

Food Prices and the Inflation Experiences of Low-income Households

by Leslie McGranahan

Introduction

Food prices have been rising rapidly over the past two years. In August 2008, aggregate food prices were 6.1 percent above their level in August 2007. Prices in August 2007 were already 4.8 percent above the level in August 2006. Because food purchases represent a larger portion of the expenditures of low-income households, these increases in price have a more substantial impact on the purchasing power of low-income households. This article describes the food inflation experiences of different population groups to demonstrate how different groups have been differentially affected by the recent run-up in food prices. In addition to spending more of their budget on food, lower-income households also concentrate more of their food expenditure on food consumed at home than higher-income households. Because the prices for food at home have been growing more rapidly than the prices of food away from home, this creates an additional gap in the impact of food inflation on lower- and higher-income households.

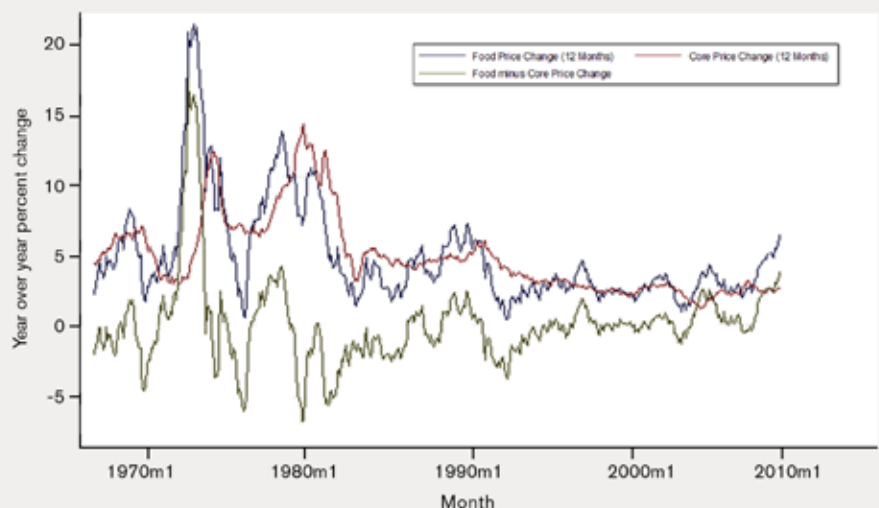
This investigation into the differential impacts of food inflation is part of a larger project that looks at household consumption patterns to assess the inflation experiences of different types of households. That project, the Chicago Fed IBEX® (Income-Based Economic Index), measures household

inflation as the weighted price increase in the goods purchased by that household, where the weights depend on the consumption patterns of the household as documented in the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey*.¹ The IBEX® reports inflation levels for 37 different types of households, covering the period from 1981 to 2007.²

The principal finding from that research is that over long-time horizons, the inflation experienced by most of these groups has been very similar. The one exception to this is the elderly. Households with individuals 65 or over have faced higher inflation due to their tendency to purchase medical care – a category where prices rose above the average for much of the covered period.

While the long-run inflation patterns across groups have been very similar, the short-run dynamics have differed due to periodic differences in price changes in particular items that are purchased by particular types of households. The current growth in food inflation is one example where those households that concentrate a greater percentage of their purchases on food have experienced higher inflation rates.

Figure 1: Food and Core Price Changes, January 1968 to August 2008



Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Price Index*.

Similarly, high energy inflation has had differential impacts on different types of households.³

Food inflation over time

Figure 1 places the August 2008 food inflation rate of 6.1 percent into historical context by graphing food inflation, core inflation (inflation excluding food and energy), and the difference between them from 1968 to 2008. The graph shows that food inflation today is high relative to the experience of the past decade, although food inflation is lower than was experienced in the mid and late 1970s. An annualized increase exceeding 6 percent last occurred in 1990. The difference between food inflation and core inflation is high relative to the past two decades, but low when compared to the 1970s. For example, annual food inflation was 6.1 percent in August 2008, while core inflation was 2.5 percent. This difference of 3.6 percent was the largest gap reported since early 1979, but substantially smaller than the nearly 17 percent difference in August 1973.

The recent increase in prices has not been uniform across all food categories. The U.S. Bureau of Labor Statistics (BLS) publishes price changes for over 100 food items and for 17 categories of food expenditure.⁴ Table 1 shows that, among these categories, the largest price increases have been in fats and oils, fresh vegetables, bakery products, cereal, and cereal products. While these prices stand out, price increases in every food category have been higher than core inflation. Across the food items that comprise these categories, the largest increase was in rice (up 40.0 percent from August 2007 to August 2008), while the smallest was in oranges, including tangerines (a decrease of 2.9 percent).

There has also been a difference in price increases, depending on where food is consumed. Prices for food at home are up 7.5 percent, while prices for food away from home are up 4.5

Table 1: Price Increases by Food Expenditure Category, August 2007 to August 2008

	Price Change
Food	6.1%
Food at Home	7.5%
Cereals And Cereal Products	11.9%
Bakery Products	11.5%
Beef And Veal	7.0%
Pork	3.4%
Other Meats	2.9%
Poultry	4.2%
Fish And Seafood	7.7%
Eggs	6.9%
Dairy And Related Products	6.4%
Fresh Fruits	10.5%
Fresh Vegetables	14.2%
Processed Fruits And Vegetables	10.5%
Nonalcoholic Beverages And Beverage Materials	3.4%
Sugar And Sweets	5.4%
Fats And Oils	16.5%
Other Foods	5.9%
Food Away from Home	4.5%

Source: Bureau of Labor Statistics, *Consumer Price Index*.

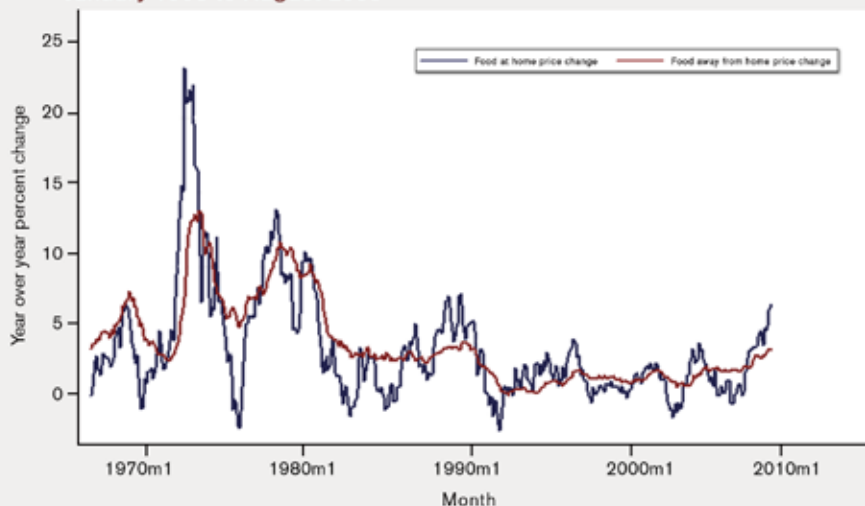
percent. Food at home comprises standard grocery store purchases, while food away from home primarily consists of food eaten at restaurants and fast food. Prices for food at home have historically been more volatile than prices for food away from home, and inflation for food at home has often been higher when food inflation is high. Figure 2 compares inflation for food at home and inflation for food away from home.

Why has food inflation been high?

Food prices have been going up for a number of different reasons. One culprit

has been the rise in the price of energy and its effects on food. The energy effect operates in two ways. First, oil price increases have led to increased demand for ethanol and other alternative energy sources. The increased demand for corn to produce ethanol has led to an increase in the price of corn, as well as to an increase in the price of other agricultural commodities because acreage planted with those commodities has been replaced with corn. Second, energy price increases impact food prices through crop production and food transportation, which are fairly energy intensive.

Figure 2: Inflation for Food at Home and Food Away from Home, January 1968 to August 2008



Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Price Index*.

Prices for food at home are up 7.5 percent, while prices for food away from home are up 4.5 percent. Food at home comprises standard grocery store purchases, while food away from home primarily consists of food eaten at restaurants and fast food. Prices for food at home have historically been more volatile than prices for food away from home, and inflation for food at home has often been higher when food inflation is high.

Another factor behind the run up in food prices is the decline in the value of the U.S. dollar. This has increased the cost of imports and increased foreign demand for U.S. agricultural output. Foreign demand for food products has also grown because of increasing economic growth and wealth.⁵ Individual food categories have also been subject to independent influences. For instance, fresh fruit price growth has partly been due to poor weather in countries producing bananas.

The lower growth in prices of food away from home likely results from the fact that the price of the food commodities represents a lower portion of the cost of food away from home. Labor and rental costs are important parts of restaurant food production. In addition, the prices of food away from home may be more difficult to adjust due to “menu costs” – the costliness of changing printed prices. Finally, restaurant patrons may be particularly price sensitive, as they can choose to eat cheaper meals at home.

Food consumption patterns

How households are affected by increases in food prices depends on

two factors. The first factor is the percentage of the household's expenditure dedicated to food. The second is the mix of food items the household consumes—i.e., what food the household purchases for its food market basket. Households that dedicate a higher percentage of their total consumption to food have faced higher inflation recently because food prices have been increasing more rapidly than the prices of other goods. In addition, for a given percentage of total expenditure on food, some households purchase more foods whose prices are growing especially quickly (relative to other foods).

Consumption data for 2006 (the most recent year of available data from the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey*) was used to determine the market baskets for different types of households, and then the price change in these market baskets was calculated using Consumer Price Index data.

For this article, the consumption patterns and inflation experiences of 11 different groups, as well as the overall population, were investigated. The first four groups are based on quartiles of

family income after income is adjusted for family composition using the National Academy of Science's equivalence scale. The next four groups are defined by the work and poverty status of the household members – the working poor, the working non-poor, the non-working non-poor, and the non-working poor. Households are defined as poor if their income is below the federal poverty line. Households are defined as working if household members combined work 1,750 hours per year or more. This corresponds to the Census Bureau's definition of working full-time, full-year of 50 weeks per year and 35 hours per week. Results are also presented for elderly households, households headed by single mothers, and for households receiving food stamps.

Table 2, column 1 shows the proportion of household expenditure dedicated to food for these different household types. The calculations based on the income quartiles show that food expenditure percentages fall as income increases. This finding corresponds to other research that shows a higher concentration of spending on necessities among lower-income households. The poor, independent of

their work status, spend a higher percent on food than the non-poor. In addition, the non-working poor spend a higher percentage on food than the working poor. The non-working poor are probably of lower income and spend less on transportation to work and other work related expenses. Elderly households spend a smaller percent than any of the other groups on food, possibly because they eat at home more and consume fewer calories. Of all the groups, food stamp recipients concentrate the highest percentage of their total consumption on food. As will be discussed in more detail below, the effect of food inflation on food stamp recipients is partly blunted by the indexation of food stamp benefit amounts to food prices. Single mother households' food expenditure shares are

in line with the working poor. Overall, lower-income households concentrate a higher proportion of their total spending on food than does the remainder of the population. As a result, recent increases in food prices have a more substantial impact on their purchasing power.

While lower-income households concentrate a higher percentage of their total expenditures on food than higher-income households, wealthier households spend a greater dollar amount on food. Column 2 of Table 2 presents average total annual expenditure on food by household type for 2006. Food stamp recipients, the non-working poor, and bottom income quartile households spend the least amount on food, while top quartile households and the working non-poor spend the most on food.

Food expenditure percentages represent just one part of the calculation of food inflation. Food inflation also depends on which foods are purchased. Table 2 also shows spending patterns on food at home compared with food away from home for the different household types. The percentage of food expenditure away from home increases with income. More than half of all food expenditure occurs away from home for the highest-income households (top income quartile), compared with one-third for the lowest-income households (bottom income quartile). For the work and poverty status categories, working households consume a higher fraction of their food outside the home, than non-working households, and non-poor households consume a higher fraction outside the

Table 2: Food Expenditure Patterns, by Household Type

Group	Food as a share of total expenditure	Annual food expenditure (Aug. 2007 \$)	As a share of food expenditure	
			Food at home	Food away from home
All	13.5%	\$5,921.28	54.5%	45.5%
Bottom Income Quartile	14.9%	\$3,870.90	66.4%	33.6%
Second Income Quartile	14.7%	\$5,423.42	57.2%	42.8%
Third Income Quartile	14.1%	\$6,496.86	53.8%	46.2%
Top Income Quartile	12.1%	\$8,056.36	46.8%	53.2%
Working Poor	15.4%	\$4,413.67	65.5%	34.5%
Poor Not Working	16.2%	\$3,260.80	71.0%	29.0%
Not Poor Not Working	11.9%	\$4,587.23	58.6%	41.4%
Working Not Poor	13.6%	\$6,849.69	51.9%	48.1%
Elderly	11.7%	\$4,500.33	60.5%	39.5%
Single Mom	15.2%	\$5,123.60	57.9%	42.1%
Food Stamp Recipients	17.8%	\$3,913.56	74.8%	25.2%

Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Expenditure Survey*. **Note:** Annual food expenditure in August 2007 \$ is calculated by inflating annual expenditure data from the *Consumer Expenditure Survey* for 2006 using the change in the *Consumer Price Index for Food* from 2006 to August 2007.

Table 3: Inflation Experiences by Demographic Group, August 2007 to August 2008

Group	Food inflation	Food's contribution to Total Inflation	Overall household inflation	Additional food costs
All	6.2%	0.8%	5.5%	\$365.81
<i>Bottom Income Quartile</i>	6.5%	1.0%	5.9%	\$253.41
<i>Second Income Quartile</i>	6.2%	0.9%	5.7%	\$337.92
<i>Third Income Quartile</i>	6.1%	0.9%	5.6%	\$398.83
<i>Top Income Quartile</i>	6.0%	0.7%	5.1%	\$479.96
<i>Working Poor</i>	6.5%	1.0%	6.2%	\$287.93
<i>Poor Not Working</i>	6.6%	1.1%	5.8%	\$216.15
<i>Not Poor Not Working</i>	6.4%	0.8%	5.1%	\$293.46
<i>Working Not Poor</i>	6.1%	0.8%	5.5%	\$416.03
<i>Elderly</i>	6.5%	0.8%	5.2%	\$292.08
<i>Single Mom</i>	6.2%	0.9%	5.8%	\$317.66
<i>Food Stamp Recipients</i>	6.7%	1.2%	6.3%	\$262.05

Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Price Index*, and Bureau of Labor Statistics, *Consumer Expenditure Survey*. **Note:** The 6.2 percent reported here for overall food inflation differs from the 6.1 percent reported by the CPI because of differences in the market baskets and formula used to calculate inflation.

home than poor households. As a result, the non-working poor have the highest fraction of consumption at home while the working non-poor have the highest fraction away from home.

Elderly households consume less than average outside the home while single mothers have consumption patterns similar to the overall population. Food stamp recipients spend one-quarter of their food dollars away from home (food stamps are not accepted for restaurant food). They have the lowest percentage of consumption away from home of all the groups investigated.

Household inflation also depends on which foods are consumed at home. Households that consume more oranges have faced lower inflation than households that consume a lot of rice, other things equal. These differences do

not appear to have a strong influence on differential inflation rates across households, because expenditure patterns within food at home are very similar across the different household types. For every household type and for every food at home expenditure subcategory, the percent of expenditure on that type of food is between 0.7 and 1.4 times the average.⁶ Because of these similarities, expenditure breakdowns within food at home are not presented.

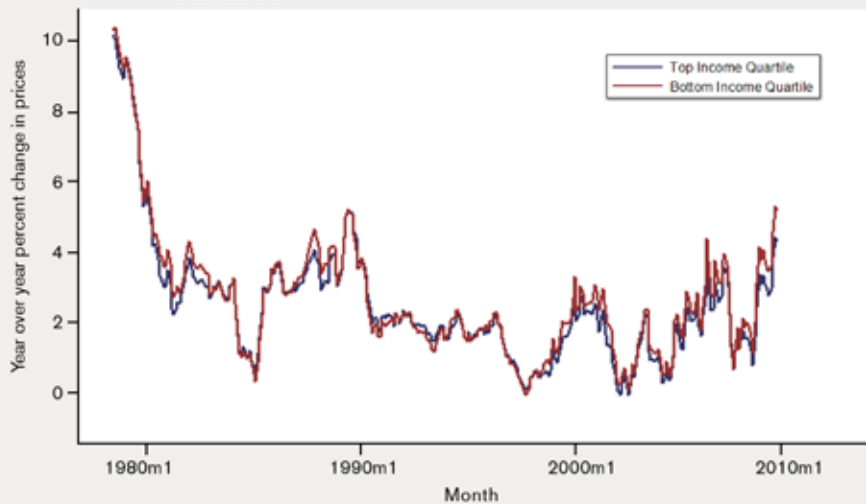
Household food inflation

The measures of price changes by food category are combined with market basket information to gauge household food inflation in two ways. The first measure is the weighted average price change of the food items consumed by the household (for all 17 categories listed in Table 1). This measure tells us

how much more (in percentage terms) it would cost the household to buy the same food market basket. Mechanically, this measure combines the food price change for each category from August 2007 through August 2008 with the share of that category in the household's food basket in 2006. Table 3, column 1 shows the result. Based on these data, food inflation has ranged from 6.0 percent to 6.7 percent. It has been the lowest for the highest-income households, while it has been the highest for the food stamp recipients and the non-working poor.

The second measure of food inflation, presented in Table 3, column 2, asks how much inflation the household would have faced if there were no price increases except in food. In other words, this calculation assumes that the prices of other goods were unchanged

Figure 3: Inflation Experiences of Low- and High-income Households, 1982-2008



Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Price Index*, and Bureau of Labor Statistics, *Consumer Expenditure Survey*.

between August 2007 and August 2008. This measure combines the price change for each food category with the share of total consumption concentrated on that category to calculate food's contribution to total inflation. Based on these numbers, food's contribution to total inflation has ranged from 0.7 percent to 1.2 percent. For the highest-income households, food's contribution to inflation has been the smallest, while for food stamp recipients, its contribution has been the largest. This calculation also tells us how much larger the household's overall budget would need to be to cover the increasing cost of its food basket.

The third column of Table 3 shows the household types' inflation based on their actual market basket across all expenditure categories (including non-food items). One notable determinant of these inflation rates is the amount of motor fuel purchased by the household. These findings for total inflation are similar to the results for food inflation and food's contribution to total inflation in that total inflation rates have been highest for food stamp recipients and total inflation declined as income increased over this period.

The findings that food inflation and total inflation were highest for food

stamp recipients and low-income households between August 2007 and August 2008 have not been consistent over time. Figure 3 displays total group inflation for the lowest and highest income quartile households from 1982 to 2008. During many periods since 1982, the lowest-income households faced lower food inflation and lower total inflation than the highest-income

the food basket annually by household type. In this case, the annual food expenditure of the household is multiplied by the inflation rate between August 2007 and August 2008. An additional 6.2 percent spent on food by the average household, which spent \$5,921 on food in 2006 (translated to August 2007 dollars), equals an additional \$366 per year.⁷ To purchase their 2006 market basket, food stamp recipients would need to spend \$262 more per year based on August 2008 prices as compared to August 2007 prices.

The Food Stamp Program

Throughout this analysis, the expenditure patterns of food stamp recipients have stood out. Food stamp recipients have faced the highest food inflation of any of the groups and concentrate the largest portion of their total expenditure on food. The Food Stamp Program contains provisions that automatically adjust benefit levels for changes in the price of food. This section discusses how the extent to which food stamp benefit adjustments compensate for the price increases faced by recipient households.

...the non-working poor have the highest fraction of consumption at home, while the working non-poor have the highest fraction away from home.

households. This has particularly been the case when food inflation has been lower than overall inflation and inflation for food away from home has been lower than inflation for food at home. Low-income households have consistently dedicated a higher portion of their total expenditure toward food than high-income households.

In the final column of Table 3, the level of food inflation is translated into the additional amount of money needed for

The maximum food stamp benefit is set equal to the cost of the USDA's Thrifty Food Plan, a balanced minimum cost diet that is comprised solely of food consumed at home. Food stamp benefit levels for the 12 months starting in October are based on the price of the Thrifty Food Plan in the previous June. Between June 2007 and June 2008, the cost of the Thrifty Food Plan increased by 8.4 percent for a family of two from \$298 to \$323.⁸ Comparable

Table 4: Estimates of Inflation Experiences by Demographic Group, 2009

Group	Projected food inflation, 2009	Projected food contribution to total inflation, 2009
All	4.3%	0.6%
<i>Bottom Income Quartile</i>	4.3%	0.6%
<i>Second Income Quartile</i>	4.3%	0.6%
<i>Third Income Quartile</i>	4.3%	0.6%
<i>Top Income Quartile</i>	4.3%	0.5%
<i>Working Poor</i>	4.3%	0.7%
<i>Poor Not Working</i>	4.3%	0.7%
<i>Not Poor Not Working</i>	4.3%	0.5%
<i>Working Not Poor</i>	4.3%	0.6%
<i>Elderly</i>	4.3%	0.5%
<i>Single Mom</i>	4.3%	0.7%
<i>Food Stamp Recipients</i>	4.3%	0.8%

Source: Author's calculations based on the Bureau of Labor Statistics, *Consumer Expenditure Survey*, and U.S. Department of Agriculture, Economic Research Service, *Food Price Outlook*, 2008.

increases were seen by other sized families. Because the Thrifty Food Plan does not include any food consumed away from home, the price increase between 2007 and 2008 was more in line with the price increase of food at home.

Food stamp recipients are expected to spend 30 percent of their income on food. As a result, the food stamp benefit received by a household is equal to the maximum benefit minus 30 percent of the household's net income (income minus a series of deductions). For example, a family of two with a net monthly income of \$375 would have received a monthly benefit of \$173 in 2007 (\$298-.3x\$375).

If that household's income was unchanged between 2007 and 2008, the benefit amount would increase from

\$173 to \$198 (\$323-.3x\$375) starting in October – the household would receive an additional \$300 in food stamps in 2008. This increase in benefits would defray the additional cost of food. In this example, the household's annual benefits would increase by more than the average additional cost of food of \$262. This occurs because the percentage increase in the cost of the Thrifty Food Plan was greater than the percentage increase in the cost of food, and because household income was assumed to be unchanged from year to year.

While these calculations are based on hypothetical households, and may not represent the experiences of individual households, they point to the fact that food stamp benefits increase as food prices increase. These price

increases, at least partially, and potentially totally, offset the increased price of food.⁹

Looking ahead

The Economic Research Service (ERS) of the Department of Agriculture releases detailed forecasts of food price changes. Their recent forecast is for food inflation for all of 2008 of between 5.0 percent and 6.0 percent, broken down into inflation for food at home of 5.5 percent to 6.5 percent, and inflation for food away from home of 3.5 percent to 4.5 percent. For 2009, they are forecasting a slight moderation with total of food at home and food away from home, growing from 4.0 percent to 5.0 percent. They also provide forecasts for all 17 categories of food expenditure displayed in Table 1.¹⁰

Table 4 provides estimates of food inflation and food's contribution to total inflation for the different household types based on the 2006 food expenditure patterns and the ERS's 2009 price forecasts. For these estimates, the midpoints of the ranges of the ERS's anticipated price changes are used. For all the population groups, food inflation of 4.3 percent for 2009 is predicted. This consistency arises from the fact that food at home and food away from home are expected to grow at similar rates. There is some disparity across the projected contributions to inflation due to differences in food's share of total expenditure.

Adjusting consumption

The discussion of food price inflation takes as given the expenditure patterns of households and calculates inflation based on price changes. These calculations are based on the assumption that household food consumption patterns remain fixed in the face of price increases. However, households can respond to price increases by altering their consumption patterns.

Research within the United States does not tend to find that people substantially adjust the amount of food they consume in response to price changes. According to the ERS, the price elasticity of demand for food, beverages, and tobacco in the United States is -0.08, meaning that a 1 percent increase in the price of food decreases the quantity demanded by eight-hundredths of a percent.¹¹

However, households substitute across food categories and items in response to price increases. One pattern that is emerging is that households are responding to increasing food prices by choosing to eat at home more or packing lunch for work. Survey data points to increased at home dining. In conjunction with this, many of the large restaurant chains are reporting slower sales and weak financial results. By contrast, grocery stores are reporting strong sales. They are also reporting that consumers are purchasing more private label rather than brand name items. Fast food chains have also been performing well as consumers are attracted by their value options.¹²

The ability to switch to at home dining is more of an option for high-income households, because they eat out more to begin with. In addition, low-income households may already be purchasing inexpensive and generic items, and have little leeway to trade down to these cheaper options.

Conclusion

Food price inflation has been high over the past year. These price increases have had a disproportionate effect on low income, poor, and food stamp recipient households for three reasons. First, low-income households concentrate a greater proportion of their total budget to food than high-income households, making them more sensitive to food price changes in general. Second, low-income households concentrate more of their total food

expenditure at home, where prices have been growing rapidly, relative to food away from home. Third, because low-income households consume less expensive foods and eat predominately at home, they have less capability to meet their food budget by trading down to less expensive food options.

Notes

- 1 For details on the Chicago Fed IBEX®, see Leslie McGranahan and Anna Paulson, "Constructing the Chicago Fed Income-Based Economic Index: Inflation," *Federal Reserve Bank of Chicago Working Paper No. WP-2005-20*, or available at www.chicagofed.org/community_development/chicagofed_ibex_consumer_price_index.cfm on December 1, 2008.
- 2 Household types are overall urban population, based on race/ethnicity (Black, Hispanic, White, other), educational attainment (less than high school, high school graduate, some college, college graduate), age (elderly, non-elderly), food stamp recipients, home ownership status (home owner, non-home owner), poverty status (poor, non-poor), poverty status where poverty is defined at twice the federal poverty line (poor, non-poor), poverty and work status (non-poor non-working, non-working poor, working poor, working non-poor), poverty and work status where poverty is defined as twice the federal poverty line (non-poor non-working, non-working poor, working poor, non-poor, non-working), income quartile, income quartile where income is adjusted for family composition, savers, non-savers, and single mothers. The creators of the index are in the process of adding the disabled to this list.
- 3 See David B. Cashin and Leslie McGranahan, "Household energy expenditures 1982-2005," *Chicago Fed Letter*, June 2006, No. 227.
- 4 The BLS has 18 categories, because it splits nonalcoholic beverages and beverage materials into two. Expenditure percent breakdowns within nonalcoholic beverages were not calculated.
- 5 For a more comprehensive discussion of food price increases, see Tom Capehart and Joe Richardson, 2008, "Food Price Inflation: Causes and Impacts," *CRS Report for Congress, Congressional Research Service No. RS22859*, April 10, or *Farm Foundation Issue Report*, "What's Driving Food Prices?" July 2008.
- 6 The coefficient of variation (the ratio of the standard deviation to the mean) of the expenditure shares within food at home of the 16 different subcategories of food at home, it ranges from 5 percent to 18 percent.
- 7 Any adjustment to account for the fact that the expenditure amounts were calculated in 2006 and prices increased between base period 2006 and August 2007 have been omitted. Taking these price increases into account would increase these numbers slightly.
- 8 This is based on a family of two, because the average food stamp household has 2.3 members.
- 9 A separate issue is the timing of these adjustments. For a good discussion of this see Dorothy Rosenbaum, "Food stamp inflation adjustment lags, resulting in inadequate benefits," revised July 23, 2008. Available at www.cbpp.org/7-22-08fa.htm on December 1, 2008.

10 Available at www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/cpiforecasts.htm on December 1, 2008. Cereals and bakery products are reported together.

11 Available at www.ers.usda.gov/data/InternationalFoodDemand on December 1, 2008.

12 "With prices high, consumers warm to the idea of eating in," Associated Press, September 21, 2008. Available at www.chicagotribune.com/news/nationworld/chi-eating-charticlesep21,0,7895851.story on December 1, 2008. Also see Dan Sewell, "Kroger profit rises 3.4 pct on sales growth," Associated Press, September 16, 2008. Available at www.nytimes.com/2008/09/17/business/17kroger.html on December 1, 2008.

Biography

Leslie McGranahan is an economist in the in the regional analysis team of the economic research department of the Federal Reserve Bank of Chicago. Her research interests include the effectiveness of antipoverty programs, government expenditure on low income populations and the intergenerational transmission of wealth and inequality. She received a bachelor's degree in politics from Princeton University and master's and doctorate degrees in economics from Northwestern University.