

Methodology for Archived Fresh Fruit and Vegetables Baskets

USDA, Economic Research Service (ERS) calculated the farm share as well as the farm-to-retail cost spread for baskets of fresh fruit and fresh vegetables based on what U.S. households purchased at retail stores for at-home consumption between 1999 and 2003. The following describes how ERS created those baskets as well as the annual time series derived from them.

Data for fruit basket were estimated for each year between 1997 and 2015 and those for fresh vegetables basket for each year between 1997 and 2016.

Creating the retail food baskets

ERS used the Consumer Expenditure Survey (CE) to help determine the contents of retail food baskets. The diary portion of the CE reports how much money U.S. households spent during 1 year on several types of foods. For example, households spent, on average, \$148.51 for fresh vegetables in 1999 (including \$18.92 for lettuce, \$26.91 for tomatoes, \$28.35 for potatoes, and \$74.33 for "other fresh vegetables").

Because the CE does not contain data on prices or quantities purchased, ERS obtained this information for individual fresh fruits and fresh vegetables from Nielsen's Homescan panel. Households participating in this panel kept a record of their purchases at retail stores using a scanner installed in their home. After a shopping trip, panelists would re-scan purchased items or manually enter information on products lacking a bar code. The sample available for this study contained data for 7,200 households in 1999 and 8,833 households in 2003.

Based on the Nielsen data, a representative household, for example, split its 1999 CE expenditures of \$18.92 for lettuce into \$11.73 for iceberg and \$7.19 for romaine (iceberg lettuce represented all purchases of head lettuce, which accounted for about 62 percent of the value of all lettuce purchased; romaine represented all purchases of leafy lettuce). Using Nielsen national average prices, ERS then estimated quantities purchased. For example, since iceberg lettuce averaged \$0.78 per pound, a representative household in 1999 could have bought 15.04 pounds with its \$11.73.

A similar process was used to estimate quantities of fresh potatoes, fresh tomatoes, and "other fresh vegetables" purchased. To select items for inclusion in "other fresh vegetables," Nielsen data were used to rank foods by expenditure share. The top 12 foods were selected, and the \$74.33 spent by households in the CE on other fresh vegetables in 1999 was allocated among the selected 12 foods. For example, broccoli accounted for 7.46 percent of Nielsen panelist expenditures on the 12 other fresh vegetables, so 7.46 percent of the \$74.33 spent on other fresh vegetables in the CE (\$5.55) was allocated to expenditures on broccoli. Because the price of broccoli averaged \$0.88 per pound at retail, it was further inferred that a representative household bought 6.3 pounds over the course of 1999.

ERS repeated the above procedures using data from 2003. The final market baskets for fresh fruit and fresh vegetables were created by averaging the contents of the 1999 and 2003 baskets.

Agricultural Baskets

Once the contents of the fresh fruit and fresh vegetables retail food baskets were specified, ERS used conversion factors to estimate the contents of their corresponding agricultural baskets. For each food in a retail basket, conversion factors inflate the retail quantity by the amount necessary to compensate for waste and shrinkage that occurs as goods are prepared for retail sales. For example, the market basket for fresh vegetables contained 21.11 pounds of carrots, and ERS estimated that farmers supplied 1.031 pounds of carrots for every 1 pound supplied by marketers at retail.

Fresh vegetables: contents of retail and agricultural baskets (in pounds)

Vegetable	Retail quantity	Farm quantity
Asparagus	2	2.19
Bell peppers	6.47	7.04
Broccoli	6.71	7.29
Cabbage	7.51	8.08
Carrots	21.11	21.76
Cauliflower	2.18	2.37
Celery	5.34	5.74
Corn on the cob	4.38	4.76
Cucumber	6.79	7.38
Iceberg lettuce	15.37	16.53
Agaricus mushrooms	3.12	3.32
Onions	24.22	25.77
Potatoes	82.92	86.37
Romaine lettuce	7.97	8.57
Sweet potatoes	4.67	5.19
Tomatoes	20.91	24.6
Note: Some numbers have been rounded. Source: USDA, Economic Research Service, Price Spreads from Farm to Consumer data product.		

Fresh fruit: contents of retail and agricultural baskets (in pounds)

Fruit	Retail quantity	Farm quantity
Apples	34.07	35.49
Cantaloupe	11.25	12.23
Cherries	2.11	2.29
Grapefruit	15.07	15.54
Grapes	15.89	17.47
Honeydew melon	1.8	1.96
Kiwifruit	0.91	1
Lemons	6.01	6.27
Oranges	25.02	25.79
Peaches	8.87	9.43
Pears	3.87	4.07
Plums	2.46	2.59
Strawberries	8.27	8.99
Watermelon	19.75	21.95
Note: Some numbers have been rounded. Source: USDA, Economic Research Service, Price Spreads from Farm to Consumer data product.		

Calculating an annual price series

ERS assumed that its retail food baskets are similar to the foods which the U.S. Department of Labor, Bureau of Labor Statistics (BLS) prices for calculating the Consumer Price Index (CPI) (U.S. city-average series). The value of each retail basket in year t can then be approximated as the product of its base year value, $Q'_r P_{r0}$, and an adjustment factor to account for retail price inflation. This adjustment factor is the ratio of the appropriate CPI at time t , CPI_t , to the same CPI in the base year of the data series, CPI_0 . A formal equation for the farm share of a retail basket at time t , FS_t , becomes:

$$FS_t = Q'_r P_{ft} / (Q'_r P_{r0})(CPI_t/CPI_0)$$

where $Q'_r P_{ft}$ is the base year value of the farm basket. BLS publishes separate CPIs for fresh fruit and fresh vegetables. This approximation makes annual calculations more convenient to implement as researchers do not need to collect prices for individual foods at retail every year. Only the CPI for the food group is required to update the value of the retail basket. In 2001, the CPI for fresh vegetables was 230.6. To estimate the retail price of the market basket in, say 2005, the retail value of the market basket in the base year (\$162) was multiplied by the appropriate CPI for that year (271.1), divided by its 2001 value (230.6). That is, $\$162 \times (271.7 / 230.6) = \190.87 .

ERS used prices received by farmers for their commodities to update the value of the farm basket for each year of the data series. In 2005, the total value of all the contents of the fresh vegetables farm basket was \$48.32, which amounted to about 25 percent of the estimated price of \$190.87 for the retail basket.