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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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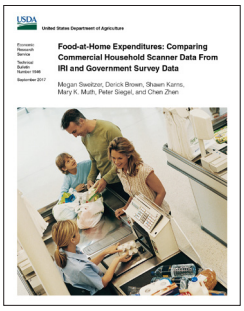
Contents

United States Department of Agriculture

A report summary from the Economic Research Service *September 2017*



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

Megan Sweitzer, Derick Brown, Shawn Karns, Mary K. Muth, Peter Siegel, and Chen Zhen

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,

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,[1] 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.[2]

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

[1] 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.

[2] 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.[3]

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

[3] 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.[4] 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-

[4] 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).[5] 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,[6] with each stratum having at least two PSUs.[7]

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

[5] 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.

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

[7] 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.[8] 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.

[8] 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

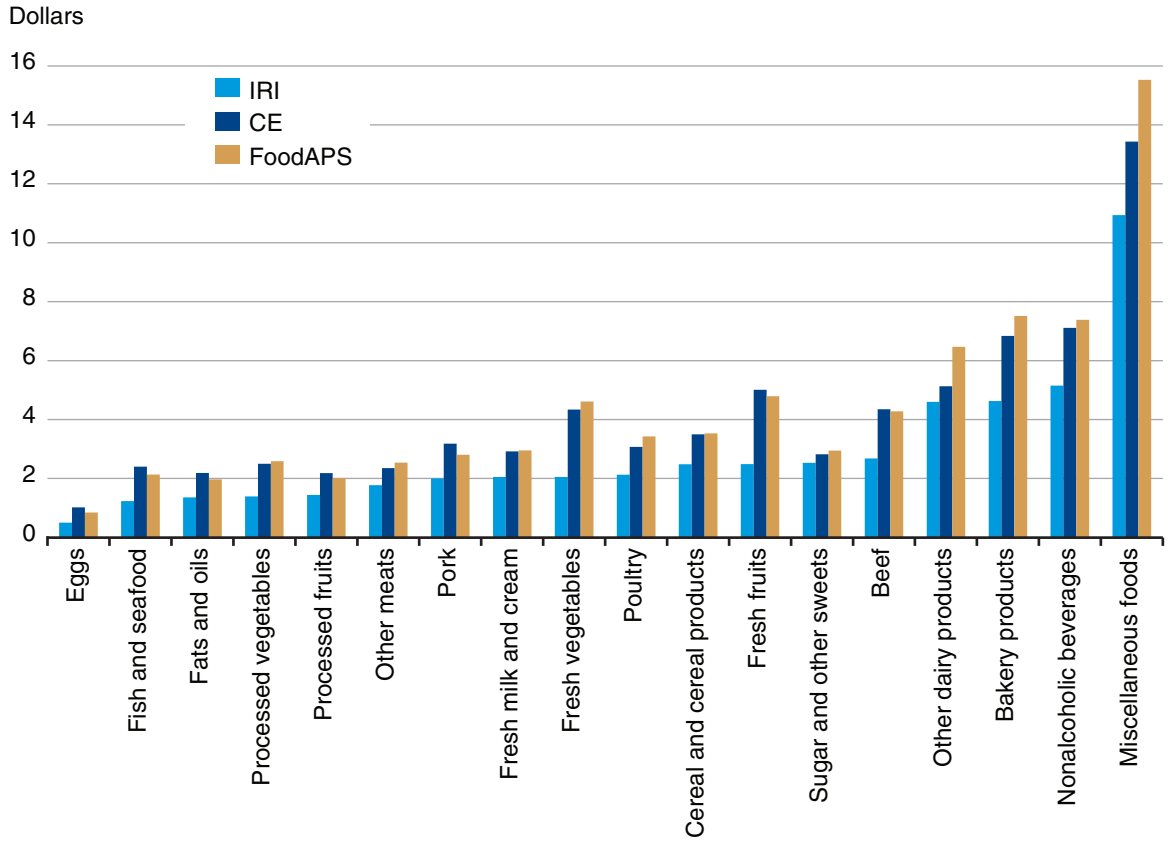
Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

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

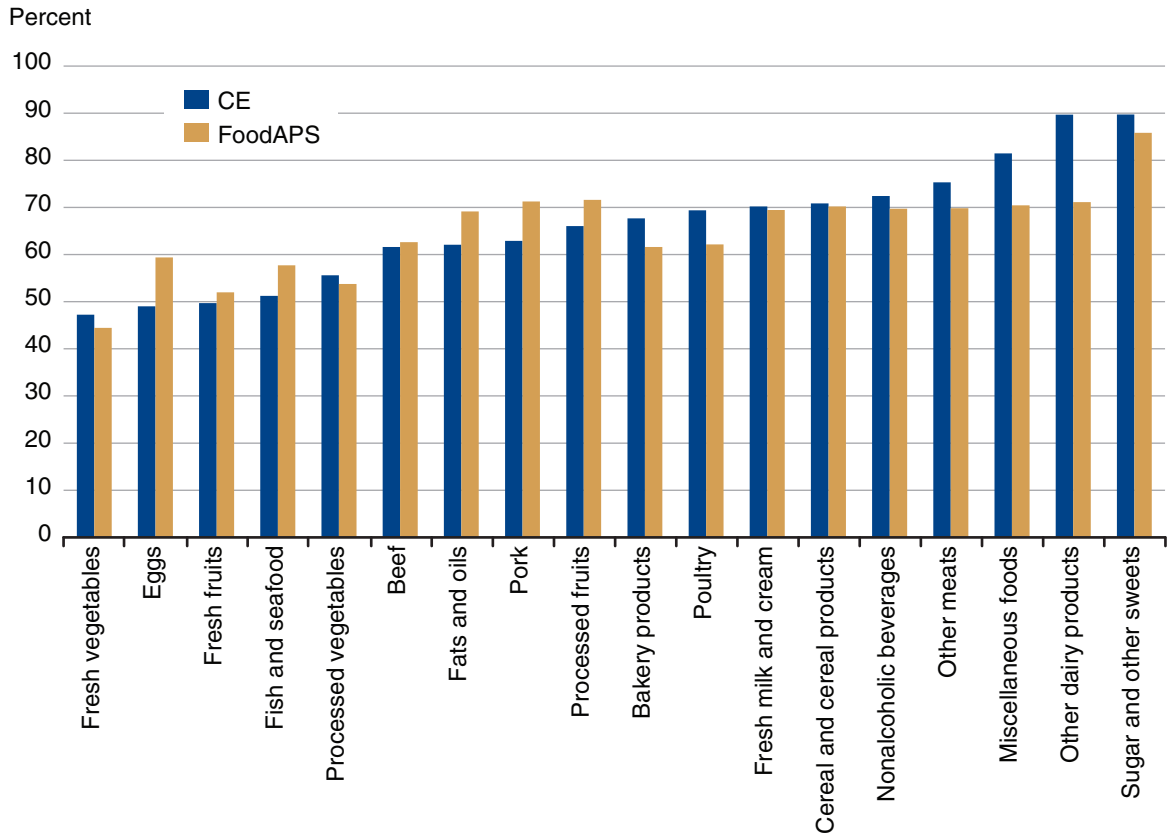


Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

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.

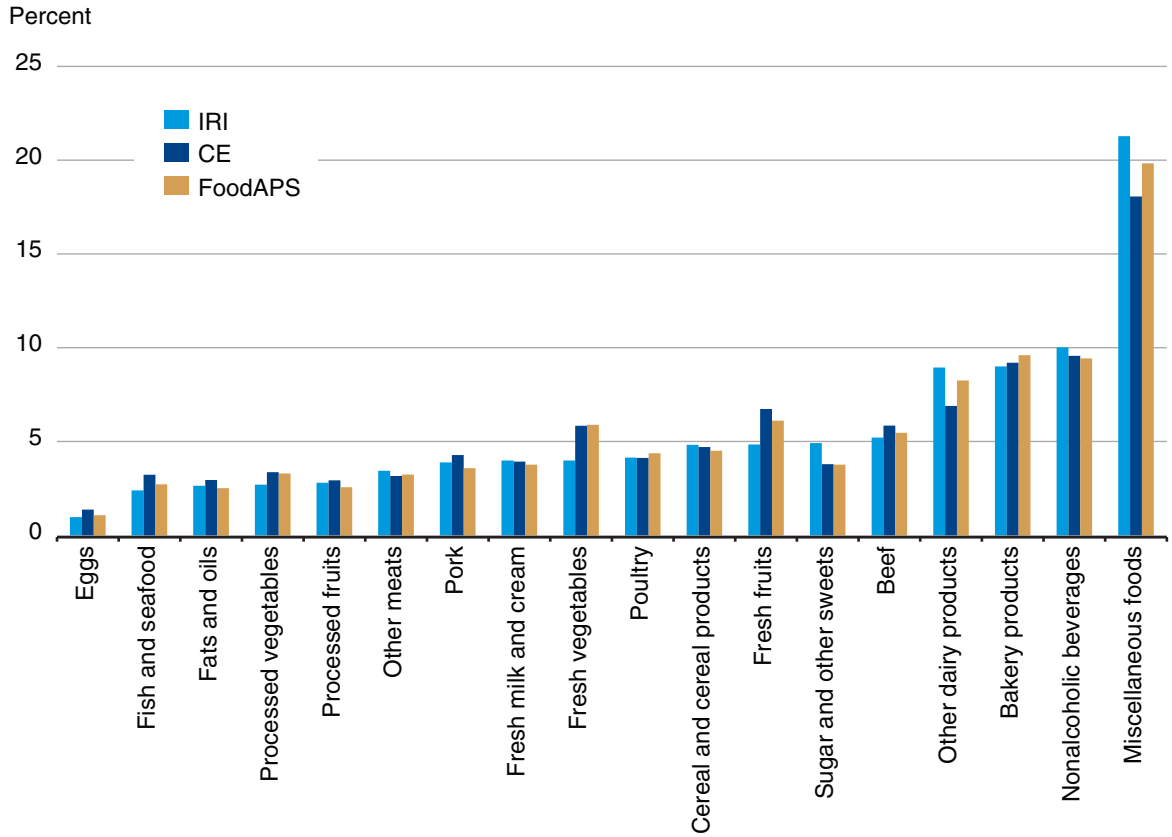
Figure 2
Average weekly expenditures in IRI as a percentage of Consumer Expenditure Survey (CE) and FoodAPS expenditures by product category, 2012



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



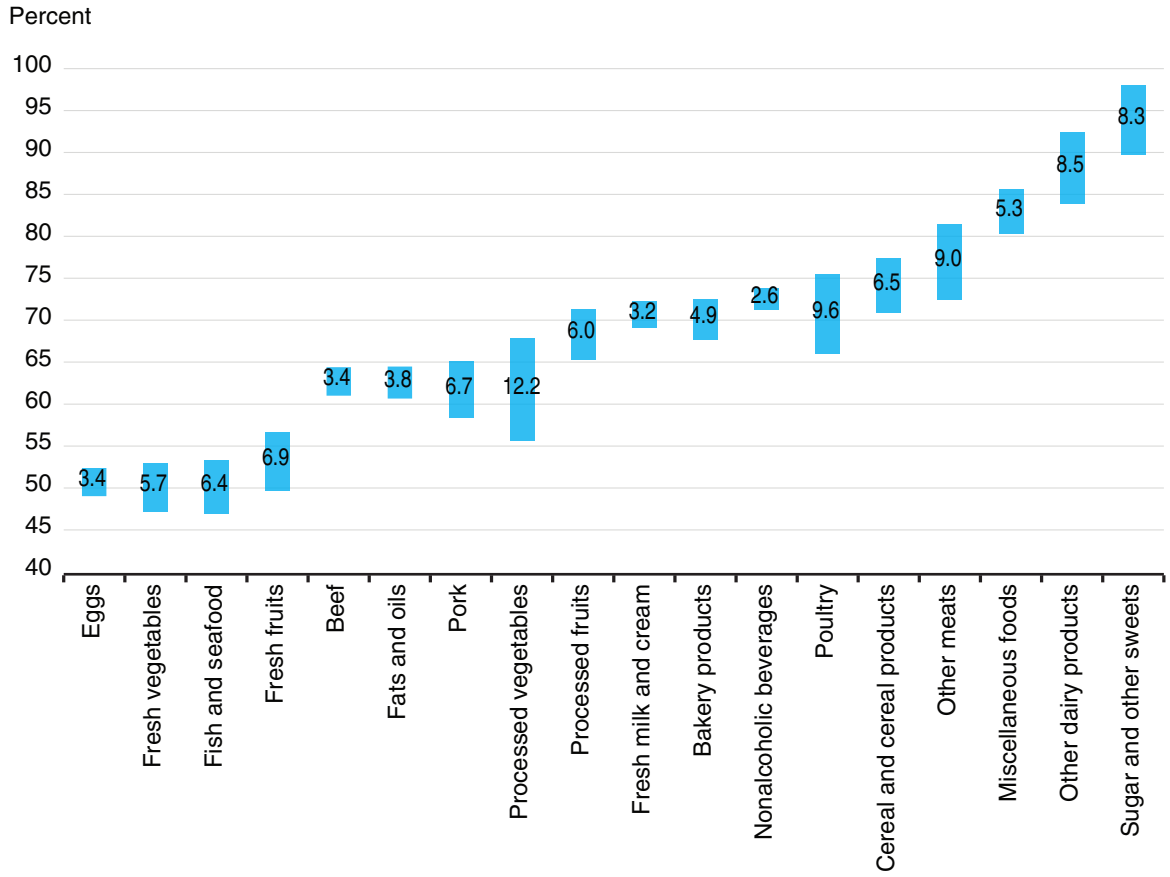
Source: USDA, Economic Research Service estimates using IRI, CE, and FoodAPS data, 2012.

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.

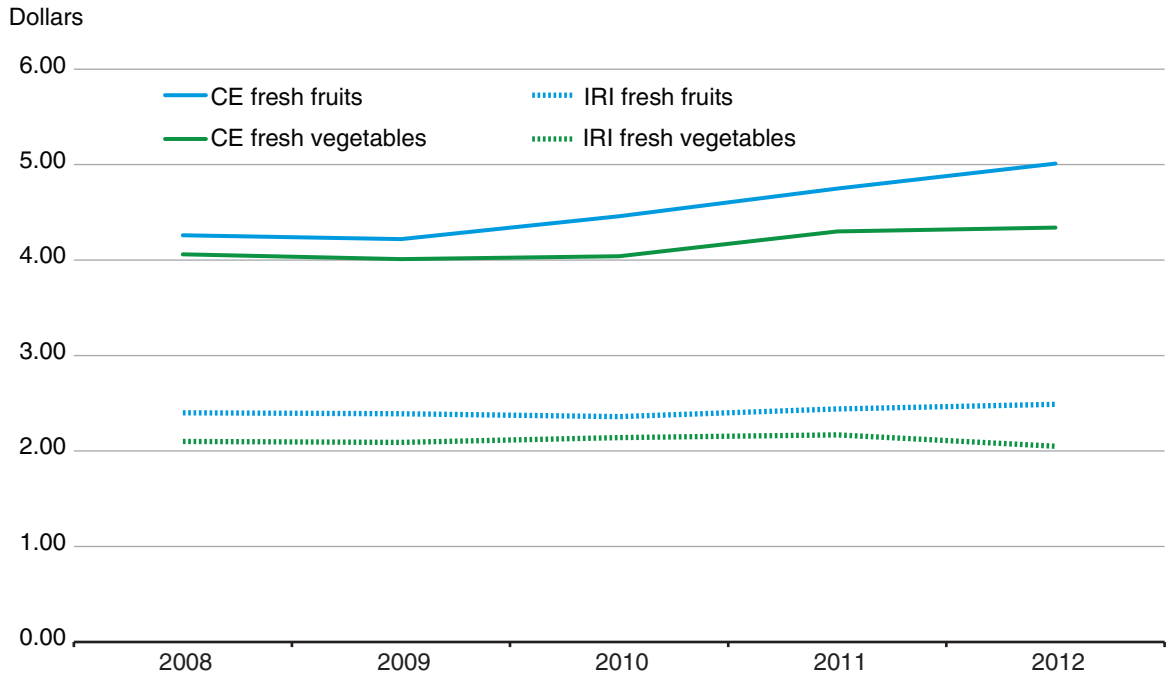
In each year from 2008 to 2012, the fresh fruits and fresh vegetables categories were among those with the lowest expenditures relative to CE (fig. 5). For fresh vegetables, IRI expenditures relative to CE ranged from a high of 53 percent in 2010 to a low of 47 percent in 2012. IRI's expenditures for 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

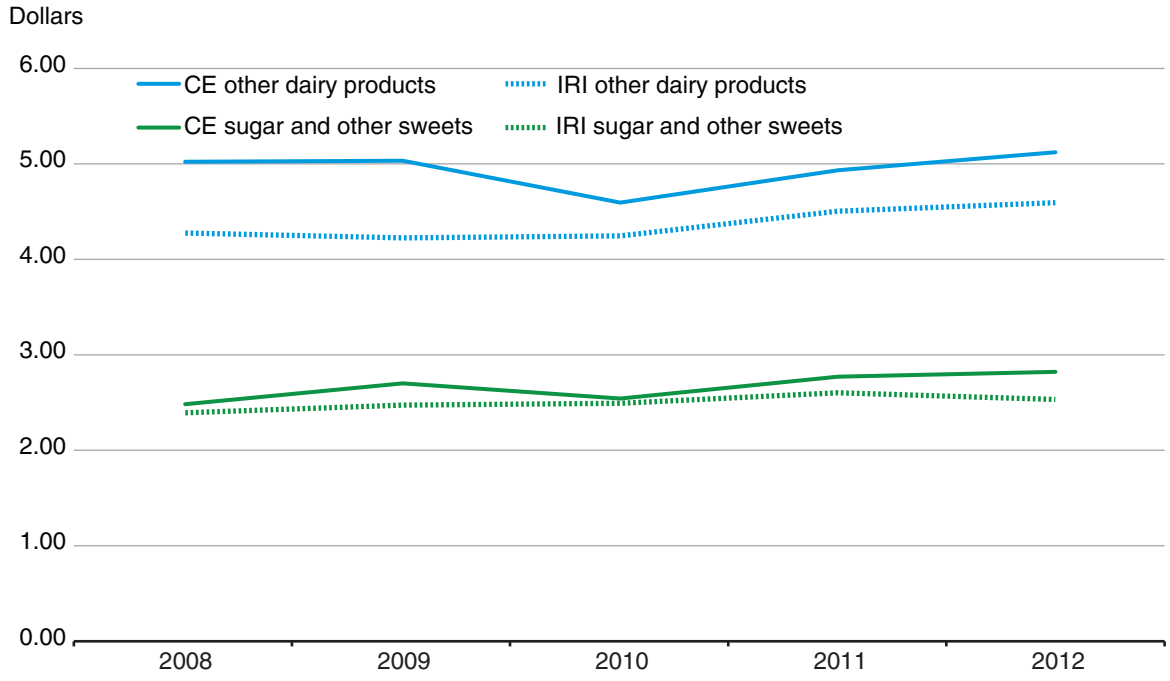
Average weekly household expenditures on fresh fruits and vegetables, IRI and Consumer Expenditure Survey (CE), 2008-12



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

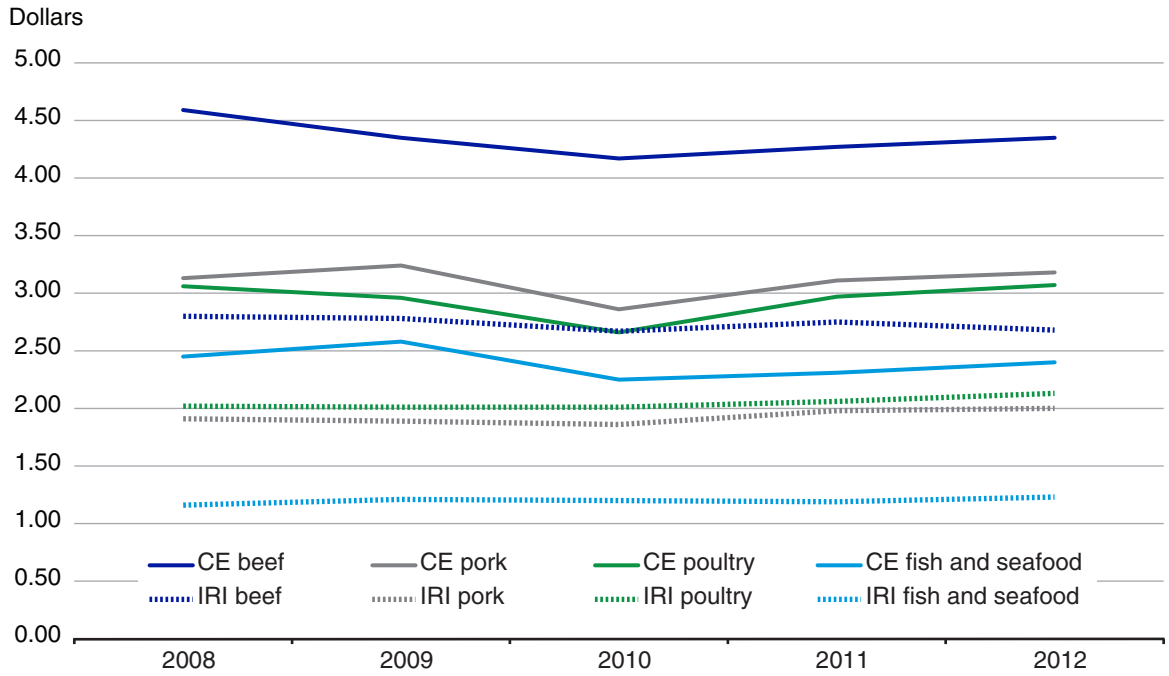
Figure 6

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 ($)	Poultry ($)
CE						
$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
IRI						
$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
IRI as percentage of CE						
$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 ($)	Fresh vegetables ($)
CE						
$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
IRI						
$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
IRI as percentage of CE						
$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%

—continued

Table 4
Average weekly household expenditures by category and household income, Consumer Expenditure Survey (CE) and IRI, 2012—continued

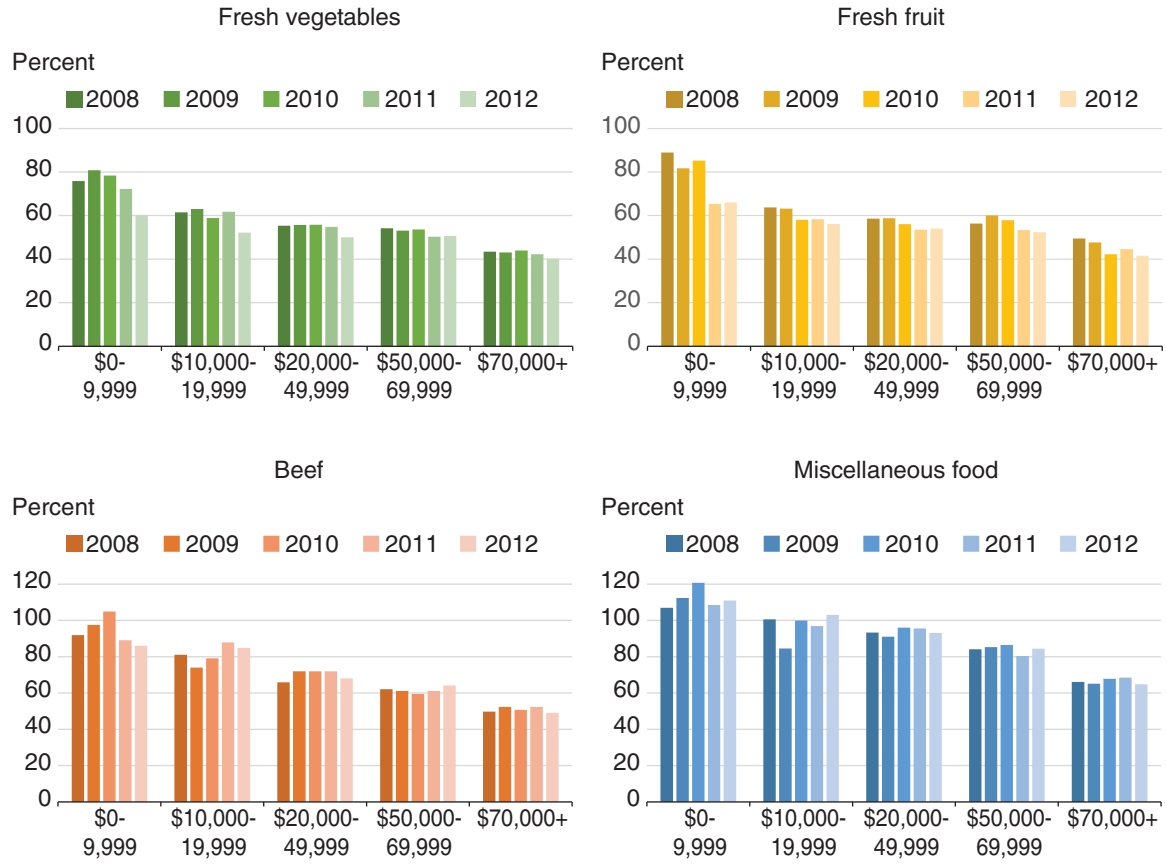
Income	Processed fruit ($)	Processed vegetables ($)	Sugar and other sweets ($)	Fats and oils ($)	Nonalcoholic beverages ($)	Miscella-neous food ($)
CE						
$0-9,999	1.40	1.57	1.58	1.44	4.19	7.90
SE	0.12	0.12	0.15	0.13	0.35	0.60
$10,000-19,999	1.27	1.85	1.80	1.51	4.65	8.32
SE	0.07	0.14	0.12	0.12	0.24	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
IRI						
$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
IRI as percentage of CE						
$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 ($)	Poultry ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Fresh vegetables ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Miscellaneous food ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Poultry ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Fresh vegetables ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Miscella-neous food ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Poultry ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Fresh vegetables ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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 ($)	Miscella-neous food ($)
CE						
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
IRI						
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
IRI as percentage of CE						
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.

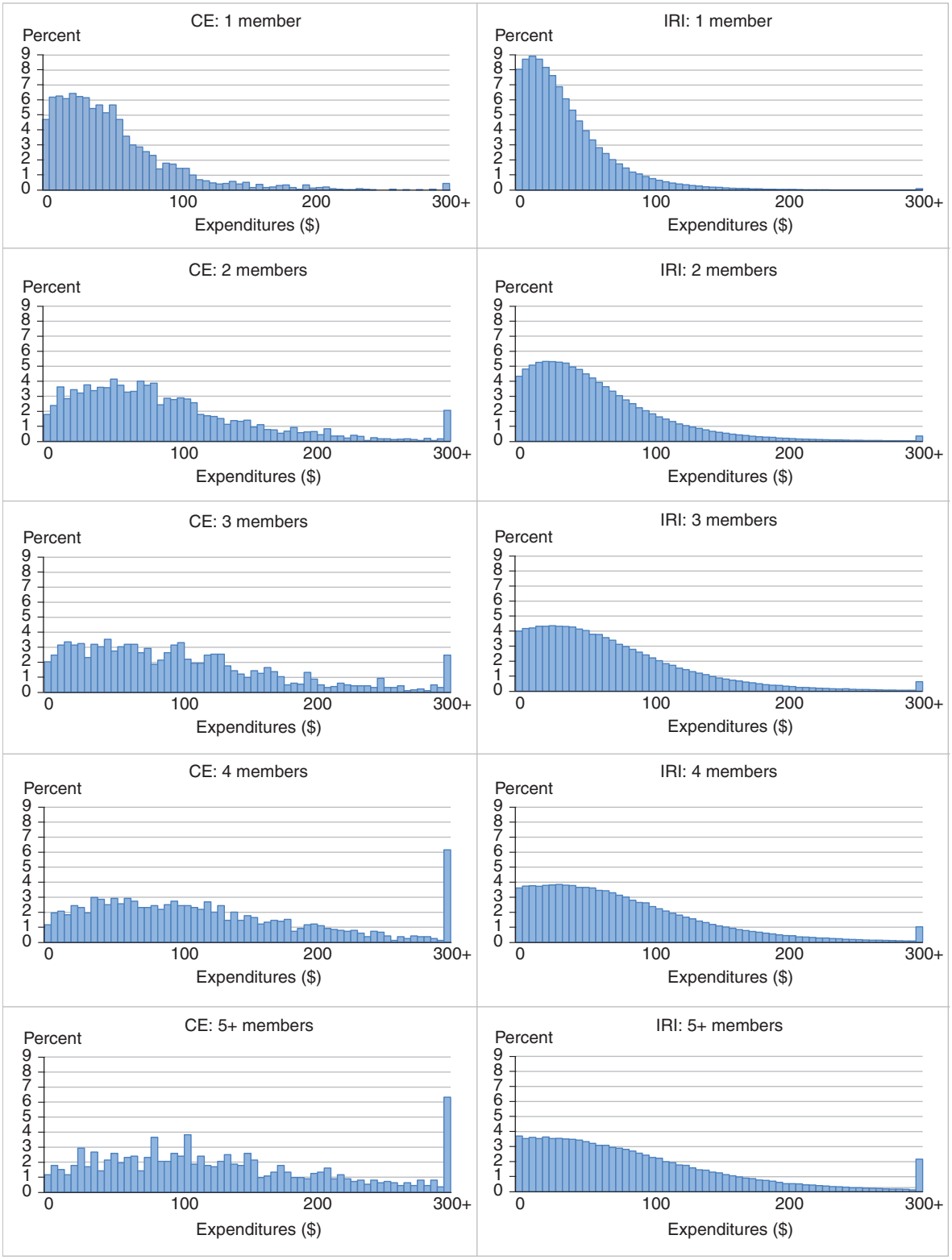
Expenditures were more similar between surveys for one-member households, where IRI spending was around 80 percent or greater of CE spending for most categories. Additionally, spending on sugar and other sweets, other dairy, and miscellaneous food in IRI surpassed spending in CE for one-person households.

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:

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

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.

Zi,j,l can similarly be written as

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

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.[9] 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:

$$SE(X_{i,j}^{IRI}) = \sqrt{\sum_{h=1}^{H_i} \frac{n_{(i),h}}{n_{(i),h}-1} \sum_{a=1}^{n_h} \left(\left(\sum_{b=1}^{m_{ha}} X_{(i,j),h,a,b}^{IRI}\right) - \bar{X}_{(i,j),h}^{IRI}\right)^2}\,, \tag{3}$$

[9] 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:

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

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

$\overline{Y}_{(i,j),h}^{IRI}$ 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/BEARNAISE/DILL SAUCE	35
MISCELLANEOUS FOODS	SS HORSERADISH/HORSERADISH SAUCE	248

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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 SUBTITUTES/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.