



Consumers and Food Price Inflation

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Summary

The heightened commodity price volatility of 2008 and the subsequent acceleration in U.S. food price inflation raised concerns and generated many questions about farm and food price movements by Members of Congress and their constituents. This report responds to those concerns by addressing the nature and measurement of retail food price inflation. For a discussion of the relationship between farm and retail prices, and the major factors influencing retail food prices, see CRS Report R40621, *Farm-to-Food Price Dynamics*.

During the 1991 to 2006 period, U.S. food prices were fairly stable—annual food price inflation, as measured by the U.S. Bureau of Labor Statistics (BLS) Consumer Price Index (CPI) for all food (excluding alcoholic beverages), averaged a relatively low 2.5%. However, several economic factors emerged in late 2005 that began to gradually push market prices higher for both raw agricultural commodities and energy costs, and ultimately retail food prices. U.S. food price inflation increased at a rate of 4% in 2007 and at 5.5% in 2008—the highest since 1990 and well above the general inflation rate of 3.8%.

By late 2008 the inflationary price trends had reversed. Prices for many raw agricultural commodities had already started to decline by late spring of 2008; however, owing to lags in the adjustment process, it was not until November 2008 that monthly food price inflation fell to near 0%, and it actually declined from February through May 2009. USDA projects that annual food price inflation will ease into a range of 2%-3% in 2009 (and to a slightly higher range of 3% to 4% in 2010) as lower commodity and energy costs combine with weak domestic and global economies to reduce demand-driven inflation from 2008 levels.

The all-food CPI has two components—food-at-home and food-away-from-home. The food-at-home CPI is most representative of retail food prices and is significantly more volatile than the food-away-from-home index. The food-at-home CPI is projected in a range of 1% to 2% for 2009, compared with a 3.5% to 4.5% annual inflation rate for food-away-from-home prices. This difference is partially explained by the larger share of farm products in the final price of retail foods than in food-away-from-home. Farm product prices are, in general, substantially more volatile than the other marketing and processing costs that enter into retail or ready-to-eat foods.

Many wages and salaries, as well as federal programs (including several domestic food assistance programs), are linked to price inflation through escalation clauses in order to retain their purchasing power. For households where income and federal benefits do not keep up with price inflation, declines in purchasing power are real and immediate. However, even for households with escalation clauses, a time lag usually occurs between the time the price inflation is measured and the time when the wage or program benefit is adjusted upward to compensate.

The 2008-2009 global economic crisis—which encompassed higher retail prices, unemployment, income loss, and lower effective household purchasing power—has manifested itself in higher participation rates in the federal Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program. As of August 2009, participation in the SNAP was at an all-time high of 36.5 million persons (or one in every 10 Americans). Other domestic food assistance programs also have seen increased participation and costs. In response to advocates' calls for increased federal assistance, Congress approved (in February 2009) additional support for domestic food assistance programs totaling \$20.8 billion over 10 years via the stimulus package (the American Recovery and Reinvestment Act of 2009; P.L. 111-5).

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Introduction

Everyone eats. As a result, everyone is affected to some degree by food price changes. This makes understanding food price changes and their effects on consumers an important matter for Congress. This report provides information on the current status of U.S. food prices, measuring their changes, and how such changes relate to U.S. consumers.

The first section of the report, “Consumer Demand,” briefly reviews the major economic concepts underlying consumer food behavior. The second section, the “Consumer Price Index” describes how U.S. food price inflation rates have evolved since 1915, when federal price data collection for inflation measuring purposes began. The third section, “Consumer Income and Expenditures,” provides information on recent history and projections for U.S. food expenditure shares relative to total household budget, with comparisons across income quintiles, as well as internationally. The fourth section, “Recent Food Price Inflation,” examines retail food price inflation, including a review and discussion of the level of food price inflation registered by the consumer price index for all-food, at-home, and away-from-home food purchases as well as for major food groups. A fifth section, entitled “Effect of High Prices,” discusses the impact that rapid food price inflation can have on government food programs and the more vulnerable consumer groups. Finally, an appendix section, “Major Statistical Indicators of Consumer Expenditures and Food Price Changes,” describes the nature of the statistical indicators used to measure consumer food prices and expenditures.

Each section may be read independently of the others. Thus, those readers that are concerned primarily with the status of U.S. food price inflation may proceed directly to the sections entitled “Historic Price Inflation Patterns” or “Recent Food Price Inflation.”

Consumer Demand

Consumer demand is influenced by economic factors—own-price, the price of close substitutes, the price of complementary items, and household income—as well as by several non-economic factors including tastes and preferences, family size, age of family members, geographic location, shopping behavior, and lifestyle choices. Economists attempt to study and measure the nature of consumer behavior in response to changes in prices, incomes, and household characteristics, with an eye for understanding the potential social welfare outcomes that may result from price and income changes across different socioeconomic groups. Policymakers, in turn, often attempt to use that information to design and implement policies that mitigate the more deleterious effects of price and income changes on consumers.

Price Responsiveness

In general, consumers will use less of any good if its price increases relative to other goods (referred to as the pure “substitution effect” by economists). However, a consumer’s price responsiveness is a matter of degree and is subject to the potential influence of disposable income as well as other non-price factors such as those listed in the preceding paragraph.

Under most circumstances, the availability of many close substitutes is likely to make consumers more sensitive or responsive to price changes, because they have the opportunity to switch to

similar alternatives. In contrast, a lack of substitutes may give the consumer little choice but to continue to purchase the available good, even as its price rises, especially if it is deemed a necessity. Strong ethnic or cultural tastes and preferences may endear a person to a particular food type such that he or she will continue to purchase that food as its price rises even in the presence of abundant substitutes (for example, ethnic groups that are accustomed to eating rice at every meal may be reluctant to switch to bread or potatoes even if the price of rice rises relative to those other foods).

Rapid or unexpected changes in retail food prices will impact some consumers more than others depending on income levels and the importance of the affected food items in consumers' budgets. In general, if an item represents a very small portion of the consumer's budget (for example, consider salt), then a consumer is less likely to respond to a price change. Basic food staples such as bread, potatoes, pasta, and rice tend to take smaller shares of the consumer's food budget (relative to meat, dairy products, fruits and vegetables, and more processed food products) and, as a result, consumers are less responsive to a change in their price. In contrast, high-valued food items such as expensive cuts of meat or seafood probably represent more costly (and infrequently purchased) delicacies for most households. As a result, most households will tend to be far more responsive to changes in the prices of such high-valued products than for basic staples. Often a price change for an item within a specific food group¹ may result in consumers switching to lower-quality items within that food category—the classic example being a switch from steak to hamburger when meat prices rise. In contrast, a widespread price rise across all food groups may engender substantial reshuffling of consumer food budget allocations as households try to meet their nutritional goals with their limited budgets.

Of course, the absolute size of a consumer's disposable income is also important in determining actual purchasing power. For households with smaller incomes, the food budget itself is likely a larger portion of total household expenditures, and such households are likely to be more responsive to price changes across all food categories than are higher-income households.

In summary, lower-income consumers who spend a significant share of their household budget on food are likely to be impacted more severely by rising food prices (and are likely to be more responsive to price changes) than high-income consumers with lower food budget shares.

Income Responsiveness

A household's absolute level of disposable income (and, to a lesser degree, wealth) directly affects its ability to respond to price changes. As a result, as household incomes grow, consumers often opt for more expensive or higher-quality selections of foods than are presently in their food budget, or may experiment by trying new or unfamiliar foods. For example, as incomes increase in less-developed countries, it is common to see per-capita expenditures on meat and dairy products increase. In contrast, when incomes decline, consumers tend to pull back from more expensive options. If the income decline is severe and is perceived as permanent or long-lasting, consumers may make substantial changes to their food budget choices.

In the aggregate, household consumption behavior in response to perceived income changes (if persistent and widespread) may affect a country's agricultural production or trade patterns. As a

¹ Examples of food groups include meat, dairy products, bakery goods, fruits, or vegetables.

result, it is important for policymakers to monitor household wealth and income levels and distribution for unexpected shifts that may have important economic consequences.

Economists call the relationship between changes in consumer income and the quantity of an item purchased an *Engel curve*. This relationship is used by economists to classify goods.

- For a **normal good**, consumers buy more of it as their incomes increase, but at a decreasing rate such that its average budget share declines for higher income levels.
- For a **luxury good**, consumers buy more of it as their incomes increase and at an increasing rate such that its budget share increases at higher income levels.
- For an **inferior good**, consumers buy less of it as their incomes increase.

Of course, different goods will be classified differently by different people since tastes and preferences also are important. However, with respect to the overall food budget, in the aggregate certain behavioral norms are expected. *Engel's law* is the idea (largely validated by data with some minor exceptions) that food, in general, is a normal good, so that the budget share spent on food declines as a consumer's income rises. While Engel's law is generally observable for individual households, it tends to hold best in the aggregate—that is, when considering an entire population. To the extent that this “law” holds, then the proportion of a nation's income spent on food serves as a good index for international comparisons of relative consumer welfare.

Tastes and Preferences

Non-economic factors such as cultural or ethnic preferences may determine both the share of a particular food product in the household's budget (e.g., rice represents a larger share of per-capita expenditure in most Asian households than in most European households at similar income levels) as well as a household's responsiveness to a change in the price of a particular product.

Dietary needs also change with age. For example, young children and adolescents generally need both more calories and a higher portion of protein-based calories to meet nutritional demands of rapid physical growth and high activity levels. Populations or households with a large share of individuals from this demographic stratum are more likely to consume larger per-capita portions of meat and dairy products than an older, more mature and sedentary population would. As a result, population demographics such as household composition, size, and age structure often play an important role in consumer price sensitivity and income responsiveness. In increasingly affluent societies, lifestyle choices, when complemented with sufficient purchasing power, can also play an influential role in household food purchases.

Summary

For households with low disposable income levels where food expenditures are a large share of the budget, rising food prices result in greater responsiveness and may force more difficult budgetary tradeoffs than in higher-income households with smaller food-budget shares. Of course the opposite effect is true during periods of falling prices. However, each household's price and income effects also are influenced by its particular set of non-economic characteristics.

The Consumer Price Index (CPI)

The CPI is perhaps the most widely reported measure of U.S. price inflation.² The CPI is used both as an economic indicator of retail price inflation and as a means of adjusting current-period values for inflation. The “All-Items” CPI is the index most often referred to (i.e., the headline CPI) for representing consumer price inflation. It is generally divided into eight major spending categories, including a “Food and Beverage” category (**Figure 18**).

The CPI category of “Food and Beverages” is composed of two major subcategories: “All-Food” (which has a relative weight of 14.6% in the all-items CPI), and “Alcoholic Beverages” (1.1%). The all-food CPI is the principal indicator of consumer food price changes. The all-food CPI can be subdivided into the “Food-at-Home” and “Food-Away-from-Home” categories. The **food-at-home CPI** reflects changes in the prices of foods consumed at home. As such it is the principal indicator of changes in retail food prices in the United States. The **food-away-from-home CPI** reflects changes in the prices of foods purchased outside of the home, primarily at eating and drinking places such as restaurants and other eating establishments. However, it also includes price changes for ready-to-eat foods purchased at hotels and motels, recreational places and sporting events, vending machines, and school and work cafeterias.

Historic Price Inflation Patterns

Over time, the all-food and all-items CPIs have moved together, although the all-food CPI has been consistently more variable than the all-items CPI (**Figure 1** and **Table 1**). Prior to 1960, both of these indexes exhibited higher average inflation rates and more volatility than in recent years. During the 1914-1920 period, both price indexes recorded double-digit annual inflation. Food inflation hit its all-time high of 28.7% in 1917 (**Figure 1**). All-items price inflation peaked a year later at 18%. Just four years later retail prices entered a prolonged deflationary period, starting in 1921 with a deflationary plunge of -24.2% for all-food and -10.5% for all-items, that lasted until 1941 when war time shortages finally renewed retail price inflation.

The variability of the overall CPI and its individual components is important because uncertainty about price changes makes planning more difficult—whether it is the investment planning of a business, the meal planning of a household, or the policy intervention planning of a government agency.

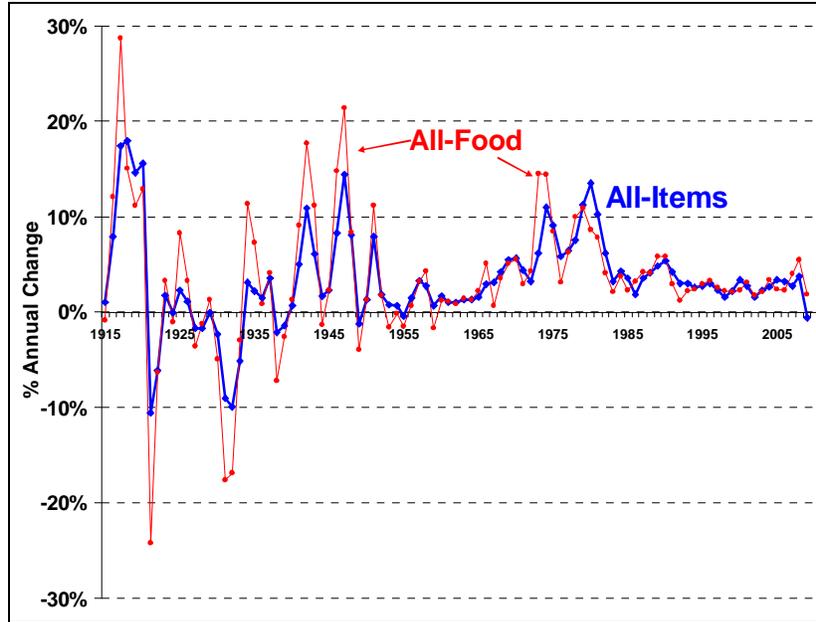
During the 1941-1960 period, price inflation remained extremely volatile, alternating between spikes of inflation and steep disinflationary (i.e., deflationary) drops. It was not until 1960 that retail prices stabilized with tolerably mild inflation. However, this proved short-lived as the 1970s saw a return to sharp price spikes generated by an energy crisis and rapid, unexpected shifts in global crop supply and demand.³ By the early 1980s, retail price inflation had returned to modest levels below 5%. Since 1983 retail prices, as measured by the all-items and the all-food CPIs,

² For more information on statistical issues related to the measurement of price inflation, see the Appendix at the end of this report. See also CRS Report RL30074, *The Consumer Price Index: A Brief Overview*, by Brian W. Cashell.

³ For a brief discussion of 1970s energy markets, see CRS Report R40187, *U.S. Energy: Overview and Selected Facts and Numbers*, by Carl E. Behrens and Carol Glover. For a brief discussion of 1970s agricultural markets, see May Peters, Suchada Langley, and Paul Westcott, “Agricultural Commodity Price Spikes in the 1970s and 1990s,” *Amber Waves*, ERS, USDA, March 2009, at <http://www.ers.usda.gov/>.

have been relatively low and relatively stable, except for temporary surges in 1989-1990 and again in 2007-2008.

Figure 1. Annual Price Inflation, 1915-2008: All-Items vs. All-Food



Source: Department of Labor, Bureau of Labor Statistics.

Notes: The percent change is calculated from the annual average CPI for successive years.

Table 1. Retail Price Change, Mean and Variability, by Historic Time Period
(all data—mean and standard deviation (SD)—are percentages)

CPI Series	1914-1920		1921-1941		1941-1960		1960-1983		1983-2008	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All-Items	10.8	7.4	-1.4	4.5	3.9	4.1	5.3	3.6	3.1	0.9
Energy	—	—	—	—	—	—	6.9	9.1	3.6	7.1
All-Food	11.6	9.6	-1.8	9.0	4.9	7.2	5.2	4.1	3.1	1.2
At-Home	—	—	—	—	—	—	5.0	4.5	3.1	1.6
Away-from-Home	—	—	—	—	—	—	6.0	3.1	3.2	0.9
Core^a	—	—	—	—	—	—	5.1	3.3	3.2	1.1

Source: Calculations were made by CRS based on BLS CPI data.

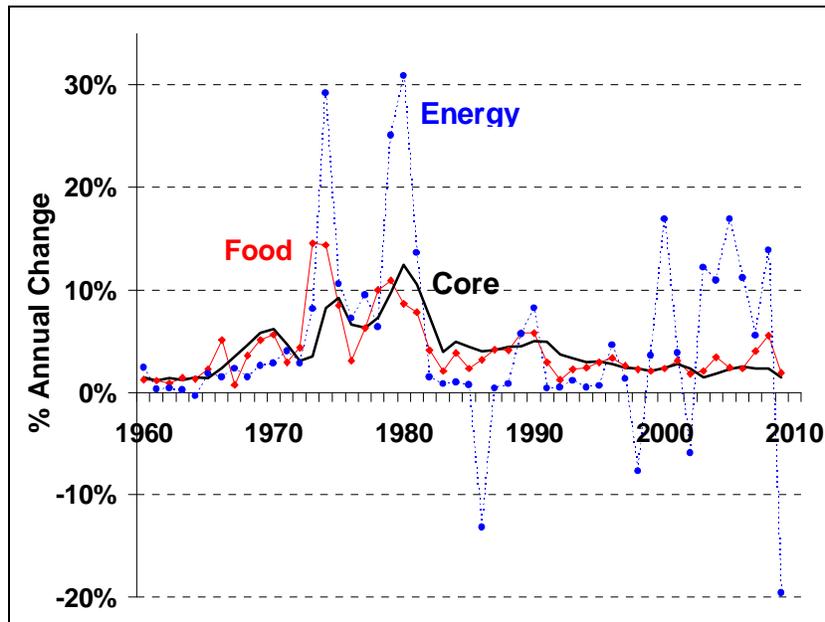
Notes: “—” = not available. The mean is the average annual price change for each period. The standard deviation (SD) is a measure of dispersion around the mean value for each period. Plus or minus one (two) SD captures 68.2% (95.4%) of the variation around the mean value for each period. The mean and SD have been calculated using the annual percent change data for each of the five different periods. A larger SD implies greater variability, for example, all-food price inflation has shown a clear pattern of declining variability as the SD has fallen from 9.6% during the 1914-20 period to 4.1% during 1960-83 (more than halving the variability), and finally to 1.2% during 1983-2008 (a further decline of over 70% in variability).

a. The “Core” price index is the all-items CPI without the energy and all-food components.

Overall Inflation versus Core Inflation

Many economists and policymakers believe that the food and energy components of the CPI are volatile and subject to shocks not easily dealt with through government monetary policy. In response, the BLS also reports another price index, referred to as the “core” index because it removes the food and energy price components from the all-items CPI.⁴ The so-called core CPI is thought to be a useful measure of underlying trend inflation in the short run. According to BLS data, the food component of the CPI, although more volatile than the overall CPI, is still substantially less volatile than the energy component (**Figure 2** and **Table 1**).

Figure 2. Annual Price Inflation Since 1960: All-Items, All-Food, and Energy



Source: Department of Labor, Bureau of Labor Statistics.

Since 1960, the energy price index has been a more volatile component of the all-items CPI than the food price index by a substantial margin. For example, the energy price inflation standard deviation (SD) of 9.1% was more than double the all-food SD of 4.1% during the 1960-1983 period, and nearly six times larger since 1983 (7.1% versus 1.2%).

Since 1983 both the all-food and the all-items CPIs have been lower (in terms of average values) and substantially more stable (in terms of SDs) than during the preceding seven decades. In contrast, the energy price index has been substantially more volatile since 1983 (although at a lower mean level) than it was during the preceding two decades. This is an important point because the energy price index has seen its weighted share of the CPI gradually increase over time and, although energy’s current weight share of 7.6% is only about half that of the food weight share of 14.6%, energy price inflation is far more insidious than food inflation to the extent that energy costs figure in the retail price of practically every other component of the CPI.

⁴ For more information, see CRS Report RS22705, *Inflation: Core vs. Headline*, by Marc Labonte.

Consumer Income and Expenditures

A household allocates its available income across a range of expenditure, savings, and investment choices. As mentioned earlier, food expenditures as a share of a household's total budget are an indicator of sensitivity (or vulnerability) to unexpected food price changes. At the national level, food budget share (via Engel's law) can be used as a general indicator of welfare among nations.

Food as a Share of Consumer's Budget

According to Bureau of Economic Analysis (BEA) estimates, in 2007 total U.S. disposable personal income (DPI) was \$10,171 billion, or \$33,707 per capita.⁵ Of these estimates, ERS calculates that, on average, 9.8% of disposable personal income was spent on food.⁶

Figure 3 shows the evolution of the average food budget share against U.S. DPI per capita in constant 1982-1984 average dollars. By both measures (food budget share and real DPI per capita), U.S. consumers have seen their "well-being" improve substantially over the past 70 years. (Note that these are national averages that ignore any potential distribution issues.) The U.S. food share of real DPI has fallen from a high of 31.4% in 1933 to about 10% since 2000, while the average DPI per capita (in 1982-1984 dollars) has risen from \$2,824 in 1933 to over \$16,000 by 2006.

When measured as a share of average total consumer expenditures of \$49,638 per household (based on Consumer Expenditure Survey (CES) data, **Table 2**), average food outlays of \$6,133 per household accounted for 12.4% of total spending in 2007.⁷ As mentioned earlier, the difference between the two estimates of food budget share (9.8% based on DPI versus 12.4% based on CES total expenditures) is due to how disposable income and food expenditures are calculated for each of these indicators (discussed more fully in the appendix).

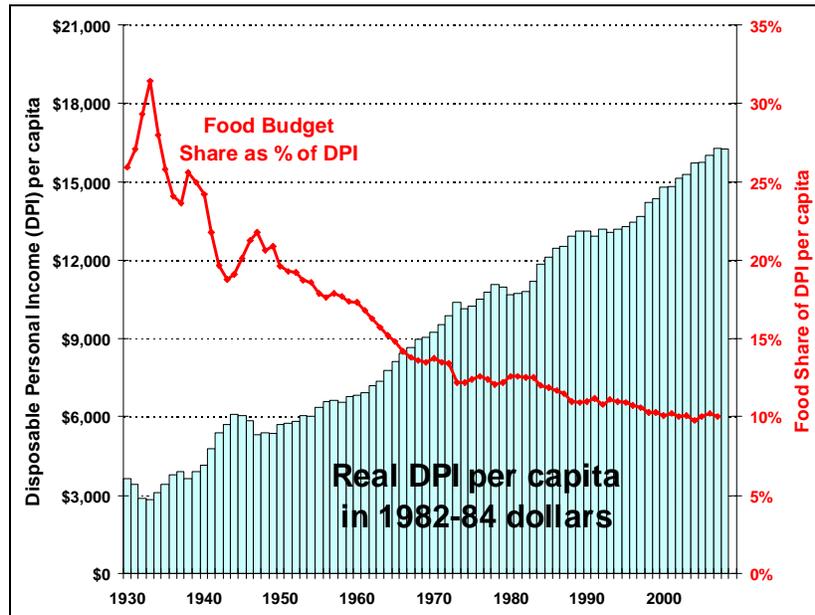
The estimated food share of household expenditures (**Table 2**) varied across income quintiles in the United States, in accordance with Engel's law—that is, each succeeding higher income quintile increased its absolute expenditures on food (in dollar terms), but at a decreasing rate such that the food budget share declines across higher quintiles. For example, the lowest 20% of U.S. households spent \$3,035 on food, or 14.8% of their average total expenditures of \$20,471 in 2007. The budget food outlay increases in absolute dollars, while the food budget share declines across income quintiles until the wealthiest quintile, where households spent an average of \$10,444 on food, or 10.8% of their total budget of \$96,752.

⁵ "Personal Income and Outlays: January 2009," News Release BEA 09-06, March 2, 2009. The estimates for 2008 total and per-capita DPI were \$10,645.8 billion and \$34,958, respectively. However, comparable food expenditure data for 2008 were not yet available as of March 2009.

⁶ The DPI and DPI-food-share estimates are for 2007 from Table 7, Food Expenditure Tables, *Food CPI, Prices and Expenditures* Briefing Room, ERS, USDA, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/>.

⁷ CES data are calculated "per consumer unit" which is described as "similar to a household" by BLS.

Figure 3. Comparison of Real U.S. Disposable Personal Income (DPI) Per Capita and the Share of DPI Spent on Food, 1930-2007



Source: “Food CPI, Prices and Expenditures Briefing Room,” Food Expenditure Tables, ERS, USDA.

Notes: Real DPI is BEA nominal DPI series deflated by the all-items CPI with base 1982-1984 = 100; real food expenditures are the ERS series of food expenditures deflated by the all-food CPI with base 1982-1984 = 100.

Table 2. Average Household Food Expenditures in 2007 by Income Quintiles

Income Quintile	Total	All Food	Food-at-Home	Food-Away-from-Home
Expenditures per household				
Highest 20%	\$96,752	\$10,444	\$5,265	\$5,179
Fourth 20%	\$57,285	\$7,242	\$3,980	\$3,262
Third 20%	\$42,447	\$5,682	\$3,333	\$2,349
Second 20%	\$31,150	\$4,260	\$2,741	\$1,519
Lowest 20%	\$20,471	\$3,035	\$2,005	\$1,030
Average Outlay (\$)	\$49,638	\$6,133	\$3,465	\$2,668
Share of Expenditures: Total and (All Food)				
Highest 20%	100%	10.8% (100%)	5.4% (50.4%)	5.4% (49.6%)
Fourth 20%	100%	12.6% (100%)	6.9% (55.0%)	5.7% (45.0%)
Third 20%	100%	13.4% (100%)	7.9% (58.7%)	5.5% (41.3%)
Second 20%	100%	13.7% (100%)	8.8% (64.3%)	4.9% (35.7%)
Lowest 20%	100%	14.8% (100%)	9.8% (66.1%)	5.0% (33.9%)
Average Outlay (%)	100%	12.4% (100%)	7.0% (56.5%)	5.4% (43.5%)

Source: Table I. Quintiles of before-tax income: Average annual expenditures and characteristics, Consumer Expenditure Survey, 2007, BLS, Dept. of Labor, at <http://www.bls.gov/cex/2007/Standard/quintile.pdf>.

Another clear pattern that emerges from the CES data (**Table 2**) is the propensity to spend more of the food budget on away-from-home food consumption at higher income levels, both in absolute dollars and as a share of the food budget (refer to the percentages in parentheses in **Table 2**), thereby meeting the description of a luxury good. Or, otherwise stated, lower-income U.S. households tend to spend a larger share of their food budget on at-home consumption and are thus more vulnerable to unexpected retail food price increases (this is discussed further in the next section).

At-Home versus Away-from-Home Consumption

U.S. households have shown a strong propensity over time to increase their share of annual food consumption outside of the home (**Figure 4**). This tendency is associated with increasing per-capita disposable income as mentioned above. It is also associated with increasing female participation in the labor force, more two-earner households, increased advertising and promotion by large food-service chains, increasing time constraints on household members (e.g., longer commutes, increased work hours and less leisure time, etc.), the smaller size of U.S. households, and the increased availability of relatively low-cost fast food establishments.⁸

With the exception of a brief period following the end of World War II, the portion of the national food budget spent on food consumption away from the home has steadily increased from 9% in 1900 to an estimated 49% in 2008. This phenomenon has important implications for consumer responsiveness to price and income changes, as well as for household nutrition.

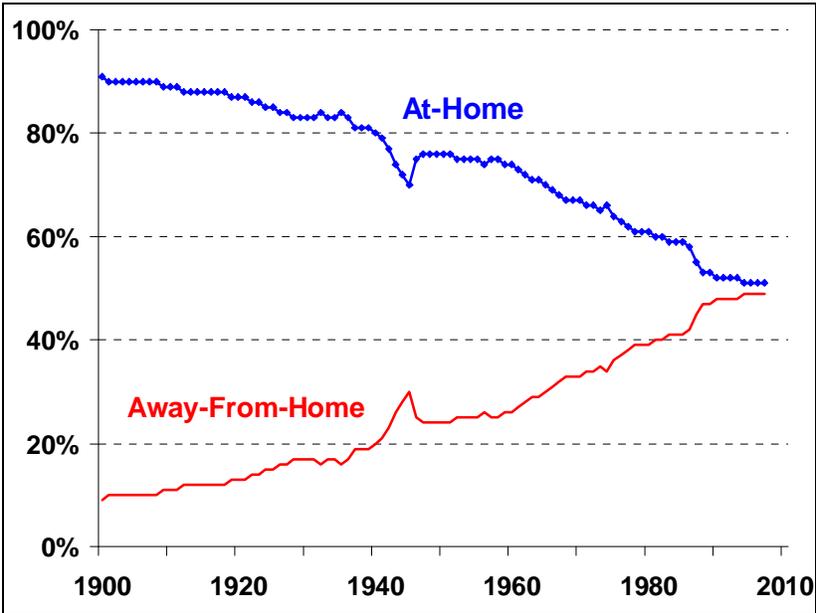
The prices of food-at-home purchases are significantly more volatile than are prices of food-away-from-home purchases (**Table 1** and **Figure 5**). ERS research suggests that away-from-home expenditures are typically higher for single-person households and households containing multiple adults without living-at-home children.⁹ By implication, households with living-at-home children typically rely more on at-home food consumption (as a share of their budget) and are thus more vulnerable to the normally higher price variability associated with retail food prices.

Although increased food-away-from-home expenditure is associated with higher income (both in absolute terms and as a share of the household food budget), it is not always a luxury item. A partial key to understanding how increasing food-away-from-home consumption may impact consumer behavior is the extent to which such consumption is a choice (for example, made in the evenings or on weekends during leisure hours) or more of an obligation (made during work hours), as well as the extent to which a consumer has alternative dining choices when eating out (for example, subsidized cafeteria meals are often available at schools or in large institutional work settings).

⁸ For a discussion of this issue, see “Food Away From Home,” *Diet Quality and Food Consumption* Briefing Room, ERS, USDA, at <http://www.ers.usda.gov/Briefing/DietQuality/>.

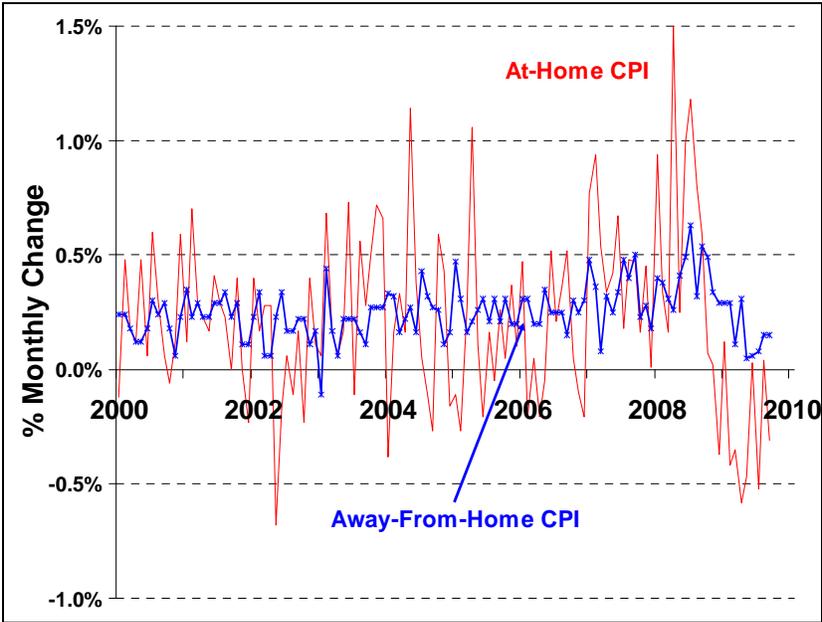
⁹ Hayden Stewart, Noel Blisard, Sanjib Bhuyan, and Rodolfo M. Nayga, Jr., *The Demand for Food Away From Home: Full-Service or Fast Food?* AER No. 829, ERS, January 2004.

Figure 4. Average U.S. Food Expenditure Shares: At-Home vs. Away-from-Home



Source: Table 7, "Food CPI, Prices and Expenditures Briefing Room," Food Expenditure Tables, ERS, USDA, available at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/>.

Figure 5. Monthly Food Price Inflation Since 2000: At-Home vs. Away-from-Home



Source: BLS, U.S. Dept. of Labor.

Notes: Month-to-month inflation measured as the percent change in the monthly seasonally adjusted CPI for each index.

International Comparisons

The Economic Research Service (ERS) includes in its food expenditure data series a comparison of food budget shares (based on at-home food expenditures) for over 70 countries. **Table 3** includes samples of countries from the ERS database ranked in terms of their at-home food expenditure budget shares, from smallest to largest. These data suggest that, on average, the United States has achieved a higher level of social welfare (based on this particular indicator) than any of the other countries in the database.

Table 3. International Comparison of Food-at-Home Budget Shares, Selected Countries, 2007

Country	Total Expenditures per capita	At-Home Food Expenditures per capita	At-Home Food Share
United States	\$33,947	\$1,935	5.7%
United Kingdom	\$27,272	\$2,351	8.6%
Canada	\$23,993	\$2,203	9.2%
Germany	\$21,832	\$2,497	11.4%
France	\$23,184	\$3,176	13.7%
Italy	\$21,315	\$3,091	14.5%
Japan	\$18,737	\$2,742	14.6%
South Korea	\$10,287	\$1,589	15.4%
Poland	\$6,675	\$1,375	20.6%
Mexico	\$5,579	\$1,348	24.2%
Brazil	\$4,183	\$1,028	24.6%
Russia	\$4,363	\$1,251	28.7%
India	\$536	\$174	32.4%
China	\$882	\$308	34.9%
Philippines	\$1,136	\$424	37.3%
Egypt	\$1,279	\$496	38.8%
Nigeria	\$677	\$273	40.3%
Algeria	\$1,119	\$491	43.9%
Indonesia	\$1,138	\$520	45.7%
Pakistan	\$634	\$290	45.7%

Source: Table 97, "Food CPI, Prices and Expenditures Briefing Room," Food Expenditure Tables, ERS, USDA, available at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/>.

The food budget share is only one indicator of national welfare, and it ignores any unfavorable distribution of the food expenditure share (should any exist). Referring back to **Table 2** for the at-home food budget share for U.S. income and total expenditure quintiles based on CES data, it would appear that even the lowest 20% of U.S. households, on average, spend less than 10% of their budgets on at-home food consumption and thus appear relatively well-off in food terms based on this particular international standard. Readers should note that this cursory assessment is aggregate in nature and does not exclude the possibility that there are food-deficient individuals

within the lowest 20% quintile of the U.S. population. According to ERS, in 2007, an estimated 11.1% of U.S. households were food-insecure at least some time during the course of the year.¹⁰

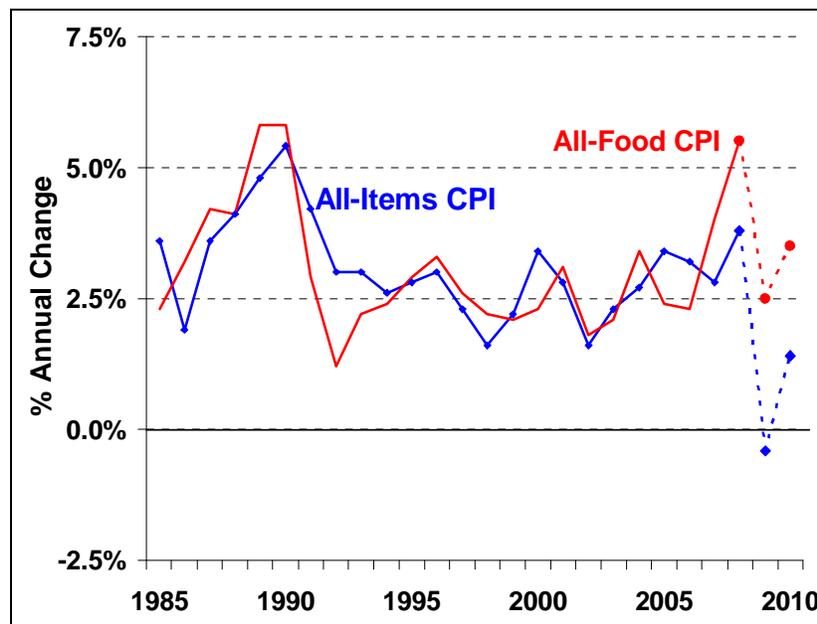
Recent Food Price Inflation

This section provides a discussion of observed food price inflation in recent years based on CPI data. It is important to remember that the various CPI categories discussed here are indicative of price changes at the retail level in U.S. urban settings. As such, they are indicative of the prices faced by most consumers living in the United States (approximately 87% of U.S. consumers are covered by the CPI data collection process).

Annual All-Food versus All-Items Price Inflation

As a general rule, the all-item and all-food CPIs tend to move together. Following a relatively tumultuous period of price inflation in the late 1980s, both price indexes entered an extended period of relative stability. From 1991 through 2006, the all-food CPI measured average annual inflation of 2.5%, compared with 2.7% annual average all-items price inflation.

Figure 6. Annual Price Inflation: All-Items vs. All-Food, 1985-2010F



Source: Historical data, unadjusted for seasonality, For 1985-2008, data are from the Dept. of Labor, BLS. Data for 2009 and 2010: all-food CPI is from USDA, ERS, as of Oct. 23, 2009; all-items CPI is from Global Insights, U.S. Economic Outlook, October 2009.

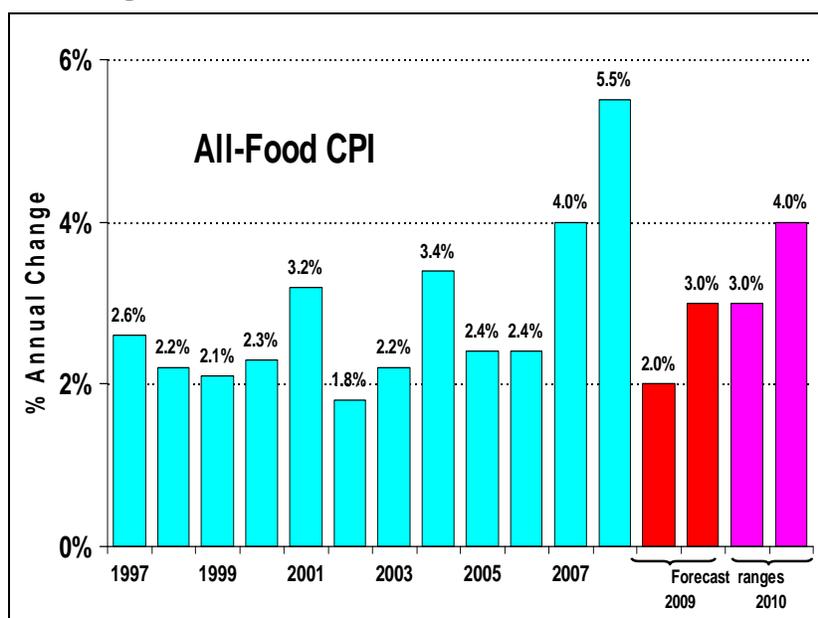
Notes: The percent change is calculated from the annual average CPI for successive years.

¹⁰ For a discussion of food insecurity in the United States, see *Food Security in the United States* Briefing Room, ERS, USDA, at <http://www.ers.usda.gov/Briefing/FoodSecurity/>.

However, several economic factors emerged in late 2005 that began to gradually push market prices higher for both raw agricultural commodities and energy costs.¹¹ These factors included rising consumer incomes, not just in the United States but globally, which sparked demand for meat and dairy products, food and feed grains, and raw materials ranging from minerals and metals to coal and petroleum. In 2007, U.S. food price inflation reached 4% (**Figure 7**), the highest since 1990.

In early 2008, monthly food price inflation appeared to be accelerating (**Figure 8**). In July 2008, the month-to-month food price change was 0.96% (equivalent to an annual rate of 12.1% if sustained for the entire year). Monthly retail food price inflation responds with a lag of several months to price changes in raw commodity markets. For the entire year, 2008 food prices rose by 5.5%, well above the all-items CPI of 3.8% (**Figure 6**). However, by late 2008 retail price trends had reversed and began following prices for raw agricultural commodities, which had already started to decline by late spring of 2008. By November 2008 monthly retail food price inflation had fallen to near 0%, then actually declined during February through May 2009.

Figure 7. Annual Food Price Inflation Since 1997



Source: Historical data (1985-2008) are from the Dept. of Labor, BLS. Forecast for the 2009 all-food CPI is from USDA, ERS, October 23, 2009.

The 2009 – 2010 Forecast for Annual Food Price Inflation

In 2009, both price indexes, the all-food and the all-items, are forecast sharply lower (**Figure 6**); however, the all-items CPI is expected to be subject to much stronger deflationary pressures than the all-food CPI. As a result, the disparity between the two indexes is forecast to widen as the all-items CPI falls at an annual rate of -0.4%,¹² while U.S. food price inflation in 2009 is projected

¹¹ For more information on the factors behind the sharp run-up in global commodity prices in the first half of 2008, see CRS Report RL34474, *High Agricultural Commodity Prices: What Are the Issues?* by Randy Schnepf.

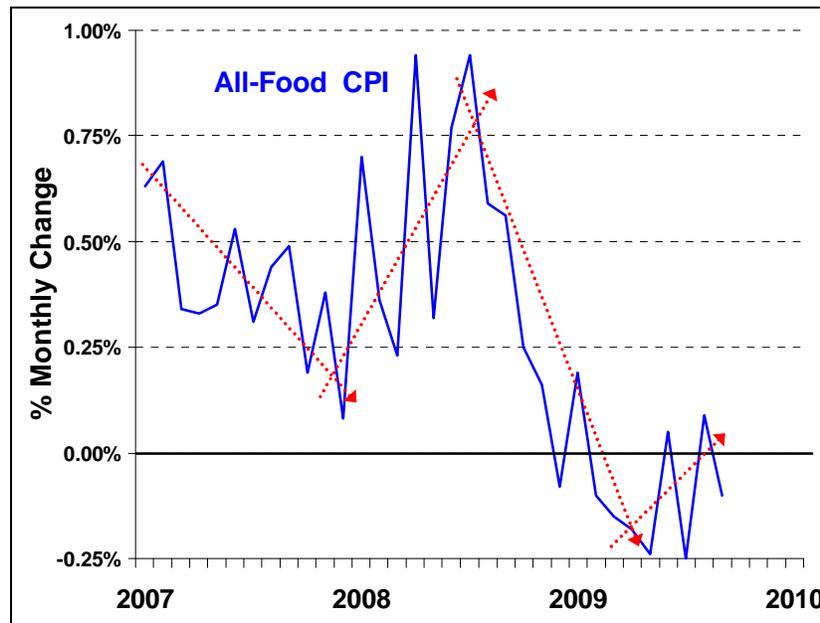
¹² The all-items CPI forecast is from *U.S. Executive Summary*, Global Insights, October 2009.

by ERS to be in the 2% to 3% range (**Figure 7**).¹³ Sharply lower commodity and energy costs are expected to combine with weak domestic and global economies to reduce inflationary pressures from 2008 levels for both of these price indexes. As a result, pressure on retail food prices is expected to subside, resulting in low to moderate food price inflation in 2009. However, by 2010 both the U.S. and global economies are expected to resume growing and, as a result, are forecast to reverse the deflationary price pattern (**Figure 6**).

The Recent Monthly All-Food Price Inflation Pattern

When the all-food CPI is adjusted for seasonal variations and expressed on a monthly basis, four strong patterns can be seen to have emerged since January 2007 (**Figure 8**). First, a mildly volatile, downward pattern of monthly price change persisted throughout 2007. This was followed by a highly volatile, upward pattern of price inflation during the first nine months of 2008, at which point monthly price changes declined sharply into December, when they actually fell below the preceding month's level (i.e., the monthly all-food CPI deflated or became negative) for the first time since November 2006. Monthly food price changes continued their deflationary trend hitting bottom in May of 2009. Finally, food prices have shown an upward trend since May 2009.

Figure 8. Monthly Retail Food Price Inflation Trended Down in 2007, Spiked Sharply Higher in Early 2008, Then Plummeted into 2009



Source: Data, adjusted for seasonality, are from the Department of Labor, BLS.

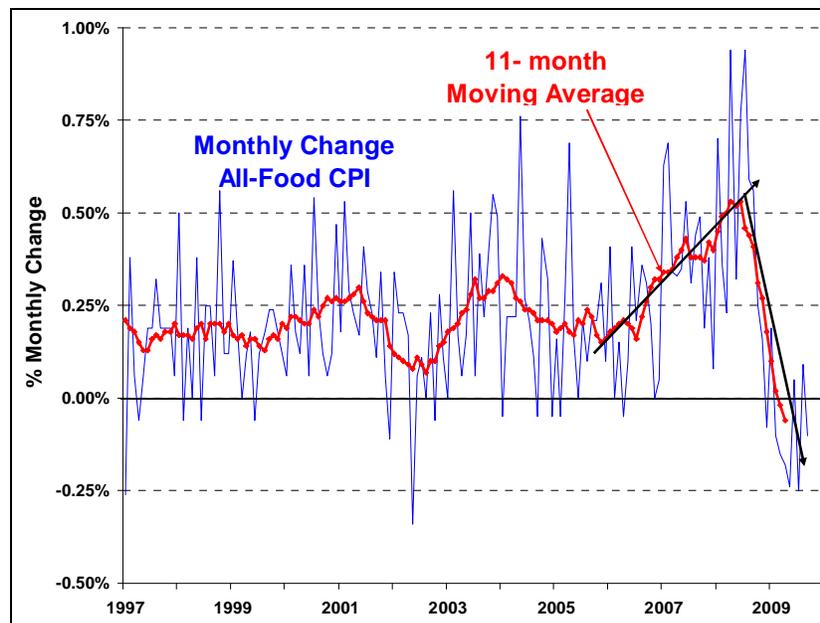
Notes: The percent change is calculated from the CPI for successive months. Multiply any given month's value by 12 to approximate the annual inflation rate experienced during that particular month, without compounding.

¹³ ERS updates its food price forecast monthly. For the most current ERS food price forecast with related data tables and a discussion of the issues, see "Analysis and Forecasts of the CPI for Food," *Food CPI and Expenditures* Briefing Room, ERS, USDA, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/consumerpriceindex.htm>.

Month-to-month retail food price declines continued into 2009 even though farm prices had stabilized in early 2009. This is because food processors and retailers are traditionally slow to pass on price decreases that they experience at the wholesale level for several reasons, including substantial inherent operating risk associated with volatile markets.¹⁴

The same monthly all-food price inflation measures (also adjusted for seasonality) are presented in **Figure 9**, but for a longer time period and accompanied by their 11-month moving average (MA).¹⁵ The MA series reveals a strong upward inflationary trend that began at the end of 2005 and persisted through June 2008. Since June 2008, the MA has moved strongly downward. Retail food prices are clearly responding to the deflationary pressures associated with the collapse of U.S. and international commodity prices that occurred in mid-2008, as well as to the crisis that emerged in late 2008 in U.S. and global financial markets.

Figure 9. Food Price Inflation Since 1997: Monthly Change vs. 11-Mo. Moving Ave.



Source: Data, adjusted for seasonality, are from the Department of Labor, BLS.

At-Home versus Away-from-Home Food Price Inflation

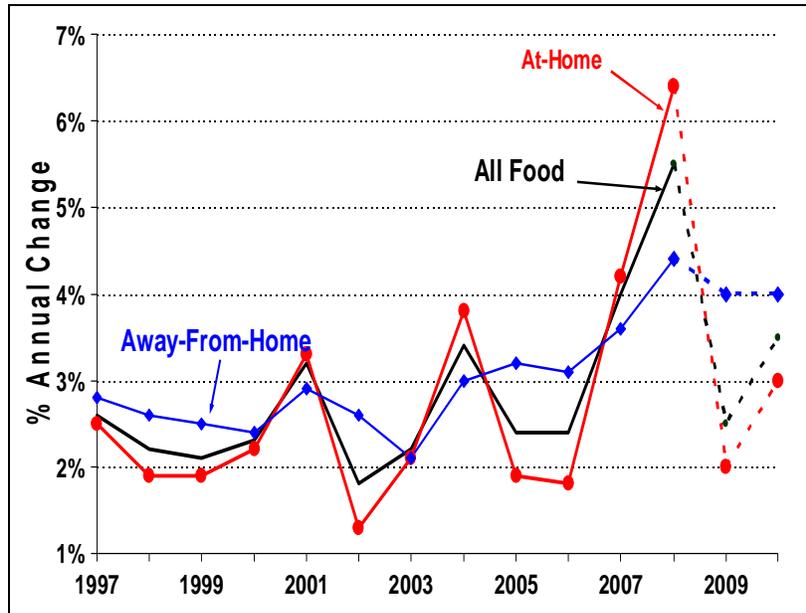
As shown earlier (**Figure 5**), at-home food prices are substantially more volatile than away-from-home food prices (see also **Table 1**, where the at-home food price SD of 1.6% compares with a 0.9% SD for away-from-home food prices since 1983). This volatility is apparent, even when using a shorter time period (**Table 4** and **Figure 10**). It is not surprising, then, that at-home food prices are forecast to make a steeper decline in 2009 and a sharper reversal in 2010, than either all-food or food-away-from-home.

¹⁴ These issues are discussed in more detail in CRS Report R40621, *Farm-to-Food Price Dynamics*, by Randy Schnepf.

¹⁵ Moving averages are used to reveal underlying patterns or trends that can otherwise be hidden by a substantial amount of month-to-month variation in price movements.

When displayed in terms of monthly price changes, the pattern exhibited by at-home food price inflation (**Figure 11**) appears very similar to the pattern for all-food price inflation (**Figure 8**), although the at-home food price movements are more extreme. In contrast, monthly away-from-home price inflation is much more stable. Note that both at-home and away-from-home monthly price inflation show a distinct downturn beginning in July 2008.

Figure 10. Annual Food Price Inflation for All, At-Home, and Away-from-Home CPI
(historical data since 1997, with forecast for 2009 and 2010)



Source: See source info from Table 4.

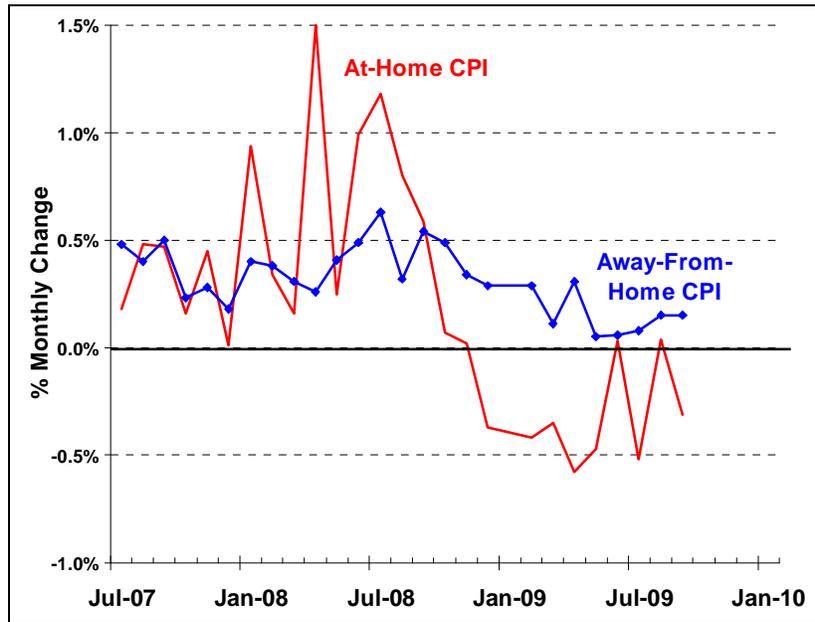
Table 4. Annual Food Price Inflation Since 2005

Category	Weights	Annual % Change					
		2005	2006	2007	2008	2009F	2010F
All-Items	na	3.4	3.2	2.8	3.8	-0.4	1.4
All-Food	100%	2.4	2.4	4.0	5.5	2.0 to 3.0	3.0 to 4.0
Food-at-Home	55.8%	1.9	1.7	4.2	6.4	1.0 to 2.0	2.5 to 3.5
Food-Away-from-Home	44.3%	3.1	3.1	3.6	4.4	3.5 to 4.5	3.5 to 4.5

Source: Historical data (unadjusted for seasonality) for 2005 to 2008 are from BLS, Dept of Labor; 2009 and 2010 forecasts are from ERS, USDA, as of Oct. 23, 2009, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/cpiforecasts.htm>. The all-items CPI forecasts for 2009 and 2010 are from Global Insights, U.S. Economic Outlook, October 2009.

Notes: BLS data are as of February 2009 using 2005-2006 weights for U.S. City Average (CPI-U). Annual percent changes are calculated from annual average indexes.

Figure 11. Monthly Retail Food Price Inflation Since July 2007
(at-home vs. away-from-home)



Source: Historical data (adjusted for seasonality) are from BLS, Dept of Labor.

Notes: The percent change is calculated from the CPI for successive months. Multiply any given month's value by 12 to approximate the annual inflation rate experienced during that particular month, without compounding.

Price Inflation by Major Food Categories

The relatively high food price inflation of 2007 and 2008 was not felt evenly across all food groups, but varied widely in terms of both the timing and the relative magnitude of inflation. In 2008, the inflation rate for at-home food was 6.4% (**Table 5**); however, only the “fruits and vegetables” category experienced a similar level of price inflation (6.2%). Several product categories experienced substantially higher inflation, including egg prices which were up 14% in 2008 after having soared by 29% in 2007; fats and oils were up 13.8%, cereals and bakery products up 10.2%, snacks up 8.1%, and dairy products up 8%. In contrast, the broad price index of meats, poultry, and fish was up only 4.2%, and non-alcoholic beverages (including carbonated and non-carbonated drinks and juices) were up 4.3%.

The demand-side influences of income growth (and decline) and the global financial crisis that emerged in late 2008 have already been discussed briefly. On the supply side, food price inflation is the result of dynamic forces that occur both at the farm where the raw agricultural ingredients for retail food items are produced, and along the marketing chain as the farm output is transformed and moved to the retail customer. An array of costs are layered on top of the price of the raw agricultural commodity, including handling, transportation, storage, and processing, as well as the insurance, financing, and advertising costs necessary to move the product to the retail customer. The relative importance of these marketing costs varies widely for different retail food products depending on the degree of processing and transformation (i.e., cleaning, packaging, shipping, advertising, etc.). As a result, economic forces such as higher energy costs or increased labor rates do not impact all food categories equally.

Table 5. The Food-at-Home CPI by Category Since 2005

Category	Weights ^a		Annual Percent Change					
	%	%	2005	2006	2007	2008	2009F	2010F
Food at Home	100%		1.9	1.7	4.2	6.4	1.5-2.5	2.5-3.5
1-Cereal & Bakery Products	14.1%		1.5	1.8	4.4	10.2	3.0 to 4.0	2.5 to 3.5
Cereals and products ^b		4.5%	0.3	0.3	3.9	10.1	Na	Na
Bakery products ^c		9.4%	2.0	2.6	4.5	10.3	Na	Na
2-Meats; Poultry; & Fish	21.9%		2.4	0.8	3.8	4.2	1.0 to 2.0	1.5 to 2.5
Beef & veal		6.8%	2.6	0.8	4.5	4.5	-1.0 to 0.0	1.0 to 2.0
Pork		4.2%	2.0	-0.3	2.0	2.3	-1.0 to 0.0	0.5 to 1.5
Poultry		4.1%	2.0	-1.8	5.2	5.0	2.0 to 3.0	1.0 to 2.0
Fish & seafood		3.7%	3.0	4.7	4.6	6.0	4.0 to 5.0	4.0 to 5.0
3-Eggs	1.3%		-13.7	4.9	29.2	14.0	-16 to -15	2.0 to 3.0
4-Dairy & Products	11.2%		1.2	-0.6	7.4	8.0	-7 to -6	2.5 to 3.5
Milk		3.8%	1.6	-1.2	11.7	6.0	Na	Na
Cheese		3.6%	1.4	-1.4	5.9	12.1	Na	Na
Ice Cream		1.8%	-0.4	0.9	2.3	5.1	Na	Na
Other		2.0%	1.6	0.6	6.1	7.7	Na	Na
5-Fruits & Vegetables	14.6%		3.7	4.8	3.8	6.2	-1.0 to 0.0	2.5 to 3.5
Fresh fruits		5.6%	3.7	6.0	4.5	4.8	-2.0 to -1.0	3.0 to 4.0
Fresh vegetables		5.6%	4.0	4.6	3.2	5.6	-1.0 to 0.0	2.0 to 3.0
Processed fruits & veg.		3.5%	3.3	2.9	3.6	9.5	6.0 to 7.0	3.0 to 4.0
6-Non-alcoholic Beverages	12.0%		2.9	2.0	4.1	4.3	2.5 to 3.5	2.5 to 3.5
Juices & non-alc. drinks		8.0%	1.9	2.3	4.2	4.4	Na	Na
Coffee, tea, & other		4.1%	5.0	1.6	4.0	4.2	Na	Na
7-Sugar & Sweets	3.7%		1.2	3.8	3.1	5.5	5.0 to 6.0	3.5 to 4.5
8-Fats & Oils	3.0%		0.0	0.2	2.9	13.8	2.5 to 3.5	4.0 to 5.0
8-Other Foods ^d	18.2%		1.5	1.4	1.8	5.2	4.0 to 5.0	2.5 to 3.5
Froz./freeze-dried foods		3.8%	0.5	0.4	1.9	4.3	Na	Na
Snacks		3.8%	2.8	1.5	2.0	8.1	Na	Na

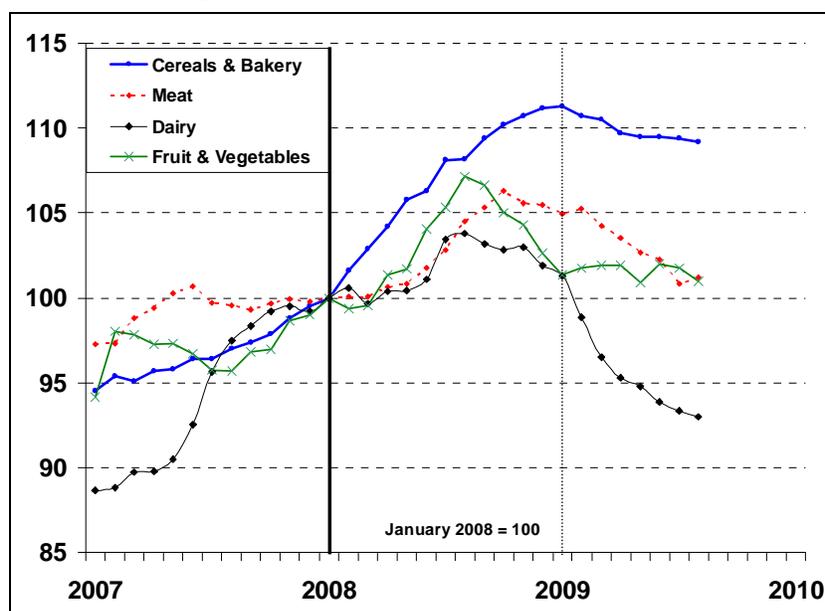
Source: Historical data for 2005 to 2008 are from BLS, Department of Labor, for the U.S. City Average (CPI-U). The 2009 forecasts are from ERS, USDA, as of October 23, 2009.

- a. Weights are "as a percent of total at-home food expenditures."
- b. Flour and prepared flour mixes, breakfast cereals, rice, pasta, and cornmeal.
- c. Bread, fresh biscuits, rolls, muffins, cakes, cupcakes, cookies, and other bakery products.
- d. Includes soups, spices, seasonings, condiments, sauces, baby food, and other miscellaneous foods.

In 2009, at-home food prices are forecast to rise a modest 2% (within a range of 1.5% to 2.5%). However, eggs and dairy products are forecast to fall sharply from their 2008 levels—egg prices are forecast to fall by 15.5% (in a range of -16% to -15%), and dairy products are forecast down by 6.5% (in a range of -7% to -6%).

Annual averages can cloud over substantial inter-year price movements. As a result, it is worthwhile to glance over the monthly price indexes for the past two years to get a better sense of the general pattern of retail food price movements across the various food groups. Monthly price indexes (**Figure 12**) for the four principal food groups—cereals and bakery products; meats (including beef, pork, poultry, and seafood); dairy products (including milk, cheese, ice cream, and other); and fruits and vegetables (including fresh as well as processed)—for the period from January 2007 through August 2009 reveal very different patterns of price movement.¹⁶

Figure 12. Monthly Retail Price Indexes: Various Major Food Groups



Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

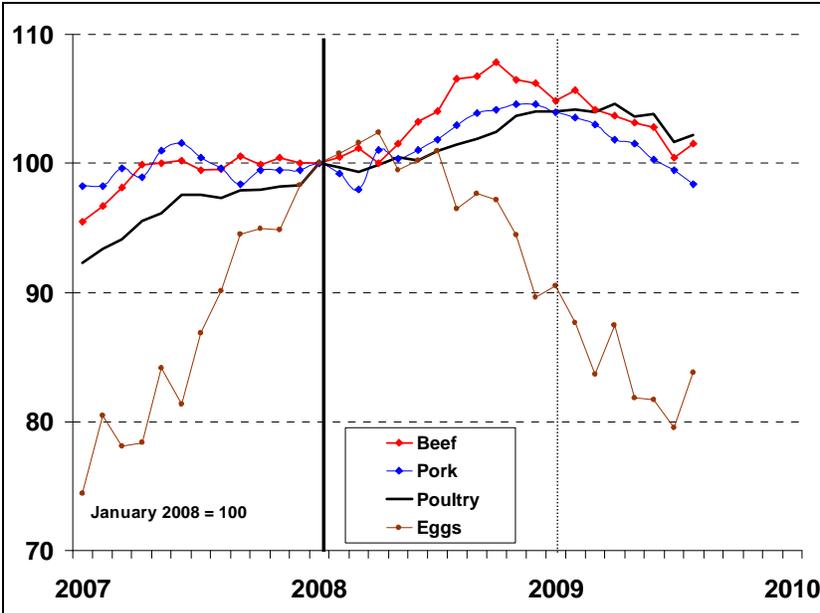
The meat price index was the most stable over this period, while the cereals and bakery product price index showed the strongest increase, rising nearly 18% between January 2007 and January 2009. The dairy price index showed a strong rise through 2007 and into 2008, then declined slightly through the second half of 2008 before falling sharply in early 2009 (down 8.8% since December 2008). The fruit and vegetable price index was the most volatile, as a general upward pattern over the two-year period was punctuated by significant deflationary movements during both 2007 and 2008.

Perhaps the most dramatic and volatile of the individual foods was eggs (**Figure 13**), which rose 35% from January 2007 to January 2008, then fell over 20% by July 2009. A year-over-year production decline from 2006 to 2007 coupled with strong exports tightened U.S. egg supplies

¹⁶ Note that these statistics (based on the change in monthly price indexes) differ from the statistics reported in **Table 5**, where the inflation rates are calculated using the difference from annual averages rather than monthly averages.

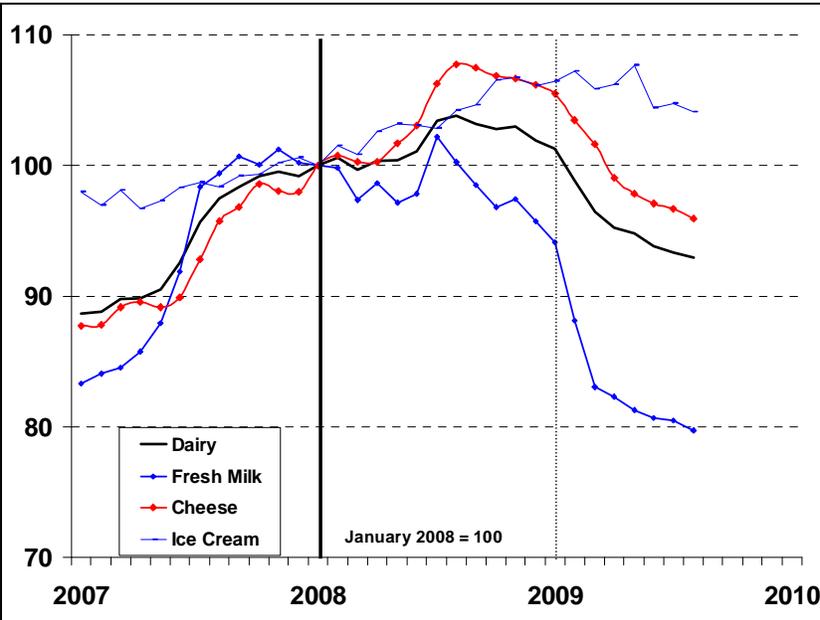
and pushed prices sharply higher in 2007. Stronger egg production by mid-2008 coupled with the global economic crisis dampened prices starting in the later half of 2008.

Figure 13. Monthly Retail Price Indexes: Beef, Pork, Poultry, and Eggs



Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

Figure 14. Monthly Retail Price Indexes: Dairy, Fresh Milk, Cheese, and Ice Cream



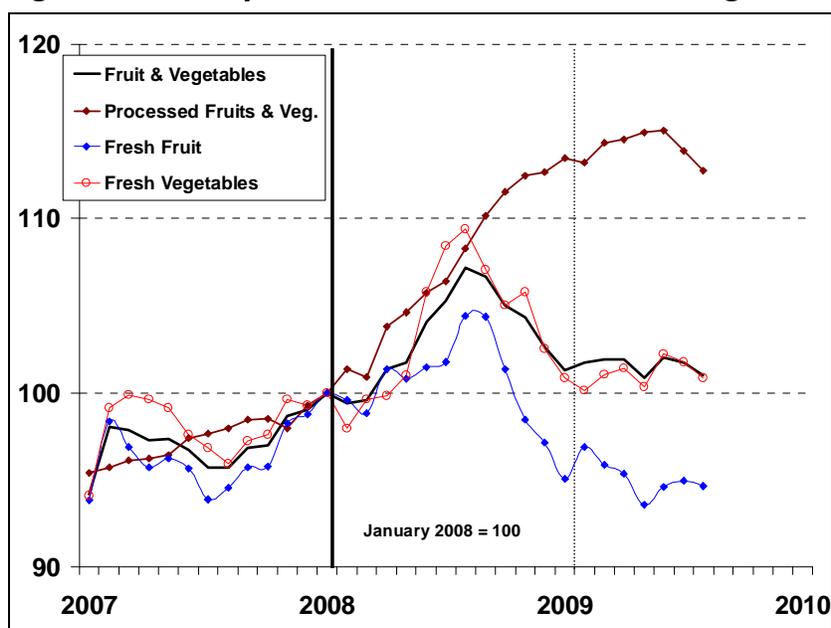
Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

The components of the dairy group (Figure 14) followed distinctly different patterns, particularly the price index for fresh milk, which showed a sharp escalation in early 2007 (up 20% on the year), followed by a sharp drop-off in 2008 including a 22% fall from July 2008 to August 2009.

The milk price pattern for the 2007-2008 period was very similar to the egg price pattern for that same period, and for the same principal reasons—initially tight supplies and expensive feed costs, followed by increased supplies and a sharp drop in prices and demand. U.S. milk production expanded through 2007 and into 2008, while the global economic crisis weakened demand, especially from international markets. In contrast, highly processed ice cream showed a fairly steady upward rise from mid-2007 before slowing in early 2009.

Similarly, the price index for processed fruits and vegetables (**Figure 15**) rose steadily through 2008, while the price indexes for fresh fruit and fresh vegetables exhibited volatile, slightly upward patterns into mid-2008 before declining into 2009.

Figure 15. Monthly Retail Price Indexes: Fruits and Vegetables

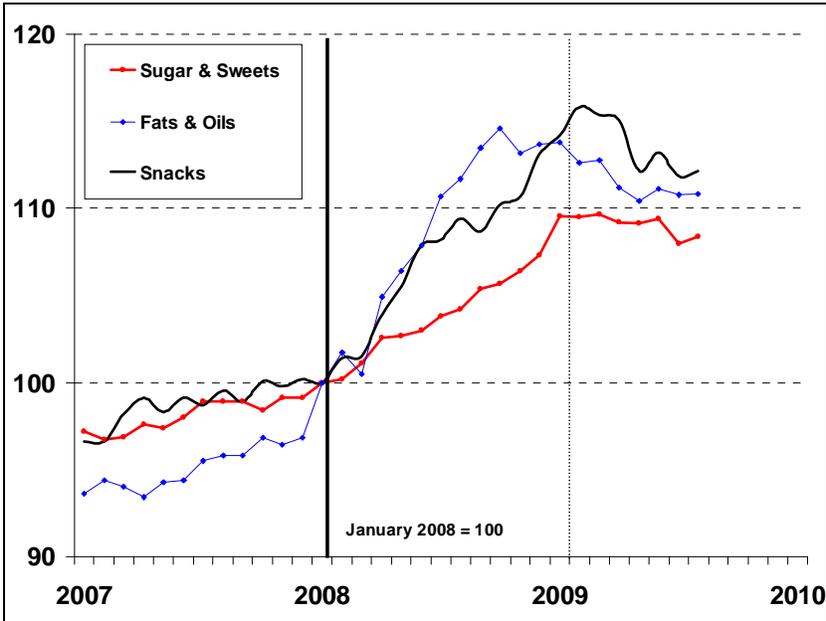


Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

The price index for highly processed snacks (**Figure 16**) rose slowly in 2007, then accelerated upward during 2008 before falling back somewhat in 2009. The sugar and sweets price index had a similar pattern, although with a somewhat slower rise during 2008. The fats and oils price index rose rapidly during 2007 and during the first nine months of 2008, then leveled off as the global market for oils became over-supplied, in part due to the fall-off in demand (related to the global financial crisis) in lesser-developed countries, where fats and oils are still treated as luxury goods.

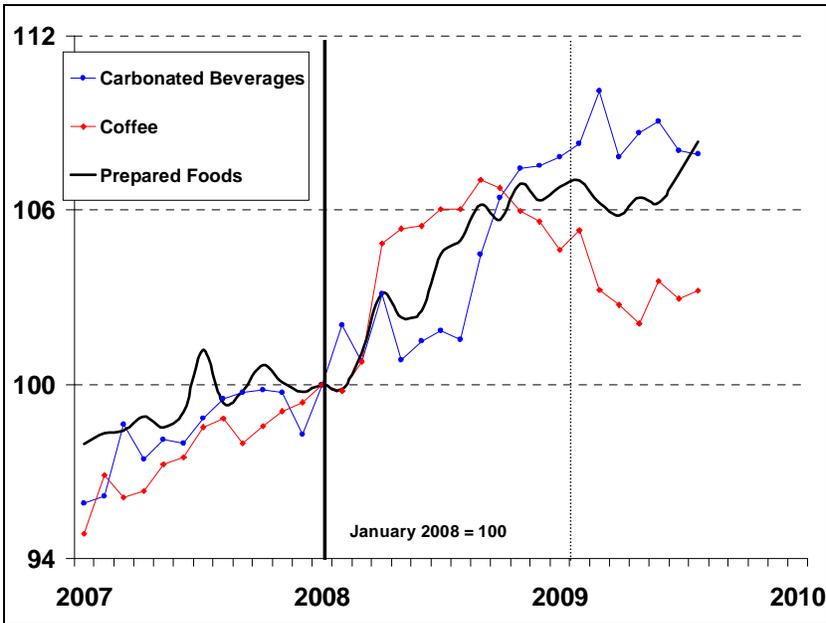
Similar to other highly processed food products, the prepared-food group (which includes frozen and freeze-dried prepared foods) and the carbonated beverages index both rose steadily through 2008 (**Figure 17**). However, both the prepared foods and carbonated beverages price indexes showed signs of leveling off in early 2009. In contrast, coffee prices rose sharply during the first half of 2008 before falling sharply in response to a decline in demand following the global financial crisis.

Figure 16. Monthly Retail Price Indexes: Sugar, Fat & Oils, and Snacks



Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

Figure 17. Monthly Retail Price Indexes: Coffee, Carbonated Beverages, and Prepared Foods



Source: Seasonally adjusted monthly CPI data, BLS, Department of Labor.

In sum, evidence from recent years suggests that highly processed foods more consistently adhere to steady, stable upward price trends. In contrast, prices for less-processed retail food products—such as eggs, milk, and fresh fruits and vegetables—respond far more quickly to changes in both farm commodity prices and economic conditions and have followed farm prices downward in the early months of 2009.

Effect of High Prices

The surge in agricultural commodity prices as well as the rise in costs of raw materials, energy, and transportation that persisted from mid-2005 through early 2008 translated into higher retail prices for food and other household products. For a given level of income, higher prices mean lower effective purchasing power, since the same household budget will now acquire a smaller volume of products.

Many wages and salaries, as well as federal programs (including several domestic food assistance programs), are linked to price inflation through escalation clauses in order to retain their purchasing power. For households where income does not keep up with price inflation, declines in purchasing power are both real and immediate. However, even for households with escalation clauses that adjust incomes or benefits for price inflation, there is a time lag between the time the price inflation is measured and the time when the wage or program benefit is adjusted upward to compensate. As a result, for households with incomes or federal benefits linked to price inflation escalators, higher prices can cause a short-term decline in real purchasing power. This is most meaningful when prices are accelerating. When prices are falling, as during a deflationary period, consumers with fixed incomes realize gains in real income (provided that they are not subject to wage cuts or layoffs).

Although commodity prices peaked in early 2008 and have been declining since, most retail prices have been slow to reflect wholesale commodity price declines, and it has only been since early 2009 that retail prices have significantly retreated for most foods. The negative aspects of high retail prices have been magnified by the global financial crisis that emerged in 2008. The economic downturn has manifested itself in a decline in household wealth due to sharply lower real estate values, tighter business and consumer credit, and rising unemployment numbers.

Federal Spending for Domestic Food Assistance Programs

The federal government operates several domestic food assistance programs targeted to low-income households, as well as schoolchildren and nutritionally vulnerable groups such as pregnant and/or lactating mothers.¹⁷

Food price inflation leads to more spending on domestic assistance efforts. Increasing prices encourage those who are eligible, but not participating, to enroll. They also translate directly (albeit with a time lag) into higher benefit payments and per-meal subsidies for “entitlement” programs in which benefits are indexed to food-price inflation. These entitlement programs include the Supplemental Nutrition Assistance Program (the SNAP, formerly the Food Stamp Program) and programs supporting meals served to children in schools and other venues. Increasing prices also place pressure on appropriators to provide more funding to support caseloads for “discretionary” programs like the Special Supplemental Nutrition Program for Women, Infants, and Children (the WIC program).

¹⁷ For details on the individual programs, see “Programs and Services,” Food and Nutrition Service, USDA, at <http://www.fns.usda.gov/fns/services.htm>. Also see CRS Report R40397, *Child Nutrition and WIC Programs: A Brief Overview*, by Joe Richardson. For program funding information, see the “Domestic Food Assistance” section (by Joe Richardson) of CRS Report R40000, *Agriculture and Related Agencies: FY2009 Appropriations*, coordinated by Jim Monke.

The 2008-2009 global economic crisis—with its higher unemployment, income loss, and lower effective household purchasing power—following on the heels of higher retail prices, has brought on higher participation rates and greater costs for domestic food aid programs like the SNAP, child nutrition meal-service programs (e.g., the School Lunch program), the WIC program, The Emergency Food Assistance Program (TEFAP), and Older Americans Act nutrition programs. As of August 2009 (the latest available information to date), participation in the SNAP was at an all-time record high of 36.5 million persons (or about one in every 10 Americans). SNAP monthly benefit costs have grown from \$2.8 billion in January 2008 to \$4.9 billion in August 2009, with average per-person monthly benefit spending rising from \$100 to \$133.¹⁸ Other domestic food assistance programs also have seen increased participation (and costs). The number of lower-income children receiving free or reduced-price school lunches has risen from 31.0 million schoolchildren in February 2008 to 31.4 million in February 2009.¹⁹ WIC participation has grown from 8.6 million women, infants, and children in January 2008 to some 9 million in January 2009.²⁰

Responding to calls for increased federal assistance, the 2009 American Recovery and Reinvestment Act (ARRA; P.L. 111-5) provided additional support for domestic food assistance programs: an estimated \$11.5 billion for FY2009-FY2010 and \$20.8 billion through FY2019.²¹ The SNAP is the primary recipient of this new money, most of which will be used to pay for added benefits, loosened eligibility standards, and administrative costs.

Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps)

The SNAP is the largest of the federally supported domestic food assistance programs. SNAP benefits normally are indexed annually (each October) for changes in the cost of USDA's least costly food plan, the "Thrifty Food Plan" (TFP). For a number of years and well into 2006, annual increases in the cost of the TFP typically ranged between 1.5% and 2.5%. However, starting in late 2006, food prices reflected in the cost of items in the TFP began to increase at a much faster rate. For example, basic benefits were increased by 4.6% in FY2007 and by 8.5% in October 2008. While these were substantial increases, they lagged by three months in reflecting rising food costs—they were (by law) based on prices from the immediately previous June. Thus there is a three-month gap between the calculation of the price inflation index in June and its use to adjust SNAP benefits in October.

In recognition of the lag in the inflation index for SNAP benefits, increased food needs, and reduced income, the ARRA included a major across-the-board boost in SNAP benefits, effective in April 2009. The ARRA provisions mandate that the TFP dollar amounts used for basic SNAP benefits be 13.6% above the June 2008 TFP cost level; this effectively boosts each recipient household's monthly benefit by an amount equal to 13.6% of the maximum (TFP) benefit for its household size. For a one-person household, the added benefit is \$24 a month; for two persons,

¹⁸ USDA, Food and Nutrition Service (FNS), Supplemental Nutrition Assistance Program, "Monthly Data -- National Level: FY 2006 through August 2009," at: <http://www.fns.usda.gov/pd/34SNAPmonthly.htm>.

¹⁹ USDA, FNS, Program Data—Child Nutrition Tables, "National Level Monthly Data: FY 2005 through August 2009," at: <http://www.fns.usda.gov/pd/36slmonthly.htm>.

²⁰ USDA, FNS, WIC Program, "Monthly Data -- National Level: FY 2006 through August 2009," at: http://www.fns.usda.gov/pd/37WIC_Monthly.htm

²¹ For more information, see CRS Report R40160, *Agriculture, Nutrition, and Rural Provisions in the American Recovery and Reinvestment Act (ARRA) of 2009*, coordinated by Jim Monke.

\$44 a month; for three persons (the typical household), \$63 a month; for four persons, \$80 a month; and for larger households, higher amounts. This change adds to the already effective 8.5% increase in benefits under pre-existing law. For example, inflation-indexed monthly benefits for four-person households went up by \$46 in October 2008 (the 8.5% increase mentioned above); the ARRA adds another \$80 a month. However, the structure of the ARRA increase is such that the new, higher benefit levels will continue until normal annual indexing rules provide benefits that surpass the value of the new add-on. As a result, it is unlikely that there will be another SNAP benefit increase related to food costs until October 2010 or later, unless food prices increase dramatically.²²

The impact of benefit increases on SNAP costs also depends on participation. The number of Americans receiving SNAP assistance has climbed steadily over the past eight years from a low of about 17.2 million in 2000 to an all-time record high of 36.5 million in August 2009. The previous food stamp participation peak was in 1994, when about 27.5 million Americans received assistance.

For FY2008, the regular benefit increase noted above (combined with estimated growth in enrollment) yielded a likely \$2 billion cost attributable to adjustments for food price increases (out of total spending of \$36.7 billion), about double the \$1 billion that would have occurred based on pre-2007 price increases. Costs are expected to increase even more in FY2009.

Child Nutrition

Federally supported child nutrition programs and initiatives reach more than 40 million children. In FY2008, federal spending on these programs totaled over \$15 billion, the second-largest federal commitment to domestic food assistance. The basic goals of federal child nutrition programs are to improve children's nutrition, increase lower-income children's access to nutritious meals and snacks, and help support the agricultural economy.

Federal payments for meals and snacks served to children now range as high as \$2.80 per meal, including the value of USDA commodity donations. Cash per-meal payments are indexed every July to food-price changes reflected in the food-away-from-home component of the CPI over the 12-month period ending each May. Commodity support (now some 21 cents per meal) also is indexed annually based on the Bureau of Labor Statistics' Producer Price Index for five major food components (cereal and bakery products, meats, poultry and fish, dairy products, processed fruits and vegetables, and fats and oils).

Inflation-indexed subsidy rates (those paid for the majority of school meals that are served free or at a reduced price to children from lower-income families) have increased by over 35 cents per meal between the 2005-2006 school year and the 2008-2009 school year. The annual increase in subsidies has gone from 2.9% for the 2005-2006 school year to 3.3% for the 2007-2008 school year and well over 4% for the 2008-2009 school year; in FY2008, this increased federal support by about \$300 million above spending if earlier food price increases had prevailed. This trend is expected to continue into FY2009.

²² As of February 2009, the cost of the TFP was just 1% above the base June 2008 TFP.

While inflation indexing of child nutrition subsidies lags behind actual increased costs to participating meal providers like schools, no change has been made to the annual July indexing cycle.

The WIC Program

Unlike the SNAP and child nutrition programs, which receive mandatory funding, the WIC program is funded from discretionary sources. Spending depends on annual appropriations, based largely on estimates of participation and the cost of the food packages that are purchased with WIC vouchers. The value of benefits is not indexed, per se. Rather, WIC vouchers are redeemable at whatever the participating retailer charges for the items covered by the vouchers, which differ according to the type of recipient (e.g., pregnant mother, infant, child). As a result, the cost of WIC vouchers reflect food price changes without the time lag built into other inflation-indexed nutrition programs. Just as important, WIC vouchers are highly specific as to the food items they cover and have a relatively heavy emphasis on certain types of food—for example, dairy items and infant formula are major components.

In recent years, the cost of WIC food vouchers has varied a great deal, largely because of changes in dairy-related food prices. The average per-participant monthly cost of vouchers has ranged from \$34.80 in FY2002 to \$39.15 in FY2007. However, the annual percentage increase has been very small for some years (1% or less for FY2003, FY2005, and FY2006) and more substantial for other years (6.6% for FY2004 and 5.6% for FY2007). Most recently, monthly per-participant WIC food costs averaged just under \$45 for the first three months of FY2009, compared to about \$42 for the same period last year. Given this significant volatility, it is difficult to produce specific estimates of the effect of food price inflation on WIC program costs.

Although WIC spending is discretionary, Congress has historically shown a willingness to appropriate whatever amounts are necessary to meet costs imposed by increased participation or food costs. Most recently, it provided a \$400 million contingency reserve to meet unexpected costs in FY2009 and FY2010 as part of the ARRA.

TEFAP and Older Americans Act Programs

The Emergency Food Assistance Program (TEFAP) and meal service programs under the Older Americans Act also provide key food assistance support for vulnerable groups. Like the WIC program, they are discretionary, and rising need and higher food prices have placed pressure on appropriators to add to federal funding. TEFAP, which provides federally donated food commodities and supports distribution of privately donated commodities, is budgeted at \$450 million in FY2009 (\$350 million for commodities and \$100 million for distribution costs); as a result of new funding provided by the ARRA, this is \$150 million above the amount previously available. Older Americans Act nutrition programs (“meals-on-wheels” and meals served to seniors in congregate meal settings) also have received added funding under the ARRA; \$100 million in new FY2009 federal support was added to about \$800 million already available.

Foreign Food Aid

USDA's international activities are funded by discretionary appropriations (e.g., foreign food assistance under the Food for Peace Act (P.L. 480) and by using the borrowing authority of the CCC (e.g., export credit guarantees, market development programs, and export subsidies).²³ Because foreign food aid is a budget value and not a food volume, its effective "purchase power" is diminished by food price hikes without additional appropriations. Unlike some domestic nutrition programs, foreign food aid is not adjusted to account for changing costs.

Food aid usually takes the form of basic food grains such as wheat, sorghum, and corn, and vegetable oil—commodities critical to developing-country diets. Since there is very little value added for these commodities, shifts in prices translate directly into higher prices for food-insecure countries or reduced food aid contributions per dollar spent. Also, higher energy costs have increased shipping costs for both food purchases and food aid.

²³ For more information, see CRS Report RL33553, *Agricultural Export and Food Aid Programs*, by Charles E. Hanrahan.

Appendix. Major Statistical Indicators of Consumer Expenditures and Food Price Changes

Several government agencies produce useful statistical indicators for measuring and monitoring consumer expenditure behavior and food prices in the United States. The monthly Consumer Price Index (CPI) produced by the Department of Labor's Bureau of Labor Statistics (BLS) is the most widely recognized indicator of consumer price inflation. It is described in detail below along with a brief discussion of the Personal Consumption Expenditure (PCE) price deflator prepared by the Department of Commerce's Bureau of Economic Analysis (BEA).²⁴

In contrast to the CPI, which is largely unique as a statistical indicator of consumer price changes, several different indicators of both consumer income and food expenditures are available, due primarily to important differences in how food expenditures and personal income are defined by the different data series. As a result, each of these data sources has certain strengths and weaknesses depending on how it is to be used.

The BLS, in addition to producing the CPI, is also responsible for producing and reporting on the annual Consumer Expenditure Survey (CES). The CES is the only federal survey that allows users to associate the complete range of household expenditures with the major characteristics and incomes of those households. The CES is discussed in more detail below.

Two alternate sources of information on personal income are produced by the Department of Commerce's U.S. Census Bureau and the BEA.²⁵ The Census Bureau collects data and reports annually on both household income and characteristics.²⁶ However, Census income data do not include information on household expenditures.

The BEA produces a set of national income and product accounts (NIPAs) that provide information on the value and composition of output produced in the United States by major sector during a given period, and on the distribution and uses of the income generated by that output.²⁷ The BEA complements the aggregate NIPA data with population estimates from the Census Bureau to derive per-capita estimates of personal income and outlays by major category. However, NIPA data are aggregate national account indicators, not household indicators.

The U.S. Department of Agriculture's Economic Research Service (ERS) combines data from the above sources with other information to conduct economic analyses across a range of consumer food price and expenditure topics.²⁸ Four noteworthy research products include:

²⁴ The PCE price index is a measure of the change in prices paid for goods and services by the personal sector in the U.S. national income and product accounts (NIPA).

²⁵ Information on both of these bureaus can be obtained by visiting <http://www.commerce.gov/>.

²⁶ For more information on the Census Bureau's income data, visit <http://www.census.gov/hhes/www/income.html>.

²⁷ For more information on NIPAs, see *Measuring the Economy: A Primer on GDP and the National Income and Product Accounts*, BEA, U.S. Dept. of Commerce, Sept. 2007, at http://www.bea.gov/national/pdf/nipa_primer.pdf.

²⁸ ERS undertakes economic research across a broad range of agricultural policy topics not limited to consumer food price and expenditure issues. Information related to food prices and expenditures is accessible at the *Food CPI, Prices, and Expenditures* Briefing Room, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/>.

- **Food CPI Forecasts**—short-term (12- to 18-month) forecasts of U.S. food price inflation for all food, food-away-from home, and food-at-home, with the latter category broken out into 15 selected food subcategories.²⁹
- **Food Expenditure Tables**—aggregate food expenditure estimates produced from national data that measure current sales or receipts by each type of store that sells food.³⁰ ERS methods provide a comprehensive measure of the total value of all food expenditures by all final purchasers including government agencies, businesses, and nonprofit organizations.
- **Food Baseline Projections**—projections for the U.S. agricultural sector 10 years ahead, including crop production, agricultural trade, farm income, and consumer food prices and expenditures.³¹ Projections are a description of what would be expected to happen under the 2008 farm bill (P.L. 110-246), with very specific external circumstances.
- **Price and Income Response Elasticities**—detailed estimates of consumer price and income responsiveness, and food expenditure behavior, across different income groupings both within the United States³² and for low-, middle-, and high-income countries.³³

Consumer Expenditure Survey (CES)

The CES is a nationwide, annual household survey that collects information on expenditures for goods (including food items) and services used in day-to-day living.³⁴ In addition, the CES collects information on household income and household characteristics such as the number, age, race, education, and gender of household members, housing tenure status, and household assets and liabilities.

The CES is designed to represent the total U.S. civilian non-institutional population. It has been collected annually by the U.S. Census Bureau—under contract with BLS—since 1979.³⁵ Prior to 1979, the CES was conducted every 10 to 12 years.

The CES uses two main survey components, an interview and a diary, to collect information.

²⁹ ERS food price inflation forecasts are available at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/cpiforecasts.htm>.

³⁰ For a list of the food expenditure tables, visit <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/>.

³¹ “Table 30—Consumer food price indexes and food expenditures,” at <http://www.ers.usda.gov/Briefing/Baseline/>.

³² For information on entire demand systems, see “Food Demand Analysis,” and for information on specific food groups, see “Who Eats What, Where, and How Much,” both at the *Diet Quality and Food Consumption* Briefing Room, ERS, USDA, at <http://www.ers.usda.gov/Briefing/DietQuality/who eats.htm>.

³³ James Seale, Jr., Anita Regmi, and Jason Bernstein, *International Evidence on Food Consumption Patterns*, Technical Bulletin No. 1904, ERS, USDA, Sept. 2003, and Anita Regmi, ed., *Changing Structure of Global Food Consumption and Trade*, Agriculture and Trade Report WRS-01-1, ERS, USDA, May 2001.

³⁴ For more information, see the U.S. Dept. of Labor, BLS, *BLS Handbook of Methods, Chapter 16, Consumer Expenditures and Income*, at <http://www.bls.gov/opub/hom/pdf/homch16.pdf>.

³⁵ The BLS releases data from the CES in several formats including an annual report, news releases, and articles in the *Monthly Labor Review* and other journals. For more information on the CES, see the BLS website for “CES Frequently Asked Questions,” at <http://www.bls.gov/cex/faq.htm>.

- The **interview survey** is designed to obtain data on the types of expenditures respondents can recall for a period of three months or longer. In general, these are relatively large expenditures such as those for property, automobiles, or major appliances, or they occur on a regular basis such as rent, utilities, or insurance premiums. Approximately 14,000 addresses are contacted each calendar quarter of each year. Usable interview data is obtained from approximately 7,100 households each quarter.
- The **diary survey** is designed to obtain expenditure data on small, frequently purchased items such as food and beverage expenditures (both at home and in eating places), housekeeping supplies and services, nonprescription drugs, and personal care products. About 12,000 addresses are selected each year to complete a diary survey of household expenditures for two consecutive one-week periods. Usable diary data is obtained from approximately 7,100 households.

Major Uses of CES Data

An important use of CES data is for periodic updating of the Consumer Price Index (CPI) market basket of goods and services, as well as to determine the relative importance of CPI components and to derive new cost weights for the market basket items.³⁶

Another important use of CES data is to allow data users to relate the expenditures and income of consumers to key characteristics of those consumers. For example, CES data are used by both government and private agencies to study the welfare of different segments of the population such as the elderly, low-income families, urban families, and those receiving food stamps. CES data are used by policymakers to evaluate the potential effects of policy changes on levels of living among diverse socioeconomic groups. Also, market researchers may use CES data to analyze the demand for various goods and services by different demographic groups. Because of the large survey sample size and the representative nature of sample selection, the CES data also allow for regional comparisons.

Household-Level Expenditures versus National Average Disposable Income

Clearly, only the CES household-level data allow analysts to evaluate food expenditure behavior while controlling for specific household characteristics. However, ERS has shown (as discussed below) that national accounts data can provide a more comprehensive evaluation of national food expenditure behavior by capturing food industry and other non-household food behavior that is otherwise omitted from a household survey. These differences are briefly discussed here.

National Accounts Data: Focus on Food Expenditure Trends

For monitoring national food expenditure trends and patterns (e.g., food budget shares or food-at-home versus away-from-home consumption patterns) food expenditure estimates based on aggregate account data generally provide the most useful information. In this regard, the ERS food expenditure series is perhaps the most qualified and easily accessible of available data

³⁶ CPI data, once released, are never revised because of their widespread use for adjusting wages to cost-of-living adjustments. However, the components of the market basket, their respective weights, and the formula for calculating price changes are revised on occasion for future calculations.

series. ERS uses primarily Census Bureau data (as classified under the North American Industry Classification System (NAICS)) to construct very detailed and comprehensive food expenditure series based on specific industry and business food sales.³⁷

Unlike NIPAs, ERS food expenditure calculations exclude pet food, ice, and prepared animal feeds, as well as nonfoods such as drugs and branded supplies, in estimating at-home food purchases.

Unlike CES data, ERS food expenditure estimates include non-household purchases and acquisitions—for example, government food purchases for domestic military personnel, the value of school meals (including “free lunches” distributed under the National School Lunch Program), and the value of food purchased by airlines for serving during flights.

CES Household Data: Focus on Individual Consumer Behavior

For evaluating household purchases and consumer behavior, household-level expenditure data (as available from the CES) are generally preferable to aggregate income measures such as the disposable personal income (DPI) data available from either the Census or the BEA. There are two primary reasons for this. First, the CES expenditure data are collected at the household level, thus permitting household comparisons rather than relying on the national averages available from the NIPA data. Second, household expenditures are generally more stable than household income measures—even during periods of unemployment by household members, the household will continue to make purchases of routine items such as food. Thus, household expenditure data are less subject to the gyrations of the general economy.

Household expenditure data can be more reliably measured by survey data than can household income data. As a matter of fact, it is not uncommon for CES data for household annual expenditures to exceed reported income before taxes, particularly for households from lower-income groups. Why? Some CES interview respondents may be reluctant to answer inquiries concerning their income. Some households whose members may experience a spell of unemployment may draw on their savings to maintain their expenditures. Self-employed consumers may experience business losses that result in low or even negative incomes for a period, but are able to maintain their expenditures by borrowing or relying on savings. Students may get by on loans while they are in school, and retirees may rely on savings and investments.

The Consumer Price Index (CPI)

The CPI is a composite measure of the average change over time in the prices paid by U.S. urban consumers for a defined market basket of goods (including food) and services that people buy for day-to-day living.³⁸ Since its focus is on consumer expenditures, it intentionally excludes government expenditures and the cost of inputs used by manufacturing and agriculture.

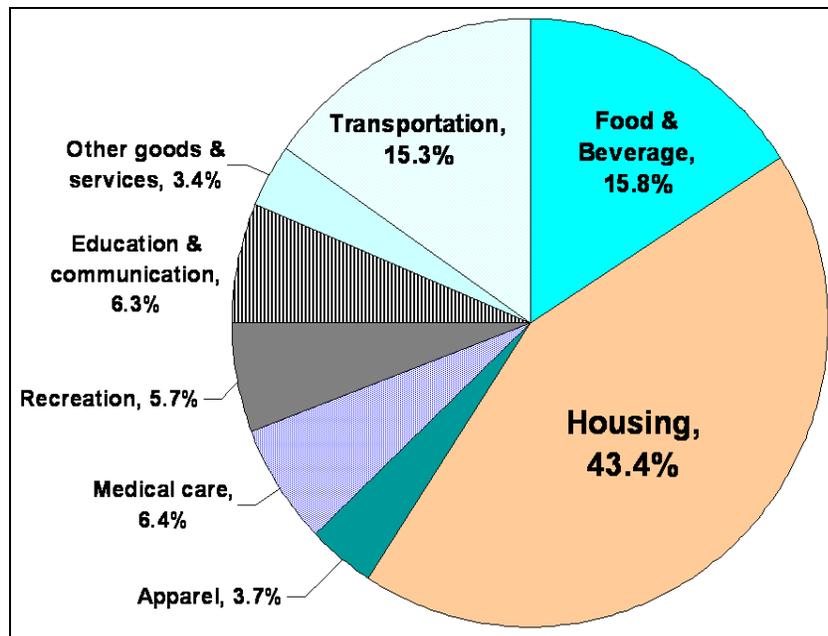
³⁷ For details, see “Measuring the ERS Food Expenditure Series,” *Food CPI, Prices, and Expenditures* Briefing Room, ERS, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/measuringtheersfoodexpendituresseries.htm>.

³⁸ The BLS CPI website with supporting documents and news releases is at <http://www.bls.gov/cpi>.

Is the CPI's Food Market Basket Representative?³⁹

The BLS is responsible for collecting monthly price data for the market basket of consumer expenditure categories from across the United States, then calculating and reporting the monthly price indexes (or CPIs) for those items. The mix of goods and services making up the market basket is based on spending patterns established by the annual CES, and is updated every two years. The prices of market basket items are drawn from representative urban settings across the United States. According to BLS, the consumer groups included in the sample pool (referred to as the U-population and used to create the CPI-U index) represent 87% of the total U.S. population including professionals, the self-employed, the poor, the unemployed, and retired people.⁴⁰ Not included in the CPI are spending patterns of people living in rural non-metropolitan areas, farm families, people in the Armed Forces, and those in institutions.

Figure 18. CPI Relative Weights by Major Category



Source: U.S. Department of Labor, BLS.

Note: As of December 2008 (based on the 2005-06 CES).

CPI Categories and Weights

The BLS collects prices each month in 87 urban areas across the United States for about 80,000 items from approximately 23,000 retail establishments (including department stores, filling

³⁹ For more information, see the BLS report, *The Consumer Price Index—Why the Published Averages Don't Always Match An Individual's Inflation Experience*, at <http://www.bls.gov/cpi/cpifact5.htm>.

⁴⁰ A subset of the U-population, the W-population consists of the U-population for whom 50% or more of household income comes from wages and clerical workers' earnings. The W-population is used to create its own price index (CPI-W). For specific details refer to "Calculation of Price Indexes," *BLS Handbook of Methods, Chapter 17, The Consumer Price Index*, BLS, Dept. of Labor, p. 2, June 2007, at <http://www.bls.gov/opub/hom/pdf/homch17.pdf>.

stations, supermarkets, hospitals, etc.).⁴¹ All taxes directly associated with the purchase and use of items are included in the index. The data are further combined, based on population size, into 38 different urban geographic areas.⁴² The data on goods and services are aggregated into 211 categories. As a result, basic price indexes are available for $38 \times 211 = 8,018$ area-item combinations. Higher-level indexes are produced by calculating a weighted average across the relevant basic indexes. The weights are derived from reported expenditures from the CES. BLS updates the expenditure weights every two years.

The “All-Items” CPI is the index most often referred to (i.e., the headline CPI) for representing consumer price inflation, and represents a weighted index based on the indexes from all areas and for all categories of goods and services whose prices are collected. The all-items CPI is generally divided into eight major spending categories, including a “Food and Beverage” category (**Figure 18** Error! Reference source not found.), which accounts for 15.8% of average consumer expenditures. This compares with the Housing category’s dominant share of 43.4% of annual consumer expenditures and the Transportation category’s 15.3% share.⁴³

What About Seasonality Patterns in the Data?

Some monthly price data are subject to seasonal influences that normally occur at the same time and in about the same magnitude every year, independent of market phenomena or consumer income shifts, or household characteristics. For example, meat purchases generally increase in the summer months, when the “grilling” season is open. As a result, the meat market experiences a general surge in demand during the summer months that is independent of incomes, household characteristics, or other economic or demographic factors.

For most price indexes, BLS reports two series—a seasonally adjusted index that removes systematic seasonal influences from the data, and the original unadjusted data.⁴⁴ The seasonally adjusted data, including the all-items index levels, are subject to revision for up to five years after their original release. In contrast, the unadjusted data are not subject to revision, even when the index formula is itself altered. This is because many wage contracts and government program benefits are indexed via an escalation agreement to the unadjusted CPI. A revision of historical CPI data would necessarily imply a revision of all wage and benefit payments made under the previously unrevised CPI series.

For analyzing general price trends in the economy, the BLS recommends using seasonally adjusted price indexes since they eliminate price movements that result from seasonal phenomena such as changing climatic conditions, production cycles, model changeovers, holidays, and sales. In contrast, BLS recommends using unadjusted price indexes when the primary interest to consumers is the price actually paid. Unadjusted price indexes are used extensively for escalation purposes in collective bargaining agreements or pension plans.⁴⁵

⁴¹ “How BLS Measures Changes in Consumer Prices,” BLS, Dept of Labor, at <http://www.bls.gov/cpi/cpifact2.htm>.

⁴² For specific details refer to “Calculation of Price Indexes,” *BLS Handbook of Methods, Chapter 17, The Consumer Price Index*, BLS, Dept. of Labor, pp. 3-4, June 2007, available at <http://www.bls.gov/opub/hom/pdf/homch17.pdf>.

⁴³ All CPI data referenced in this report refer to the CPI-U data series.

⁴⁴ This discussion follows from “A Note on Seasonally Adjusted and Unadjusted Data,” *Consumer Price Index: February 2009*, monthly news release, BLS, U.S. Department of Labor.

⁴⁵ For more information, see CRS Report RL34168, *Automatic Cost of Living Adjustments: Some Economic and Practical Considerations*, by Brian W. Cashell.

Is the Food-at-Home CPI a Good Measure of Retail Food Price Change?

As mentioned above, the food-at-home CPI is the principal indicator of changes in retail food prices in the United States. Because of its central role as a measure of retail food price inflation, the food-at-home CPI is routinely subject to public scrutiny by food market participants including industry groups, consumer and hunger advocacy groups, and policymakers. A chief concern is whether and to what extent there are any persistent biases in the food-at-home CPI. If the CPI's market basket of items and their respective weights fail to adjust in step with consumer expenditure behavior or if the method for calculating price changes is itself faulty, then the process would likely produce a biased statistical measure of price change.

Indeed, research by BLS and ERS analysts suggests that the food-at-home CPI has tended to overstate retail food price inflation. In particular, they identified four specific problems in the CPI's construction that have imparted an upward bias in the food-at-home CPI.⁴⁶

1. Consumers' spending patterns change, albeit gradually, over time. For example, an aging population (as in the United States) tends to consume less meat and alcohol, but larger shares of cereals and bakery products. Also, food budget shares have declined over time with rising incomes, and an increasing share of food spending has gone for away-from-home consumption.
2. Prices for some food items—particularly fresh fruits and vegetables and fresh meats—may vary widely on occasion. If not accounted for, these fluctuations create an inflationary drift by attaching greater weight to price increases than to decreases. For example, a \$0.50 increase on a \$1.00 price is a 50% increase, whereas a return to the \$1.00 from the \$1.50 price is only a 33% price decrease.
3. Price indexes must keep up with the introduction of new food items and new stores to fully represent consumer price alternatives. For example, the CPI has been slow to incorporate the rapid expansion of discount stores that often sell food items at substantially lower prices than traditional grocery stores.⁴⁷
4. Fixed-weight price indexes are vulnerable to a substitution bias.⁴⁸ A fixed-weight index does not allow for the likelihood that consumers respond to relative price changes by changing the quantity or quality of their food purchases. For example, price rises due to higher quality should not count as inflation, since the consumer is getting more product value for the higher price.

BLS has responded to these problems over time by implementing a series of changes to its methods for incorporating and weighting price information from new stores and for new products starting in 1981. In addition, starting in 2002, BLS began updating the expenditure weight shares every 2 years. Prior to 2002, such revisions were more episodic, occurring every 10 to 12 years. A continual rebalancing of the market basket to include new products and more current expenditure

⁴⁶ This discussion follows from "CPI Bias," *Food CPI, Prices, and Expenditures* Briefing Room, ERS, USDA, as of March 26, 2007, at <http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/cpibias.htm>.

⁴⁷ For a discussion of this issue see *The Impact of Big-Box Stores on Retail Food Prices and the Consumer Price Index*, Economic Research Report No. 33, Ephraim Leibtag, ERS, USDA, December 2006.

⁴⁸ Empirical studies conducted in the 1980s and 90s suggested that substitution bias resulted in an upward bias of about 0.4 percentage points per year in using changes in the CPI to measure changes in the cost of living. M. Boskin, E. Dulberger, R.J. Gordon, Z. Griliches, and D.W. Jorgenson, "Consumer Prices, the Consumer Price Index, and the Cost of Living," *Journal of Economic Perspectives*, Vol. 12, No. 1, Winter 1998, pp. 3-26.

weights helps to ensure that the CPI more accurately reflects how consumers allocate their spending.

BLS also has introduced new methods of index construction (in particular, a geometric mean formula for within-item averages) to minimize problems associated with sharply fluctuating prices and possible inflationary drift. However, this adaptation does not capture substitution across items, only within items (thus mitigating lower-level substitution bias). In other words, it would not capture a price-related shift from steak to hamburger, only a shift between differently priced steaks. BLS began to publish a new chained index (the C-CPI-U) in August 2002, to more closely approximate the substitution across expenditure categories that consumers undertake when relative prices change.⁴⁹ However, the traditional all-items CPI (CPI-U) remains the most widely quoted price index and still is subject to the higher-level substitution bias.

Why Not Use the PCE Price Index to Measure Consumer Price Inflation?

An alternate measure of inflation—the Personal Consumption Expenditure (PCE) price index—is produced by the Department of Commerce’s Bureau of Economic Analysis (BEA).⁵⁰ The PCE price index measures the change in prices paid for goods and services by the personal sector in the U.S. national income and product accounts (NIPAs).

Despite their apparent similarity, the CPI and PCE price indexes are constructed differently, they behave differently over time, and they have different purposes and uses.⁵¹ The PCE price index is based on national accounts data and is primarily used for macroeconomic analysis and forecasting. In contrast, the CPI is based on household survey data and measures the change in prices paid by urban consumers for a market basket of consumer goods and services; it is primarily used as an economic indicator and as a means of adjusting current-period data for inflation. Because of this later use, historical CPI data are never revised (unlike PCE data).

Analysts at BEA and BLS have identified four major differences between the CPI and the PCE price indexes. First, they are calculated using different formulas.⁵² Second, each formula’s set of weights is different (the CPI uses base-year weights versus the PCE’s current-year weights). Third, the CPI measures “out-of-pocket” expenditures based on individual household survey data, whereas the PCE price index measures the aggregate outlay for all goods and services purchased by households and nonprofit institutions as drawn from national accounts. Finally, the BEA and BLS analysts cite an accumulation of other minor differences in seasonality adjustments, pricing, and a residual difference due to the underlying data used for each index.

Empirical tests conducted by BEA and BLS analysts suggest that differences in the formulas and the weights account for most of the difference in how the two indexes measure inflation. The CPI uses a formula whereby the weights for goods and services are determined by household

⁴⁹ For more information on the C-CPI-U, see CRS Report RL32293, *The Chained Consumer Price Index: How Is It Different, and Would It Be Appropriate for Cost-of-Living Adjustments?* by Brian W. Cashell.

⁵⁰ NIPA data tables including PCE price indexes are available at <http://www.bea.gov/national/nipaweb/index.asp>.

⁵¹ For a detailed discussion of their differences, see Clinton P. McCully, Brian C. Moyer, and Kenneth J. Stewart, “Comparing the Consumer Price Index and the Personal Consumption Expenditures Price Index,” *Survey of Current Business*, November 2007, at http://www.bea.gov/scb/pdf/2007/11%20November/1107_cpice.pdf.

⁵² The CPI is calculated using a “modified” Laspeyres index, while the PCE price index is calculated using the Fisher-Ideal Index. See source information from the preceding footnote 51 for details.

expenditures in the base year. In successive years, the same fixed “base” of weighted goods and services is valued using the new year’s prices. A shortcoming of this approach is that, because the weights for individual goods and services are fixed, consumer substitution due to relative price changes is not captured by the index. In contrast, the PCE price index uses current-year expenditures to determine the weights. As a result, the PCE price index fully captures consumer substitution among detailed items as the relative price of those items changes.

However, PCE price index methodology is difficult, if not entirely impractical, to implement using household expenditure data. Household survey data are available with a substantial lag due to collection and preparation time, and thus are generally not available for the most current period. This precludes calculating current-year weights as per the PCE formula. As a result, the CPI’s base-year weighting appears to be the most timely and practical (although perhaps not the most theoretically sound) method for calculating a price index.

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