

Chicago Fed Letter

Food inflation and the consumption patterns of U.S. households

by Leslie McGranahan, economist

In July 2008, food prices were 6.0% above their July 2007 level. This article examines how different household types have been affected by the recent rapid rise in food prices.

Increases in food prices have been grabbing headlines recently. In this *Chicago Fed Letter*, I investigate the expenditure patterns of different types of households to discover which house-

holds have been most affected by food price changes. I find that food price increases have had a more dramatic effect on the purchasing power of low-income households than that of high-income households. This is largely because low-income households concentrate more of their total budgets on food and spend relatively more on food consumed at home.

Figure 1 shows that there have been periodic episodes of high food inflation over the past four decades. However, a number

at 6.0% or higher was last seen in 1990. The figure also shows that food inflation was substantially higher than it is today in the mid-1970s and from 1978 through 1980. The gap between food price changes and price changes for other goods has also been growing. For example, food inflation was 6.0% from July 2007 through July 2008, while

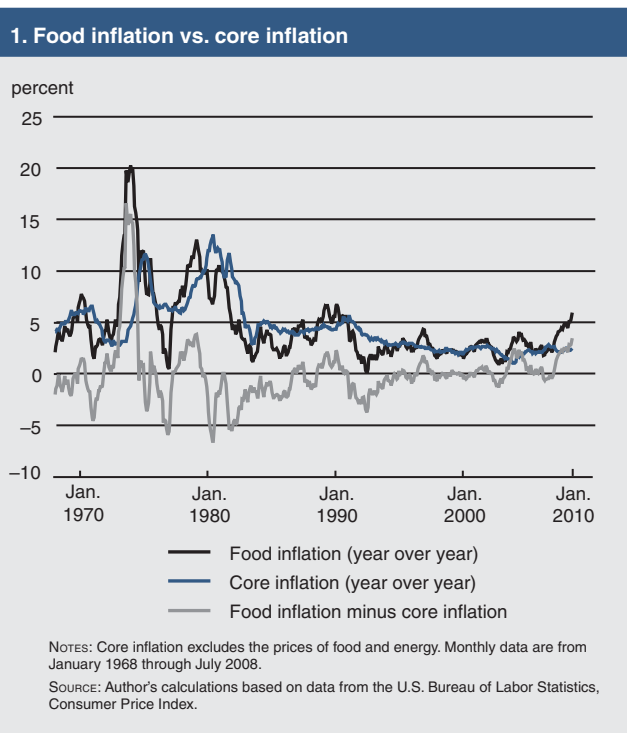
core inflation (which excludes food and energy prices) was 2.5%. This difference of 3.5% was the largest gap reported since early 1979.

The recent increase in food 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.¹ Figure 2 shows that, among these categories, the largest price increases have been in eggs, fats and oils, bakery products, fresh vegetables, and cereals and cereal products.² Price increases for pork and other meats have been less than or equal to core inflation. But price increases in every other food category have been higher than core inflation.

There has also been a difference in price increases depending on where food is consumed. Prices for food at home are up 7.1%, while prices for food away from home are up 4.6%. Prices for food at home have historically been more volatile than prices for food away from home. And prices for food at home have tended to increase more quickly when food prices are increasing quickly.

Reasons for food price increases

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



2. Annual food price changes and expenditure patterns, by food category

	Price change, July 2007–July 2008	Spending by food category, 2006	
		Share of total expenditure	Share of food expenditure
(----- percent -----)			
Food	6.0	13.5	100.0
Food at home	7.1	7.4	54.5
Cereals and cereal products	11.8	0.3	2.3
Bakery products	12.2	0.7	4.9
Beef and veal	4.6	0.5	3.8
Pork	1.4	0.3	2.5
Other meats	2.5	0.2	1.7
Poultry	3.5	0.3	2.3
Fish and seafood	6.5	0.3	2.0
Eggs	16.3	0.1	0.6
Dairy and related products	8.1	0.8	5.9
Fresh fruits	8.4	0.4	3.1
Fresh vegetables	12.0	0.4	3.0
Processed fruits and vegetables	8.9	0.4	3.2
Nonalcoholic beverages and beverage materials	3.9	0.7	5.3
Sugar and sweets	5.0	0.3	2.0
Fats and oils	15.8	0.2	1.3
Other foods	5.3	1.4	10.6
Food away from home	4.6	6.2	45.5

NOTE: The 17 categories of food expenditure are the 16 that fall under food at home plus food away from home.

SOURCES: Author's calculations based on data from the U.S. Bureau of Labor Statistics, Consumer Price Index and *Consumer Expenditure Survey*.

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 an increase in the price of other agricultural commodities, because acreage planted with those commodities has been replaced with corn. Second, energy price increases affect food prices through crop production, which is fairly energy intensive.

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 wealth, particularly in China and India.³ Individual food categories have also been subject to independent influences. For instance, pork prices have not grown as quickly as other food prices in part because of the increases in supply resulting from a successful vaccination program for circovirus. 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 arises from the relative difficulty of adjusting these

prices combined with the reluctance of restaurants to raise prices on cash-strapped patrons who may then choose to eat 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 foods the household consumes—i.e., which items 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).

I use data on the market baskets of different types of households to assess household sensitivity to food price changes. These market baskets were calculated in the process of generating the Chicago Fed IBEX® (Income-Based Economic

Index)—an ongoing project that documents the expenditure patterns of different types of households in order to assess inflation differentials.⁴ I measure 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. I use consumption data for 2006—the most recent year of available data from the U.S. Bureau of Labor Statistics' *Consumer Expenditure Survey*.

Figure 2 displays household food expenditure patterns overall and by category—both as a percentage of total expenditure (second column) and as a percentage of total food expenditure (third column) for the U.S. urban population. In 2006, food expenditure represented 13.5% of household budgets. These overall expenditure patterns obscure variation in consumption patterns across households.

Different types of households concentrate different proportions of their expenditure on food. I look at consumption patterns for six different types of households. The first four types divide households by income quartile after income is adjusted for family composition using the National Academy of Sciences' equivalence scale. The final two types are elderly households and households that receive food stamps.

The first column of figure 3 shows expenditure percentages for these six household types for food. 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 (bottom two income quartiles). Elderly households spend less 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. The effect of food inflation on food stamp recipients is partly blunted by the indexation of food stamp benefit amounts to food prices.⁵

Overall, lower-income households concentrate a higher proportion of their

3. Food expenditure patterns, by demographic group

Group	Food as a share of total expenditure	Share of food expenditures	
		Food at home	Food away from home
		(----- percent -----)	
All	13.5	54.5	45.5
Bottom income quartile	14.9	66.4	33.6
Second income quartile	14.7	57.2	42.8
Third income quartile	14.1	53.8	46.2
Top income quartile	12.1	46.8	53.2
Elderly	11.7	60.5	39.5
Food stamp recipients	17.8	74.8	25.2

NOTE: All values are for 2006.

SOURCE: Author's calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Expenditure Survey*.

4. Food inflation experiences, by demographic group

Group	Food inflation	Food's contribution to total inflation	
		Food's contribution to total inflation	Total inflation
		(----- percent -----)	
All	6.0	0.8	5.6
Bottom income quartile	6.3	0.9	6.0
Second income quartile	6.0	0.9	5.8
Third income quartile	5.9	0.8	5.7
Top income quartile	5.8	0.7	5.2
Elderly	6.3	0.7	5.3
Food stamp recipients	6.4	1.1	6.3

NOTES: All values are annual changes from July 2007 through July 2008. See the text for further details.

SOURCES: Author's calculations based on data from the U.S. Bureau of Labor Statistics, *Consumer Price Index* and *Consumer Expenditure Survey*.

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.

Food expenditure percentages represent just one part of the effect of food inflation. Food inflation also depends on which foods are purchased. Figure 3 also shows spending patterns on food at home compared with food away from home.⁶ I find that 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). Elderly households

spend less than average on food away from home. Food stamp recipients spend one-quarter of their food dollars away from home (food stamps are not accepted for restaurant food).

Household food inflation

I combine the measures of price changes by food category with market basket information to measure 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 figure 2). This measure tells us how much more it would cost the household to buy the same food market basket in July 2008 relative to July 2007. Mechanically, this measure combines the food price change for each category from July 2007 through July 2008 with the share of that cate-

gory in the household's food market basket in 2006 (figure 4, first column). Based on these data, food inflation has ranged from 5.8% to 6.4%. It has been the lowest for the highest-income households, while it has been the highest for the lowest-income families, the elderly, and food stamp recipients.

The second measure of food inflation (figure 4, second column) asks how much inflation the household would have faced if the prices for all other goods except food had been unchanged between July 2007 and July 2008. I call this food's contribution to total inflation. This measure combines the price change for each food category with the share of total consumption concentrated on that category. Based on these numbers, food's

contribution to total inflation has ranged from 0.7% to 1.1%. For the highest-income households and the elderly, food's contribution to inflation has been the smallest, while for the food stamp recipients, its contribution has been the largest. (If we were to assume that the prices of all other goods grew at a higher rate—such as 5.5%, which was the actual rate increase for prices of all goods excluding food—the group inflation rates would be higher and closer together.)

The final column of figure 4 shows the household types' inflation based on their actual market baskets across *all* expenditure categories (including nonfood 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, as well as those for food's contribution to total inflation, in that total inflation has been highest for food stamp recipients and total inflation declines as income increases.

The findings that food inflation and total inflation were highest for food stamp recipients and low-income households have not been consistent over time. During many periods in the past 20 years, particularly when food inflation has been

Charles L. Evans, *President*; Daniel G. Sullivan, *Senior Vice President and Director of Research*; Douglas Evanoff, *Vice President, financial studies*; Jonas Fisher, *Economic Advisor and Team Leader, macroeconomic policy research*; Richard Porter, *Vice President, payment studies*; Daniel Aaronson, *Economic Advisor and Team Leader, microeconomic policy research*; William Testa, *Vice President, regional programs, and Economics Editor*; Helen O'D. Koshy, Kathryn Moran, and Han Y. Choi, *Editors*; Rita Molloy and Julia Baker, *Production Editors*.

Chicago Fed Letter is published monthly by the Research Department of the Federal Reserve Bank of Chicago. The views expressed are the authors' and are not necessarily those of the Federal Reserve Bank of Chicago or the Federal Reserve System.

© 2008 Federal Reserve Bank of Chicago
Chicago Fed Letter articles may be reproduced in whole or in part, provided the articles are not reproduced or distributed for commercial gain and provided the source is appropriately credited. Prior written permission must be obtained for any other reproduction, distribution, republication, or creation of derivative works of *Chicago Fed Letter* articles. To request permission, please contact Helen Koshy, senior editor, at 312-322-5830 or email Helen.Koshy@chi.frb.org. *Chicago Fed Letter* and other Bank publications are available on the Bank's website at www.chicagofed.org.

ISSN 0895-0164

lower than overall inflation, the lowest-income households faced lower food inflation and lower total inflation than the highest-income households. However, low-income households have consistently dedicated a higher portion of their total expenditure toward food than high-income households.

Conclusion

In the past year, food prices have increased by 6.0%. The effect that these price changes have had on different household types depends on the share of their budget set aside for food and on the specific food items that they

consume. Here, I find that low-income households and food stamp recipients have been particularly affected by these food price increases because food represents a greater share of their budgets and because more of their food consumption takes place at home.

¹ Actually, the BLS has 18 categories because it splits nonalcoholic beverages and beverage materials into two. I report these as one category.

² For expanded versions of figures 2, 3, and 4, see www.chicagofed.org/economic_research_and_data/research_resources/files/rr_mcgranahan_cfloctober2008_255_expandedfigures.pdf.

³ See Tom Capehart and Joe Richardson, 2008, "Food price inflation: Causes and impacts," CRS Report for Congress,

Congressional Research Service, No. RS22859, April 10.

⁴ 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 www.chicagofed.org/community_development/chicagofed_ibex_consumer_price_index.cfm.

⁵ As one would expect, although poorer households spend a higher proportion

of their total expenditure on food, wealthier households spend a higher dollar amount on food.

⁶ Expenditure patterns across the categories that make up food at home are fairly similar for all household types. For detailed data, see www.chicagofed.org/economic_research_and_data/research_resources/files/rr_mcgranahan_cfloctober2008_255_expandedfigures.pdf.