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# Methodology for the Quarterly Food-Away-from-Home Prices Data

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# Methodology for the Quarterly Food-Away-from-Home Prices Data

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## Abstract

Accurate and detailed prices are a key component to analyze a variety of important questions related to consumer behavior. Given the importance of food-away-from-home (FAFH) consumption in a typical American's diet, the variation in nutritional value across different types of FAFH meals, and evidence that prices may vary substantially across areas, Economic Research Service researchers created a novel dataset that can be used to study how prices may affect food choices, intake, and health outcomes. The Quarterly Food-Away-from-Home Prices (QFAFHP) data contain quarterly average prices without tax for meals and specific FAFH (e.g., all entrees and combination meals, soda, hamburgers, school lunches) from four types of FAFH establishments (full- and limited-service restaurants, vending machines, and schools) and for alcoholic beverages (at home and away from home). The prices are further disaggregated for the entire Nation, four census regions, and nine census divisions. ERS developed QFAFHP as a complementary data product to the Quarterly Food-at-Home Price Database, which provides market-level food prices for food-at-home products based on the Nielsen Homescan data. This report describes in detail the methodology behind QFAFHP and the underlying data, composed of individual product prices collected by the Bureau of Labor Statistics for the Consumer Price Index.

**Keywords:** regional prices, food away from home, food policy

**JEL:** R10, C80, Q18

## Acknowledgments

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## What Is the Issue?

Food away from home (FAFH) is integral to a typical American's food budget and diet, constituting approximately 43 percent of the food budget for an average U.S. household in 2012 and about a third of daily calories consumed by the average adult. Consequently, FAFH plays a key role in the nutrition and health of Americans as well. Researchers use the variation in food prices over time and across regions to estimate how price changes affect the demand for different products (changes in quantity purchased or expenditures), and in turn, how changes in demand affect nutritional and health outcomes. Several studies have investigated the role of food-at-home prices on food purchasing behavior and dietary outcomes, but conducting similar analyses for FAFH has been difficult because of limited price information. ERS researchers have constructed quarterly FAFH price data to help examine the economic determinants of diet quality and health outcomes. The new data allow researchers to analyze a variety of questions, such as how demand varies across establishment types (e.g., full- versus limited-service restaurants), across specific foods (e.g., hamburgers versus sandwiches), and across regions (e.g., West versus South).

## What Did The Study Find?

- Full-service restaurant prices from 1998 to 2012 were, on average, highest in the Northeast at $8.94 and lowest in the South at $7.17.

- The price of meals at full-service restaurants in all four census regions rose between 1998 and 2004, but began to decline in 2005. Prices were flat during the 2007-09 recession but rose again slightly after the recession.

- Overall, limited-service meals were almost one-third the price of meals at full-service restaurants. At limited-service restaurants, sandwiches were generally the most expensive category and Mexican-style meals the least expensive.

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- School lunch prices varied less across regions and divisions than did full-service and limited-service prices, but school lunch prices increased more than either of these other categories between 1998 and 2012, with school lunch prices in the Northeast rising more than 5 percent over this period.

- Beer and wine away from home were 3 to 4 times more expensive than their at-home versions, while spirits away from home were 6 to 10 times more expensive than spirits at home.

## How Was the Study Conducted?

ERS researchers used prices without tax collected by the U.S. Bureau of Labor Statistics (BLS) for the Consumer Price Index from 1998 to 2012 to construct average, weighted prices for 20 FAFH and alcohol products for the United States, the 4 census regions, and 9 census divisions for 4 establishment types, full-service restaurants, limited-service restaurants, vending machines, and school lunches. Full-service restaurants are defined by BLS as establishments where a server takes customers' orders and payment is made after eating, while limited-service restaurants include establishments where customers pay at a register before eating. Only prices for entrees and combination meals were included in the average, weighted price calculations for the disaggregated products of full- and limited-service restaurants and schools. For vending machines and alcoholic beverages and related disaggregated products, average, weighted price calculations were per ounce. The weights are based on the sample of outlets from which BLS collects prices and are designed to ensure prices represent the census regions and divisions. The researchers estimated standard errors using a jack-knife approach to facilitate hypothesis testing.

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## Introduction

Food away from home (FAFH) and alcohol have become integral to a typical American's food budget and diet. In 1977, FAFH constituted 30 percent of households' food budgets, and this figure grew steadily to 43 percent in 2012 (figure 1) (ERS, 2013). Daily calories consumed from FAFH increased from 18 percent in 1977-78 to 32 percent in 2005-08 (figure 2) (Lin and Guthrie, 2012). Alcohol sales in the United States grew from $33 billion to $171 billion over the same period, representing 11 percent of total food and alcohol sales in 2012 (ERS, 2013).  Alcoholic beverages contributed almost 100 daily calories to the diet of the average adult in 2007-10 (Nielsen et al., 2012), and they are the fifth largest source of calories for adults over the age of 19 after grain-based desserts, yeast breads, chicken and chicken mixed dishes, and soda/energy/sports drinks (USDA and HHS, 2010).

Figure 1
**Portions of household food budgets spent on FAFH and FAH, 1929-2012**
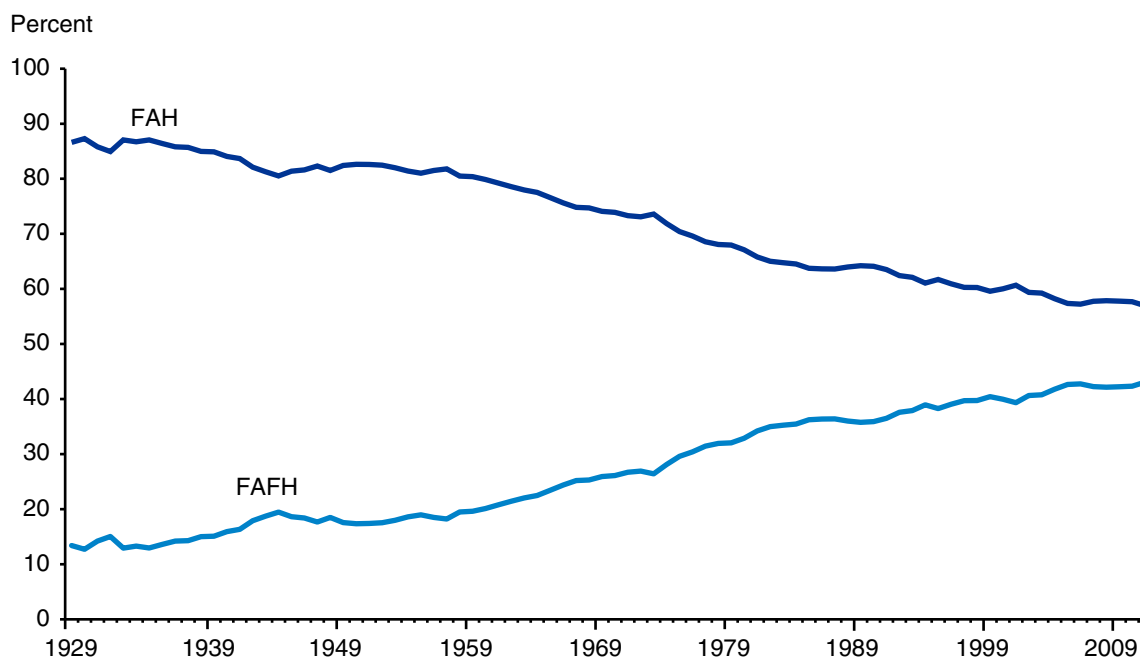


Percent

Note: FAFH = food away from home   FAH = food at home
Source: U.S. Department of Agriculture, Economic Research Service, Food Expenditure Tables, table 7.

Figure 2

**Percentage of total daily calorie consumption by type of establishment as reported in NHANES**



FAH, 82%

Full service, 3%
Limited service, 3%
Schools, 3%
Other FAFH, 8%

1977-78

FAH, 68%

Full service, 7%

Limited service, 13%

Schools, 4%
Other FAFH, 8%

2005-08

Note: FAH = food at home   FAFH = food away from home   NHANES = National Health and Nutrition Examination Survey
Source: From table 2, "Average shares of U.S. caloric and nutrient intakes, by source of food, for individuals 2 years of age and older, 1977-78 and 2005-08," in Lin, B.-H., and J. Guthrie. 2012. *Nutritional Quality of Food Prepared at Home and Away From Home 1977-2008*, EIB-105, U.S. Department of Agriculture, Economic Research Service.

The growing importance of FAFH may contribute to Americans' nutritionally poor diet (Lin et al., 1999; Jeffrey et al., 2006; Todd et al., 2010) and may play a role in the rising rate of obesity (Chou et al., 2004; Davis and Carpenter, 2009; Currie et al., 2010; Chen et al., 2013). Although the relationship of alcohol consumption to diet quality and obesity is not as clear, some evidence suggests that alcohol consumption is associated with weight gain for heavier individuals and nondaily drinkers (Suter, 2005).

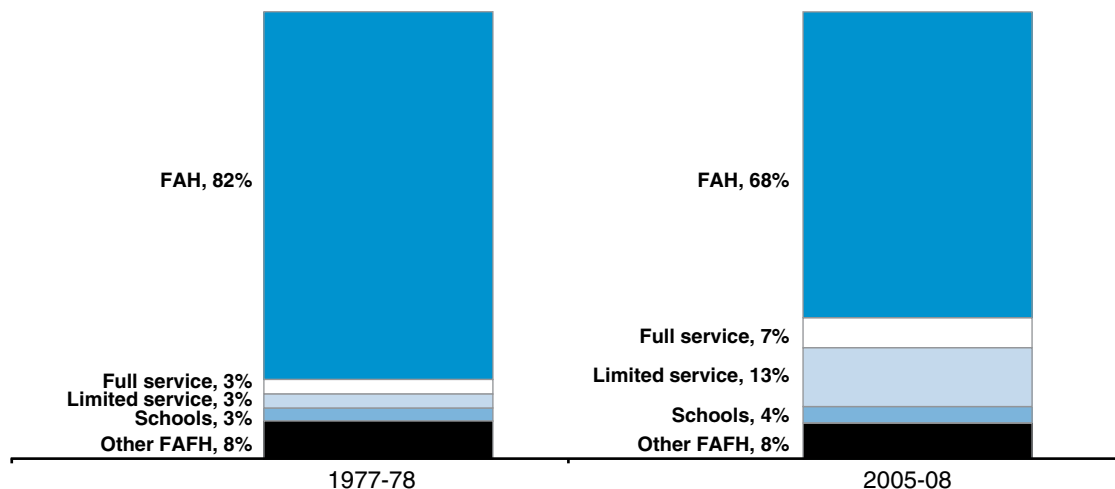For all these reasons, researchers, policymakers, and the public have an interest in determining what factors drive this increase in demand for FAFH and alcohol over time and across geographic areas.  An extensive body of research has shown that food prices influence demand for healthy and unhealthy foods and, therefore, that prices significantly affect diet and health outcomes. Some of these studies link data on food-at-home (FAH) prices from the Quarterly Food-at-Home-Price Database (QFAHPD) with health surveys, such as the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) and the National Health and Nutrition Examination Survey (NHANES).

Using QFAHPD and ECLS-K, Wendt and Todd (2011) show that price decreases of healthy foods purchased at grocery stores lower children's body mass indices (BMI), and they find the inverse relationship between price decreases of unhealthy FAH and children's BMI. Rahkovsky and Gregory (2012) use QFAHPD and NHANES to show that prices for a variety of foods purchased at grocery stores—such as vegetables, processed foods, whole milk, and whole grains—affect blood cholesterol. They conclude that a subsidy on vegetables and whole grains effectively lowers the cost of treating cardiovascular diseases.  Lin et al. (2011) find that a 20-percent increase in the price of soda (about 0.5 cents per ounce) reduces caloric consumption by 34-47 calories per day for adults, leading

to 1 kilogram of weight loss in 1 year. While these studies illustrate that FAH prices are important, similar research on the role of FAFH prices on diet and health is limited because detailed FAFH price data have not existed.

Prices and income changes affect demand for FAFH quite differently than they affect FAH. The studies that support this finding have used four sources of FAFH prices: the Consumer Price Index (CPI) from the U.S. Bureau of Labor Statistics (BLS); price indexes for components of the Personal Consumption Expenditures (PCE) estimates from the National Income and Product Accounts (NIPA) produced by the Bureau of Economic Analysis (BEA); the Cost of Living Index (COLI) from the Council of Community and Economic Research (C2ER); and the Consumer Reports on Eating Share Trends (CREST) data published by the NPD group.

Some studies used the monthly CPI to estimate the responsiveness of FAFH product demand to price changes. Reed et al. (2005) found that demand for FAFH as a whole responds less to price changes than does demand for many disaggregated FAH products, while Okrent and Alston (2012) found that demand for certain disaggregated FAFH products, such as meals at full-service restaurants, responded more to price changes than did other disaggregated FAFH products, such as meals at limited-service restaurants, mobile vendors, and schools. Huffman (2011) used annual data from the NIPA and found FAH to be more price responsive than FAFH. However, both data sets used in these studies, the Consumer Expenditure Survey and NIPA, are only available at a national level, and thus these studies are not able to capture regional variation in FAFH prices.

Several studies have found significant regional price variation for FAH, which may be the case for FAFH as well (Sturm and Datar, 2011; Todd et al., 2011; Kumcu and Leibtag, 2011). In addition, Huffman (2011) estimated that prices, income, and changes in the structure of the population boosted demand for FAFH 350.7 percent and FAH 148.1 percent between 1948 and 1996, motivating his call for better information to understand trends in demand for FAFH across regions of the country and within types of FAFH products.

Other studies have linked quarterly average prices in metropolitan areas for specific limited-service items published by C2ER to nationally representative surveys of diet and health (e.g., Chou et al., 2004; Powell et al., 2007; Khan et al., 2012). However, the coverage of FAFH products in these data is limited to only three items: a hamburger from McDonalds, pizza from Pizza Hut or Pizza Inn, and fried chicken from KFC or Church's Chicken. Furthermore, the prices are not nationally representative because the C2ER data are collected with the specific purpose of comparing the cost of living in urban areas for "moderately affluent professional and managerial households," or households in the top 20 percent of the income distribution for that area (C2ER, 2010).

Lastly, the NPD group collects data on the total bill spent at an FAFH establishment for a nationally representative sample in CREST. Hence, one can calculate the price for certain characteristics of a meal per visit (Richards and Mancino, 2013) but not the price of individual items. In addition, because these data are only available as a cross section, they cannot be used to compare differences across time.

To fill in these gaps, the Quarterly Food-Away-from-Home Prices (QFAFHP) data provide prices on FAFH, alcohol at home, and alcohol away from home. QFAFHP contains quarterly average prices at national, census region, and census division levels for products from four types of FAFH establishments: full-service restaurants, limited-service restaurants, vending machines, and schools. BLS defines full-service restaurants as establishments where a server provides service, orders are gener-

ally taken while customers are seated, and customers pay after eating (BLS, 2008a). Limited-service restaurants are establishments where customers pay before eating, and if waiters or waitresses are present, they do not take customers' orders (BLS, 2008b). Food types tracked by QFAFHP differ among the establishment types, such as inexpensive entrees and meals at full-service restaurants or hamburgers at limited-service restaurants. Prices for both alcohol at home and away from home are included because the Quarterly Food-at-Home-Price Database contains neither. Alcohol prices are disaggregated by product type but not by establishment type, beyond at home and away from home. QFAFHP data can be used to estimate price elasticities for disaggregated FAFH products by region and to predict and compare growth in aggregate demand for FAH and FAFH. In this report, ERS researchers discuss the data and methods used to construct QFAFHP. They also present summary statistics on the average and dispersion of the prices across regions, products, establishment types, and time.

# Sources of FAFH Prices

As discussed in the prior section, few sources of FAFH prices exist (table 1). Publicly available Government sources of FAFH price variation include the CPI, PCE, and average meal costs published in the Economic Census by the U.S. Census Bureau. Two additional sources of FAFH data are the COLI and CREST data.

BLS publishes price indexes for a variety of goods and services at different geographic levels (BLS, 2013). Price indexes by establishment type are available for FAFH at the national level (e.g., full-service restaurants in the entire United States), and composite price indexes are also available for all FAFH establishments by census region, large metropolitan areas, or aggregations of smaller metropolitan areas (e.g., all FAFH in the Northeast, New York City, or medium and small cities in the Northeast). Aggregations of the entire United States mask price variations between geographic areas, for example, between the Northeast and the Midwest. Also, aggregations of all establish-

Table 1
**Comparison of different datasets with information on food away from home and alcohol**

| Data | Units | Regional Disaggregation | Frequency | Coverage |
|---|---|---|---|---|
| Consumer Price Index | Geometric means price index | National; limited product coverage for census regions | Time series, Monthly, 1998-present | Full service, limited service, vending machines and mobile vendors, meals from employee sites and schools, other FAFH, alcohol at home, alcohol away from home; FAFH and alcohol for census regions |
| COLI | Dollar per item | Metropolitan area | Cross section, Quarterly | Hamburgers, pizza, fried chicken, beer at home, liquor at home, wine at home |
| CREST | Dollar per visit | Census division | Cross section | 44 restaurant categories (e.g., quick-service deli, fine dining), 300 disaggregated prepared food and alcoholic beverages (e.g., pancakes, ham sandwich) |
| Economic Census | Dollar per meal | National, State | Cross section, every 5 years | Full service, limited service, and cafeterias, grill buffets and buffets |
| QFAFHP | Dollar per meal/ entrée; dollar per ounce | National, census region, census division | Time series, Quarterly, 1998-2011 | High level of detail across establishment types and foods. |
| National Income and Product Accounts | Fisher ideal price index | National | Time series, Annual, 1929-2012 | Food and nonalcoholic beverages for off-premise consumption; alcoholic beverages for off-premise consumption |

Note: FAFH = food away from home
Source: Bureau of Economic Analysis (BEA), National Income and Product Accounts; Bureau of Labor Statistics (BLS), Consumer Price Index; Council of Community and Economic Research (C2ER), Cost of Living Index (COLI); NPD Group, Consumer Reports on Eating Share Trends (CREST); U.S. Bureau of the Census, Economic Census; U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices (QFAHFP).

ment types mask price variations between types of outlets—for example, between full- and limited-service restaurants. As shown in figures 3 and 4, the CPI for FAFH differs by census region and by establishment type. This pattern illustrates that price indexes, as well as average prices, are likely to vary by establishment type within geographic regions.

Figure 3
**Monthly CPIs for FAFH by census region, 1978-2012**
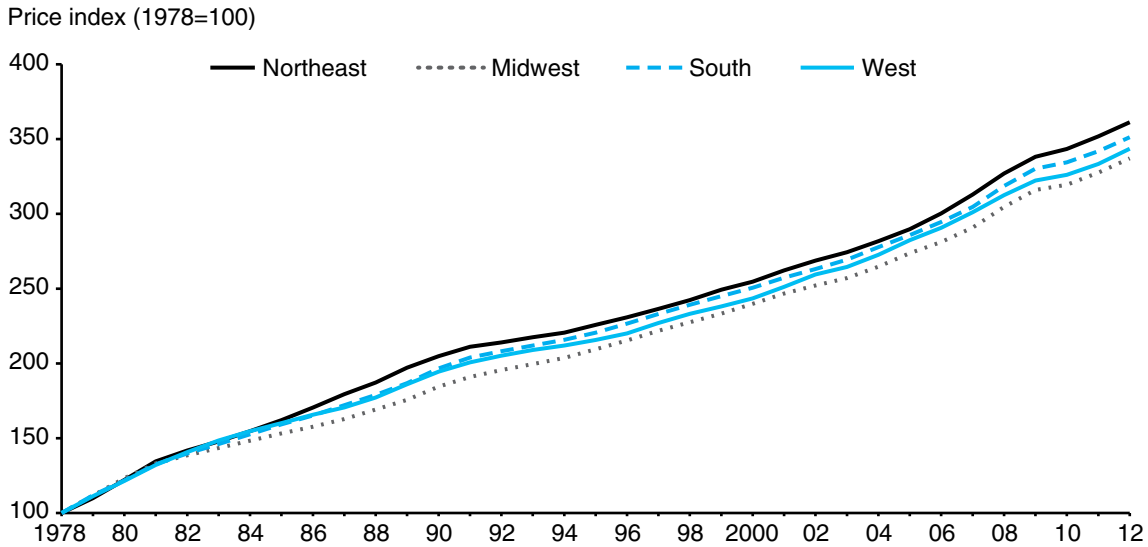
Price index (1978=100)



Note: FAFH = food away from home
Source: Bureau of Labor Statistics, Consumer Price Index (CPI).

Figure 4
**Monthly CPIs for FAFH by establishment type, 1997-2012**
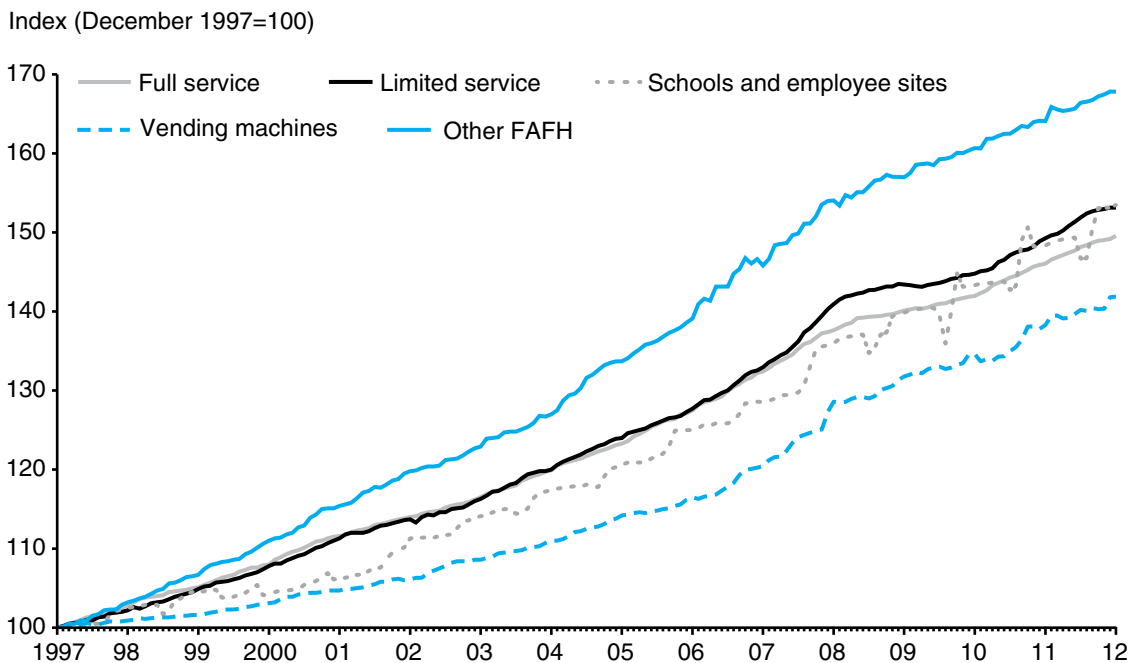
Index (December 1997=100)



Note: FAFH = food away from home
Source: Bureau of Labor Statistics, Consumer Price Index (CPI).

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BEA publishes national price indexes for components of its PCE estimates in NIPA (BEA, 2012). BEA uses the CPI for meals and snacks at limited-service and full-service restaurants, alcoholic beverages away from home, and food at employee sites and schools to calculate a price index for purchased meals and beverages (BEA, 2012). Hence, the movements in the national CPI for FAFH and BEA's price index closely follow each other, with only minor differences in which products are included in each index (e.g., alcoholic beverages are excluded from the CPI for FAFH) and in the index formulas (figure 5). Again, these data are only available at the national level and do not provide geographic price variation.

The U.S. Census Bureau publishes data on the average cost per meal at restaurants at the national and State levels in the Economic Census. Costs are available for three types of establishments: (1) full-service restaurants (North American Industry Classification System (NAICS) industry code 722110); (2) limited-service restaurants (NAICS industry code 722211); and (3) cafeterias, grill buffets, and buffets (NAICS industry code 722212). Establishments are grouped into eight categories based on the average cost per meal at the outlet. Figure 6 shows the average cost of a meal at most limited-service restaurants, in 2007, ranging between the $5.00-$6.99 and $7.00-$9.99 cost categories, whereas the average cost of a meal at full-service restaurants varies much more. Additional data are available to calculate average costs for broader categories, such as the number of establishments in each category, and the total number of establishments that responded for each category. However, the Economic Census is available only every 5 years, and the average cost data is released with a 3-year lag.

Figure 5
**Comparison of annual PCE price index for purchased meals and beverages and CPI for FAFH, 1929-2012**

Price index (1953=100)
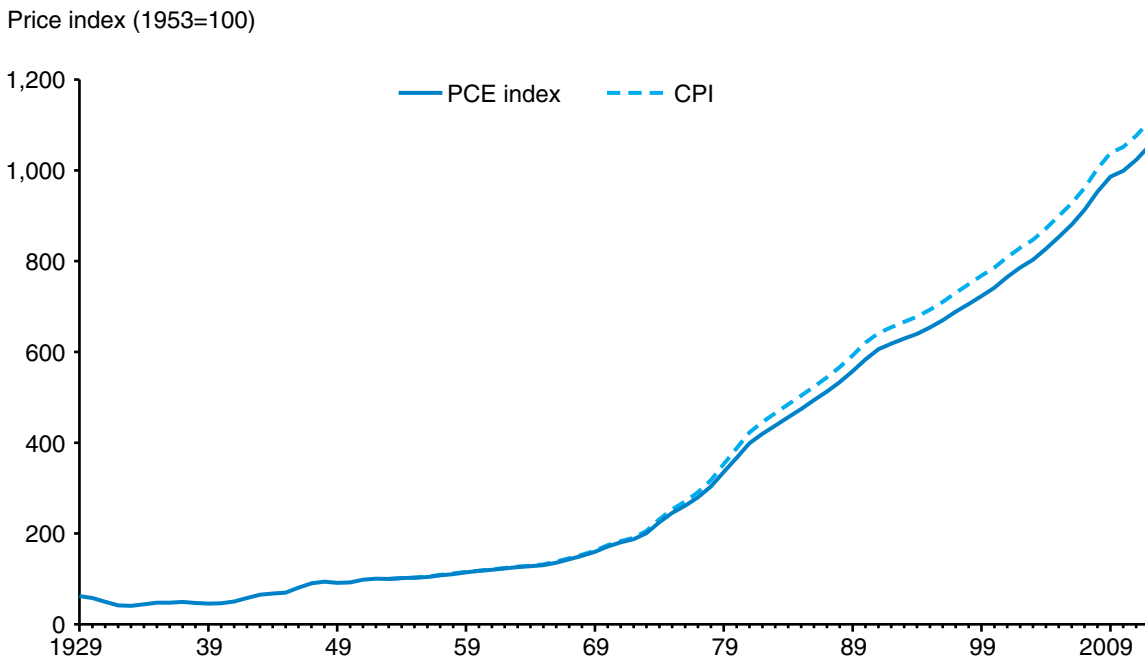


Note: PCE = Personal Consumption Expenditures   CPI = Consumer Price Index   FAFH = food away from home
Source: Bureau of Economic Analysis, Personal Consumption Expenditures Price Index and Bureau of Labor Statistics, Consumer Price Index (CPI).

Figure 6
**Number of establishments by average cost of meal for FAFH, 2007**

Number of establishments
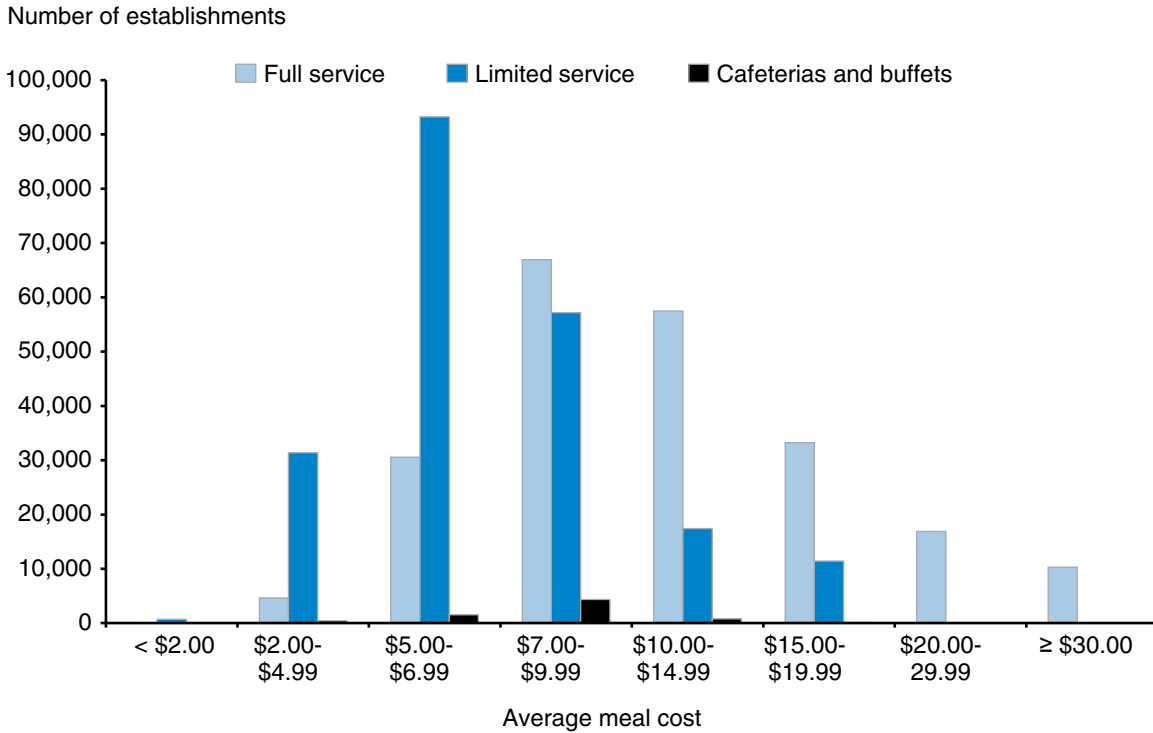


Note: FAFH = food away from home
Source: U.S. Census Bureau, Economic Census 2007.

In COLI, C2ER publishes an aggregate quarterly index and underlying average prices for nearly 300 metropolitan and nonmetropolitan areas across the United States (with a few in Canada) and 57 specific products. Products include select FAH, FAFH, alcohol, and nonfood items—for example, the average price per pound of a T-bone steak or per 75-ounce box of Cascade brand dishwashing powder. COLI includes average prices for three FAFH products: a Quarter-Pounder with cheese from McDonald's, an 11-12-inch regular thin crust pizza with cheese from Pizza Hut or Pizza Inn, and a fried chicken thigh or drumstick from Kentucky Fried Chicken or Church's (C2ER, 2010). The COLI data has advantages over other sources, but it also carries some caveats. First, COLI's goal is to represent prices paid by moderately affluent professional and managerial households in the top income quintile in different markets. Therefore, the data fail to represent large portions of the population, including lower and medium-income households and households that hold blue-collar occupations. Second, C2ER emphasizes that COLI is not intended to measure price change over time, making quarter-to-quarter comparisons invalid. Third, standard errors are not computed because the sample is not randomly selected and because a limited number of products are priced in a given area and quarter. This means significance cannot be determined, and thus, it is not possible to conduct hypothesis tests on differences between geographic regions (C2ER, 2012).

CREST provides daily data on consumer purchases of meals and snacks at restaurants, including information on both the food ordered and the establishment. The main advantage of CREST is that these data come from a large sample (52,500 individuals in a given month) that demographi-cally and geographically represents the U.S. population. The data are also rich in characteristics of the food, restaurants, and respondents. Information includes specific types of food ordered, such

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as penne pasta or BBQ chicken; specific categories of restaurants, such as Asian, Mexican, family style, steak restaurant, and upscale hotel; data on when and where the food was consumed; and whether discounts were used. Demographics include the ages, household income, and education of individuals visiting the restaurants. However, these data are only available at the total bill level; that is, the price, serving size, and all other information recorded are for the entire bill. Thus, prices and quantities for individual food items cannot be directly determined, though indirect measures have been estimated (Richards and Mancino, 2013).

The above review of the existing data sources of FAFH prices demonstrates that currently available data provide only a limited understanding of price variation across geographic regions and over time for FAFH. To overcome these gaps in the data, ERS researchers constructed quarterly average prices without tax for a complete set of FAFH items using the prices underlying the BLS CPI. These data, which quantify the price variation across regions, establishment types, and meals, will help researchers, Government agencies, and the public more completely understand the nature of FAFH prices in the United States. For example, researchers could link the QFAFHP to several publicly available datasets by census region or division to investigate the influence of FAFH prices on purchases and consumption of FAFH and FAH—and hence, indirectly, on body weight, nutrition, and health outcomes. Researchers could also use the database to examine interactions between time use and price on demand for FAFH.

# BLS Sample Design and Data Collection

QFAFHP is constructed from individual prices of products collected by BLS for the CPI.[1]  BLS constructs the CPI each month by collecting prices across U.S. urban areas for the majority of products consumers purchase, including FAH and FAFH.  First, BLS generates a sample of establishments in each primary sampling unit (PSU)[2] based on the Telephone Point-of-Purchase Survey (TPOPS).  Within each PSU, TPOPS asks a randomly selected sample of representative households with a landline what their expenditures were on TPOPS categories at every retail location they visited.  For example, a sample respondent in New York City might be asked whether he or she purchased any food at a limited-service restaurant.  If the answer is yes, then he or she is asked at what location(s) the food was purchased and the total amount of money spent on food from that location. TPOPS categories for FAFH include the following:

1.  Full-service meals and snacks

2.  Limited-service meals and snacks

3.  Food at employee sites and schools

4.  Food from vending machines and mobile vendors

5.  Beer, ale, and other malt beverages at home

6.  Distilled spirits at home

7.  Wine at home

8.  Alcoholic beverages away from home

Based on the responses from TPOPS, BLS chooses a sample of outlets within each PSU using probability proportional to size sampling, where the "size" is aggregate expenditures at each outlet. Smaller PSUs are aggregated into areas based on each PSU's population and census region (e.g., small- and medium-sized PSUs in the Northeast are grouped together), whereas a larger PSU can, by itself, represent an entire area (e.g., New York City). About 25 percent of the outlet sample in each PSU rotates throughout a year, so that at the end of 4 years, the entire outlet sample in the United States has been updated (BLS, 2007).

To determine which products to price at each outlet, a BLS field agent uses a multistage probability selection method, with the help of a manager or owner of the sample outlet. The manager provides the BLS field agent with the proportion of revenue attributable to different characteristics of the product being priced within an Entry-Level Item (ELI).[3] The field agent then uses a probability proportional to size sampling methodology to select a specific product. For example, a field agent assigned to a limited-service restaurant will first determine the proportion of revenue from the

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[1]Products purchased at FAFH establishments range from (1) specific entrees, a la carte items, and beverages offered on a menu at a certain time of day for full- and limited-service restaurants, (2) total meal cost of a lunch (including beverage) at primary and secondary schools, and (3) individual packaged beverage and food items purchased through a vending machine.

[2]PSUs are classified by population size into metropolitan and nonmetropolitan urban areas, and they are generally made up of multiple counties. They include Metropolitan Statistical Areas (MSAs), Primary Metropolitan Statistical Areas (PMSAs), and Consolidated Metropolitan Statistical Areas (CMSAs). For additional details on BLS PSU construction, see the *Handbook of Methods*, Chapter 17 (BLS, 2007).

[3]An ELI is the smallest category of item BLS uses in its index calculation. Prices for individual products are aggregated to the ELI level before aggregating to higher levels.  In the case of FAFH, the TPOPS categories match the ELI categories one for one. Alcoholic beverages at home are aggregated into one category.

first stage of characteristics, such as different types of menus offered—breakfast, lunch, or dinner menus (figure 7). The field agent chooses one type of menu, where the probability of selecting each is proportional to the share of revenue the restaurant receives from each menu type. For the chosen menu, the field agent then determines the proportion of revenue at the outlet attributable to the second stage of characteristics—for example, type of food, which might be combination meal, entree, salad, side dish, or beverage, depending on the menu chosen. Once the product characteristics have been sufficiently narrowed down, the field agent records any additional information needed to identify the product on later visits and collects the product's price every other month for 4 years.[4] Once the price is collected and sent to BLS headquarters in Washington, D.C., a commodity analyst checks the price for errors and adjusts for sales tax and unit size (BLS, 2007).

Figure 7
**Choosing prices at each sample outlet: limited-service restaurants**

| Type of menu | | | | |
| --- | --- | --- | --- | --- |
| Breakfast-lunch-dinner | Lunch-dinner | Breakfast | Lunch | Dinner |
| | | ⬇ | | |
| Type of food | | | | |
| Combination meal | Entrée | Salad | Side dish | Beverage |
| ⬇ | ⬇ | ⬇ | ⬇ | ⬇ |
| Ingredients | | | | |
| Name of combo meal and components | Name of entrée | Name of salad | Name of side dish | Name of beverage |
| "Hamburger with french fries and soda" | "Fried chicken" | "Garden salad" | "Bag of chips" | "Coffee" |
| ⬇ | ⬇ | ⬇ | ⬇ | ⬇ |
| Additional descriptions | | | | |
| "Price for regular size combo meal" | "White meat only" | "Includes dressing" | "Any flavor" | "Large" |

Source: Authors' rendering, loosely based on Bureau of Labor Statistics checklist for limited-service meals and snacks.

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[4]If, within the 4 years, a price for an item with a particular set of characteristics becomes unavailable, then the field agent chooses another price that has characteristics similar to the unavailable item. For example, if the price for a fried chicken sandwich on the regular lunch menu is no longer available, the field agent may price a grilled chicken sandwich on the same menu instead. The field agent notes the substitution, and a BLS commodity analyst determines if the two products are comparable. If the commodity analyst deems the two products not comparable, then the would-be replacement product may be added to the sample as a completely new item with different characteristics. For more details, see the BLS *Handbook of Methods*, Chapter 17 (BLS, 2007).

BLS records three prices for each product within each ELI: collected price, effective price, and effective price with tax. The collected price comes directly from the BLS field agent and is not modified in any way. A BLS commodity analyst then adjusts this price in two ways. First, adjusting the collected price for units of measurement creates the effective price. Second, adjusting the effective price to include sales tax creates the effective price with tax. The effective price with tax of a 6-pack of 12-ounce cans of beer would be the price of the beer with taxes per ounce (BLS, 2007). For products from full-service and limited-service restaurants and schools, the collected price is the same as the effective price.[5] For products from vending machines and for alcoholic beverages (at home and away from home), the effective price is generally the collected price adjusted for unit size.[6] ERS used the effective price without tax in its weighted average price calculations but made some adjustments to the sample of products and the prices, as described in the next section.

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[5]Even though BLS collects prices for employee sites in the ELI school lunches and employee sites, these prices were excluded because of small sample size and the hetereogeneity of the establishment and meal types offered at employee sites. For example, it includes both office cafeterias and buffets as well as catered meals at hotel conference sites.

[6]Prices from mobile vendors were excluded from the QFAFHP because products offered by mobile vendors were quite different from those offered by vending machines, but there were not enough observations to calculate a separate price for mobile vendors.

# Methodology for Calculating Average Prices

## Product Selection

Artificial variation in average prices can arise if prices are not adjusted for changes in quality or differences across areas, time, establishment types, and products (Okrent and Alston, 2012; Todd et al., 2010). Therefore, ERS researchers calculated FAFH product prices at the most disaggregated level possible: by census region and division and by establishment and product type (table 2). Using a number of product characteristics recorded by the field agent at the time of price collection, ERS chose products within BLS's six FAFH establishment types in such a way as to maintain a minimum

Table 2
**Aggregation of BLS PSUs to census region and division**

| BLS PSU | Census division* | Census region* |
|---|---|---|
| Hartford, CT<br>Springfield, MA<br>Boston, MA<br>Burlington, VT | New England | |
| New York City, NY<br>Pittsburgh, PA<br>Syracuse, NY<br>Buffalo, NY<br>Sharon, PA<br>Johnstown, PA<br>Philadelphia, PA<br>Reading, PA<br>New York Suburbs, NY**<br>New Jersey Suburbs, NJ | Middle Atlantic | Northeast |
| Detroit, MI<br>Milwaukee, WI<br>Saginaw, MI<br>Chicago, IL<br>Cleveland, OH<br>Cincinnati, OH<br>Dayton, OH<br>Columbus, OH<br>Youngstown, OH<br>Wausau, WI<br>Evansville, IN<br>Elkhart, IN<br>Madison, WI<br>Decatur, IL<br>Mount Vernon, IL | East North Central | |
| St. Louis, MO**<br>Minneapolis, MN**<br>Kansas City, MO<br>Lincoln, NE<br>Faribault, MN<br>Chanute, KS | West North Central | Midwest |

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Table 2
**Aggregation of BLS PSUs to census region and division—continued**

| BLS PSU | Census division* | Census region* |
|---|---|---|
| Melbourne, FL<br>Ocala, FL<br>Gainesville, FL<br>Norfolk, VA<br>Raleigh, NC<br>Richmond, VA<br>Baltimore, MD<br>Miami, FL<br>Tampa, FL<br>Ft. Myers, FL<br>Arcadia, FL<br>Atlanta, GA<br>Washington, DC<br>Florence, SC<br>Albany, GA<br>Greenville, SC<br>Statesboro, GA | South Atlantic | South |
| Florence, AL<br>Birmingham, AL<br>Chattanooga, TN**<br>Morristown, TN | East South Central | |
| Pine Bluff, AR<br>Oklahoma City, OK<br>San Antonio, TX<br>Dallas, TX<br>Houston, TX<br>Lafayette, LA<br>Baton Rouge, LA<br>Beaumont, TX<br>Brownsville, TX<br>Amarillo, TX<br>Odessa, TX | West South Central | |
| Phoenix, AZ<br>Denver, CO<br>Yuma, AZ<br>Provo, UT<br>Boise, ID<br>Las Vegas, NV<br>Brookings, SD | Mountain | West |
| San Diego, CA<br>Modesto, CA<br>Los Angeles, CA<br>Los Angeles Suburbs<br>Seattle, WA<br>Portland, OR<br>Bend, OR<br>San Francisco, CA<br>Chico, CA<br>Pullman, WA | Pacific | |

Note: BLS = Bureau of Labor Statistics  PSU = Primary Sampling Unit
*Quarterly Food-Away-from-Home-Prices data include prices for census divisions and census regions;
**PSUs that cross census division borders. Authors adjusted weights to account for the percentage of population residing in each division to ensure prices are geographically representative. BLS already adjusts weights to account for PSUs that cross census region borders to ensure representativeness.
Source: BLS, Consumer Price Index.

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sample size of three individual prices within each quarter and area.[7] The establishment types closely follow the TPOPS categories for FAFH: full-service FAFH, limited-service FAFH, schools, vending machines, alcohol at home, and alcohol away from home (table 3).

The quality of full-service restaurants (reflected in ambiance, reputation, and so on) varies widely, and this quality variation could drive much of the price variation in this category (Mehta and Maniam, 2002). In particular, the BLS sample included full-service meal prices that could cost less than $5 per entree or more than $100 per entree for any given region and quarter. The average meal price at a full-service restaurant generally reflects whether it is an inexpensive or fine-dining establishment.

To eliminate some of these obvious quality differences, ERS defined two types of full-service products: entrees and combination meals at inexpensive restaurants and entrees and combination meals at moderately priced restaurants. Combination meals are meals with one price for two or more items, usually a main course and one or more additional items, such as a side dish or beverage. "Inexpensive" is defined as full-service restaurants that had a less-than-$10 average price per entree or meal over the entire time the restaurant was in the BLS sample, and "moderately priced" is defined as restaurants that had an average price between $10 and $20.[8]

Products at limited-service restaurants were divided into seven categories: all entrees and combination meals, nonalcoholic beverages, hamburgers, pizza, fried chicken, sandwiches, and Mexican-style dishes. ERS researchers grouped the limited-service categories by products offered rather than by the establishments' price points, because limited-service restaurants display less price variation (figure 6) than do full-service restaurants. Furthermore, while industry analysts tend to categorize full-service establishments by price points, such as "casual" or "fine dining," limited-service restaurants are often categorized by their food offerings because they tend to specialize in a certain type of cuisine, such as hamburgers, sandwiches, or Mexican food (Basham and Menza, 2007). The seven limited-service categories ERS researchers chose to study were the only ones for which a sufficient sample size existed, and they represent the largest share of the limited-service industry (Friddle et al., 2001).

The beverages category consists mainly of carbonated beverages that were often sold for the same price, regardless of type (cola, non-cola, and so on) and sugar content (regular or diet). It also includes lemonade, iced tea, coffee, and juice, but not milkshakes or smoothies. The hamburgers category includes all types (e.g., with or without cheese, double burgers, junior-sized burgers), as well as combination meals with french fries, beverages, and so on. The average price for pizza is the price per person, determined by information recorded by the field agent (e.g., serving size of each pizza). Fried chicken includes chicken nuggets, fingers, tenders, and other variations, as well as fried chicken legs, thighs, drumsticks, and white meat.[9] The sandwich category includes any kind of sandwich or wrap. Mexican-style dishes include items such as tacos, nachos, burritos, quesadillas,

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[7]The minimum sample size of three was required by BLS to ensure confidentiality of participating establishments. BLS considers a single price or single establishment to be representative given their sampling methodology.

[8]ERS did not include fine-dining restaurants because of the small sample size. The break between inexpensive and moderately priced restaurants was chosen based on price ranges used by Government, industry, and other publicly accessible sources such as the Economic Census Subject Series for the Average Cost Per Meal, the National Restaurant Association, Yelp.com, and Zagat. Sample size and natural breaks in the data seen visually were also considered.

[9]Chicken breasts, quarters, and other cuts from establishments that primarily serve fried chicken are also included. Fried chicken sandwiches, however, are not included; they are in the sandwich category.

Table 3
**QFAFHP sample size and product characteristics**

| | Average quarterly sample size | | Price determining characteristics |
|---|---|---|---|
| | Per region | Per division | |
| **Full service** | | | |
| All meals | 259 | 158 | Combination meals and entrees |
| Inexpensive | 99 | 64 | Combination meals and entrees sold at establishments with average price less than $10 |
| Moderately priced | 65 | 37 | Combination meals and entrees sold at establishments with average price between $10 and $20 |
| **Limited service** | | | |
| All meals | 305 | 190 | Combination meals and entrees |
| Hamburgers | 55 | 34 | Hamburger combination meals and entrees, all types (e.g., with or without cheese, double burgers, junior-sized burgers) |
| Fried chicken | 29 | 21 | All entrees and combination meals of chicken nuggets, fingers, tenders, and other variations; fried chicken legs, thighs, drumsticks, and white meat (no sandwiches) |
| Pizza | 21 | 14 | All pizza, not including combo meals, per serving |
| Sandwiches | 21 | 14 | All sandwich and wrap entrees and combination meals |
| Mexican-style dishes | 27 | 18 | Tacos, nachos, burritos, quesadillas, fajitas, enchiladas, taquitos, chimichangas, tamales, taco salads, and so on |
| Nonalcoholic beverages | 31 | 20 | Lemonade, iced tea, coffee, hot tea, milk and juice, carbonated beverages but excluding milk shakes and smoothies |
| **School lunches** | 81 | 54 | Lunches at public and private (excluding vocational) primary and secondary schools |
| **Vending machines** | | | |
| Snacks | 38 | 23 | Candy bars, chips, and sweets, but not ice cream, candy or gum, ounces per unit sold |
| Nonalcoholic beverages | 79 | 50 | Coffee, tea, juice, and soda, ounces per unit |
| Soda | 59 | 39 | Soda, ounces per unit sold |
| **Alcohol** | | | |
| Beer at home | 101 | 59 | All beer, ale, and other malt beverages at home, price per ounce |
| Wine at home | 103 | 61 | All wine at home including sparkling wine, price per ounce |
| Spirits at home | 81 | 49 | All spirits away from home, price per ounce |
| Beer away from home | 61 | 36 | All beer, ale, and other malt beverages away from home, price per ounce |
| Spirits away from home | 33 | 19 | All spirits and cocktails away from home, price per ounce |
| Wine away from home | 44 | 25 | All wine away from home including sparkling wine, price per ounce |

Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices (QFAFHP).

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fajitas, enchiladas, taquitos, chimichangas, tamales, and taco salads sold at any type of limited-service outlet.

Vending machine products were divided into three groups: snacks, all beverages, and carbonated beverages.  The snacks category includes candy bars, chips, and sweets (e.g., cookies, donuts, sweet rolls), but not hard candy, gum, fresh fruit, meals (e.g., sandwiches, pizza) or ice cream, which are all included in the BLS ELI.[10]  The beverages category includes all beverages, while the carbonated beverages category does not include coffee, tea, or juice.  Products sold by mobile vendors are not included in any category.

ERS researchers removed lunches at employee sites from the schools category because school lunch prices are an important area of interest, particularly because USDA operates the National School Lunch Program (e.g., Ollinger et al., 2011).  School lunches were defined as the student price for one lunch at any school serving grades Kindergarten through 12th grade, including both public and private institutions, but not vocational schools.  The price includes meals that are offered for free or at a reduced price, although the field agent records the full price.

The alcoholic beverages category includes beer, wine, and spirits, which are divided into at home and away, yielding six alcohol categories: beer at home, wine at home, spirits at home, beer away from home, wine away from home, and spirits away from home.  Beer includes all types of malt beverages; wine includes sparkling wine; and spirits away from home includes drinks mixed with other ingredients, such as juice, soda, or mixers.  Prices are reported per ounce.

## Sample and Price Adjustments

ERS researchers adjusted the sample of products and individual prices in several ways.  The sample was adjusted for outliers by removing individual prices that were three standard deviations below or above the average per year, quarter, and area. Meal and snack prices were adjusted to be per person by dividing the effective price by the average number of people the product was meant to serve (as recorded by the field agent). For example, the price of a pizza noted to serve six to eight people was adjusted by dividing the collected price by 7.  Likewise, effective prices for nonalcoholic beverages were adjusted to be per ounce by dividing the effective price by the number of ounces in the drink recorded by the field agent.[11]  Also, non-restaurants, such as grocery stores, convenience stores, and gas stations, were excluded from the sample. Even though these establishments sell meals and snacks intended to be consumed away from home, these foods and their pricing strategies may be different than those of FAFH establishments. School lunch prices that were recorded as monthly were adjusted to daily by dividing by 22.

## Average Price Calculation and Standard Errors

Average prices were constructed in two steps. In the first step, ERS researchers calculated an average price per individual product within a quarter, where an individual product refers to a specific item

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[10]Hard candy, gum, fresh fruit and meals were removed because they differ from the majority of other products (namely candy bars, chips, and sweets) in systematic ways. They represent a small portion of this category and their prices are driven by different factors.

[11]If the field agent did not record the number of servings or ounces for pizza or beverages, ERS researchers used other information to calculate the price per person or per ounce.  For example, the collected price of 12- and 14-inch pizzas without a serving size was divided by 4, because most 12- and 14-inch pizzas in the data were reported to serve four people.

at a specific store location (e.g., a cheeseburger at the fast-food restaurant at 100 Main St.). Because most prices are collected bimonthly, individual product prices collected in odd months would enter the average quarterly price twice in quarters 1 and 3, while those collected in even months would enter only once. To reduce artificial quarter-to-quarter variation based on this bimonthly collection methodology, ERS first calculated an average quarterly price per individual product. (In other words, individual products that entered the quarter twice were given a weight of 0.5.) In the second step, ERS calculated a weighted average of these quarterly prices per individual product to obtain an average price per quarter and area for each item (figure 8).

The average price $\bar{p}$, for a given establishment type $e$, area $a$, year $y$, and quarter $q$, is given by equation (1):

$$\bar{p}_{e,a,y,q} = \frac{\sum_{i=1}^{n} \bar{p}_{i,e,a,y,q} * \bar{w}_{i,e,a,y,q}}{\sum_{i=1}^{n} \bar{w}_{i,e,a,y,q}}, \tag{1}$$

Figure 8
**Aggregation of individual product prices to average quarterly price per census region**
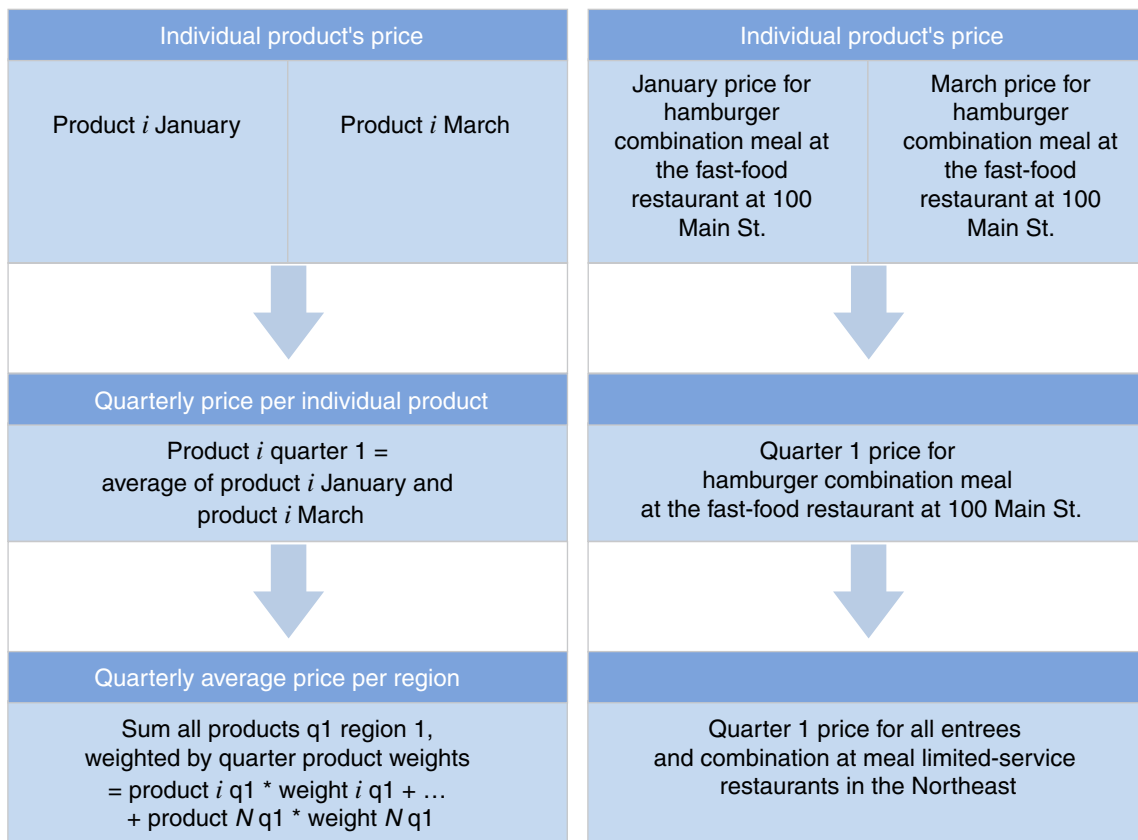


Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices. Authors' rendering of QFAFHP methodology.

where $\bar{p}_{i,e,a,y,q}$ is the average quarterly price per individual product calculated in the first step, and $\bar{w}_{i,e,a,y,q}$ is the weight for a given product $i$, establishment type $e$, area $a$, year $y$, and quarter $q$, described below.

The weights, $\bar{w}$, were calculated in the same manner as the weights used by the BLS average prices for FAH products. The BLS weights roughly approximate the average quantity purchased per item and are representative at the census region level by accounting for the outlet sample and the share of the population in each PSU. The BLS weights are designed to be used monthly. Because ERS researchers aggregated the data quarterly, they averaged the weights for individual products that appeared twice in a quarter.

The census region weights for all the TPOPS categories, except alcoholic beverages, are based on four pieces of information given by equation (2):

$$W_{R_1} = \frac{TPOPSwt * DupFactor}{Count * BasePrice} \tag{2}$$

The TPOPS weight, *TPOPSwt*, is based on the aggregate expenditure by all households for all items in the TPOPS category in a given PSU in a given month. For example, every price collected from limited-service restaurants in New York City in January 2000 will have the same TPOPS weight. The remaining variables adjust the TPOPS weight so that it approximates the quantity of the item purchased, in a given outlet, making the weights unique to each item for which a price is collected.

The *Count* variable gives the number of individual products intended to be collected according to the sample design. Dividing the TPOPS weight (total expenditure for the entire TPOPS category in a PSU) by the number of items priced in the PSU results in the average monthly expenditure on each item in that TPOPS category in the PSU. Dividing this expenditure by the price in the base period, *BasePrice*, gives an approximate average quantity for the item.

Less than 1 percent of the observations in any given TPOPS category also use the duplication factor, *DupFactor*, which adjusts for the fact that, in some cases, BLS field agents are not able to collect all of the prices needed for the sample (e.g., because of time constraints). For example, if four prices should have been collected from limited-service restaurants in New York City in January 2000 but the field agent could collect only three, then the duplication factor will be equal to 1.25 so the three prices actually represent four.

The weights for the alcoholic beverage TPOPS categories are given by equation (3):

$$W_{R_2} = \frac{TPOPSwt * DupFactor * GeoAdjFactor * PercentTPOPS}{Count * ELIfactor * BasePrice}. \tag{3}$$

Three additional variables are used for these categories: *GeoAdjFactor*, *PercentTPOPS*, and *ELIfactor*. The geographic adjustment factor, *GeoAdjFactor*, corrects for the population and sample in the PSU. The percentage of TPOPS, *PercentTPOPS*, and the ELI adjustment factor, *ELIfactor*, convert the TPOPS weight to represent the ELI rather than the TPOPS category.

Census region and division (i.e., area $a$) were defined based on the PSU of the individual product (table 2). Table 2 displays each BLS PSU and the corresponding census division and census region. Some PSUs cross census regions and divisions. BLS adjusts the aggregation weights to ensure their

published price indexes are representative at the region level. To ensure prices calculated by ERS are representative at the census division level, BLS staff provided their population percentages and ERS adjusted their weights to account for the share of the division population located in each PSU following BLS methodology. The weights are adjusted by the share of the division population in each PSU, *PSUpop*/*DIVpop*, to ensure that the prices are representative at the division level as well (equations (4) and (5)):

$$W_{D_1} = \frac{TPOPSwt*DupFactor}{Count*BasePrice} * \frac{PSUpop}{DIVpop},$$ (4)

$$W_{D_2} = \frac{TPOPSwt*DupFactor*GeoAdjFactor*PercentTPOPS}{Count*ELIfactor*BasePrice} * \frac{PSUpop}{DIVpop}.$$ (5)

Standard errors were also calculated for each average price to facilitate hypothesis testing and create confidence intervals. ERS researchers calculated the standard errors for each region-quarter-year average price using a jackknife approach, in which an average price was recalculated multiple times, each time dropping one individual product's price from the sample (equation (6)):

$$\sigma = \sqrt{\frac{N-1}{N}} \sum_{n=1}^{N} (\mu - \hat{\mu}_n),$$ (6)

where $N$ is the number of average quarterly prices per individual product for a given establishment or category in a given area, quarter, and year; $\mu$ is the average quarterly price calculated using the entire sample; and $\hat{\mu}_n$ is the quarterly price calculated when individual product $n$ is dropped.

# FAFH Price Variation Across Area and Time

This section summarizes census region prices from QFAFHP across the country and over time. Table 4 presents the average quarterly price across the entire period (first quarter of 1998 to second quarter of 2012), coefficients of variation across this period, the price at the beginning of the period (usually the minimum price), the price at the end of the period (usually the maximum price), and the average annual growth rate. The coefficient of variation (CV), presented for each product-area price series, is a statistic that measures dispersion or variation, standardized for the variable in question. In this case, it measures how much prices vary over time. It is calculated by dividing the standard deviation by the average price, which allows comparison of variation across FAFH and alcohol products and areas even if they have widely different average values. A higher CV means prices vary more.

Jackknife standard errors (equation 6) for the individual price estimates are very small for most of the FAFH and alcohol categories and areas. Thus, the average-weighted prices are generally statistically significant at the 5-percent level.[12] For brevity, the standard errors for the individual average-weighted prices are not reported here, but they are available in QFAFHP for closer inspection.

Table 4
**QFAFHP 1998-2012 price data disaggregated by product and census region**

|  |  | Northeast | Midwest | South | West |
|---|---|---|---|---|---|
| **Full service** |  |  |  |  |  |
| All meals | Mean price ($) | 8.94 | 7.78 | 7.17 | 8.60 |
|  | CV | (0.10) | (0.14) | (0.11) | (0.09) |
|  | 1998 ($) | 7.25 | 5.81 | 5.69 | 7.39 |
|  | 2012 ($) | 10.10 | 8.95 | 9.54 | 11.15 |
|  | Growth (%) | 2.45 | 3.13 | 3.62 | 2.80 |
| Inexpensive | Mean price ($) | 6.36 | 6.32 | 5.81 | 6.77 |
|  | CV | (0.13) | (0.15) | (0.12) | (0.09) |
|  | 1998 ($) | 5.07 | 4.81 | 4.61 | 6.48 |
|  | 2012 ($) | 7.38 | 7.82 | 7.41 | 8.58 |
|  | Growth (%) | 2.73 | 3.51 | 3.58 | 1.91 |
| Moderately priced | Mean price ($) | 11.43 | 11.82 | 11.12 | 10.96 |
|  | CV | (0.09) | (0.04) | (0.07) | (0.07) |
|  | 1998 ($) | 10.04 | 11.36 | 10.83 | 10.24 |
|  | 2012 ($) | 12.12 | 12.03 | 13.25 | 12.69 |
|  | Growth (%) | 1.42 | 0.50 | 1.61 | 1.67 |

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[12]In this case, statistical significance refers to comparisons across areas within the same establishment type or food category and over time. For example, full-service meals in the Northeast are statistically significantly different from those in the Midwest, South, and West. Prices that tend not to be statistically significantly different from other areas include those with smaller sample sizes, such as the division-level specific food prices. For example, prices for Mexican-style meals in division 1 are not statistically significantly different from Mexican-style meals in division 2. However, Mexican-style meal prices in divisions 1 and 2 are statistically significantly different from fried chicken prices in division 2. Region-level prices for specific foods and division-level prices for establishment types are statistically significantly different from other price series.

Table 4
**QFAFHP 1998-2012 price data disaggregated by product and census region—continued**

| | | Northeast | Midwest | South | West |
|---|---|---|---|---|---|
| **Limited service** | | | | | |
| All meals | Mean price ($) | 3.37 | 2.95 | 3.18 | 2.80 |
| | CV | (0.15) | (0.13) | (0.17) | (0.17) |
| | 1998 price ($) | 2.63 | 2.33 | 2.43 | 2.13 |
| | 2012 price ($) | 4.01 | 3.56 | 4.12 | 3.42 |
| | Growth (%) | 3.18 | 3.00 | 3.73 | 3.25 |
| Hamburgers | Mean price ($) | 4.22 | 3.75 | 3.67 | 3.70 |
| | CV | (0.23) | (0.15) | (0.16) | (0.17) |
| | 1998 price ($) | 3.09 | 2.97 | 2.89 | 2.93 |
| | 2012 price ($) | 6.21 | 5.00 | 4.66 | 4.74 |
| | Growth (%) | 4.96 | 3.52 | 3.28 | 3.65 |
| Fried chicken | Mean price ($) | 3.97 | 3.81 | 3.86 | 4.09 |
| | CV | (0.18) | (0.15) | (0.17) | (0.16) |
| | 1998 price ($) | 2.91 | 3.40 | 3.09 | 3.33 |
| | 2012 price ($) | 5.18 | 4.59 | 4.51 | 5.13 |
| | Growth (%) | 4.14 | 2.39 | 2.79 | 4.07 |
| Pizza | Mean price ($) | 2.73 | 3.74 | 3.61 | 3.34 |
| | CV | (0.21) | (0.14) | (0.11) | (0.15) |
| | 1998 price ($) | 2.44 | 3.48 | 3.13 | 3.39 |
| | 2012 price ($) | 4.01 | 4.91 | 4.41 | 3.61 |
| | Growth (%) | 4.17 | 3.55 | 3.58 | 1.45 |
| Sandwiches | Mean price ($) | 5.19 | 4.75 | 4.74 | 4.94 |
| | CV | (0.18) | (0.15) | (0.19) | (0.14) |
| | 1998 price ($) | 4.26 | 3.69 | 3.27 | 4.11 |
| | 2012 price ($) | 6.74 | 5.83 | 6.11 | 5.60 |
| | Growth (%) | 3.63 | 3.29 | 4.30 | 2.44 |
| Mexican | Mean price ($) | 2.60 | 2.47 | 2.47 | 2.23 |
| | CV | (0.23) | (0.37) | (0.22) | (0.17) |
| | 1998 price ($) | 1.69 | 1.70 | 1.68 | 1.78 |
| | 2012 price ($) | 3.27 | 4.23 | 3.48 | 3.58 |
| | Growth (%) | 5.31 | 7.16 | 5.66 | 4.81 |
| Nonalcoholic beverages* | Mean price ($) | 0.07 | 0.07 | 0.07 | 0.08 |
| | CV | (0.17) | (0.20) | (0.18) | (0.20) |
| | 1998 price ($) | 0.07 | 0.06 | 0.05 | 0.05 |
| | 2012 price ($) | 0.09 | 0.10 | 0.07 | 0.09 |
| | Growth (%) | 2.53 | 3.84 | 2.84 | 4.01 |
| **Schools** | | | | | |
| Lunches | Mean price ($) | 1.72 | 1.78 | 1.67 | 1.78 |
| | CV | (0.22) | (0.16) | (0.15) | (0.14) |
| | 1998 price ($) | 1.26 | 1.34 | 1.31 | 1.50 |
| | 2012 price ($) | 2.54 | 2.36 | 1.98 | 2.34 |
| | Growth (%) | 5.34 | 3.94 | 3.09 | 3.93 |

Table 4
**QFAFHP 1998-2012 price data disaggregated by product and census region—continued**

| | | Northeast | Midwest | South | West |
|---|---|---|---|---|---|
| **Vending machines** | | | | | |
| Food snacks* | Mean price ($) | 0.42 | 0.38 | 0.34 | 0.32 |
| | CV | (0.16) | (0.17) | (0.22) | (0.19) |
| | 1998 price ($) | 0.32 | 0.29 | 0.24 | 0.34 |
| | 2012 price ($) | 0.61 | 0.56 | 0.59 | 0.53 |
| | Growth (%) | 5.13 | 4.76 | 7.48 | 4.58 |
| Nonalcoholic beverages* | Mean price ($) | 0.06 | 0.05 | 0.05 | 0.05 |
| | CV | (0.17) | (0.14) | (0.13) | (0.21) |
| | 1998 price ($) | 0.05 | 0.05 | 0.04 | 0.04 |
| | 2012 price ($) | 0.07 | 0.07 | 0.06 | 0.07 |
| | Growth (%) | 3.22 | 2.87 | 2.09 | 4.69 |
| Soda* | Mean price ($) | 0.06 | 0.05 | 0.05 | 0.05 |
| | CV | (0.13) | (0.14) | (0.11) | (0.14) |
| | 1998 price ($) | 0.04 | 0.04 | 0.04 | 0.04 |
| | 2012 price ($) | 0.07 | 0.06 | 0.06 | 0.06 |
| | Growth (%) | 3.12 | 2.79 | 2.01 | 3.61 |
| **Alcoholic beverages** | | | | | |
| Beer at home* | Mean price ($) | 0.07 | 0.06 | 0.06 | 0.07 |
| | CV | (0.14) | (0.09) | (0.12) | (0.14) |
| | 1998 price ($) | 0.05 | 0.05 | 0.05 | 0.05 |
| | 2012 price ($) | 0.08 | 0.07 | 0.07 | 0.09 |
| | Growth (%) | 2.75 | 2.00 | 2.29 | 3.17 |
| Wine at home* | Mean price ($) | 0.24 | 0.24 | 0.19 | 0.20 |
| | CV | (0.19) | (0.34) | (0.23) | (0.22) |
| | 1998 price ($) | 0.17 | 0.16 | 0.14 | 0.15 |
| | 2012 price ($) | 0.30 | 0.35 | 0.25 | 0.27 |
| | Growth (%) | 5.17 | 6.08 | 4.27 | 4.40 |
| Spirits at home* | Mean price ($) | 0.51 | 0.42 | 0.44 | 0.40 |
| | CV | (0.15) | (0.18) | (0.11) | (0.13) |
| | 1998 price ($) | 0.37 | 0.32 | 0.35 | 0.29 |
| | 2012 price ($) | 0.59 | 0.50 | 0.48 | 0.44 |
| | Growth (%) | 3.62 | 3.49 | 2.43 | 2.83 |
| Beer away from home* | Mean price ($) | 0.23 | 0.20 | 0.21 | 0.20 |
| | CV | (0.20) | (0.14) | (0.17) | (0.09) |
| | 1998 price ($) | 0.17 | 0.15 | 0.16 | 0.17 |
| | 2012 price ($) | 0.31 | 0.24 | 0.27 | 0.24 |
| | Growth | 3.97 | 3.27 | 3.95 | 2.27 |
| Wine away from home* | Mean price ($) | 0.80 | 0.63 | 0.81 | 0.75 |
| | CV | (0.27) | (0.31) | (0.20) | (0.31) |
| | 1998 price ($) | 0.39 | 0.33 | 0.51 | 0.39 |
| | 2012 price ($) | 0.97 | 0.93 | 0.94 | 0.98 |
| | Growth (%) | 8.46 | 7.49 | 6.00 | 7.60 |
| Spirits away from home* | Mean price ($) | 3.28 | 2.94 | 3.40 | 3.71 |
| | CV | (0.17) | (0.08) | (0.19) | (0.17) |
| | 1998 price ($) | 2.69 | 2.40 | 2.58 | 2.68 |
| | 2012 price ($) | 3.66 | 3.03 | 4.17 | 3.82 |
| | Growth (%) | 2.28 | 1.81 | 3.80 | 2.80 |

Note: CV = coefficient of variation, 1998-2012; 1998 = 1998 quarter 1(first period) price; 2012 = 2012 quarter 2 (last period) price; Growth = average annual growth.

*Prices are per ounce.

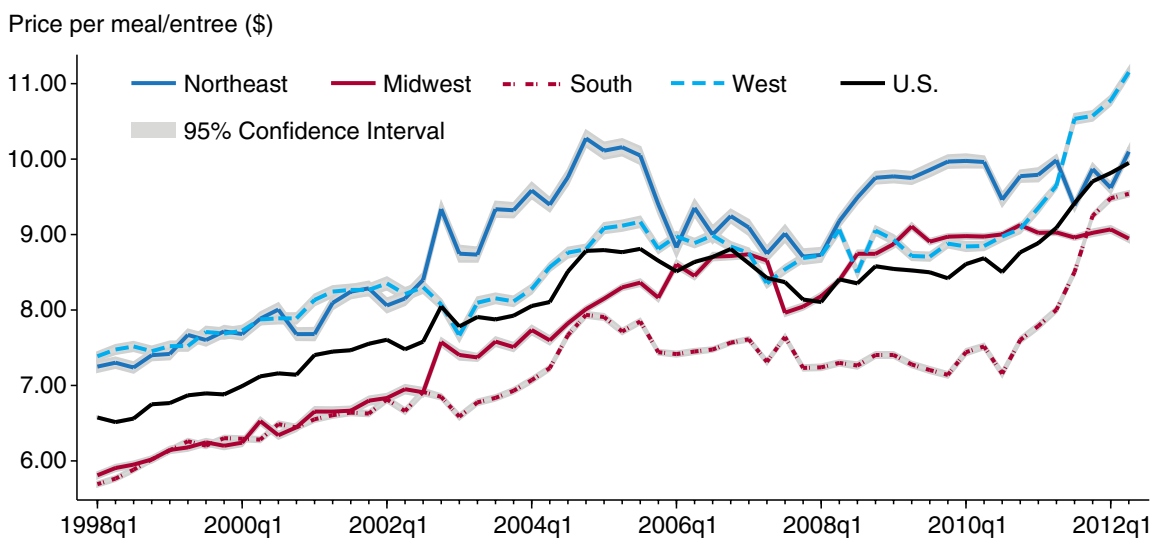Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices (QFAFHP).

## Full-service restaurants

Overall, full-service prices were highest in the Northeast ($8.94 on average between 1998 and 2012), while prices at inexpensive restaurants were generally higher in the West, and prices at moderately priced restaurants were higher in the Midwest (figure 9). During the time period studied, the South saw the greatest average annual growth in prices at all full-service restaurants (3.6 percent) as well as inexpensive restaurants (3.6 percent), and the West saw the greatest growth in moderately priced restaurants (1.7 percent). Prices in the Midwest displayed the greatest variation over time with a CV of 0.14, while prices in the West displayed the least variation with CV of 0.09 percent. The regions had different experiences during the 2007-09 recession. Prices paid for all full-service meals began to decline in 2005 and were generally stagnant during the recession (i.e., between fourth quarter of 2007 and third quarter of 2009). Average quarterly price growth of moderately priced meals, however, was negative in all regions except for the Midwest, and price growth of inexpensive meals was positive in all regions except for the West.

## Limited-service restaurants

Entrees and meals at limited-service restaurants displayed similar trends, though the price of a meal at a limited-service establishment was nearly one-third the price of a full-service meal. Between 1998 and 2012, the highest average price was in the Northeast ($3.37) and the lowest in the West ($2.80), representing a price difference of 20 percent. Prices varied the most in the South and West, with a CV of 0.17, and they varied the least in the Midwest, with a CV of 0.13. The price of meals at limited-service restaurants increased between 3 and 3.7 percent annually. During the recession, limited-service prices, unlike full-service prices, did not differ from non-recessionary periods, with the exception of the West. During the recession, limited-service prices in the West and Midwest declined, but prices in the South and Northeast steadily increased (figure 10).

Figure 9

**Average quarterly price of full-service meals by census region, 1998q1-2012q1**

Price per meal/entree ($)



Note: q1 (as in "1998q1") = first quarter.
Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices.

*Methodology for the Quarterly Food-Away-from-Home Prices Data, TB-1938*
Economic Research Service/USDA

Figure 10
**Average quarterly price of limited-service meals by census region, 1998q1-2012q1**
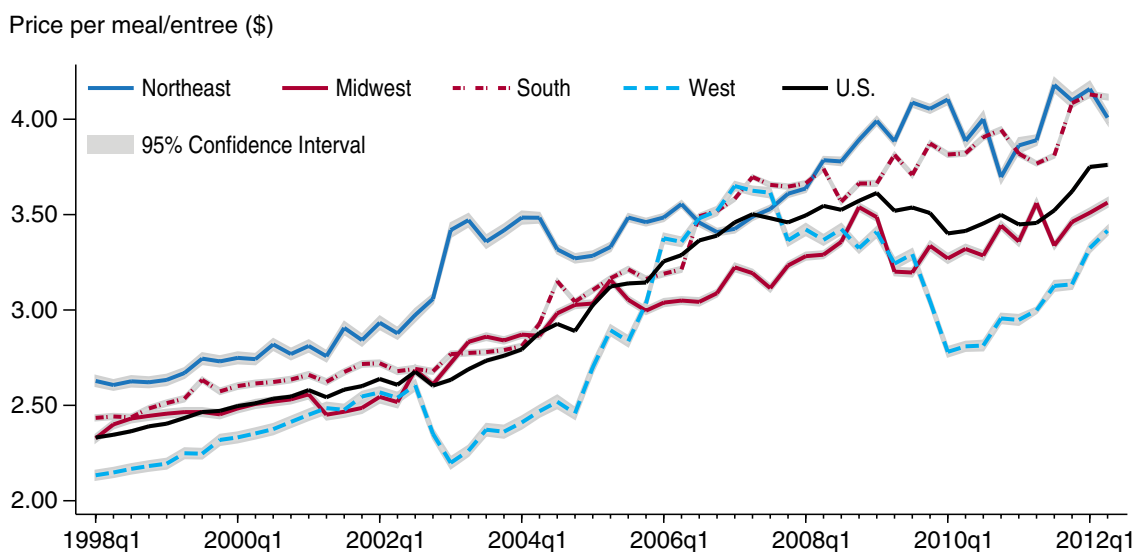
Price per meal/entree ($)



Note: q1 (as in "1998q1") = first quarter.
Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices.

Limited-service meals disaggregated by food type varied more than the aggregate meals category. Average prices were generally highest for sandwiches, and they were generally lowest for Mexican-style meals over the entire period. Regionally, in the second quarter of 2012, sandwiches were most expensive in the Northeast ($6.74) and least expensive in the West ($5.60), a 27-percent difference (figure 11). Displaying CVs between 0.14 and 0.19, sandwich prices varied more than the limited-service meal category as a whole. Average annual growth was highest for Mexican-style meals, ranging between 4.8 percent and 7.2 percent per census region. Price patterns of disaggregated limited-service entrees and meals, except for hamburgers, did not seem to differ during the recession.

Comparing full-service and limited-service meals by region illustrates that prices were highest in the Northeast for both full-service and limited-service meals. The least expensive regions were the South for full-service meals and the West for limited-service meals.

## Vending machines

Prices for snacks at vending machines varied substantially over time as product availability changed. The average regional price per ounce of a vending-machine snack over the entire time period studied was between $0.32 (in the West) and $0.42 (in the Northeast). Prices varied the most in the South (CV of 0.22) and least in the Northeast (CV of 0.16). Prices increased 4.8 to 7.5 percent annually, with the highest growth in the South.

*Methodology for the Quarterly Food-Away-from-Home Prices Data, TB-1938*
Economic Research Service/USDA

Figure 11

**Average quarterly price of specific limited-service meals and entrees by census region, 1998q1-2012q1**
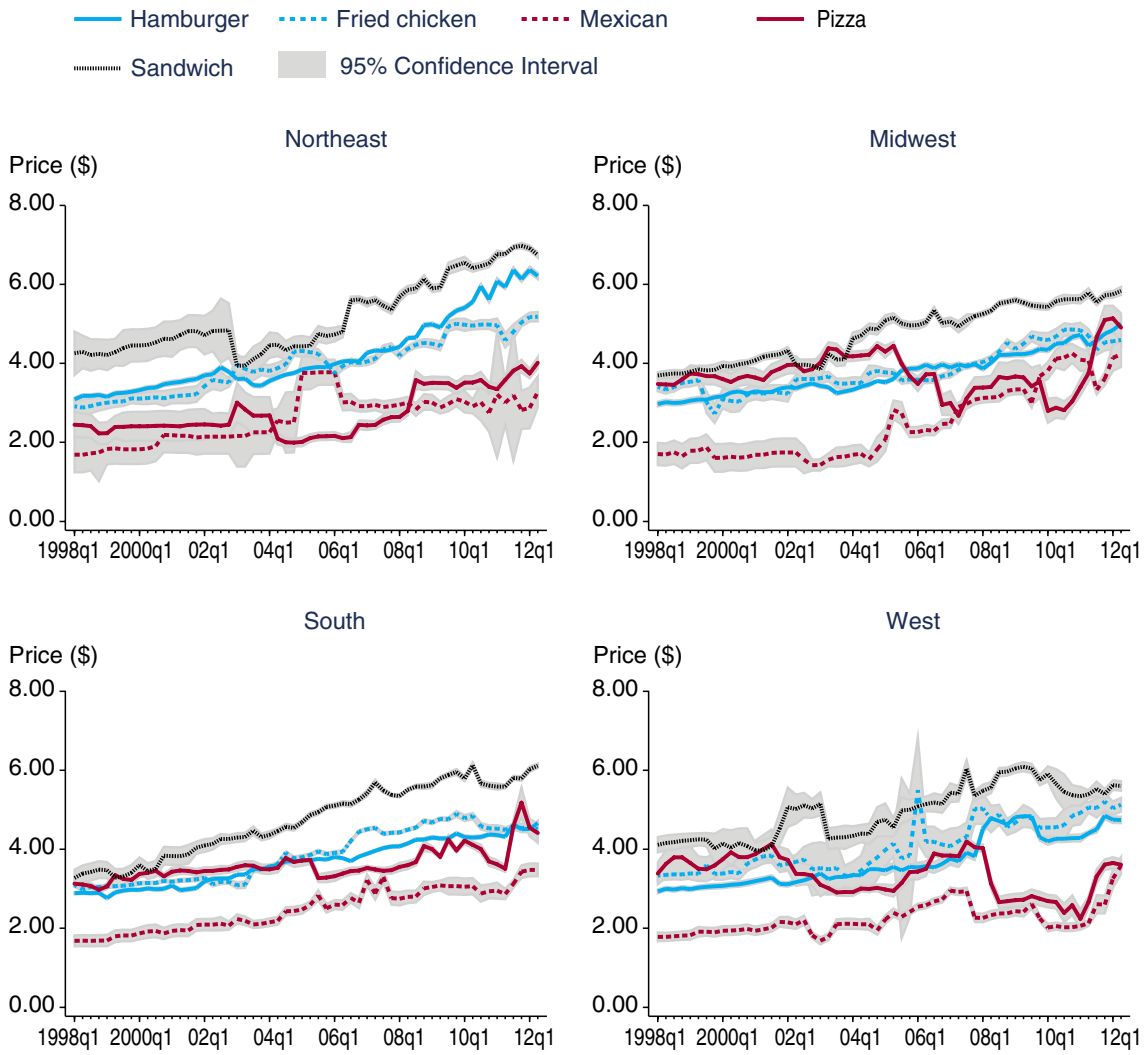


Note: q1 (as in "1998q1") = first quarter.
Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices.
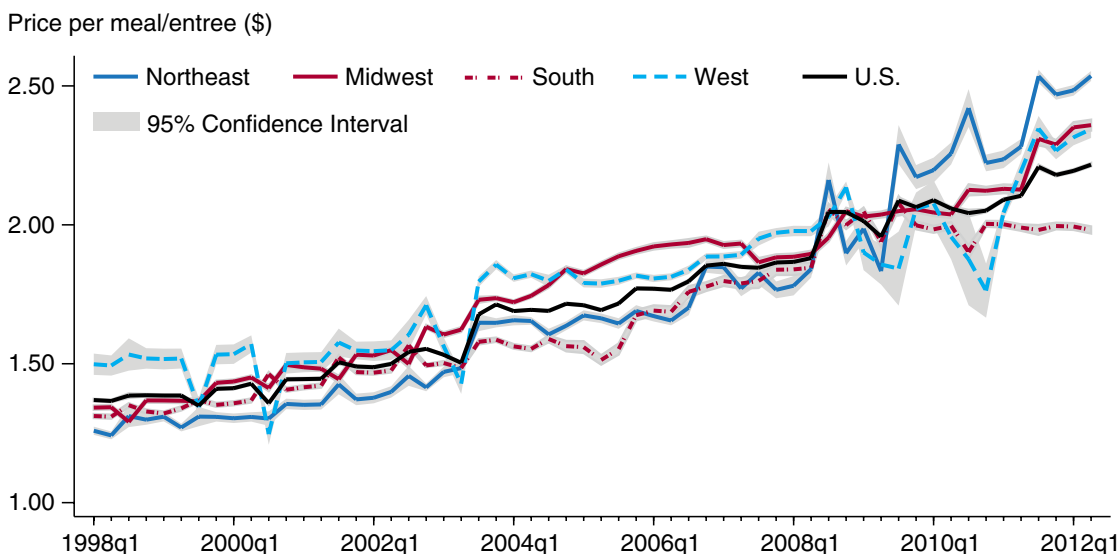
## Schools

School lunch prices displayed smaller geographic differences than did prices in full-service and limited-service restaurants (figure 12). For the entire sample period, on average, the Midwest and West had the highest prices for school lunches ($1.78), while the South had the lowest ($1.67), a difference of 9 percent. Regional prices varied the most in the Northeast and the least in the West (CVs of 0.22 and 0.14 respectively). At the end of the period, the Northeast had the highest price ($2.54), while the South had the lowest ($1.98). On average, the price of school lunches grew about 3 to 5 percent annually.

*Methodology for the Quarterly Food-Away-from-Home Prices Data, TB-1938*
Economic Research Service/USDA

Figure 12
**Average quarterly price of school lunches by census region, 1998q1-2012q1**

Price per meal/entree ($)



Note: q1 (as in "1998q1") = first quarter.
Source: U.S. Department of Agriculture, Economic Research Service, Quarterly Food-Away-from-Home Prices.

## Nonalcoholic Beverages

Nonalcoholic beverages from limited-service restaurants were slightly more expensive than beverages and soda alone from vending machines. Across the Nation, limited-service beverages were $0.04-$0.05 per ounce (or about $0.64-$0.80 per 16-ounce drink) in the first quarter of 1998 and $0.05-$0.07 per ounce (or $0.80-$1.12 per 16-ounce drink) in the second quarter of 2012. Limited-service beverage prices grew 2.5 to 4.0 percent annually between 1998 and 2012, roughly the same rate as beverages from vending machines (2.1 to 4.7 percent annually) and soda from vending machines (2.0 to 3.6 percent annually).

## Alcohol

As for alcoholic beverages, the away-from-home versions were typically more expensive than their at-home versions, though at-home spirits were twice as expensive ($0.44 per ounce) than beer consumed away from home ($0.21 per ounce). In general, wine displayed the greatest variation, with CVs of 0.19 to 0.34 at home and 0.20 to 0.31 away from home, while beer displayed the least variation, with CVs of 0.09 to 0.14 at home and 0.09 to 0.20 away from home. Average annual price growth was also greatest for wine, with at-home use growing 5 percent annually and away from home growing 7 percent, compared to beer use which grew 3 percent (including at-home and away-from-home versions).

# Limitations

While QFAFHP will be useful to many researchers, using the data poses some notable limitations. First, the price variation across regions reflects changes in supply and demand, making welfare comparisons across regions based directly on QFAFHP inaccurate. For example, the fact that limited-service prices are consistently higher in the Northeast than in other census regions does not automatically imply that Northeastern consumers are worse off. It may be that limited-service restaurants in the Northeast offer better quality meals or service than in other regions.

A second, related limitation is that prices for meals at limited- and full-service restaurants are presented as a price per meal not a price per ounce or gram (i.e., they are not unitized). Using the Northeast as an example, the price of meals at limited-service restaurants could be higher because the portion size in the Northeast is larger. However, because of the many national chains of limited-service restaurants where the portion sizes are standard within chains, portion size is less likely to differ among limited-service than among full-service restaurants and schools.

Lastly, expenditures are not readily available for the user to aggregate prices into price indexes. However, a user of QFAFHP can construct census region or national price indexes using sales from the Economic Census in a fixed-weight price index formula.[13] Expenditures for FAFH by establishment type and census region are available from the BLS Consumer Expenditure Survey, and can be used to calculate national level price indexes.[14]

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[13]These data are available through Census' American FactFinder Portal at http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

[14]These data are available at http://www.bls.gov/cex/.

# Conclusion

While the Quarterly Food-at-Home Price Database (QFAHPD) provides reliable estimates of market-level food prices over time for food-at-home (FAH) products, complementary food-away-from-home (FAFH) and alcohol prices did not exist before. Other publicly available FAFH price data do not provide detail on how prices of disaggregated FAFH and alcohol products vary over time and geographic areas. Given the growing importance of FAFH to a typical American household's food budget and diet, ERS researchers constructed Quarterly Food-Away-from-Home Prices (QFAFHP) and examined trends in FAFH and alcohol prices over time and across geographic areas.

ERS researchers used prices collected by the Bureau of Labor Statistics (BLS) for the Consumer Price Index (CPI) from 1998 to 2012 to construct average, weighted prices for 20 FAFH product categories for the Nation, the 4 census regions, and 9 census divisions. The prices are from four types of FAFH establishments: full-service restaurants, limited-service restaurants, schools, and vending machines. ERS calculated the prices using BLS's complex survey design and sample weights so as to be representative at the census division, census region, and national level.

ERS finds that prices of products at full-service restaurants (including meals at inexpensive and moderately priced restaurants) and limited-service establishments vary significantly across census regions. In particular, ERS finds that regional prices are generally statistically significantly different from each other, whereas divisional prices differ less. Between 1998 and 2012, for all the products in the QFAFHP, the price of wine showed the highest average annual growth at about 5 percent across regions for wine at home and around 7 percent for wine away from home. Of the foods, prices of snacks from vending machines grew the most between 1998 and 2012, between 4 and 8 percent, which is double the rate of meals at limited- and full-service restaurants (with the exception of Mexican-style meals).

ERS researchers also found differences in the way that prices trended over the sample period and during the 2007-09 recession. Prices paid for full-service meals began to decline in 2005 and were generally stagnant during the recession, but by 2010, they began to climb (except in the Northeast). Unlike full-service restaurants, limited-service restaurants showed no differences in price trends between the recession and non-recessionary periods.

Although FAFH is an important component in Americans' diets, limitations in the recent publicly available data have precluded understanding how FAFH prices vary across the country, across establishment types, and across meal types. Likewise, researchers have lacked data on alcohol, despite its growing place in Americans' food budgets and diets. QFAFHP aims to close these data gaps, facilitating more research on these important issues.

# References

Basham, M. and J. Menza. 2007. "Industry Surveys: Restaurants." *Standard & Poor's Industry Surveys*, Vol. 175, No. 42, Section 1. Available online: http://homepage.smc.edu/thomas_phillip/rpt/Restaurants.pdf.

Bureau of Economic Analysis (BEA). 2012. *Concepts and Methods of the U.S. National Income and Product Accounts*. Available online: http://www.bea.gov/national/pdf/methodology/chapters1-4.pdf.

BEA. 2013. National Income and Product Accounts Table 2.5.4. Available online: http://www.bea.gov/iTable/index_nipa.cfm.

Bureau of Labor Statistics (BLS). 2007. "The Consumer Price Index," *BLS Handbook of Methods,* BLS. Washington, DC. Available online: http://www.bls.gov/opub/hom/pdf/homch17.pdf.

BLS. 2008a. "Checklist for ELI FV011 – Full Service Meals and Snacks." Internal documentation.

BLS. 2008b. "Checklist for ELI FV012 – Limited Service Meals and Snacks." Internal documentation.

BLS. 2013. Consumer Price Database: All Urban Consumers (Current Series). Available online: http://www.bls.gov/cpi/.

Chen, S.E., R.J. Florax, and S.D. Snyder. 2013. "Obesity and Fast-Food in Urban Markets: A New Approach Using Geo-referenced Micro Data," *Health Economics* 22: 835-856.

Chou, S.-Y., M. Grossman, and H. Saffer. 2004. "An economic analysis of adult obesity: results from the Behavioral Risk Factor Surveillance System," *Journal of Health Economics* 23(3): 565-587.

Community and Economic Research (C2ER). 2010. *Cost of Living Index: Manual*. C2ER: Arlington, VA. Available online: www.coli.org/surveyforms/colimanual.pdf.

C2ER. 2012. *ACCRA Cost of Living Index: Section 2 Average Prices*. C2ER: Arlington, VA.

CSP Daily News. 2012. "Say (Grilled) Cheese," CSP Business Media, LLC. Available online: http://www.cspnet.com/news/foodservice/articles/say-grilled-cheese.

Currie, J., S. DellaVigna, E. Moretti, and V. Pathania. 2010. "The Effect of Fast Food Restaurants on Obesity and Weight Gain," *American Economic Journal: Economic Policy* 2(3): 32-63.

Davis, B., and C. Carpenter. 2009. "Proximity of Fast-Food Restaurants to Schools and Adolescent Obesity," *American Journal of Public Health* 99(3): 505-510.

Friddle, C. G., S. Mangaraj, and J. Kinsey. 2001. "Food Service Industry: Trends and Changing Structure in the New Millennium," Working Paper 01-02. The Retail Food Industry Center, University of Minnesota.

Huffman. W. E. 2011. "Household Production and the Demand for Food and Other Inputs: U.S. Evidence," *Journal of Agricultural and Resource Economics* 36(3): 465-487.

Jeffrey, R.W., J. Baxter, M. McGuire, J. Linde. 2006. "Are Fast-Food Restaurants an Environmental Risk Factor for Obesity?" *International Journal of Behavior Nutrition and Physical Activity* 3(2):35.

Khan, T. L.M. Powell, and R. Wada. 2012. "Fast Food Consumption and Food Prices: evidence from panel data on 5th and 8th grade children," *Journal of Obesity.* Vol. 2012, Article ID 857697. doi: 10.1155/2012/857697. http://dx.doi.org/10.1155/2012/857697

Kumcu, A. and E. Leibtag. 2011. *The WIC Fruits and Vegetable Cash Voucher: Does Regional Price Variation Affect Regional Buying Power*? EIB-75, U.S. Department of Agriculture, Economic Research Service.

Lin, B.-H., J. Guthrie, and E. Frazao. 1999. *Away-From-Home Foods Increasingly Important to Quality of American Diet,* AIB-749, U.S. Department of Agriculture, Economic Research Service.

Lin, B.-H., and J. Guthrie. 2012. *Nutritional Quality of Food Prepared at Home and Away From Home 1977-2008*, EIB-105, U.S. Department of Agriculture, Economic Research Service.

Lin, B.-H,, T.A. Smith, J.-Y. Lee, and K.D. Hall. 2011. "Measuring Weight Outcomes for Obesity Intervention Strategies: The Case of a Sugar-Sweetened Beverage Tax," *Economics and Human Biology* 9(4): 329-341.

Mehta, S. and B. Maniam. 2002. "Marketing Determinants of Customers' Attitudes Towards Selecting a Restaurant," *Academy of Marketing Studies Journal* 6(1): 27-44.

Nielsen, S.J., M. Div, B.K. Kit, T. Fakhouri, C.L. Ogden. 2012. *Calories Consumed From Alcoholic Beverages by U.S. Adults, 2007-2010.* NCHS Brief No. 110. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.

Okrent, A.M. and J.M. Alston. 2011. *Demand for Food In the United States: A Review of the Literature, Evaluation of Previous Estimates and Presentation of New Estimates of Demand*, Giannini Foundation Monograph 48. University of California: Berkeley, CA.

Okrent, A.M. and J.M. Alston. 2012. *The Demand for Disaggregated Food-at-Home and Food-Away-from-Home Products in the United States*, ERR-139, U.S. Department of Agriculture, Economic Research Service.

Ollinger, M., K. Ralston, and J. Guthrie. 2011. *School Foodservice Costs: Location Matters*, ERR-117, U.S. Department of Agriculture, Economic Research Service.

Powell, L.M., M.C. Auld, F.J. Chaloupka and L.D. Johnston. 2007. "Access to fast food and food prices: relationship with fruit and vegetable consumption and overweight among adolescents," *Advances in Health Economics and Health Services Research* 17: 23-48.

Rahkovsky, I. and C.A. Gregory. 2012. "Food Prices and Blood Cholesterol," *Economics and Human Biology* 11(1): 95-107.

Reed, A.J., J.W. Levedahl, and C. Hallahan. 2005. "The Generalized Composite Commodity Theorem and Food Demand Estimation," *American Journal of Agricultural Economics* 87(1): 28-37.

Richards, T.J. and L. Mancino. 2013. "Demand for Food-Away-From Home: A Multiple Discrete-Continuous Extreme Value Model," *European Review of Agricultural Economics* 41(1): 111-133.

Suter, P.M. 2005. "Is Alcohol Consumption A Risk Factor For Weight Gain and Obesity?" *Critical Reviews in Clinical Laboratory Sciences* 42(3): 197-227.

Sturm, R. and A. Datar. 2011. "Regional Price Differences and Food Consumption Frequency Among Elementary School Children," *Public Health* 123(3): 136-41.

Todd, J.E., E. Leibtag and C. Penberthy. 2011. *Geographic Differences in Relative Prices of Healthy Foods*, EIB-78, U.S. Department of Agriculture, Economic Research Service.

Todd, J.E., L. Mancino, and B.-H.Lin. 2010. *The Impact of Food Away From Home on Adult Diet Quality*, ERR-90, U.S. Department of Agriculture, Economic Research Service.

Todd, J.E., L. Mancino, E. Leibtag, C. Tripodo. 2010. *Methodology Behind the Quarterly Food-at-Home Price Database*, TB-1926, U.S. Department of Agriculture, Economic Research Service.

U.S. Census Bureau. 2007. 2007 Economic Census, Miscellaneous Subject Series. Available at http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

U.S. Department of Agriculture, Economic Research Service. 2013. Food Expenditure Tables. Available online: http://www.ers.usda.gov/data-products/food-expenditures.aspx

U.S. Department of Agriculture and U.S. Department of Health and Human Services. 2010. *Dietary Guidelines for Americans, 2010.* 7th edition, Washington, D.C. Available online: http://www.fns.usda.gov/sites/default/files/PolicyDoc.pdf

Wendt, M. and J.E. Todd. 2011. *The Effect of Food and Beverage Prices on Children's Weights,* ERR-118, U.S. Department of Agriculture, Economic Research Service.

Whitehouse Task Force on Childhood Obesity Report to the President. 2010. *Solving the Problem of Childhood Obesity Within a Generation*. Executive Office of the President of the United States. Available online: http://www.letsmove.gov/sites/letsmove.gov/files/TaskForce_on_Childhood_Obesity_May2010_FullReport.pdf.