



United States
Department of
Agriculture



Economic
Research
Service

How Do Low-Income Households Respond to Food Prices?

Biing-Hwan Lin, Joanne F. Guthrie

Economic Information Bulletin Number 29-5

September 2007

Households make food choices based on numerous factors, such as taste, convenience, nutrition, and price. Low-income households spend a larger share of their income on food than do higher income households (Blisard and Stewart, 2007); one might expect food stamp households, therefore, to be especially influenced by price. If this is the case, lowering the price of a healthful, but underconsumed, food or increasing the price of an overconsumed food may be an effective strategy in improving the eating habits of low-income households. Some proposed changes to the Food Stamp Program are intended to encourage healthful food choices by influencing the relative prices of foods. For example, a proposal to offer food stamp participants a bonus based on the amount of fruits and vegetables they purchase could be considered to effectively lower the price of those foods (Guthrie et al., 2007). What effects would such policies likely have on the food choices of low-income households?

To answer this question, it is important to understand how consumers respond to prices and whether low-income households respond more strongly to prices than other consumers do. ERS research on consumers' response to food prices and how it affects their purchases of particular foods can provide insights into the likely effects of price interventions as a strategy to improve food choices.

Response to Price Varies by Type of Food and Household Income

The availability of survey data on household food consumption and purchases has enabled ERS researchers to examine the response of higher and lower income consumers to price. Using the 1987-88 Nationwide Food Consumption Survey data, ERS researchers Huang and Lin (2000) estimated household food demand by segmenting households into three income levels, with the cutoff for the lowest income group the same as the food stamp eligibility cutoff. They found that, in general,



Photo by Joseph Sanford

household demand for dairy products, fruits, and vegetables was more responsive to price than demand for other food categories. Low-income households were more responsive to price changes than high-income households; however, the differences were quite small.

How Does Consumer Response to Price Affect Food Choices?

Would consumer response to price change be large enough to make price manipulation an effective strategy for changing food choices? If so, a policy intervention that manipulated price by providing food stamp participants with a bonus or coupons for purchasing healthful underconsumed foods, thus lowering their price to participants, might be effective in encouraging their consumption. Alternatively, an intervention that raised the price of an overconsumed food might discourage its consumption. Research conducted or supported by ERS has examined consumers' responses to price changes, and found that the answer may vary, depending on the food chosen for price manipulation. The following two examples illustrate this point.

Example 1: Snack Foods

ERS researchers used supermarket sales data to investigate the effect of raising the price of an overconsumed food category on consumers' food purchases (Kuchler et al., 2004). The category they chose was salty snacks, such as chips. They found that consumer demand for these products is relatively unresponsive to price. That is, the percentage decrease in the purchased quantity is less than the percentage increase in the price. Specifically, they concluded that a 10-percent rise in the price of potato chips (about 2 cents per ounce) would decrease annual household purchases of potato chips by 4.5 percent (7 ounces of 156 ounces). Consumers seem to enjoy salty snacks so much that raising their prices by a small amount has little effect.

Example 2: Milk and Soft Drinks

There has been a populationwide shift in beverage consumption in America. Federal dietary guidance urges more consumption of low-fat milk and less consumption of sweetened beverages, such as soft drinks; however, the reverse has taken place. Consumption of soft drinks has soared, whereas milk consumption has declined (fig. 1). The low cost of soft drinks, compared with other beverages, such as milk, is often cited as a reason for these consumption shifts, and this trend in declining milk consumption and rising soft drink consumption is indeed consistent with the trend in relative prices (fig. 2).

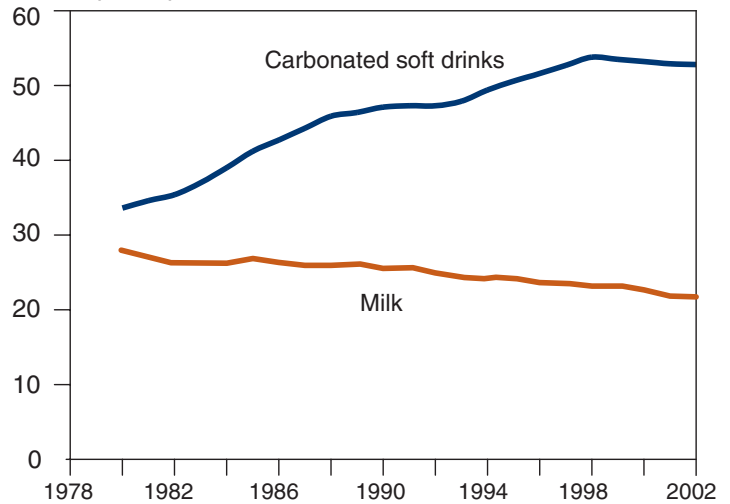
Data from the 1996-97 National Food Stamp Program Survey were used to investigate factors influencing beverage purchases by food stamp participants, and price differences in beverages were found to provide a partial explanation for purchasing behavior (Yen et al., 2004). Study findings suggested that a 10-percent reduction in milk price would result in a 14-percent increase in the consumption of reduced-fat milk, and a 10-percent increase in soft drink price would lead to an 8-percent reduction in soft drink consumption. Nutrition knowledge and beliefs were also found to be associated with beverage choice decisions. For example, people who believed that it was important to get adequate servings of milk tended to drink more milk, and people who believed that it was important to moderate sugar consumption tended to drink fewer soft drinks.

The findings of these two studies, one on salty snacks and one on milk and soft drinks, are consistent with the earlier research by Huang and Lin on consumer response to food prices. For some foods, consumer demand is not very price sensitive, so small price manipulations may not induce large responses in purchases—snack foods appear to fall in this category. For other foods, such as milk, Huang and Lin found demand to be more responsive to price. Consistent with this finding, the case study of milk and soft drink

Figure 1

In the past two decades, soft drink consumption soared, while milk consumption declined¹

Gallons per capita



¹Food availability data is a proxy for per capita consumption over time. Source: Economic Research Service/USDA, Food Availability (Per Capita) Data System, www.ers.usda.gov/data/foodconsumption/

purchasing found a much stronger effect of price on consumer demand for reduced-fat milk. These findings suggest that price manipulation may have varying effects on food purchases across different foods; it may influence consumption of particular categories, such as dairy, fruit, and vegetables, which appear to be most responsive to price change.

How Much Can Price Change Affect Food Choices? Examining the Evidence for Fruits and Vegetables

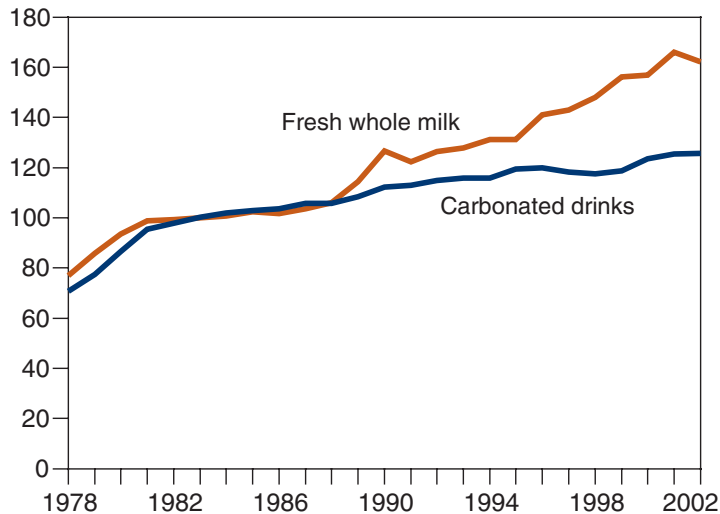
For more than a decade, promotion of increased vegetable and fruit consumption has been a major focus of Federal dietary guidance. Nevertheless, Americans still do not consume recommended amounts of fruits and vegetables (Casagrande et al., 2007). ERS-funded research indicates that lower income consumers eat fewer fruits and vegetables than higher income consumers do. Recently, public health advocates have suggested strategies for increasing fruit and vegetable consumption of food stamp participants that, through either a bonus or some other approach, would effectively lower the price of these foods. To assess the potential effectiveness of price intervention in improving participants' diets, we use the estimates of price responsiveness generated by Huang and Lin, as well as information on current consumption compared with the recommended level. For ease in demonstrating the effects of a discount, a hypothetical 10-percent discount policy option is examined.

ERS research indicates that a 10-percent discount in the price of fruits and vegetables would increase the amount purchased by 6-7 percent. Fruit and vegetable consumption of the average food stamp participant is estimated at 1.95

Figure 2

Consumer Price Index for carbonated soft drinks and milk

Index: 1982-84=100



Source: Bureau of Labor Statistics.

cups per day. A 10-percent reduction in fruit and vegetable prices, therefore, would raise consumption to an estimated 2.08 cups. A 20-percent reduction in price would raise consumption to about 2.2 cups—an improvement, although still below the 3.5-5.0 cups per day recommended for typical adults.

What would be the effect on program costs of adding such a bonus to existing food stamp benefits? According to the food spending data collected by the Bureau of Labor Statistics' Consumer Expenditure Survey, households in the poorest one-fifth of the population spent \$208 per person on fruits and vegetables in 2004. At that spending level, a bonus of 10 cents per dollar spent on all fruits and vegetables would result in an additional \$21 per person per year (if the bonus was restricted to fresh produce, it would result in \$12 per person per year). Given a Food Stamp Program caseload of 25.7 million participants, the annual cost of the bonus can be roughly estimated to be approximately \$0.5 billion if all fruits and vegetables were eligible for the bonus and \$0.3 billion if the bonus was restricted to fresh produce. If the bonus were successful in increasing fruit and vegetable consumption, program costs would rise,

although benefits could also be expected to be greater. New research is underway at ERS to improve these estimates to provide more information to policymakers.

Information Sources

Blisard, Noel, and Hayden Stewart. *Food Spending in American Households, 2003-04*, Economic Information Bulletin No. EIB-23, U.S. Department of Agriculture, Economic Research Service, March 2007, available at: <http://www.ers.usda.gov/Publications/eib23/>.

Casagrande, S.S., Y. Wang, C. Anderson, and T.L. Gary. "Have Americans Increased Their Fruit and Vegetable Intake? The Trends between 1988 and 2002," *American Journal of Preventive Medicine* 32(4):257-63, April 2007.

Fox, Mary Kay, and Nancy Cole. *Nutrition and Health Characteristics of Low-Income Populations: Volume I, Food Stamp Program Participants and Nonparticipants*, E-FAN-04-014-1, U.S. Department of Agriculture, Economic Research Service, December 2004, available at: <http://www.ers.usda.gov/Publications/efan04014-1/>.

Guthrie, Joanne F., Elizabeth Frazao, Margaret Andrews, and David Smallwood. "Improving Food Choices—Can Food Stamps Do More?" *Amber Waves* 5(2):22-28, U.S. Department of Agriculture, Economic Research Service, April 2007, available at: <http://www.ers.usda.gov/AmberWaves/April07/Features/Improving.htm>.

Huang, Kuo S., and Biing-Hwan Lin. *Estimation of Food Demand and Nutrient Elasticities from Household Survey Data*, Technical Bulletin No. 1887, U.S. Department of Agriculture, Economic Research Service, September 2000, available at: <http://www.ers.usda.gov/Publications/tb1887/>.

Kuchler, Fred, Abeyayehu Tegene, and J. Michael Harris. *Taxing Snack Foods: What to Expect for Diet and Tax Revenues*, Agriculture Information Bulletin No. 747-08, U.S. Department of Agriculture, Economic Research Service, August 2004, available at: <http://www.ers.usda.gov/Publications/aib747/aib74708.pdf>.

Yen, Steven T., Biing-Hwan Lin, David M. Smallwood, and Margaret Andrews. "Demand for Nonalcoholic Beverages: The Case of Low-Income Households," *Agribusiness* 20(3):309-21, July 2004.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.