SS CANNED BREAD                                       | 3      |
| BAKERY PRODUCTS  | SS CRACKERS WITH FILLINGS                             | 610    |
| BAKERY PRODUCTS  | SS DOUGHNUT   | 2143   |
| BAKERY PRODUCTS  | SS ENGLISH MUFFIN                                     | 701    |
| BAKERY PRODUCTS  | SS FRESH ROLL/BUN/CROISSANTS                          | 6747   |
| BAKERY PRODUCTS  | SS MUFFIN   | 2216   |
| BAKERY PRODUCTS  | SS PASTRY/DANISH/COFFEE CAKE                          | 5312   |
| BAKERY PRODUCTS  | SS PIES (NO SNACK PIES)                               | 2664   |
| BAKERY PRODUCTS  | SS RTU PIE CRUST (PIZZA CRUST)                        | 9      |
| BAKERY PRODUCTS  | SS SNACK/CUPCAKE/BROWNIE < 5OZ                        | 4654   |
| BAKERY PRODUCTS  | SS STUFFING MIX                                       | 491    |
| BAKERY PRODUCTS  | WEIGHT CONTROL/PROTEIN SUPPLEMENT (COOKIES)           | 3      |
| BEEF             | FROZEN MEAT - NO POULTRY (BEEF)                       | 1849   |
| BEEF             | RFG UNCOOKED MEATS (BEEF)                             | 1046   |
| PORK             | FROZEN MEAT - NO POULTRY (PORK)                       | 274    |
| PORK             | FZ SAUSAGE  | 580    |
| PORK             | RFG BACON   | 1902   |
| PORK             | RFG BREAKFAST SAUSAGE/HAM                             | 1500   |
| PORK             | RFG CANNED/BOTTLED HAM                                | 73     |
| PORK             | RFG DINNER SAUSAGE (POLISH/ITALIAN)                   | 5547   |
| PORK             | RFG PORK PRODUCT HOCK/FEET                            | 230    |
| PORK             | RFG PREPARED DINNER/ENTRÉE (SAUSAGE)                  | 4      |
| PORK             | RFG UNCOOKED MEATS (PORK)                             | 396    |
| PORK             | SS CANNED/BOTTLED HAM                                 | 55     |
| OTHER MEATS      | FROZEN MEAT - NO POULTRY (BISON, BUFFALO, GOAT, LAMB) | 64     |
| OTHER MEATS      | FZ FRANKFURTERS/WIENERS                               | 29     |
| OTHER MEATS      | RFG FRANKFURTER/WIENERS                               | 1992   |
| OTHER MEATS      | RFG NON SLICED LUNCH MEAT                             | 942    |
| OTHER MEATS      | RFG PREPARED DINNER/ENTRÉE (LUNCH MEAT)               | 3      |
| OTHER MEATS      | RFG SLICE/SHAVED LUNCH MEAT                           | 5703   |
| OTHER MEATS      | RFG UNCOOKED MEATS (BISON, BUFFALO, LAMB)             | 67     |
| OTHER MEATS      | SS LUNCH MEATS  | 1055   |
| POULTRY          | FROZEN MEAT - NO POULTRY (CHICKEN AND BEEF)           | 7      |
| POULTRY          | FZ RFG POULTR/POULTRY SUBSTITUTES                     | 4956   |
| POULTRY          | RFG PREPARED DELI/GOURMET FOOD (CHICKEN, TURKEY)      | 6      |
| FISH AND SEAFOOD | FZ FISH/SEAFOOD                                       | 8718   |
| FISH AND SEAFOOD | RFG FISH/HERRING/SEAFOOD                              | 2146   |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY          | KEYCAT (IRI VARIABLE)                                       | # UPCs |
|----------------------|---|--------|
| FISH AND SEAFOOD     | SS ALL OTHER FISH/SEAFOOD                                   | 2009   |
| FISH AND SEAFOOD     | SS CLAM JUICE   | 42     |
| FISH AND SEAFOOD     | SS SALMON   | 384    |
| FISH AND SEAFOOD     | SS TUNA   | 1250   |
| EGGS                 | FZ EGG SUBSTITUTES  | 18     |
| EGGS                 | RFG EGG SUBSTITUTES   | 236    |
| EGGS                 | RFG FRESH EGGS  | 3256   |
| EGGS                 | SS EGG SUBSTITUTES  | 21     |
| FRESH MILK AND CREAM | EVAPORATED CONDENSED MILK (TABLE CREAM)                     | 3      |
| FRESH MILK AND CREAM | FZ COFFEE CREAMER   | 14     |
| FRESH MILK AND CREAM | RFG COFFEE CREAMER  | 609    |
| FRESH MILK AND CREAM | RFG DAIRY CREAM/HALF & HALF/SOY TOPPING (CREAM)             | 1860   |
| FRESH MILK AND CREAM | RFG FLAVORED MILK/EGG NOG/BUTTER MILK                       | 2659   |
| FRESH MILK AND CREAM | RFG SKIM/LOW-FAT MILK                                       | 4931   |
| FRESH MILK AND CREAM | RFG WHOLE MILK  | 1873   |
| FRESH MILK AND CREAM | SOUR CREAM  | 1106   |
| FRESH MILK AND CREAM | SS COFFEE CREAMER   | 1087   |
| FRESH MILK AND CREAM | SS RTD MILK/MILK SUBSTITUTES                                | 207    |
| OTHER DAIRY PRODUCTS | ALL OTHER PROCESSED CHEESE                                  | 450    |
| OTHER DAIRY PRODUCTS | AMERICAN CHEESE-ALL FORM                                    | 1384   |
| OTHER DAIRY PRODUCTS | CHEESE SPREADS/BALLS  | 1403   |
| OTHER DAIRY PRODUCTS | COTTAGE CHEESE  | 1536   |
| OTHER DAIRY PRODUCTS | CREAM CHEESE/CREAM CHEESE SPREAD                            | 1212   |
| OTHER DAIRY PRODUCTS | EVAPORATED CONDENSED MILK (CONDENSED MILK, EVAPORATED MILK) | 456    |
| OTHER DAIRY PRODUCTS | FZ ICE CREAM/ICE MILK DESSERTS                              | 276    |
| OTHER DAIRY PRODUCTS | FZ NOVELTIES SINGLE SERVING                                 | 5957   |
| OTHER DAIRY PRODUCTS | FZ YOGURT/TOFU-CARTON                                       | 973    |
| OTHER DAIRY PRODUCTS | ICE CREAM - CARTON  | 13530  |
| OTHER DAIRY PRODUCTS | ICE CREAM MIX   | 59     |
| OTHER DAIRY PRODUCTS | ICE MILK/FZ DAIRY DESSERT                                   | 8      |
| OTHER DAIRY PRODUCTS | IMITATION CHEESE - ALL FORMS                                | 265    |
| OTHER DAIRY PRODUCTS | NATURAL CHEESE - NO SHREDDED                                | 11067  |
| OTHER DAIRY PRODUCTS | NATURAL SHREDDED CHEESE                                     | 3108   |
| OTHER DAIRY PRODUCTS | POWDERED MILK   | 232    |
| OTHER DAIRY PRODUCTS | PROCESSED SHREDDED CHEESE                                   | 20     |
| OTHER DAIRY PRODUCTS | RFG BUTTER ALL FLAVORS                                      | 1035   |
| OTHER DAIRY PRODUCTS | RFG FLAVORED MILK/EGG NOG/BUTTER MILK (EGG NOG)             | 1257   |
| OTHER DAIRY PRODUCTS | RFG GRATED CHEESE   | 276    |
| OTHER DAIRY PRODUCTS | RFG KEFIR/SUBSTITUTES MILK/SOY MILK (MILK)                  | 541    |
| OTHER DAIRY PRODUCTS | RFG MILKSHAKE/NON DAIRY DRINK (MILK)                        | 40     |
| OTHER DAIRY PRODUCTS | RFG YOGURT  | 7038   |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY          | KEYCAT (IRI VARIABLE)                         | # UPCs |
|----------------------|---|--------|
| OTHER DAIRY PRODUCTS | RFG YOGURT DRINKS                             | 775    |
| OTHER DAIRY PRODUCTS | RICOTTA CHEESE                                | 461    |
| OTHER DAIRY PRODUCTS | SHERBET/SORBET/ICE CARTON                     | 1318   |
| OTHER DAIRY PRODUCTS | SS AEROSOL/SQUEEZEABLE CHEESE SPREAD          | 118    |
| OTHER DAIRY PRODUCTS | SS DAIRY SAUCE/CHEESE                         | 216    |
| OTHER DAIRY PRODUCTS | SS GRATED CHEESE                              | 465    |
| OTHER DAIRY PRODUCTS | SS RTD MILK/MILK SUBSTITUTES (MILK)           | 38     |
| OTHER DAIRY PRODUCTS | SS YOGURT/YOGURT DRINKS                       | 55     |
| OTHER DAIRY PRODUCTS | VARIETY CHEESE/PROMOTIONAL ITEMS              | 4      |
| FRESH FRUITS         | UNFM WGHT FRSH OTR FRT                        | 4757   |
| FRESH FRUITS         | UNFM WGHT FRSH OTR VEG (FRUIT)                | 6      |
| FRESH FRUITS         | UNIFORM WEIGHT FRESH APPLES                   | 1508   |
| FRESH FRUITS         | UNIFORM WEIGHT FRESH GRAPEFRUIT               | 102    |
| FRESH FRUITS         | UNIFORM WEIGHT FRESH ORANGES                  | 437    |
| FRESH VEGETABLES     | UNFM WGHT FRSH OTR VEG                        | 2386   |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH BEANS                    | 162    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH BROCCOLI                 | 134    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH CABBAGE                  | 51     |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH CARROTS                  | 505    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH CAULIFLOWER              | 31     |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH CELERY                   | 200    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH CUCUMBER                 | 86     |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH LETTUCE (LETTUCE)        | 164    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH MIXED VEGETABLE          | 1226   |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH MUSHROOM                 | 968    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH ONIONS                   | 814    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH PEAS                     | 193    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH PEPPERS                  | 396    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH POTATO                   | 1360   |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH RADISH                   | 29     |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH SPINACH                  | 89     |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH SPROUTS                  | 451    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH TOMATO                   | 847    |
| FRESH VEGETABLES     | UNIFORM WEIGHT FRESH YAMS                     | 158    |
| FRESH VEGETABLES     | UNIFORM WEIGHT TOFU/SOYBEAN                   | 345    |
| PROCESSED FRUITS     | CAROB/YOGURT COATED SNACK (FRUIT SAUCE)       | 2      |
| PROCESSED FRUITS     | CHOCOLATE CANDY BOX/BAG > 3.5OZ (DRIED FRUIT) | 2      |
| PROCESSED FRUITS     | CHOCOLATE SYRUP/DESSERT TOPPING (FRUIT SAUCE) | 1      |
| PROCESSED FRUITS     | COCONUT                                       | 285    |
| PROCESSED FRUITS     | DATES   | 284    |
| PROCESSED FRUITS     | DRIED PRUNES                                  | 369    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY      | KEYCAT (IRI VARIABLE)                      | # UPCs |
|------------------|--|--------|
| PROCESSED FRUITS | FRUIT ROLL UP/BAR/PROCESSED FRUIT SNACK    | 1720   |
| PROCESSED FRUITS | FZ APPLE JUICE CONCENTRATE                 | 77     |
| PROCESSED FRUITS | FZ BLENDED FRUIT JUICE CONCENTRATE         | 42     |
| PROCESSED FRUITS | FZ FRUIT                                   | 1652   |
| PROCESSED FRUITS | FZ GRAPE JUICE CONCENTRATE                 | 33     |
| PROCESSED FRUITS | FZ GRAPEFRUIT JC CONCENTRATE               | 14     |
| PROCESSED FRUITS | FZ LEMONADE/LIMEADE CONCENTRATE (JUICE)    | 4      |
| PROCESSED FRUITS | FZ ORANGE JUICE CONCENTRATE                | 311    |
| PROCESSED FRUITS | FZ OTHER VEGETABLE/FRUIT JUICE CONCENTRATE | 13     |
| PROCESSED FRUITS | GLAZED FRUIT                               | 164    |
| PROCESSED FRUITS | OTHER DRIED FRUIT-NO PROCESSED SNACK       | 3099   |
| PROCESSED FRUITS | RAISINS                                    | 654    |
| PROCESSED FRUITS | RFG ALL OTHER FRUIT JUICE                  | 135    |
| PROCESSED FRUITS | RFG APPLE JUICE                            | 79     |
| PROCESSED FRUITS | RFG BLENDED FRUIT JUICE                    | 398    |
| PROCESSED FRUITS | RFG CIDER                                  | 419    |
| PROCESSED FRUITS | RFG CRANBERRY JUICE/CRANBERRY JUICE BLEND  | 20     |
| PROCESSED FRUITS | RFG FRUIT JUICE LIQUID CONCENTRATE         | 19     |
| PROCESSED FRUITS | RFG GRAPE JUICE                            | 12     |
| PROCESSED FRUITS | RFG GRAPEFRUIT JUICE                       | 103    |
| PROCESSED FRUITS | RFG LEMON/LIME JUICE                       | 10     |
| PROCESSED FRUITS | RFG ORANGE JUICE                           | 1827   |
| PROCESSED FRUITS | RFG PINEAPPLE JUICE                        | 11     |
| PROCESSED FRUITS | SALTED APPLE CHIPS                         | 23     |
| PROCESSED FRUITS | SS ALL OTHER FRUIT                         | 236    |
| PROCESSED FRUITS | SS APPLE JUICE NAC                         | 676    |
| PROCESSED FRUITS | SS APPLESAUCE/FRUIT SAUCE                  | 1890   |
| PROCESSED FRUITS | SS APRICOT JUICE NAC                       | 1      |
| PROCESSED FRUITS | SS ASEPTIC JUICE ALL FLAVORS               | 485    |
| PROCESSED FRUITS | SS CANNED FRUIT JUICE ALL FLAVORS          | 648    |
| PROCESSED FRUITS | SS CANNED/BOTTLED APPLES                   | 57     |
| PROCESSED FRUITS | SS CANNED/BOTTLED APRICOTS                 | 158    |
| PROCESSED FRUITS | SS CANNED/BOTTLED BERRIES                  | 72     |
| PROCESSED FRUITS | SS CANNED/BOTTLED CHERRIES                 | 94     |
| PROCESSED FRUITS | SS CANNED/BOTTLED CITRUS FRUIT             | 486    |
| PROCESSED FRUITS | SS CANNED/BOTTLED GRAPES                   | 4      |
| PROCESSED FRUITS | SS CANNED/BOTTLED MIXED FRUIT              | 1076   |
| PROCESSED FRUITS | SS CANNED/BOTTLED PEACHES                  | 1095   |
| PROCESSED FRUITS | SS CANNED/BOTTLED PEARS                    | 628    |
| PROCESSED FRUITS | SS CANNED/BOTTLED PINEAPPLE                | 781    |
| PROCESSED FRUITS | SS CANNED/BOTTLED PRUNES/PLUMS             | 50     |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY          | KEYCAT (IRI VARIABLE)                        | # UPCs |
|----------------------|--|--------|
| PROCESSED FRUITS     | SS CANTELOUPE/MELON                          | 1      |
| PROCESSED FRUITS     | SS CHERRY JUICE NAC                          | 79     |
| PROCESSED FRUITS     | SS CIDER NAC                                 | 318    |
| PROCESSED FRUITS     | SS CRANBERRY SAUCE                           | 331    |
| PROCESSED FRUITS     | SS CRANBERRY/JUICE/CRANBERRY JUICE BLEND NAC | 419    |
| PROCESSED FRUITS     | SS FRUIT DRINK NAC (JUICE)                   | 14     |
| PROCESSED FRUITS     | SS FRUIT JUICE BLEND NAC                     | 713    |
| PROCESSED FRUITS     | SS FRUIT JUICE LIQUID CONCENTRATE            | 83     |
| PROCESSED FRUITS     | SS GRAPE JUICE NAC                           | 451    |
| PROCESSED FRUITS     | SS GRAPEFRUIT JUICE NAC                      | 141    |
| PROCESSED FRUITS     | SS LEMON/LIME JUICE NAC                      | 354    |
| PROCESSED FRUITS     | SS MARASCHINO CHERRIES                       | 445    |
| PROCESSED FRUITS     | SS ORANGE JUICE NAC                          | 171    |
| PROCESSED FRUITS     | SS OTHER FRUIT JUICE NAC                     | 324    |
| PROCESSED FRUITS     | SS PINEAPPLE JUICE NAC                       | 71     |
| PROCESSED FRUITS     | SS PREPARED PINEAPPLE SAUCE                  | 3      |
| PROCESSED FRUITS     | SS PRUNE/FIG JUICE NAC                       | 171    |
| PROCESSED VEGETABLES | DRIED BEANS/GRAINS                           | 2388   |
| PROCESSED VEGETABLES | DRIED VEGETABLE - EXCEPT BEANS               | 828    |
| PROCESSED VEGETABLES | FZ BEANS                                     | 1064   |
| PROCESSED VEGETABLES | FZ BREADED VEGETABLES                        | 165    |
| PROCESSED VEGETABLES | FZ BROCCOLI                                  | 696    |
| PROCESSED VEGETABLES | FZ CARROTS                                   | 181    |
| PROCESSED VEGETABLES | FZ CORN                                      | 630    |
| PROCESSED VEGETABLES | FZ CORN ON THE COB                           | 288    |
| PROCESSED VEGETABLES | FZ MIXED VEGETABLES                          | 2150   |
| PROCESSED VEGETABLES | FZ ONION RINGS                               | 157    |
| PROCESSED VEGETABLES | FZ ONIONS                                    | 83     |
| PROCESSED VEGETABLES | FZ OTHER PLAIN VEGETABLE                     | 1026   |
| PROCESSED VEGETABLES | FZ PEAS                                      | 798    |
| PROCESSED VEGETABLES | FZ PLAIN POTATO/FRENCH FRY/HASH BROWNS       | 1612   |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY          | KEYCAT (IRI VARIABLE)                      | # UPCs |
|----------------------|--|--------|
| PROCESSED VEGETABLES | FZ PREPARED VEGETABLE (IN SAUCE)           | 242    |
| PROCESSED VEGETABLES | FZ SPINACH                                 | 389    |
| PROCESSED VEGETABLES | FZ SQUASH/ZUCCHINI                         | 117    |
| PROCESSED VEGETABLES | POTATO PANCAKE/DUMPLING MIX                | 67     |
| PROCESSED VEGETABLES | RFG BAKED BEANS                            | 81     |
| PROCESSED VEGETABLES | RFG SAUERKRAUT                             | 100    |
| PROCESSED VEGETABLES | RFG VEGETABLE JUICE/COCKTAIL (JUICE)       | 62     |
| PROCESSED VEGETABLES | SS ALL OTHER BEANS                         | 2746   |
| PROCESSED VEGETABLES | SS ALOE VERA JUICE NAC                     | 29     |
| PROCESSED VEGETABLES | SS BAKED BEAN/PORK & BEAN                  | 699    |
| PROCESSED VEGETABLES | SS BAMBOO SHOOTS/WATERCHESTNUT             | 243    |
| PROCESSED VEGETABLES | SS CAN/BTLD GREEN BEANS                    | 996    |
| PROCESSED VEGETABLES | SS CAN/BTLD GREEN PEAS                     | 663    |
| PROCESSED VEGETABLES | SS CANNED ALL OTHER VEGETABLE              | 1490   |
| PROCESSED VEGETABLES | SS CANNED VEGETABLE JUICE/COCKTAIL (JUICE) | 268    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED CARROTS                  | 275    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED CORN                     | 1145   |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED MUSHROOMS                | 706    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED POTATO/SWEET POTATO      | 552    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED SAUERKRAUT               | 330    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED SPINACH                  | 164    |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED TOMATO                   | 2568   |
| PROCESSED VEGETABLES | SS CANNED/BOTTLED VEGETABLE                | 495    |
| PROCESSED VEGETABLES | SS FRUIT JUICE BLEND NAC (VEGETABLE JUICE) | 5      |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                         | # UPCs |
|------------------------|---|--------|
| PROCESSED VEGETABLES   | SS INSTANT POTATOES                           | 998    |
| PROCESSED VEGETABLES   | SS OTHER VEGETABLE JUICE/COCKTAIL NAC (JUICE) | 376    |
| PROCESSED VEGETABLES   | SS REFRIED BEANS ONLY                         | 517    |
| PROCESSED VEGETABLES   | SS TOMATO PASTE/SAUCE/PUREE/ASPIC             | 1163   |
| SUGAR AND OTHER SWEETS | ALL OTHER SEASONAL CANDY                      | 394    |
| SUGAR AND OTHER SWEETS | BAKING CHOCOLATE/CHIPS/COCOA                  | 784    |
| SUGAR AND OTHER SWEETS | BREATH FRESHENER (INCLUDE SUGARLESS)          | 657    |
| SUGAR AND OTHER SWEETS | BROWN/POWDER/FLAVORED SUGAR                   | 601    |
| SUGAR AND OTHER SWEETS | CARAMEL/TAFFY APPLES                          | 300    |
| SUGAR AND OTHER SWEETS | CHOCOLATE CANDY BAR < 3.5OZ/UNIT              | 3218   |
| SUGAR AND OTHER SWEETS | CHOCOLATE CANDY BOX/BAG > 3.5OZ               | 6895   |
| SUGAR AND OTHER SWEETS | CHOCOLATE CANDY SNACK SIZE                    | 399    |
| SUGAR AND OTHER SWEETS | CHOCOLATE COVERED COOKIE/WAFER CANDY BAR      | 363    |
| SUGAR AND OTHER SWEETS | CHOCOLATE SYRUP/DESSERT TOPPING               | 657    |
| SUGAR AND OTHER SWEETS | CHRISTMAS CANDY                               | 4847   |
| SUGAR AND OTHER SWEETS | CORN/CARO/CRYSTAL/WHITE SYRUP                 | 226    |
| SUGAR AND OTHER SWEETS | COUGH DROP/SQUARE                             | 1360   |
| SUGAR AND OTHER SWEETS | DIET CANDY                                    | 1076   |
| SUGAR AND OTHER SWEETS | DRY WHIP TOPPING MIX                          | 34     |
| SUGAR AND OTHER SWEETS | EASTER CANDY                                  | 5298   |
| SUGAR AND OTHER SWEETS | EDIBLE CAKE DECORATION                        | 1666   |
| SUGAR AND OTHER SWEETS | FRUIT BUTTER                                  | 339    |
| SUGAR AND OTHER SWEETS | FRUIT FLAVORED SYRUPS                         | 582    |
| SUGAR AND OTHER SWEETS | FZ JAMS/JELLIES/PRESERVE                      | 16     |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                      | # UPCs |
|------------------------|--|--------|
| SUGAR AND OTHER SWEETS | FZ WHIP TOPPINGS                           | 418    |
| SUGAR AND OTHER SWEETS | GELATIN DESSERT MIX                        | 970    |
| SUGAR AND OTHER SWEETS | GIFT BOX CHOCOLATES                        | 973    |
| SUGAR AND OTHER SWEETS | HALLOWEEN CANDY                            | 2360   |
| SUGAR AND OTHER SWEETS | HARD SUGAR CANDY/PACKAGE/ROLL CANDY        | 2332   |
| SUGAR AND OTHER SWEETS | LICORICE BIG BOX/BAG > 3.5OZ               | 935    |
| SUGAR AND OTHER SWEETS | MAPLE/PANCAKE & WAFFLE SYRUP               | 1379   |
| SUGAR AND OTHER SWEETS | MARSHMALLOW CREME                          | 48     |
| SUGAR AND OTHER SWEETS | MARSHMALLOWS                               | 470    |
| SUGAR AND OTHER SWEETS | MOLASSES                                   | 104    |
| SUGAR AND OTHER SWEETS | NON CHOCOLATE CHEWY BIG BOX/BAG > 3.5OZ    | 7207   |
| SUGAR AND OTHER SWEETS | NON CHOCOLATE CHEWY CANDY BAR < 3.5OZ/UNIT | 1574   |
| SUGAR AND OTHER SWEETS | NON CHOCOLATE CHEWY SNACK SIZE             | 124    |
| SUGAR AND OTHER SWEETS | NOVELTY CANDY                              | 3733   |
| SUGAR AND OTHER SWEETS | PLAIN MINTS                                | 1304   |
| SUGAR AND OTHER SWEETS | PLU SOFT DRINKS                            | 4      |
| SUGAR AND OTHER SWEETS | PUDDING/PIE FILLING/MOUSSE MIXES           | 855    |
| SUGAR AND OTHER SWEETS | REGULAR GUM (NO SUGARLESS)                 | 1230   |
| SUGAR AND OTHER SWEETS | RFG HONEY                                  | 4      |
| SUGAR AND OTHER SWEETS | RTS FROSTING/FROSTING MIX                  | 614    |
| SUGAR AND OTHER SWEETS | SPECIALTY NUT/COCONUT CANDY                | 1525   |
| SUGAR AND OTHER SWEETS | SS HONEY                                   | 2276   |
| SUGAR AND OTHER SWEETS | SS JAMS/JELLIES/PRESERVE                   | 4959   |
| SUGAR AND OTHER SWEETS | SUGAR SUBSTITUTES                          | 863    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                                     | # UPCs |
|------------------------|---|--------|
| SUGAR AND OTHER SWEETS | SUGARLESS GUM   | 1504   |
| SUGAR AND OTHER SWEETS | TAFFY/CANDY APPLE KIT                                     | 81     |
| SUGAR AND OTHER SWEETS | VALENTINE CANDY   | 4307   |
| SUGAR AND OTHER SWEETS | WHITE GRANULATED SUGAR                                    | 627    |
| FATS AND OILS          | ASIAN COOKING OILS  | 150    |
| FATS AND OILS          | CHUNKY PEANUT BUTTER                                      | 503    |
| FATS AND OILS          | COOKING & SALAD OILS                                      | 2121   |
| FATS AND OILS          | COOKING SPRAY   | 538    |
| FATS AND OILS          | CREAMY PEANUT BUTTER                                      | 916    |
| FATS AND OILS          | MARGARINE/MARGARINE & BUTTER BLEND/SUBSTITUTE             | 922    |
| FATS AND OILS          | OLIVE OIL   | 2578   |
| FATS AND OILS          | PEANUT BUTTER COMBO - PEANUT BUTTER & JELLY               | 77     |
| FATS AND OILS          | POPCORN OIL   | 18     |
| FATS AND OILS          | POWDERED MILK (SUBSTITUTE)                                | 2      |
| FATS AND OILS          | RFG DAIRY CREAM/HALF & HALF/SOY TOPPING (WHIPPED TOPPING) | 187    |
| FATS AND OILS          | RFG LARD  | 16     |
| FATS AND OILS          | RFG NON DAIRY TOPPINGS                                    | 44     |
| FATS AND OILS          | RFG PEANUT BUTTER (ALL)                                   | 23     |
| FATS AND OILS          | RFG SALAD DRESSING - POURABLE/SPREAD                      | 770    |
| FATS AND OILS          | SPECIALTY NUT BUTTER                                      | 419    |
| FATS AND OILS          | SS COLESLAW/FRUIT SALAD DRESSING                          | 47     |
| FATS AND OILS          | SS POURABLE SALAD DRESSING                                | 4930   |
| FATS AND OILS          | SS SALAD DRESSING MIX                                     | 130    |
| FATS AND OILS          | SS SANDWICH SPREAD/MAYONNAISE                             | 1420   |
| FATS AND OILS          | SS VEGETABLE/ANIMAL SHORTENING/LARD                       | 214    |
| NONALCOHOLIC BEVERAGES | CARBONATED WATER/CLUB SODA (INCLUDE FLAVORED)             | 2621   |
| NONALCOHOLIC BEVERAGES | CHOCOLATE MILK FLAVORING/COCOA MIX                        | 1294   |
| NONALCOHOLIC BEVERAGES | COFFEE SUBSTITUTES  | 27     |
| NONALCOHOLIC BEVERAGES | COFFEE TEA ADDITIVES/FLAVORING                            | 472    |
| NONALCOHOLIC BEVERAGES | DISTILLED WATER   | 288    |
| NONALCOHOLIC BEVERAGES | FLAVORED HOT DRINK MIX                                    | 74     |
| NONALCOHOLIC BEVERAGES | FZ COCKTAIL MIXES   | 50     |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                          | # UPCs |
|------------------------|--|--------|
| NONALCOHOLIC BEVERAGES | FZ DRINK/COCKTAIL DRINK CONCENTRATE            | 316    |
| NONALCOHOLIC BEVERAGES | FZ LEMONADE/LIMEADE CONCENTRATE                | 154    |
| NONALCOHOLIC BEVERAGES | GROUND COFFEE (INCLUDE FLAVORED)               | 6013   |
| NONALCOHOLIC BEVERAGES | GROUND DECAFFEINATED COFFEE (INCLUDE FLAVORED) | 1101   |
| NONALCOHOLIC BEVERAGES | INSTANT BREAKFAST (ADD TO MILK MEAL)           | 60     |
| NONALCOHOLIC BEVERAGES | INSTANT COFFEE                                 | 801    |
| NONALCOHOLIC BEVERAGES | INSTANT DECAFFEINATED COFFEE                   | 175    |
| NONALCOHOLIC BEVERAGES | INSTANT TEA/ICE TEA MIX                        | 1069   |
| NONALCOHOLIC BEVERAGES | LOOSE TEA & TEA BAGS                           | 5448   |
| NONALCOHOLIC BEVERAGES | LOW CALORIE SOFT DRINKS                        | 2546   |
| NONALCOHOLIC BEVERAGES | MILK CHOCOLATE MILK FLAVORING/DRINK MIX        | 151    |
| NONALCOHOLIC BEVERAGES | NON CARBONATED WATER (INCLUDE FLAVORED)        | 5202   |
| NONALCOHOLIC BEVERAGES | PLU - ALL BRANDS SODA                          | 1      |
| NONALCOHOLIC BEVERAGES | REGULAR SOFT DRINKS                            | 8446   |
| NONALCOHOLIC BEVERAGES | RFG BOTTLED JUICE & DRINK SMOOTHIE             | 290    |
| NONALCOHOLIC BEVERAGES | RFG COCKTAIL MIXES                             | 6      |
| NONALCOHOLIC BEVERAGES | RFG COFFEE CONCENTRATE                         | 13     |
| NONALCOHOLIC BEVERAGES | RFG CRANBERRY COCKTAIL/DRINK                   | 26     |
| NONALCOHOLIC BEVERAGES | RFG DRINK CONCENTRATE/SYRUP                    | 1      |
| NONALCOHOLIC BEVERAGES | RFG FRUIT DRINK ALL FLAVORS                    | 954    |
| NONALCOHOLIC BEVERAGES | RFG FRUIT NECTAR                               | 58     |
| NONALCOHOLIC BEVERAGES | RFG GRAPEFRUIT COCKTAIL/DRINK                  | 3      |
| NONALCOHOLIC BEVERAGES | RFG KEFIR/SUBSTITUTES MILK/SOY MILK (NONDAIRY) | 37     |
| NONALCOHOLIC BEVERAGES | RFG LEMONADE                                   | 431    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                      | # UPCs |
|------------------------|--|--------|
| NONALCOHOLIC BEVERAGES | RFG MILKSHAKE/NON DAIRY DRINK (DRINKS)     | 89     |
| NONALCOHOLIC BEVERAGES | RFG PREPARED TEAS                          | 1027   |
| NONALCOHOLIC BEVERAGES | RFG RTD COFFEE                             | 39     |
| NONALCOHOLIC BEVERAGES | RFG VEGETABLE JUICE/COCKTAIL (COCKTAIL)    | 10     |
| NONALCOHOLIC BEVERAGES | RFG WEIGHT CONTROL/PROTEIN SUPPLEMENT      | 18     |
| NONALCOHOLIC BEVERAGES | RTD BREAKFAST MEALS                        | 42     |
| NONALCOHOLIC BEVERAGES | SS ASEPTIC ISOTONIC DRINKS                 | 39     |
| NONALCOHOLIC BEVERAGES | SS ASEPTIC JUICE ALL FLAVORS (DRINK)       | 17     |
| NONALCOHOLIC BEVERAGES | SS ASEPTIC JUICE DRINK                     | 850    |
| NONALCOHOLIC BEVERAGES | SS BOTTLED JUICE & DRINK SMOOTHIE          | 73     |
| NONALCOHOLIC BEVERAGES | SS BREAKFAST DRINK MIX                     | 14     |
| NONALCOHOLIC BEVERAGES | SS CANNED FRUIT JUICE ALL FLAVORS (DRINK)  | 21     |
| NONALCOHOLIC BEVERAGES | SS CANNED JUICE DRINK                      | 1006   |
| NONALCOHOLIC BEVERAGES | SS CANNED VEGETABLE JUICE/COCKTAIL (DRINK) | 29     |
| NONALCOHOLIC BEVERAGES | SS CANNED/PREPARED TEA                     | 2301   |
| NONALCOHOLIC BEVERAGES | SS COFFEE CAPPUCINO DRINKS                 | 337    |
| NONALCOHOLIC BEVERAGES | SS CRANBERRY COCKTAIL/JUICE DRINK NAC      | 1231   |
| NONALCOHOLIC BEVERAGES | SS DRINK CONCENTRATE/SYRUP                 | 283    |
| NONALCOHOLIC BEVERAGES | SS FROST/WHIPPED/YOGURT DRINK MIX          | 116    |
| NONALCOHOLIC BEVERAGES | SS FRUIT DRINK MIX                         | 2054   |
| NONALCOHOLIC BEVERAGES | SS FRUIT DRINK NAC                         | 3147   |
| NONALCOHOLIC BEVERAGES | SS FRUIT NECTAR NAC                        | 237    |
| NONALCOHOLIC BEVERAGES | SS GRAPEFRUIT COCKTAIL NAC                 | 181    |
| NONALCOHOLIC BEVERAGES | SS ISOTONIC DRINK MIX                      | 381    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY            | KEYCAT (IRI VARIABLE)                                      | # UPCs |
|------------------------|--|--------|
| NONALCOHOLIC BEVERAGES | SS ISOTONIC DRINKS NON-ASEPTIC                             | 2996   |
| NONALCOHOLIC BEVERAGES | SS LEMONADE  | 530    |
| NONALCOHOLIC BEVERAGES | SS LIQUID COCKTAIL MIXES                                   | 1098   |
| NONALCOHOLIC BEVERAGES | SS NON FRUIT DRINKS - NO COFFEE                            | 169    |
| NONALCOHOLIC BEVERAGES | SS OTHER VEGETABLE JUICE/COCKTAIL NAC (DRINK, COCKTAIL)    | 125    |
| NONALCOHOLIC BEVERAGES | SS POWDER COCKTAIL MIXES                                   | 119    |
| NONALCOHOLIC BEVERAGES | SS RTD MILK/MILK SUBSTITUTES (NONDAIRY BEVERAGE, SOY MILK) | 421    |
| NONALCOHOLIC BEVERAGES | SS SPARKLING JUICE NAC (DRINK)                             | 568    |
| NONALCOHOLIC BEVERAGES | WEIGHT CONTROL/PROTEIN SUPPLEMENT                          | 4217   |
| NONALCOHOLIC BEVERAGES | WHOLE COFFEE BEANS   | 2354   |
| MISCELLANEOUS FOODS    | ALL OTHER DRY SEASONING MIXES                              | 198    |
| MISCELLANEOUS FOODS    | BABY ELECTROLYTES  | 268    |
| MISCELLANEOUS FOODS    | BABY FOOD/SNACK  | 2249   |
| MISCELLANEOUS FOODS    | BABY FORMULA   | 118    |
| MISCELLANEOUS FOODS    | BABY FORMULA LIQUID CONCENTRATE                            | 34     |
| MISCELLANEOUS FOODS    | BABY FORMULA POWDER  | 505    |
| MISCELLANEOUS FOODS    | BABY JUICE   | 118    |
| MISCELLANEOUS FOODS    | BAKING POWDER/SODA   | 236    |
| MISCELLANEOUS FOODS    | BREADING/BATTER/COATING MIXES (SEASONING MIX)              | 33     |
| MISCELLANEOUS FOODS    | CAROB/YOGURT COATED SNACK                                  | 616    |
| MISCELLANEOUS FOODS    | CATSUP/KETCHUP   | 823    |
| MISCELLANEOUS FOODS    | CHEESE SNACKS  | 1527   |
| MISCELLANEOUS FOODS    | CHOCOLATE COVERED SALTED SNACK                             | 823    |
| MISCELLANEOUS FOODS    | CHUTNEY  | 199    |
| MISCELLANEOUS FOODS    | COOKING SHERRY/WINE  | 199    |
| MISCELLANEOUS FOODS    | COOKING STARCHES/RENNET (AGAR, RENNET, STABILIZER)         | 34     |
| MISCELLANEOUS FOODS    | DRIED BEANS/GRAINS (SEASONING)                             | 14     |
| MISCELLANEOUS FOODS    | DRIED MEAT SNACKS  | 3223   |
| MISCELLANEOUS FOODS    | DRY DINNER MIX WITH MEAT                                   | 68     |
| MISCELLANEOUS FOODS    | DRY DINNER MIX-ADD MEAT                                    | 827    |
| MISCELLANEOUS FOODS    | DRY GRAVY MIXES  | 748    |
| MISCELLANEOUS FOODS    | DRY MACARONI & CHEESE MIX                                  | 903    |
| MISCELLANEOUS FOODS    | DRY MEAT/SEAFOOD SEASONING MIXES                           | 1604   |
| MISCELLANEOUS FOODS    | DRY SALAD/SIDE DISH MIX                                    | 779    |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY         | KEYCAT (IRI VARIABLE)                                   | # UPCs |
|---------------------|---|--------|
| MISCELLANEOUS FOODS | DRY SAUCE MIX   | 358    |
| MISCELLANEOUS FOODS | DRY/RFG YEAST   | 111    |
| MISCELLANEOUS FOODS | EXTRACT/FLAVORING/FOOD COLORING                         | 1394   |
| MISCELLANEOUS FOODS | FRESH CUT SALAD AND COLESLAW                            | 2329   |
| MISCELLANEOUS FOODS | FROZEN REGULAR DINNERS                                  | 399    |
| MISCELLANEOUS FOODS | FROZEN REGULAR ENTREES                                  | 4506   |
| MISCELLANEOUS FOODS | FROZEN RFG MEAT SUBSTITUTES - NO POULTRY                | 525    |
| MISCELLANEOUS FOODS | FRUIT/VEGETABLE PRESERVATIVE/PECTIN                     | 160    |
| MISCELLANEOUS FOODS | FZ APPETIZER/SNACK ROLL                                 | 2911   |
| MISCELLANEOUS FOODS | FZ BABY FOOD/JUICE/SNACK                                | 59     |
| MISCELLANEOUS FOODS | FZ CHEESECAKE   | 386    |
| MISCELLANEOUS FOODS | FZ CHILI  | 76     |
| MISCELLANEOUS FOODS | FZ EGG ROLL/POTSTICKERWONTON WRAPPER                    | 49     |
| MISCELLANEOUS FOODS | FZ HANDHELD NON BREAKFAST ENTREES                       | 2488   |
| MISCELLANEOUS FOODS | FZ MEAT SPREAD/SALADS                                   | 5      |
| MISCELLANEOUS FOODS | FZ MEAT/SEAFOOD SEASONING MIXES                         | 10     |
| MISCELLANEOUS FOODS | FZ OTHER BREAKFAST FOOD                                 | 1547   |
| MISCELLANEOUS FOODS | FZ PIZZA  | 3760   |
| MISCELLANEOUS FOODS | FZ PIZZA KITS/TOPPINGS                                  | 1      |
| MISCELLANEOUS FOODS | FZ POT PIES   | 236    |
| MISCELLANEOUS FOODS | FZ PREPARED DIPS  | 64     |
| MISCELLANEOUS FOODS | FZ PREPARED PUDDING/MOUSSE                              | 24     |
| MISCELLANEOUS FOODS | FZ PRETZELS   | 109    |
| MISCELLANEOUS FOODS | FZ RFG POULTR/POULTRY SUBSTITUTES (POULTRY SUBSTITUTES) | 113    |
| MISCELLANEOUS FOODS | FZ SAUCE/GRAVY/MARINADE                                 | 82     |
| MISCELLANEOUS FOODS | FZ SIDE DISH  | 932    |
| MISCELLANEOUS FOODS | FZ SOUP   | 370    |
| MISCELLANEOUS FOODS | FZ STUFFING   | 31     |
| MISCELLANEOUS FOODS | KERNEL POPCORN  | 350    |
| MISCELLANEOUS FOODS | KETCHUP/MUSTARD/OTHER COMBO                             | 7      |
| MISCELLANEOUS FOODS | NUTRITIONAL SNACK BAR/GRANOLA BAR                       | 7320   |
| MISCELLANEOUS FOODS | NUTRITIONAL SNACK/TRAIL MIX                             | 4002   |
| MISCELLANEOUS FOODS | NUTS FOR BAKING/COOKING                                 | 2458   |
| MISCELLANEOUS FOODS | OTHER CORN SNACK - NO TORTILLA CHIP                     | 843    |
| MISCELLANEOUS FOODS | OTHER SALTED SNACK - NO NUTS                            | 5341   |
| MISCELLANEOUS FOODS | PEPPER  | 1202   |
| MISCELLANEOUS FOODS | POTATO CHIPS  | 6053   |
| MISCELLANEOUS FOODS | PREPARED MUSTARD  | 1856   |
| MISCELLANEOUS FOODS | PRETZELS  | 2192   |
| MISCELLANEOUS FOODS | RFG APPETIZERS/SNACK ROLL                               | 1879   |

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Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY         | KEYCAT (IRI VARIABLE)                 | # UPCs |
|---------------------|---------------------------------------|--------|
| MISCELLANEOUS FOODS | RFG BREAKFAST ENTREE                  | 420    |
| MISCELLANEOUS FOODS | RFG FLAVORED SPREADS                  | 1391   |
| MISCELLANEOUS FOODS | RFG FRESH SOUPS                       | 1105   |
| MISCELLANEOUS FOODS | RFG HANDHELD NON BREAKFAST ENTREE     | 2420   |
| MISCELLANEOUS FOODS | RFG HORSERADISH/HORSERADISH SAUCE     | 243    |
| MISCELLANEOUS FOODS | RFG MARINATED VEGETABLE/FRUIT/EGG     | 150    |
| MISCELLANEOUS FOODS | RFG MEAT SPREAD/SALAD                 | 333    |
| MISCELLANEOUS FOODS | RFG MEAT/CHEESE/CRACKER/DESSERT       | 382    |
| MISCELLANEOUS FOODS | RFG MEAT/SEAFOOD SEASONING MIXES      | 20     |
| MISCELLANEOUS FOODS | RFG MUSTARD                           | 6      |
| MISCELLANEOUS FOODS | RFG PEPPER/PIMENTO/OLIVES             | 131    |
| MISCELLANEOUS FOODS | RFG PICKLES                           | 236    |
| MISCELLANEOUS FOODS | RFG PIZZA/PIZZA KITS                  | 461    |
| MISCELLANEOUS FOODS | RFG POT PIES                          | 75     |
| MISCELLANEOUS FOODS | RFG PREPARED CHILI                    | 110    |
| MISCELLANEOUS FOODS | RFG PREPARED DELI/GOURMET FOOD        | 882    |
| MISCELLANEOUS FOODS | RFG PREPARED DINNER/ENTREE            | 2089   |
| MISCELLANEOUS FOODS | RFG PREPARED DIPS                     | 2222   |
| MISCELLANEOUS FOODS | RFG PREPARED SALAD FRUIT/COLESLAW     | 2275   |
| MISCELLANEOUS FOODS | RFG PUDDING/MOUSSE/GELATIN/PARFAIT    | 1680   |
| MISCELLANEOUS FOODS | RFG RELISHES/APPETIZER RELISH         | 30     |
| MISCELLANEOUS FOODS | RFG SALAD TOPPING/BACON BITS          | 26     |
| MISCELLANEOUS FOODS | RFG SAUCE/GRAVY/MARINADE              | 1678   |
| MISCELLANEOUS FOODS | RFG SIDE DISHES                       | 1032   |
| MISCELLANEOUS FOODS | RTE POPCORN/CARAMEL CORN              | 2682   |
| MISCELLANEOUS FOODS | SALAD TOPPING/BACON BIT               | 587    |
| MISCELLANEOUS FOODS | SALT/SALT SEASONING/SALT SUBSTITUTES  | 1828   |
| MISCELLANEOUS FOODS | SNACK NUTS                            | 9482   |
| MISCELLANEOUS FOODS | SPICE/SEASONING - NO SALT/PEPPER      | 15566  |
| MISCELLANEOUS FOODS | SS ALL OTHER MEXICAN SAUCE/MARINADE   | 592    |
| MISCELLANEOUS FOODS | SS ASIAN FOOD ITEMS                   | 972    |
| MISCELLANEOUS FOODS | SS ASIAN SAUCE/MARINADE               | 1696   |
| MISCELLANEOUS FOODS | SS CHILI/HOTDOG SAUCE                 | 294    |
| MISCELLANEOUS FOODS | SS CRACKERS WITH FILLINGS (SNACK BAR) | 7      |
| MISCELLANEOUS FOODS | SS DAIRY SAUCE/CHEESE (DIP)           | 12     |
| MISCELLANEOUS FOODS | SS DRIED BREAKFAST FOOD               | 9      |
| MISCELLANEOUS FOODS | SS DRY DIP MIX                        | 336    |
| MISCELLANEOUS FOODS | SS DRY SOUPS/SOUP MIXES               | 2170   |
| MISCELLANEOUS FOODS | SS GARLIC SPREAD                      | 99     |
| MISCELLANEOUS FOODS | SS HOLLANDAISE/BERNAISE/DILL SAUCE    | 35     |
| MISCELLANEOUS FOODS | SS HORSERADISH/HORSERADISH SAUCE      | 248    |

—continued

Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY         | KEYCAT (IRI VARIABLE)                         | # UPCs |
|---------------------|---|--------|
| MISCELLANEOUS FOODS | SS ICE POP NOVELTIES                          | 354    |
| MISCELLANEOUS FOODS | SS MARINATED VEGETABLE/FRUIT/EGG              | 1734   |
| MISCELLANEOUS FOODS | SS MEAT SAUCE/MARINADE/GLAZE                  | 2694   |
| MISCELLANEOUS FOODS | SS MEAT SUBSTITUTES/VEGETABLE PROTEIN PRODUCT | 131    |
| MISCELLANEOUS FOODS | SS MEAT/MEAT SPREAD                           | 1074   |
| MISCELLANEOUS FOODS | SS MEXICAN FOOD ITEMS                         | 105    |
| MISCELLANEOUS FOODS | SS MICROWAVE PACKAGE DINNER/ENTREE            | 479    |
| MISCELLANEOUS FOODS | SS MICROWAVE POPCORN                          | 1721   |
| MISCELLANEOUS FOODS | SS OLIVES                                     | 3174   |
| MISCELLANEOUS FOODS | SS PEPPERS/PIMENTOS                           | 2199   |
| MISCELLANEOUS FOODS | SS PICANTE SAUCE                              | 202    |
| MISCELLANEOUS FOODS | SS PICKLES                                    | 2971   |
| MISCELLANEOUS FOODS | SS PIE/PASTRY FILLING                         | 679    |
| MISCELLANEOUS FOODS | SS PIZZA KITS/MIXES TOPPINGS                  | 25     |
| MISCELLANEOUS FOODS | SS PREPARED BARBECUE SAUCE                    | 2412   |
| MISCELLANEOUS FOODS | SS PREPARED CHILI                             | 625    |
| MISCELLANEOUS FOODS | SS PREPARED DIP                               | 740    |
| MISCELLANEOUS FOODS | SS PREPARED HOT/CAJUN SAUCE                   | 1453   |
| MISCELLANEOUS FOODS | SS PREPARED ITALIAN SAUCE                     | 4045   |
| MISCELLANEOUS FOODS | SS PREPARED LIQUID GRAVY                      | 499    |
| MISCELLANEOUS FOODS | SS PREPARED PASTA DISHES                      | 801    |
| MISCELLANEOUS FOODS | SS PREPARED PIZZA SAUCE                       | 246    |
| MISCELLANEOUS FOODS | SS PREPARED PUDDING/GELATIN                   | 673    |
| MISCELLANEOUS FOODS | SS PREPARED SALAD                             | 243    |
| MISCELLANEOUS FOODS | SS PREPARED SEAFOOD SAUCE                     | 387    |
| MISCELLANEOUS FOODS | SS PREPARED SLOPPY SAUCE                      | 120    |
| MISCELLANEOUS FOODS | SS PREPARED TACO SAUCE                        | 141    |
| MISCELLANEOUS FOODS | SS PREPARED TARTAR SAUCE                      | 217    |
| MISCELLANEOUS FOODS | SS REGULAR PREPARED DINNER/ENTREE             | 497    |
| MISCELLANEOUS FOODS | SS RELISH/APPETIZER RELISH                    | 965    |
| MISCELLANEOUS FOODS | SS RTU PIE CRUST                              | 293    |
| MISCELLANEOUS FOODS | SS SALSA                                      | 3099   |
| MISCELLANEOUS FOODS | SS SOUP                                       | 4815   |
| MISCELLANEOUS FOODS | SS SOUP STARTER/BOUILLON/BOTH                 | 1920   |
| MISCELLANEOUS FOODS | SS STEAK/WORCESTERSHIRE SAUCE                 | 525    |
| MISCELLANEOUS FOODS | SS TOASTER PASTRY/TART                        | 981    |
| MISCELLANEOUS FOODS | SUNFLOWER/PUMPKIN SEEDS                       | 1783   |
| MISCELLANEOUS FOODS | TOASTED CORN NUT SNACKS                       | 153    |
| MISCELLANEOUS FOODS | TORTILLA/TOSTADA CHIPS                        | 2930   |
| MISCELLANEOUS FOODS | UNIFORM WEIGHT FRESH LETTUCE (PREPARED SALAD) | 15     |
| MISCELLANEOUS FOODS | VINEGAR                                       | 2068   |

—continued



Appendix table 1

**IRI keycats by Consumer Expenditure Survey (CE) categories—continued**

| CE CATEGORY | KEYCAT (IRI VARIABLE) | # UPCs |
|-------------|-----------------------|--------|
| Total       |                       | 643137 |

CE = Consumer Expenditure Survey; UPC = Universal Product Code

Source: USDA, Economic Research Service calculations using IRI data, 2008-12.