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Estimating the State-Level Food Expenditure Series

Eliana Zeballos and Wilson Sinclair

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Abstract

The USDA, Economic Research Service's (ERS) Food Expenditure Series (FES) is a comprehensive measure of the total value of food acquired in the United States over time. FES provides users with data to evaluate changes in food spending and its composition; however, FES is limited to the national level. This report presents the methodology and data used to generate food expenditure estimates at the State level. The State-level FES follows a similar methodology used in the national level but with a different underlying dataset and benchmarked to the national-level estimates. The national-level estimates are based primarily on food sales reported in the U.S. Department of Commerce, Bureau of the Census' Economic Census, which is published every 5 years, and uses three annual surveys to interpolate between years and extrapolate lagged data forward. The State-level FES estimates are based primarily on sales reported in the National Establishment Time Series Database. The database provides time-series data at the establishment level across all sectors, including grocery stores and food service outlets. The State-level FES can be used by government agencies, academics, the public, and other stakeholders to understand differences in consumer food acquisitions and spending behavior at a more granular level.

Keywords:

Food Expenditure Series, FES, food-at-home, FAH, food-away-from-home, FAFH, food spending, State estimates, national estimates, National Establishment Time Series, NETS

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A report summary from the Economic Research Service *April 2023*

Estimating the State-Level Food Expenditure Series

Eliana Zeballos and Wilson Sinclair

What Is the Issue?

The USDA, Economic Research Service's (USDA, ERS) Food Expenditure Series (FES) is a comprehensive measure of the total value of food acquired in the United States over time, by outlet and product type, and by final purchasers and users. The FES provides users with data to evaluate changes in food spending and its composition at the national level. This report presents methodology and source data used to generate State-level FES estimates. The newly developed State-level FES provides information about consumer food acquisitions and spending behavior across States and time and can improve the understanding of whether certain policies or shocks (e.g., economic recessions, tax policies, the Coronavirus (COVID-19) pandemic) have different effects on food spending at the State level.

What Did the Study Find?

The State-level FES shows several notable trends and cross-State variations in food spending:

- In 2019, Texas recorded the median State-wide total food spending per capita at $5,218, while the State with the highest total food spending per capita was Colorado and the lowest was Arkansas ($6,651 versus $4,030, respectively).
    - o The median State-wide food-at-home (FAH) spending per capita was $2,448 (New Jersey), while FAH spending per capita was the highest in Maine and the lowest in Washington, DC ($3,587 versus $1,219, respectively).
    - o The median State-wide food-away-from-home (FAFH) spending per capita was $2,721 (Tennessee), while FAFH spending per capita was the highest in Washington, DC ($4,774) and the lowest in Mississippi ($2,030).

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

- Between 1997 and 2019, the median change in inflation-adjusted total food spending per capita was 29 percent (Missouri); the largest increase was 66 percent (Rhode Island) and the largest decrease at 29 percent was in Washington, DC.
    - The median change in inflation-adjusted FAH spending per capita was 15 percent (Florida). Rhode Island spending increased the most at 64 percent, and Washington, DC decreased the most at 41 percent. Six other States also saw decreases in inflation-adjusted FAH spending per capita.
    - The median change in inflation-adjusted FAFH spending per capita was 49 percent (Texas). Inflation-adjusted FAFH spending per capita increased the most in Vermont at 74 percent and decreased the most in Washington, DC at 25 percent.
- In 2019, 50 percent or more of food spending went toward FAFH in 36 States plus Washington, DC.
    - The median FAFH share in 2019 was 52.3 percent in Arkansas, with the highest share in Washington, DC at 79.7 percent and the second highest share in Hawaii at 63.6 percent. The lowest FAFH share was in Maine at 44.7 percent, followed by Iowa at 45.3 percent.

How Was the Study Conducted?

The State-level FES follows a similar methodology to that used in the national level but with a different underlying dataset. The national-level estimates are based primarily on food sales reported in the U.S. Department of Commerce, Bureau of the Census's Economic Census, which is published every 5 years and uses three annual surveys to interpolate between years and extrapolate lagged data forward. The State-level FES estimates are based largely on sales reported in the National Establishment Time Series Database. The database provides time-series data on establishments across all sectors, including grocery stores and food service outlets. To make the national- and State-level estimates comparable, the State-level estimates are benchmarked to the FES at the national level each year.

Estimating the State-Level Food Expenditure Series

Introduction

The USDA, Economic Research Service's (ERS) Food Expenditure Series (FES) is a comprehensive measure of the total value of the U.S. food system over time, by outlet and product type, and by final purchasers and users. The current national Food Expenditure Series can be used to evaluate changes in food spending and its composition. The FES shows that since 1997, total U.S. food spending has trended upward, in both real and nominal terms. U.S. food spending composition changed, shifting toward food-away-from-home (FAFH)—spending at restaurants, recreational places, hotels, etc.—and away from food-at-home (FAH)—spending at grocery stores, supercenters, convenience stores, etc.

Policymakers, researchers, food manufacturers, retailers, and the public can find publicly available sub-national data on food spending useful. Policymakers can examine localized food spending trends and make inter-State comparisons. Researchers currently lack sales-based State-level food spending estimates and typically rely on small and expensive datasets derived from retail scanners or surveys. Those in the food industry (manufacturing, retail, foodservice, and transportation) can use these data to evaluate State-wide food spending patterns to capitalize on market trends. Finally, the general public may want to understand how the food economy works over geography and time in the United States.

This report documents the methodology and data source used to generate food expenditure estimates at the State level. The State-level FES follows a similar methodology used in the FES at the national level but uses a different underlying dataset that is further benchmarked to the national-level estimates. The national-level estimates are based primarily on food sales reported in the U.S. Department of Commerce, Bureau of the Census's Economic Census, which is published every 5 years, and uses three annual surveys to interpolate between years and extrapolate lagged data forward. The State-level FES estimates are based primarily on sales reported in the National Establishment Time Series (NETS) Database, which provides time-series data on establishments across all sectors, including grocery stores and food service outlets.

Data

The main two data sources used to construct the State-level Food Expenditure Series are the National Establishment Time Series (NETS) and the USDA, ERS's Food Expenditure Series (FES), which is constructed using various datasets from Governmental statistical agencies and trade associations. Among the datasets used to construct the national-level FES, the State-level FES estimates use the U.S. Census Bureau's Economic Census, U.S. Bureau of Labor Statistics' Consumer Price Index (CPI), and tax information from various sources.

National Establishment Time Series (NETS)

The National Establishment Time Series (NETS) is a high-frequency, longitudinal time-series, proprietary database that provides granular information on establishments across all economic sectors in the United States, such as grocery stores and food service outlets. NETS was co-created by Dun & Bradstreet and Walls & Associates, using archival data to provide annual estimates dating to 1990 from Dun & Bradstreet's survey of establishments (Walls & Associates, 2013).

Updated each January, NETS provides an annual record with information from 1990 through 2019. NETS provides sales information, employment numbers, growth, and performance data for specific business locations across time. NETS also contains the geographic coordinates, a street address, and a county Federal Information Processing Series (FIPS) code for each establishment.

NETS contains data on business establishments from a comprehensive list of industries. The database categorizes establishments using the Standard Industrial Classification (SIC) numeric codes and provides a crossroad to match to the North American Industry Classification System (NAICS), allowing users to make standardized industry comparisons with other datasets.

Although previous research showed that the number of establishments and number of employees have similar aggregate trends compared to official Economic Census and County Business Patterns (CBP) (Cho et al., 2019; Rummo et al., 2015 and Ma et al., 2013), aggregate food sales trends do not align with trends observed by the Food Expenditure Series (Zeballos and Marchesi, 2022). This finding is likely due to a significant portion of sales data in NETS being imputed based on firm-level employment numbers and using employment data to estimate sales (Barnatchez et al., 2017; Crane and Decker, 2019).

To estimate food sales more accurately, this report follows the methodology developed by Zeballos and Marchesi (2022), who developed a two-step process to minimize differences between NETS and FES sales information. First, a ratio of total sales to number of employees was calculated by using the last five rounds of the Economic Census for each NAICS code in the study by State:

$$Ratio(i) = \frac{Total\ Sales(i)_{EC}}{Number\ of\ Employees(i)_{EC}}$$

Since the Economic Census is completed every 5 years, a linear interpolation of the ratio between the Economic Censuses was performed with the aid of the consumer price index for food to calculate the ratio from 1990 to 1997 and from 2017 to 2019. Once this ratio was determined for each State, year, and NAICS code—estimated total sales were adjusted at each establishment in NETS by multiplying this ratio by the number of employees.[1]

$$Adjusted\ sales(i)_{NETS} = Ratio(i) * employees(i)_{NETS}$$

[1] See Zeballos and Marchesi (2022) for a full description of the methodology.

Food Expenditure Series and the Economic Census

Food Expenditure Series (FES)

The FES was developed in 1979 and revised in 2018 (Manchester and King, 1979; Okrent et al., 2018). The FES tracks the evolution of the value of the U.S. food system from 1869 to the present. The FES presents the total value of food and beverage acquisitions by (1) type of product (food and alcohol for off- and on-premises consumption); (2) outlet type (grocery stores, full-service restaurants, hotels and motels, etc.); (3) final purchasers (e.g., individuals/households, government, and businesses); and (4) individual/household final users (on a per household basis and as a share of disposable personal income (DPI)).

The FES complements food expenditure data produced by other statistical agencies in five ways. First, FES captures food acquisitions by all final purchasers and not just households (e.g., households, government, and business)—and FES makes adjustments to capture food produced at home, food furnished as an ancillary activity (e.g., food provided to prison inmates, inpatients at hospitals and nursing homes, military and civilian employees, and passengers on planes), and government donation programs (i.e., non-food purchases). Second, FES explicitly accounts for industries that sell food to generate revenue as a primary activity, such as grocery stores and restaurants—and includes industries where food is a supplemental activity of operations, such as educational institutions, hospitals, and transit facilities. Third, FES disaggregates food expenditures annually by outlet type (e.g., grocery stores, full-service restaurants). Fourth, FES includes estimates of both final users and final purchasers, a distinction that is important when considering food assistance programs and other government-sponsored food expenditures. And, finally, FES measures higher education meals and snacks, using a revenue-based approach rather than by cost of goods sold.

The FES has two components, a monthly update that provides estimates for sales at food-at-home (FAH) and food-away-from-home (FAFH) establishments and an annual update that provides more detailed estimates for food sales by product, outlet, and purchaser. The monthly update is released with a 2-month lag, except in March and April, and the annual update is released in May for the previous year's estimates. The monthly update presents information on food purchases and excludes non-food purchases, and it is benchmarked to annual estimates with the annual update release.

Economic Census

The U.S. Census Bureau's quinquennial (every 5 years) Economic Census is a major source of data for the FES. The Economic Census measures the complete U.S. economy—including the number of establishments, revenues, primary business activity, employment, payroll, and industry-specific statistics.[2] This measurement includes several comprehensive data products that span more than 950 detailed industries across 18 industrial sectors—classified using the North American Industry Classification System (NAICS), approximately 21,000 geographic areas, and more than 7,900 goods and service products—based on the North American Product Classification System (NAPCS) basis. The Economic Census is primarily used in this report to adjust total sales on food and beverages to control for double counting, to calculate direct sales from wholesalers and manufacturers to households, and to adjust sales by contractors and concessions.

[2] The Economic Census only reports on employer establishments, which are defined as U.S. businesses with payrolls and paid employees.

The Economic Census releases two reports that are used to make these adjustments: the Products by Industry and the Sales, Value of Shipments, or Revenue by Class of Customer reports.[3] The Products by Industry reports sales by type of product and is organized by NAICS industries and NAPCS products, which are used to adjust total sales to exclude nonfood sales. The Sales, Value of Shipments, or Revenue by Class of Customer report shows the percentage of sales to final purchases, which are used in the other three adjustments: double counting, direct selling, and multiple-outlet industries.

Methodology

The State-level FES estimates use the retail sales approach to measure expenditures. Like the monthly FES estimates, the State-level FES estimates present information only on food sales and exclude non-food sales: for FAH, home production, and donations; for FAFH, food revenues at schools and colleges, the value of FAFH furnished to employees or part of a secondary activity, and donations and government assistance. The State-level estimates provide information on the total value of all food and beverage acquisitions for off-premise consumption (food-at-home or FAH) and for on-premise consumption (food-away-from-home or FAFH) in each State using a similar methodology employed in the national-level FES; see Okrent et al. (2018) for a full description of the methodology. The State-level estimates, similar to the national-level FES, also augment the sales estimates with sales taxes and tips (if applicable) and calculate inflation-adjusted estimates.

Underlying Data for the FES: National- versus State-Level Estimates

The national-level FES uses the U.S. Census Bureau's Annual Retail Trade Survey, Service Annual Survey, Annual Wholesale Trade Survey, and Annual Survey of Manufactures for the annual estimates; and the Monthly Retail Trade Survey, Quarterly Services Survey, Monthly Wholesale Trade Survey, and Manufacturers' Shipments, Inventories, and Orders for the monthly estimates. These surveys provide national estimates for total sales for retail, service, manufacturing, and wholesale establishments in the United States (U.S. Census Bureau, 2016d). Sales estimates are provided by NAICS industry and then aggregated into outlet type for the FES estimates.

The State-level FES estimates use NETS as the underlying dataset, selecting establishments under the same NAICS codes as the national-level FES and aggregating them at the State level. NAICS uses up to six-digit codes to identify specific industries within the classification system. The first two digits specify the sector, the third digit specifies the subsector, the fourth digit specifies the industry group, the fifth digit specifies the NAICS industry, and the sixth digit designates the national industry (BEA, 2005). For simplicity, for codes with less than six digits in the State-level FES, each industry within that subsector is used in this analysis. Tables 1 and 2 list and define the relevant NAICS industries used in the FES estimates for FAH and FAFH at the State level.

[3] The Economic Census reports sales by NAICS industry and product. Previously, the reports that listed industry and product data were known as both the Class of Customer report and the Subject Series-Product Lines report, respectively. However, in the 2017 Economic Census, these reports were replaced by the Sales, Value of Shipments, or Revenue by Class of Customer and the Products by Industry reports.

Table 1

Store classifications for food-at-home by North American Industry Classification System (NAICS) codes

Outlet type	NAICS code	Industry	Definition
Grocery stores	445110	Supermarkets and other grocery (except convenience) stores	Establishments that are primarily engaged in retailing a general line of food, such as canned and frozen foods; fresh fruits and vegetables; and fresh and prepared meats, fish, and poultry.
Convenience stores	445120	Convenience stores	Establishments that are primarily engaged in retailing a limited line of goods that generally includes milk, bread, soda, and snacks.
Other food stores	4452	Specialty food stores	Establishments that are primarily engaged in retailing miscellaneous specialty foods that are not for immediate consumption and are not made on the premises.
Warehouse and club stores	452311	Warehouse clubs and supercenters	Establishments that are primarily engaged in retailing a general line of groceries—including a significant amount and variety of fresh fruits, vegetables, dairy products, meats, and other perishable groceries—in combination with a general line of new merchandise.
Other stores and foodservice	452210, 452319,	All other general merchandise stores	Establishments that are primarily engaged in retailing new goods in general merchandise stores (except 452311).
	441, 442, 443, 444, 446, 447, 448, 451, 453, 4453	Retail trade	Establishments that are primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise.
	722	Food services and drinking places	Establishments that are primarily engaged in preparing meals, snacks, and beverages for immediate on-premises and off-premises consumption. The industries in the subsector are grouped based on the type and level of services provided.
	622, 711, 713, 7211, 7212, 8111, 51213	Accommodation, recreational places, and others	Establishments that are primarily engaged in providing temporary accommodation for travelers and others, and establishments engaged in producing and/or distributing motion pictures, videos, television programs, or commercials.
Mail order and home delivery	454	Non-store retailers	Establishments that primarily sell goods via mail-order houses, vending machine operators, home delivery sales, door-to-door sales, party plan sales, electronic shopping, and sales through portable stalls.
Direct selling by manufacturers and wholesalers	4244	Grocery and related products merchant wholesalers	Establishments that are primarily engaged in the merchant wholesale distribution of (1) a general line of groceries; (2) packaged frozen food; (3) dairy products; (4) poultry and poultry products; (5) confectioneries; (6) fish and seafood; (7) meats and meat products; (8) fresh fruits and vegetables; and (9) other grocery and related products.
	311	Food manufacturing	Establishments that transform livestock and agricultural products into products for intermediate or final consumption, excluding animal food manufacturing.
	3121	Beverage manufacturing	Establishments that are primarily engaged in manufacturing soft drinks and ice; purifying and bottling water; and manufacturing brewery, winery, and distillery products.

Source: USDA, Economic Research Service using information from the U.S. Department of Commerce, Bureau of the Census.

Table 2

Store classifications for food-at-home by North American Industry Classification System (NAICS) codes

Outlet type	NAICS code	Industry	Definition
Full-service restaurants	722511	Full-service restaurants	Establishments that are primarily engaged in providing food services to patrons who order and are served while seated (i.e., waiter/waitress service) and pay after eating.
	722320	Caterers	Establishments that are primarily engaged in providing single event-based food services.
	722330	Mobile food services	Establishments that are primarily engaged in preparing and serving meals and snacks for immediate consumption from motorized vehicles or nonmotorized carts.
Limited-service restaurants	722513	Limited-service restaurants	Establishments that are primarily engaged in providing food services (except snack and nonalcoholic beverage bars) where patrons generally order or select items and pay before eating.
	722514	Cafeterias, grill buffets, and buffets	Establishments that are primarily engaged in preparing and serving meals for immediate consumption, using cafeteria-style or buffet serving equipment. Patrons select food and drink items on display in a continuous cafeteria line or from buffet stations.
	722515	Snack and nonalcoholic beverage bars	Establishments that are primarily engaged in preparing and/or serving a specialty snack—such as ice cream, frozen yogurt, cookies, or popcorn; or serving nonalcoholic beverages—such as coffee, juices, or sodas—for consumption on or near the premises.
Drinking places	722410	Drinking places (alcoholic beverages)	Establishments that are known as bars, taverns, nightclubs, or drinking places—primarily engaged in preparing and serving alcoholic beverages for immediate consumption; the establishments may also provide limited food services.
Hotels and motels	7211	Accommodation for travelers	Establishments that provide temporary accommodation for travelers and others, typically the rental of a room with a bed, or a site for a recreational vehicle or tent.
Retail stores and vending	44, 451, 452, 453, 454	Retail trade	Establishments that are primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise.
Recreational places	51213, 711, 712, 713, 713, 7212	Motion picture and video industries	Establishments that are primarily engaged in producing and/or distributing motion pictures, videos, television programs or commercials, exhibiting motion pictures or providing post-production and related services.
	7132	Arts, entertainment, and recreation	Establishments that are primarily engaged in operating facilities or providing services to meet the cultural, entertainment, and recreational interests of their patrons.
Other sales, NEC	8133, 8134, 8139, 7213, 622, 623, 8111		
	72231	Food service contractors	Establishments that are primarily engaged in providing food services at institutional, governmental, commercial, or industrial locations—based on contractual arrangements for a specified period.

Note: NEC = Not elsewhere classified.

Source: USDA, Economic Research Service using information from the U.S. Department of Commerce, Bureau of the Census.

Like the national-level FES, the State-level FES makes four main adjustments to the sales numbers to account for the following: nonfood sales, double counting, direct selling, and multiple-outlet industries. Aggregate annual FAH expenditures at the State level are calculated as the sum of sales reported in NETS for the NAICS industries listed in table 1, less adjustments for nonfood sales and double counting, and adding adjustments for direct sales. Similarly, aggregate annual-level FAFH at the State level expenditures are calculated as the sum of sales reported in NETS for NAICS industries listed in table 2, less the nonfood sales adjustment, and plus the multiple-outlet adjustments. After these adjustments are performed, food sales are benchmarked to the national-level estimates by outlet type. Taxes and tips are then calculated when appropriate and all estimates are presented in nominal dollars and constant dollars.

Nonfood Sales Adjustment

To isolate food and beverage sales from total annual sales, this report uses the North American Product Classification System (NAPCS). The NAPCS is developed by the Economic Census to calculate the proportion of sales within each NAICS code that goes toward food and nonalcoholic beverages for on- and off-premises consumption. For example, about 78 percent of supermarket and grocery store sales (NAICS 44511) in 2017 were packaged foods for off-premises consumption, and 1 percent were meals and unpackaged snacks for on-premises consumption; the remaining amount was for alcohol and nonfood products. Previously, the FES used Product Line codes for the nonfood sales adjustment. However, the NAPCS replaced the product line codes in the 2017 Economic Census. The FES updated estimates in 2022 using the NAPCS codes for the calculation of food sales within each NAICS code (The list of previously used product line codes can be found in tables A1a through A1d of Okrent et al. (2018)). The concordances between 2012 product line codes and 2017 NAPCS codes are documented in the 2017 Economic Census documentation. Food and nonalcoholic beverage products (as assigned by the NAPCS) are listed in table A1. The State-level FES uses these same percentages at the national level to calculate food and beverages sales for on- and off-premises consumption applied to aggregated NETS sales at the State level.

Double Counting Adjustment

Double counting occurs when retailers such as food stores (supermarkets and other grocery stores, convenience stores, and specialty food stores) or warehouse clubs and supercenters sell food to restaurants and other food stores. In turn, these stores resell the goods at a markup or transform the goods into other edible products before selling. Since the food purchases are captured in the final sales estimates for foodservice and other food stores (i.e., non-households), the FES excludes sales to businesses from food store sales (NAICS 44511, 44512, and 4452) as well as from warehouse clubs and supercenter sales (NAICS 452311) using the Miscellaneous Subjects Class of Customer that the Economic Census publishes. The Miscellaneous Subjects Class of Customer data show the percentage of sales to final purchaser (i.e., households and individuals, businesses, government) by NAICS industry code. The State-level FES uses this same adjustment as the national-level FES that is applied on aggregated NETS food sales at the State level.

Direct Seller Adjustment

Most food and beverage sales by manufacturers and wholesalers—businesses that generally sell items in bulk without transformation—are sold to other businesses, such as food stores and restaurants. However, wholesalers and manufacturers can also sell products to households and governments. The FES uses the Miscellaneous Subjects Class of Customer data to estimate direct sales of foods to households by wholesalers. No data are available to estimate manufacturers' direct sales of foods to households, but the FES assumes that households purchase foods from manufacturers at the same rate that the households purchase foods from wholesalers. In 2017, 0.3 percent of total wholesaler and manufacturer sales were to households. The State-level FES uses the same adjustment as the national-level FES that is applied on aggregated NETS food sales at the State level.

Multiple Outlet Adjustment

The Subject Series-Miscellaneous Subjects reports are also used to appropriately allocate sales from foodservice contractors and concession operators that operate in multiple outlet types. This includes industries such as food contracting sales (NAICS 72231)—which can occur at schools and colleges, recreational facilities, nursing homes, hospitals, office buildings, manufacturing plants, and transit terminals. The Subject Series-Miscellaneous Subjects: Concession Operators that the EC publishes, shows the percentage of limited- and full-service restaurant sales that are concessions at recreational facilities. Limited-service (NAICS 722513, 722514, and 722515) and full-service (NAICS 722511) restaurants are included in the outlet-type eating and drinking places, and FAFH concession sales are reallocated from eating and drinking outlets to recreational facilities.

National Adjustment

After performing these four adjustments on NETS sales data at the State level, aggregated food sales at the national level compare well against the trends observed by the national-level FES for total food, (FAH) and FAFH.

In order to make the national- and State-level estimates comparable, the State-level estimates are benchmarked to the FES at the national level each year by calculating the share of sales for each State, outlet type, and year—and multiplying it by the FES at the national level for the same outlet type and year:

$$Sales_{ij}^{b} = \frac{Sales_{ij}}{\sum Sales_{ij}} * FES\ Sales_{i}$$

Where $Sales_{ij}^{b}$ is the benchmarked food sales for each outlet type, i, for State, j; $Sales_{ij}$ is the estimated food sales for each outlet type, i, for State, j; $\sum Sales_{ij}$ is the sum of the estimated food sales for each outlet type over States; and $FES\ Sales_{i}$ is the national-level FES food sales for each outlet type, i. These benchmarked values are used in the rest of the report.

Taxes and Tips

State-level sales tax rates are collected each year for FAH and FAFH from each State's revenue office website. The Tax Foundation (see Drenkard, 2012, 2013, 2014; Drenkard and Walczak, 2015; Drenkard and Kaeding, 2016) publishes average local sales tax rates by State, which are then applied to sales for each outlet type in tables 1 and 2. In 2019, the highest sales tax rate for on-premises foods was 10 percent in Washington, DC, and the lowest was 0 percent in Delaware, Montana, and Oregon. The highest sales tax rate for off-premises foods was 9.1 percent in Alabama and the lowest was 0 percent in 14 States.

Tips are applied to FAFH at full-service restaurants, drinking places, hotels, and motels, full-service concessions at recreational places, and casinos—using the same rate as in the national FES of 18 percent.

Constant Dollar Measures

To make sensible comparisons across time periods, it is important to account for inflation. The objective then becomes to remove any part of the variable's change that is attributable to price movements, arriving at a constant-dollar (or inflation-adjusted) indicator. This is done by dividing the nominal value by a common price index measure that represents the value of a basket of goods in a certain time period relative to the value of the same basket in a base period. For the State-level FES, each nominal value is deflated by the U.S. Bureau of Labor Statistics' Consumer Price Index (CPI). The FAH expenditures are deflated with the CPI for FAH and the FAFH expenditures, with the CPI for FAFH using 1988 as the base year.

Per Capita and Shares of Food Expenditures

FAH and FAFH expenditures at the State level are normalized in two ways to help analyze trends and compare expenditures across States: FAH and FAFH estimates are expressed on a per capita basis and as a share of total food expenditures.[4]

Advance, Revised, and Final Estimates

In producing the State-level FES—USDA, ERS attempts to strike a balance between accuracy and timeliness. The most complete and comprehensive data available are from the newest release of NETS; however, these data lag 2 years from the reference year, decreasing their suitability for providing insight to policymakers with current food markets questions. USDA, ERS introduced a rollout of estimates that increases the timeliness of the State-level FES. The rollout begins with the publication of advance estimates, which are lagged only 1 calendar year from the reference year. The advance estimates are replaced each year by revised estimates when more reliable data are available; these estimates are lagged 2 years. As with the national-level FES, with the release of each Economic Census, the revised estimates are replaced with final estimates, which are lagged 3 to 8 years. The trend in the share of sales of each State for each NAICS code (explained in the national adjustment sub-section) is used to extrapolate the most current year of revised estimates forward.

[4] Total U.S. population by State was extracted from the St. Louis FED in July 2022.

Analysis of the State-Level Food Expenditure Series

The FES at the national level shows that in 2019, food spending by U.S. consumers, businesses, and government entities totaled $1.77 trillion or $5,379 per capita.[5] FAH spending was $824 billion or $2,508 per capita and FAFH spending was $943 billion or $2,871 per capita.

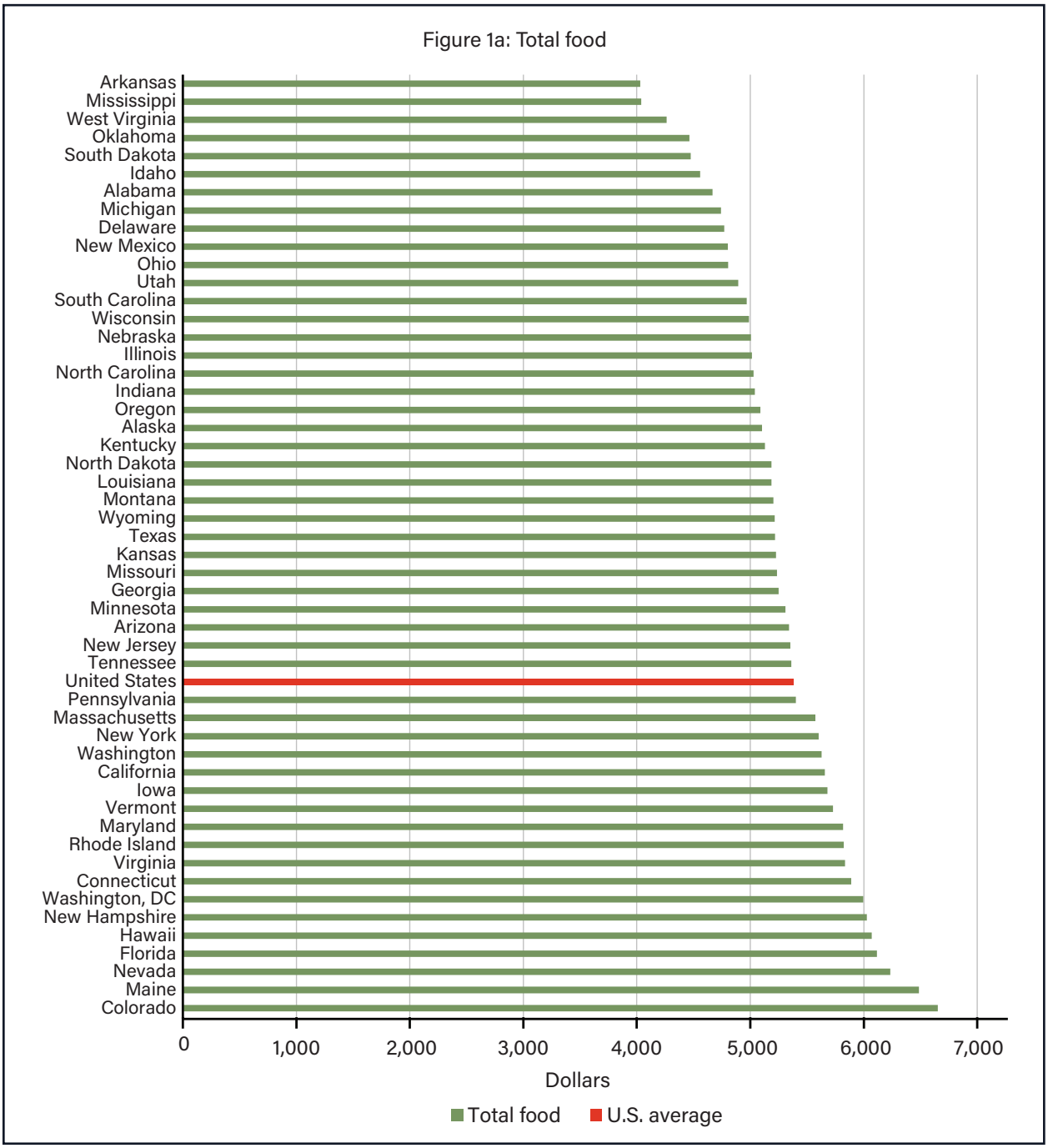
The State-level FES shows that, in 2019, the median per capita food spending was $5,218 in Texas. The highest per capita food spending was in Colorado, at $6,651, and lowest in Arkansas at $4,030. Seventeen States plus Washington, DC, had a higher per capita total food spending than the national average in 2019, and 33 States had lower per capita total food spending than the national average (figure 1A). For FAH, the median per capita food spending was $2,448 in New Jersey—while the highest per capita FAH spending was in Maine at $3,587—and lowest in Washington, DC, at $1,219. Twenty-five States had higher per capita FAH spending than the national average in 2019, while 25 States plus Washington, DC, had lower per capita FAH spending than the national average. Washington, DC, had the highest FAFH per capita spending at $4,774.[6] Mississippi had the lowest FAFH per capita spending at $2,030, while the median was Tennessee at $2,721. Eighteen States plus Washington, DC, had higher per capita FAFH spending than the national average in 2019, while 32 States had lower per capita FAFH spending than the national average (figures 1B and 1C).

[5] These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions. Population is calculated for the 50 States plus Washington, DC, using population estimates from the St. Louis FED.

[6] Figure 1C shows that Washington, DC, Hawaii, and Nevada are the States with the highest FAFH per capita spending in 2019. Since the State-level FES estimates are based on sales, the estimates may not accurately reflect the purchases of residents of some States (such as in these three jurisdictions) where a large portion of FAFH spending is probably done by out-of-State residents. This spending could come either via tourism (in the cases of Hawaii and Nevada) or employees commuting from out of State (in the case of Washington, DC).

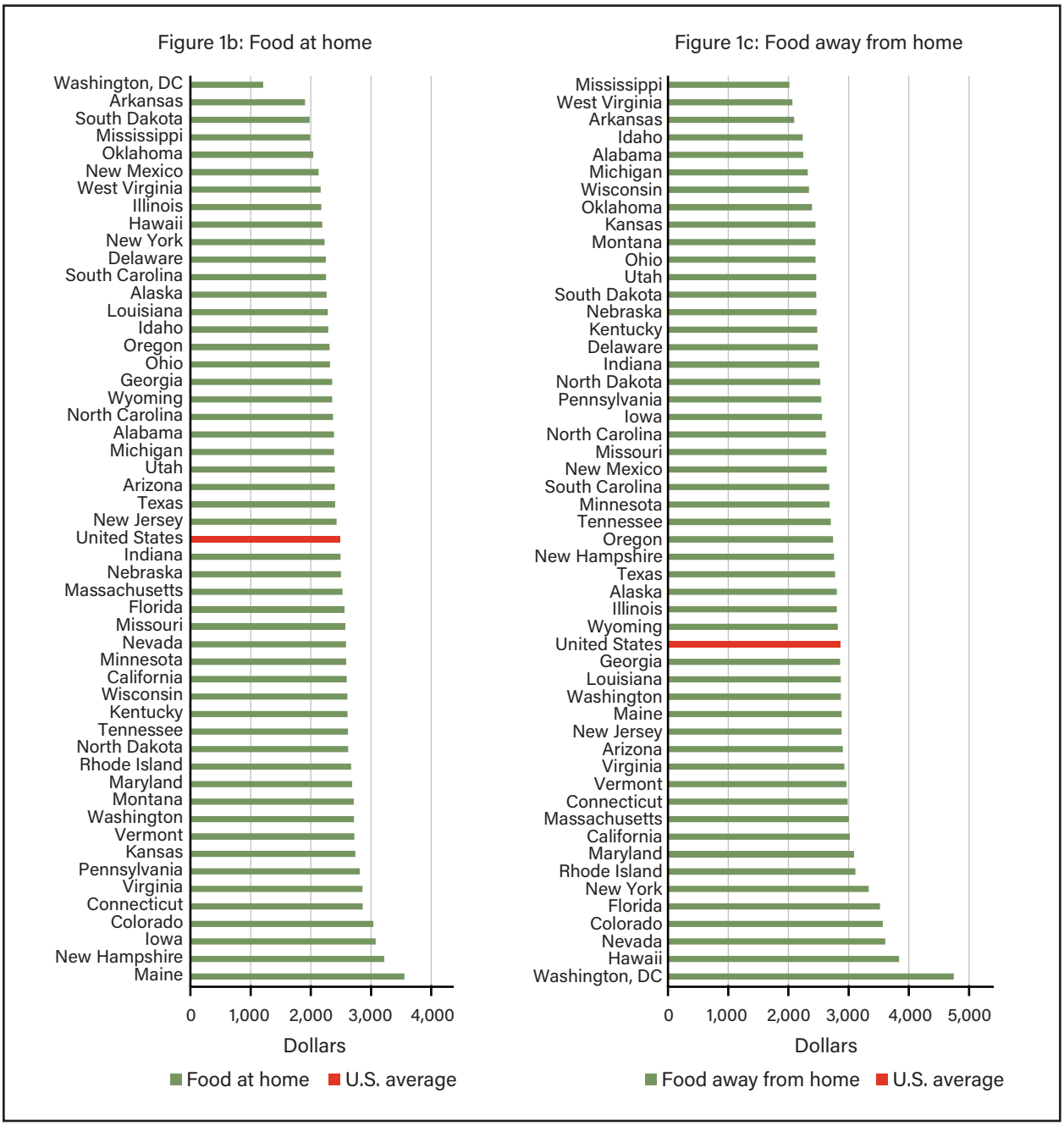
Figure 1

Nominal total food, food-at-home, and food-away-from-home per-capita expenditures, with taxes and tips, for all purchasers in 2019 by State



Note: These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions.

Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series.



Note: These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions.

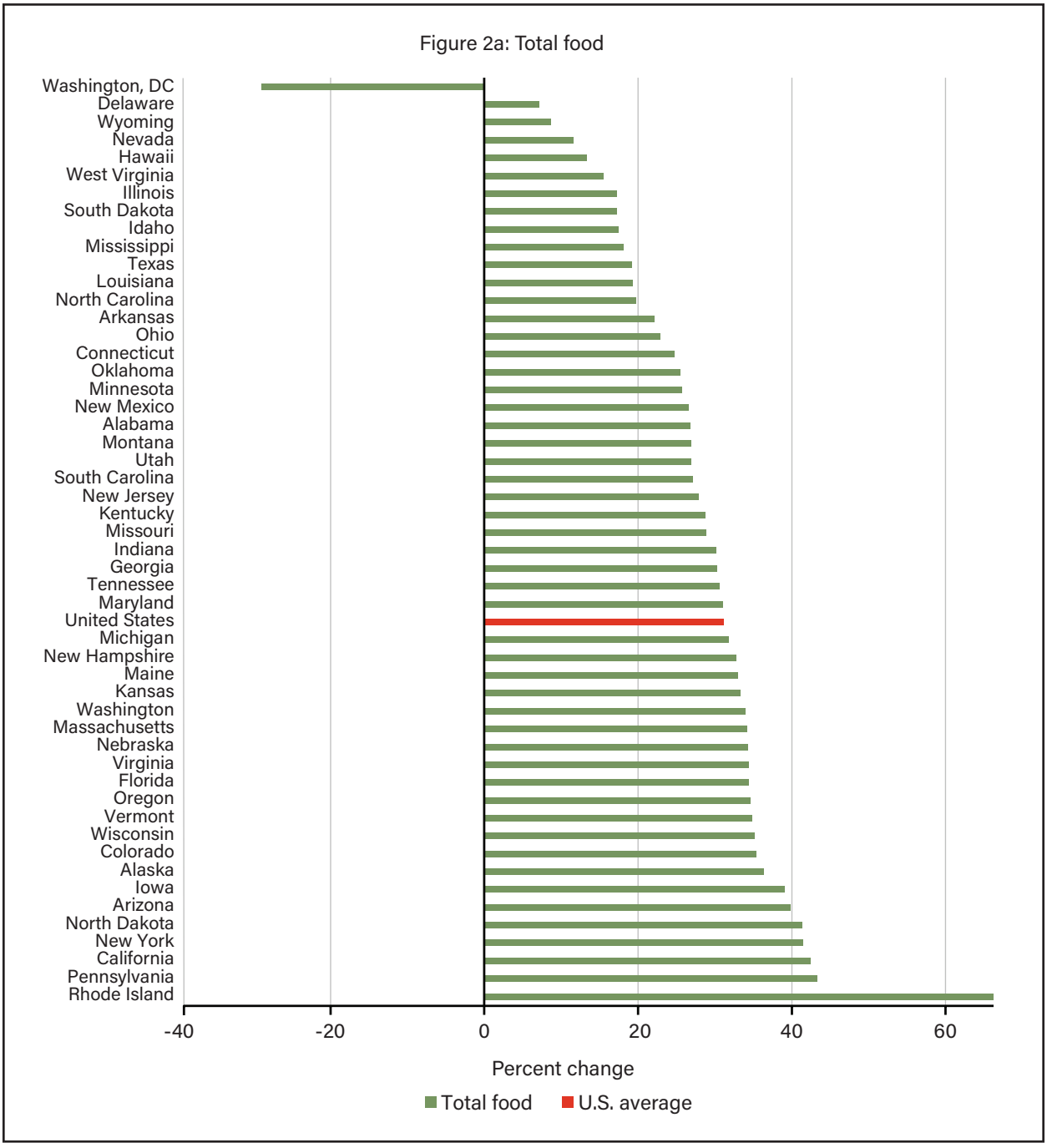
Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series.

Inflation-adjusted annual total food spending per capita in the United States has increased 31 percent from 1997 to 2019. Inflation-adjusted sales per capita of both FAH and FAFH also increased during this period, with FAH spending increasing at a lower rate (17 percent) than FAFH spending (49 percent).

The State-level FES shows that the median State per capita, inflation-adjusted total food spending increased the most from 1997 to 2019 was Missouri at 29 percent, while Rhode Island saw the largest increase at 66 percent. Per capita, inflation-adjusted total food spending decreased the most in Washington, DC, at 29 percent. Twenty-one States had a change in per capita, inflation-adjusted total food spending that was higher than the national average from 1997 to 2019, while 29 States plus Washington, DC, had lower changes than the national average over this period (figure 2A). Per capita, inflation-adjusted FAH spending increased the most in Rhode Island at 64 percent and decreased the most in Washington, DC, at 41 percent. Six States also saw a decrease in per capita, inflation-adjusted FAH spending over this period; the median change was 15 percent in Florida. The median change in inflation-adjusted FAFH spending occurred in Texas at a 49-percent increase. The State where food spending increased the most was Vermont at 74 percent, while Washington, DC, decreased the most at 25 percent. No State saw a decrease in inflation-adjusted FAFH spending, and 23 States plus Washington, DC, saw a percent change smaller than the national average (figures 2B and 2C).

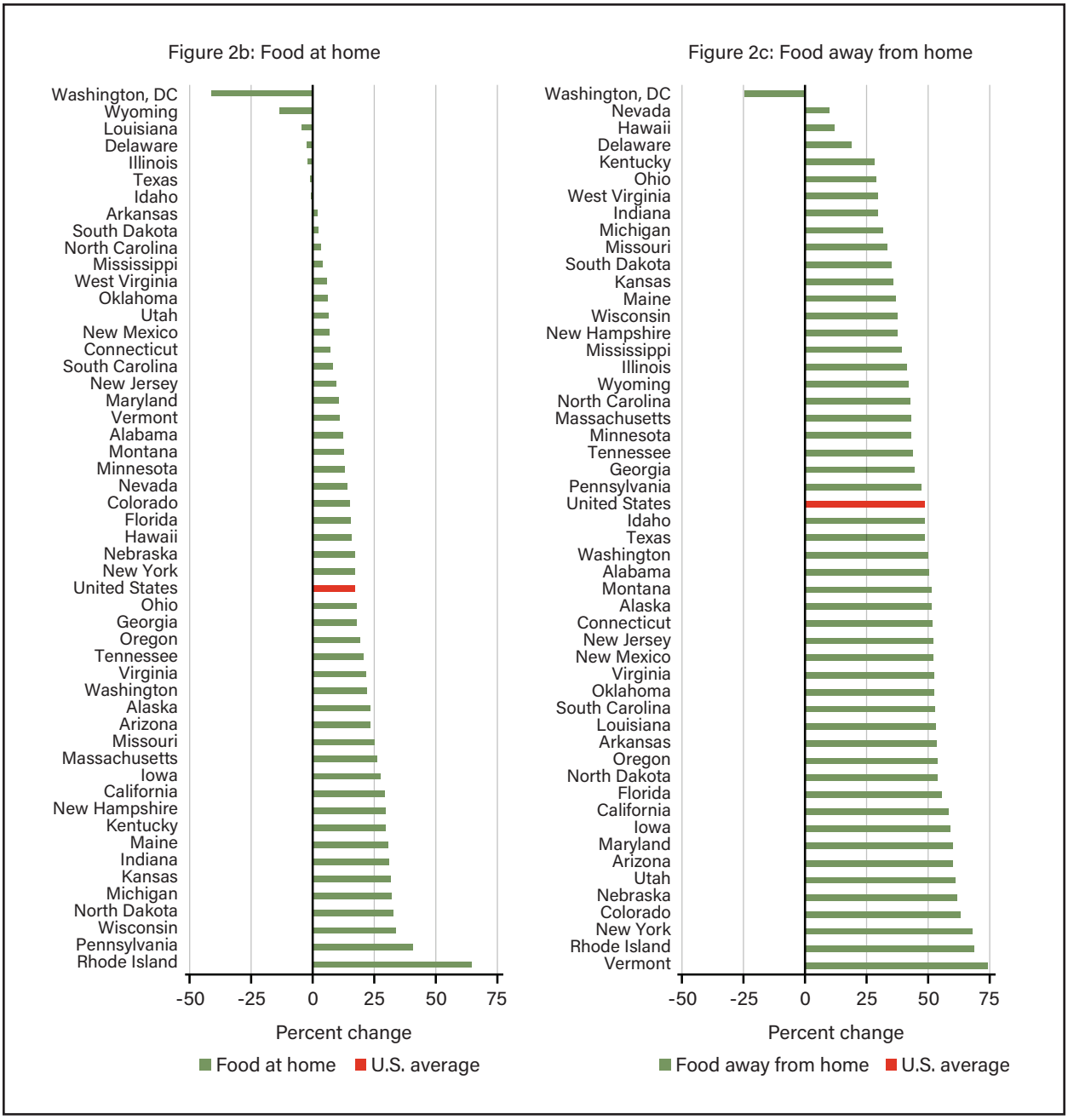
Figure 2

Percentage change in inflation-adjusted total food, food-at-home, and food-away-from-home per-capita expenditures from 1997 to 2019, with taxes and tips, for all purchasers



Note: Inflation-adjusted prices are corrected for changes in prices in relation to 1988 as the baseline. These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions.

Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series.



Note: Inflation-adjusted prices are corrected for changes in prices in relation to 1988 as the baseline. These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions.

Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series.

The FES at the national level shows that over the past three decades, the composition of the U.S. food system has changed. The aggregate U.S. food budget devoted more toward FAFH compared to FAH since 2015.[7] However, not all the States followed this trend.

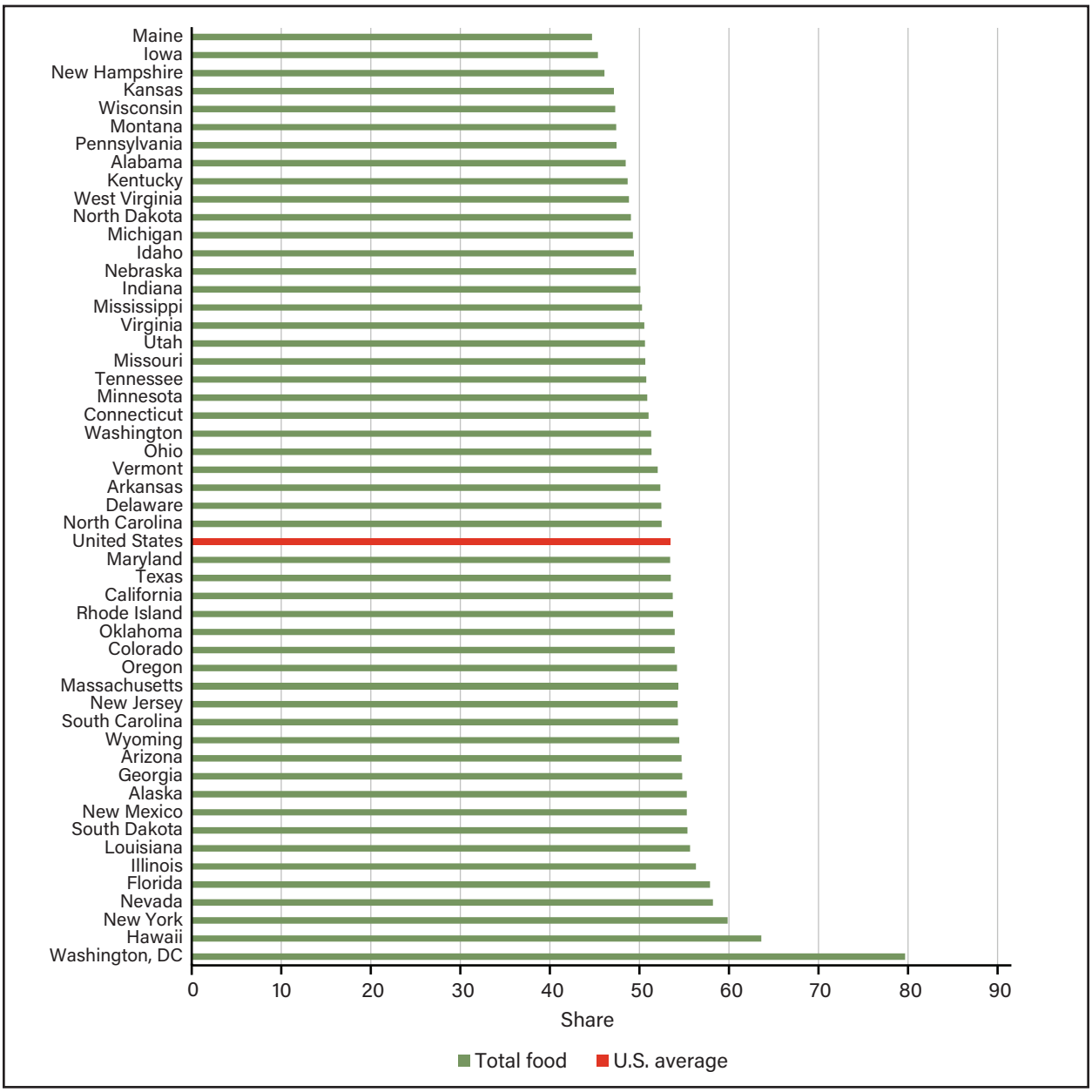
Nominal expenditures at FAFH establishments in 2019 accounted for 53.4 percent of total food spending, while the remaining 46.6 percent was spent for FAH. Note that food expenditure shares are not propor-

[7] Calculations are made with nominal estimates for sales only, excluding food furnished, donated, home grown, and served at educational institutions.

tionate to food quantities because food purchased away from home is generally more expensive than food prepared at home. FAFH outlets incur costs for the workers required to prepare and serve food—as well as for other overhead expenses such as for buildings, equipment, and utilities.

In 2019, the FAFH share was 50 percent or more in 36 States plus Washington, DC, with the highest share in Washington, DC, with 79.9 percent, and the second highest share in Hawaii with 63.6 percent. The lowest FAFH share was in Maine at 44.7 percent, followed by Iowa at 45.3 percent. The median FAFH share in 2019 was Arkansas with 52.3 percent. Twenty-two States plus Washington, DC, had a higher FAFH share than the national average in 2019, while 28 States had a lower share (figure 3). See box, "Food Spending in Washington, DC."

Figure 3
Percent share of nominal food-away-from-home spending, without taxes and tips in 2019



Note: These estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions.

Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series.

Food Spending in Washington, DC

The spending estimates for Washington, DC, are regular outliers in these results. A much greater amount of money is spent on food away from home (FAFH) in Washington, DC, than in any of the 50 States. High-tourist States such as Hawaii and Nevada stand out as well but to a lesser degree. In 2019, the FAFH share was 77 percent for Washington, DC, and 62.3 percent for Hawaii. Washington, DC, had a considerably lower per capita FAH spending and a considerably higher per capita FAFH spending compared to the highest and lowest States in 2019. FAH spending per capita in Washington, DC, in 2019 was 35 percent lower than the lowest State (Arkansas); FAFH spending per capita in 2019 was 17 percent higher in Washington, DC, than in the highest State (Hawaii).

This analysis is only meant to estimate the spending levels in each State (plus Washington, DC), so a full causal investigation into why food spending in Washington, DC, is markedly different from other States is outside the scope of this report. However, existing literature and data can provide insights into some contributing factors.

One possible factor is interstate commuting. From 2010 to 2014, only about 30 percent of Washington, DC's workforce resided in the capital city, with the vast majority of workers commuting from nearby Maryland and Virginia. The majority of those who lived and worked in Washington, DC, during this time worked in low-wage industries (Moored, 2016). These middle-wage and high-wage commuters likely disproportionally purchase food for on-premise consumption (FAFH) while in Washington, DC, for work. By identifying outliers such as Washington, DC, this study can inform research efforts to understand the drivers of State-level food spending differences.

A Comparison Between the State-Level Food Expenditure Series and Other Measures of State-Level Food Spending

The FES compares to two other national-level food spending datasets produced by U.S. statistical agencies: The Bureau of Economic Analysis's (BEA) Personal Consumption Expenditures (PCE) and the Bureau of Labor Statistics' (BLS) Consumer Expenditure (CE). Each of these data products have estimates for food at a more granular level than the current Food Expenditure Series. The Personal Consumption Expenditures (PCE) include all 50 States (plus Washington, DC), and the Consumer Expenditure survey has estimates for select metropolitan areas and regions that make up the entire Nation. This data product will put the FES in line with the BEA's PCE by State. USDA, ERS's State-level FES is the only food spending data series that primarily uses sales data, which provides the most direct measure of total purchases by final users (table 3).[8]

[8] Food expenditures can be measured in three ways: (1) by retail sales, (2) by commodity flow (or value added), and (3) by the quantities at retail prices (Manchester, 1987). Consistent with FES, State-level FES estimates use the retail sales approach to measure food expenditures.

Table 3

Comparison of the State-level Food Expenditure Series with data from other statistical agencies

Data product characteristics	USDA, ERS State-level Food Expenditure Series	BEA Personal Consumption Expenditures (PCE) by State	BLS Consumer Expenditure (CE) – selected States, regions, and selected metropolitan areas
Measure	Nominal, constant, and per capita	Nominal per capita	Nominal per capita
Base data	National Establishment Time Series; USDA, ERS Food Expenditure Series	I-O Accounts (Economic Census; U.S. Census annual surveys; data from other U.S. statistical agencies; data from trade associations)	Diary portion of the Consumer Expenditure Survey
Frequency	Annual with a 2-year lag for the revised estimates and 1-year lag for the advanced estimates	Annual PCE for FAH and FAFH by State lagged 10 months from reference year	Two-year annual mean is published approximately 18 months from reference year
Where food is purchased (outlets)	Two outlet types: FAH and FAFH	Two outlet types: FAH and FAFH	Two outlet types: FAH and FAFH
What is purchased (products)	FAH, FAFH	FAH, FAFH, AAH, AAFH, farm home production, food furnished to employees (including military) [9]	For the published estimates, 21 disaggregated FAH products (e.g., beef, fresh fruits) and FAFH stores [10]
Geography	All 50 States and Washington, DC	All 50 States and Washington, DC	Five selected States and 22 selected metropolitan areas Four regions that make up all 50 States and Washington, DC
Years of coverage	1997-present	1997-present	Dependent on different geographic areas

Note: ERS = USDA, Economic Research Service. BEA = U.S. Department of Commerce, Bureau of Economic Analysis. BLS = U.S. Department of Labor, Bureau of Labor Statistics. I-O = Input-Output. FAH = food at home. FAFH = food away from home. AAH = alcohol at home. AAFH = alcohol away from home. NAICS = North American Industry Classification System. BLS Consumer Expenditures (CE) Survey selected States: California, Florida, New Jersey, New York, and Texas. BLS Consumer Expenditures (CE) Survey selected metropolitan areas: Chicago, Detroit, Minneapolis-St. Paul, St. Louis, New York City, Philadelphia, Boston, Washington, DC, Baltimore, Atlanta, Miami, Dallas-Fort Worth, Houston, Tampa, Los Angeles, San Francisco, San Diego, Seattle, Phoenix, Denver, Honolulu, and Anchorage.

Source: USDA, Economic Research Service, using information from the U.S. Department of Commerce, Bureau of Economic Analysis, and U.S. Department of Labor, Bureau of Labor Statistics.

[9] The PCE estimates also include many more disaggregated estimates of FAH product purchases by household final users, similar to those published in the Consumer Expenditure (e.g., beef, fresh fruits) in the Underlying Detail Tables. However, BEA cautions that "…their quality is significantly less than that of the higher-level aggregates in which they are included. Compared to these aggregates, the more detailed estimates are more likely to be either based on judgmental trends, on trends in the higher-level aggregate, or on less reliable source data."

[10] The public-use Consumer Expenditure data contain more than 100 food products, mostly FAH products and a few FAFH products—including breakfast, lunch, dinner, and snacks. The public-use Consumer expenditure data also contain additional FAFH outlet information—including whether the purchase was made from a full-service restaurant, limited-service outlet, vending machine or mobile vendor, school or employee site, or caterer.

The BEA estimates the PCE from its Benchmark Input-Output Accounts, with data from the U.S. Bureau of the Census, other U.S. statistical agencies, and trade associations (BEA, 2022; BEA, 2016a).[11] The BEA's monthly PCE estimates, which are lagged 1 month from the reference month, are only for food and beverage products purchased for off-premises consumption (i.e., FAH). Its annual PCE estimates, which are lagged about 8 months from the reference year, are for broad food product aggregates—including FAH and FAFH.[12] The PCE estimates for foods and beverages capture only household purchases. The estimates exclude most of the value of food acquisitions bundled as ancillary activities (with the exception of schools and colleges, and military and civilian employees). The estimates provide only limited information on where foods and beverages are purchased, and exclude the value of nonfarm, home-grown food, and donations. The composition of the PCE by State measures are the same as that of the State-level FES in that all 50 States and Washington, DC, are individually represented in the food and beverage spending estimates.

The Consumer Expenditure estimates from the BLS are average annual household spending estimates based on the Consumer Expenditure Survey and come from a sample of households that track all purchase amounts over 2 weeks. Consumer Expenditure estimates track purchases only and exclude food furnished, donated, home grown, and served at educational institutions. Household purchases are divided into 22 food products (21 foods sold at FAH establishments and an aggregate FAFH category). Sample weights are used to estimate average household expenditures by household structure and sociodemographic group (along with variability measures).[13] These data are released twice a year, 8–9 months after the reference period. While the Consumer Expenditure estimates present the most details of food purchasing data by household structure or products purchased, the national estimates are not disaggregated to the State level for all 50 States. Disaggregated Consumer Expenditure estimates are only made for 4 regions that make up all 50 States and Washington, DC, 5 individual States, and 22 selected metropolitan areas.

The USDA, ERS State-level FES overcomes the limitations of the Consumer Expenditure and PCE estimations that track the value of food acquisitions in the United States in two primary ways: First, the FES captures food acquisitions by all final purchasers and not just households. Second, FES explicitly accounts for industries that sell food to generate revenue as a primary activity (such as grocery stores and restaurants) and industries where food is a supplemental activity of operations.

As observed at the national level, both the FES and PCE show that generally food-away-from-home spending has become more dominant at the State level since estimations began in 1997. The share of total food spending at the State level devoted to FAH and FAFH are quite similar in the FES and PCE estimates, with a few notable exceptions. On average, across all years (1997 to 2019) and all States (plus Washington, DC), the share of total food spending devoted to FAH is approximately 2.6 percentage point higher in the BEA's PCE estimates than in the FES estimates; in 2019, the PCE estimates were an average of 4.9 percentage points higher than in the FES for the FAH share. On average, the PCE estimates for the FAH share were considerably higher than that of FES estimates in 3 locations: Washington, DC (27.6 percentage points), Hawaii (16.8 percentage points), and Nevada (9.9 percentage points) (BEA, 2020). In each of these three

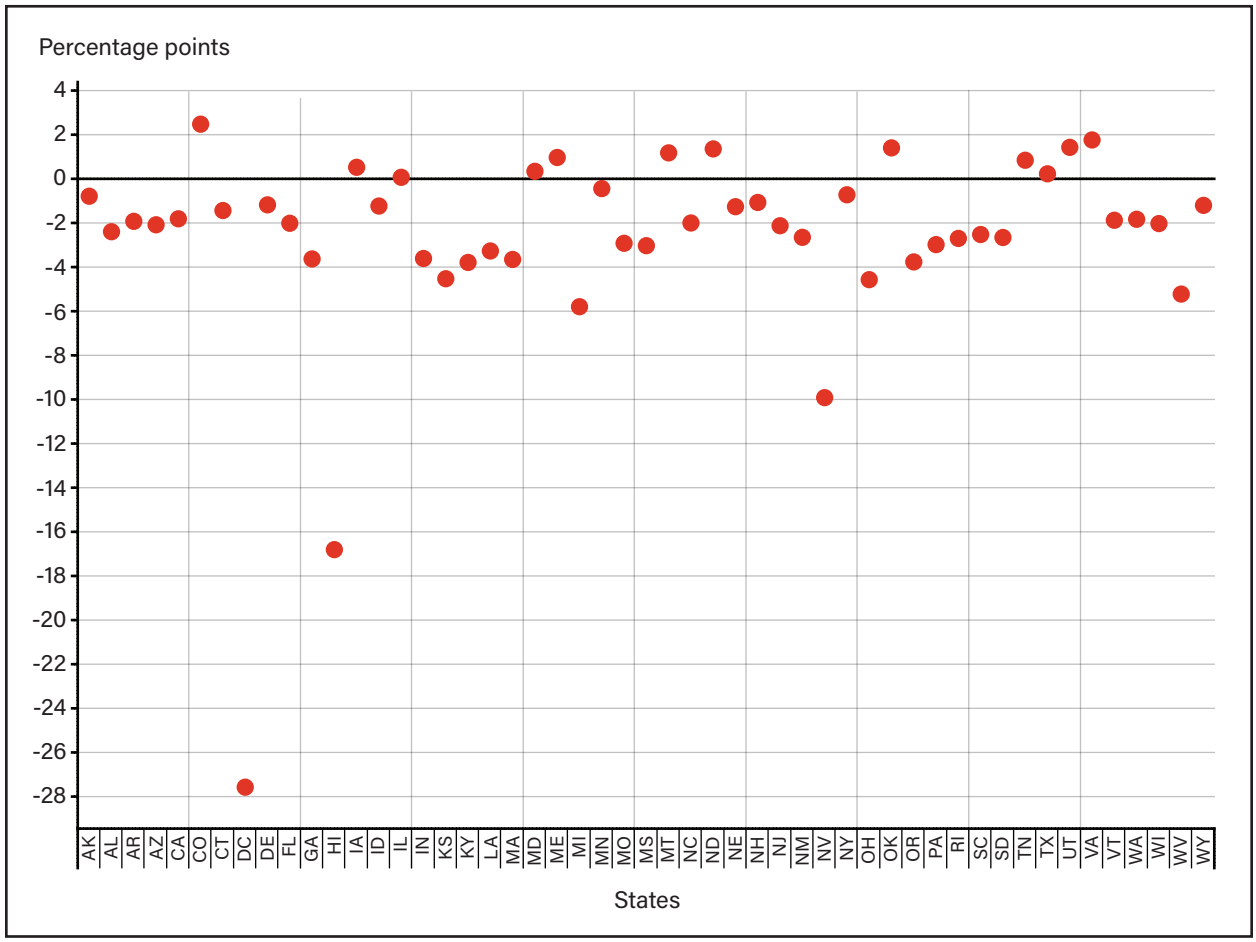
[11] The BEA also produces Input-Output (I-O) estimates. The estimates are presented in both "make tables" and "use tables. "Make tables" show what commodities industries produce and "use tables" show how industries and final users use commodities (BEA, 2022). The I-O estimates are based on data similar to that in the Food Expenditure Series, but the construction of the accounts is substantially different and does not allow for tracking food and alcohol expenditures by outlet type. This difference is because the I-O convention is to measure the output of industries that buy and resell merchandise, but the difference does not provide additional fabrication as sales receipts less the cost of goods sold, or margin (Horowitz and Planting, 2009). Hence, the "make tables" and "use tables" only show the margin produced by food and beverage, general merchandise, and other stores—whereas the Food Expenditure Series shows total sales, with some adjustments to account for double counting.

[12] The PCE estimates also include many more disaggregated estimates of FAH product purchases by the household final user like that published in the Consumer Expenditure (e.g., beef, fresh fruits), in the Underlying Detail Tables.

[13] The BLS also releases public-use Consumer Expenditure Survey data, which include more than 100 disaggregated foods.

jurisdictions, a large portion of food spending is probably by out-of-State residents either via tourism (in the cases of Hawaii and Nevada) or employees commuting from out of State (in the case of Washington, DC). This spending may be more likely at foodservice places (FAFH), which explains the lower FAH share found in FES compared to PCE (figure 4). Precisely what accounts for the large differences in Washington, DC, Hawaii, and Nevada is a subject for further investigation.

Figure 4
Average percentage point difference in the FAH share of total food spending between the State-level FES and PCE, from 1997 to 2019



Note: FAH = Food at home; FES = Food expenditure series; PCE = Personal Consumption Expenditures. Dots depict the average of the difference between the FAH share in State-level FES minus the FAH share in PCE by State from 1997–2019.

Source: USDA, Economic Research Service, using data from the State-level Food Expenditure Series and U.S. Department of Commerce, Bureau of Economic Analysis' PCE.

Conclusion

The State-level Food Expenditure Series (FES) can be used by government agencies, academics, the public, and other stakeholders to understand differences in consumer food acquisitions and spending behavior at a more granular level. The State-level FES shows several notable trends in the food industry, including the changing composition of expenditures between FAH and FAFH, and the declining FAH share of total food expenditures in many States. However, not every State follows the national-level trends. The State-level food expenditure series is a valuable means to depict a better picture of differences of total food, FAH, and FAFH spending across States and trends over time and to understand whether policies or shocks have heterogenous effects on food spending at the State level. Food expenditure policies or shocks that can be studied using the FES at the State level include but are not limited to:

- Economic shocks (e.g., economic recessions)
- Health shocks (e.g., COVID-19 pandemic)
- Food environment (e.g., low-access food areas)
- Tax policies
- Extreme weather or natural disasters
- Tourism and inter-State mobility

The State-level FES has a few limitations to keep in mind when using the data, some of which are the same limitations of the national-level FES. First, the designation of food expenditures as either off- or on-premises is self-reported by employer establishments every 5 years in the Economic Census. However, it is not clear if all establishments consider the same items to be consumed on- or off-premises. Also, since these data are available only for employer establishments, the percentage breakdown of sales between on- and off-premises, and similarly for food and nonfood products, is assumed to be the same for employer and non-employer establishments. As this information is available only every 5 years through the Economic Census a linear relationship is assumed among the data between the quinquennial (every 5 years) Economic Census. Finally, due to data restrictions, the authors used the national-level percentage breakdown of sales between on- and off-premises for food and nonfood products for all States. Establishments may consider different items to be consumed on- or off premises in different States. Similarly, the percentage of food and nonfood products may differ across States and this is not captured in the data. Similarly, the authors used the same tip rate for all States, as well as the same CPI.

A second limitation is that like the Consumer Expenditure estimates—the State-level FES estimates are for sales only and exclude food furnished, donated, home grown, and served at educational institutions. These estimates constitute a small portion of the overall value of the FES at the national level (about 0.3 percent for FAH and 12 percent for FAFH in 2019). The third limitation is that since the estimates are based on sales, estimates may not accurately reflect the purchases of residents of some States that have a large inflow of tourists (such as Hawaii and Nevada) and out-of-State consumers (like in the case of Washington, DC). Moreover, since the estimates are not differentiated by final users (households, government, and businesses), differences in the composition of final users across States is not captured.

A fourth limitation of the State-level FES is that estimates are lagged by 2 years. While projected estimates can be calculated, this is not recommended—particularly during years with large economic shocks, as States may have been affected differently. A fifth limitation is that the State-level FES presents the total value of food and beverages acquisitions desegregated by type of product—but not by outlet type, final purchasers, and final users. Finally, benchmarking food expenditures of individual States to the national FES may result in potential inaccuracies in the State-level estimates.

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Appendix

Table A1

North American Product Classification System (NAPCS) to categorize food product sales into at home and away from home: 2017 Economic Census

Food-at-home products	
NAPCS code	Code description
4000025000	Wholesale sales of packaged frozen food
4000050000	Wholesale sales of dairy products, except dried, canned, condensed, and evaporated dairy products
4000075000	Wholesale sales of eggs and poultry, except canned and frozen poultry products
4000100000	Wholesale sales of confectionery and snack foods
4000125000	Wholesale sales of cookies, bread, and baked goods
4000150000	Wholesale sales of fish and seafood, except canned and frozen fish and seafood
4000175000	Wholesale sales of fresh meat and meat products, except canned and frozen
4000200000	Wholesale sales of fresh fruits and vegetables
4000225000	Wholesale sales of baking ingredients
4000250000	Wholesale sales of nonperishable (canned and packaged) food
4000275000	Wholesale sales of grocery specialties
4000300000	Wholesale sales of coffee, tea, and powdered drink mixes
4000325000	Wholesale sales of food and beverage basic materials, including flavoring extracts, fruit peel, sausage casings, hop extract, malt, and yeast
4000350000	Wholesale sales of soft drinks, bottled water, juices, and nonalcoholic beverages
4002875000	Wholesale sales of grains, beans, and seeds
4002925000	Wholesale sales of raw milk and cream
4003000000	Wholesale sales of live poultry
4000425000	Wholesale sales of ice
5000025000	Retail sales of fresh meat and poultry
5000050000	Retail sales of fresh fish and seafood
5000075000	Retail sales of fresh fruit and vegetables
5000100000	Retail sales of eggs and dairy (except ice cream)
5000125000	Retail sales of baked goods
5000150003	Retail sales of delicatessen items, including deli meats and other service Delicatessen items (except prepared sandwiches, dishes, and entrees)
5000175000	Retail sales of frozen foods
5000200000	Retail sales of candy, prepackaged cookies, and snack foods
5000225000	Retail sales of food dry goods and other foods purchased for future consumption
5000250000	Retail sales of soft drinks and nonalcoholic beverages
5000275000	Retail sales of ice
Food-away-from-home products	
NAPCS code	Code description
5000150000	Retail sales of perishable prepared foods
5000150006	Retail sales of soup and salad bars
5000150009	Retail sales of all other perishable prepared foods, including prepared sandwiches, dishes, and entrees
7000025000	Meals, snacks, other food items, and nonalcoholic beverages, prepared and served or dispensed, for immediate consumption
7000055000	Meals, snacks, other food items, and nonalcoholic beverages, prepared and served or dispensed, for immediate consumption
7000060000	Meals, snacks, other food items, and beverages prepared for catered events
7000025027	Meals, snacks, and other food items dispensed via mobile vending service
7000025033	Nonalcoholic beverages dispensed via mobile vending service

Source: USDA, Economic Research Service, using information from the U.S. Department of Commerce, Bureau of the Census.