



ERS *Report Summary*

Economic Research Service

August 2012

U.S. Department of Agriculture



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The Demand for Disaggregated Food-Away-From-Home and Food-at-Home Products in the United States

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What Is the Issue?

Food away from home (FAFH, including limited-service and full-service restaurants) constitutes a large and growing portion of the food budget: in 2009, the annual average household expenditure on FAFH was \$2,619, or approximately 41 percent of the food budget for an average U.S. household, compared with \$1,320, or approximately 29 percent of the food budget in 1984. Because FAFH comprises a sizable share of total food expenditures and nutritional intake for an average American, disregarding the relationships between FAFH and any other subset of foods may produce misleading results for formulating nutrition and health policy. Many studies have excluded or inadequately represented FAFH, such that the estimates only partially capture the effects of policy-induced food price changes on consumer demand and nutrition.

Those analyses that included all goods and services treated FAFH as a composite good, but disaggregated products in FAFH might differ from one another in terms of responsiveness to price- and income-led expenditure changes, nutritional characteristics, or both. Little is known about how demands for different types of FAFH respond to price changes, but a handful of studies have found that demand responds to changes in income differently for full-service food than it does for limited-service food.

What Did the Study Find?

Statistically significant cross-price relationships exist between and within groups of foods. Evidence suggests that demands for FAFH products differ from demands for food-at-home (FAH) products. Further, FAFH products differ among one another in their nutritional characteristics, quality, and responsiveness to changes in prices and expenditure. Specific findings related to cross-price relationships and consumer demand for FAFH include:

- The demands for disaggregated FAFH products tend to be more sensitive to income-induced changes in total expenditures than are FAH products. This finding may explain why the budget share for FAFH products dipped during the recent recession, while the budget shares for many FAH products increased. During December 2007-June 2009, monthly total expenditures fell 0.51 percent for the average American. In addition, the prices of most FAH products, which are mostly gross substitutes for FAFH products, fell relative to the prices of the FAFH

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products. Hence, income-induced changes in total expenditures and the relative affordability of FAH versus FAFH products caused demand for FAFH to fall.

- The demand for full-service FAFH responds much more readily to price changes than does the demand for limited-service FAFH and other FAFH (including vending machines, mobile food vendors, and school and employee sites).
- Compared with the demands for foods commonly deemed “unhealthy” (e.g., white bread, cakes and cookies, frozen foods), the demands for many products commonly deemed “healthy” (fruits and vegetables, nonwhite bread, fish, and seafood) tend to be much less responsive to price changes. For example, the demand for nonwhite bread is much less price-elastic than the demand for white bread, and the demand for cookies and cakes is one of the most price-elastic.
- Many of these “healthy” and “unhealthy” foods show statistically significant substitution and complementary relationships within and among food groups—a finding that complicates any analysis trying to predict the effects of policy-induced price changes on food demands and nutritional outcomes.
- Using forecasts of price and total expenditure changes between 2011 and 2012 to predict food consumption changes over the same span, we found that predictions based on estimates of (conditional) demand elasticities that ignore the total effects of substitutions and complementarities differ substantially—sometimes even taking opposite signs—from predictions based on estimates of (unconditional) demand elasticities that include all goods and services. For example, consumption of each disaggregated dairy product was predicted to increase approximately 0.5-1 percent in 2012 when using unconditional demand elasticities, but to decrease a similar amount according to conditional elasticities. Similar contradictions in forecast changes in consumption between the two sets of demand elasticities are found for pork, poultry, eggs, sugar and sweets, and frozen foods.
- The substantial cross-price relationships between products in different groups suggest that nutrition policy analysis based on demand elasticities for small groups of products is likely to be misleading.

How Was the Study Conducted?

Using the 1998–2010 Consumer Expenditure Survey diary section, we constructed a monthly time series of household expenditures by aggregating detailed weekly expenditure data into 43 products (i.e., 3 FAFH products, 38 FAH products, alcoholic beverages, and a nonfood composite), and then averaged these data over households for a given month. We then matched the average monthly expenditures to monthly consumer price indices.

We estimated demand for the 43 products using two-stage budgeting, where the representative consumer allocates expenditures for market goods and services to groups of goods in the first stage, and then chooses products within each group of goods in the second stage. First, we estimated demand for eight food groups (cereals and bakery products, dairy, meat and eggs, fruits and vegetables, nonalcoholic beverages, other FAH, and FAFH/alcoholic beverages), and a nonfood composite good. Second, we modeled the second-stage allocation of expenditures on the eight food groups as weakly separable groups—a structure that allowed us to estimate demand for goods in a given group without considering demand for goods in other groups.

Using demand elasticity estimates from the first- and second-stage allocations, we approximated “unconditional” demand elasticities, which consider the total expenditure for all goods and services. We then computed the changes in food quantities implied by forecasted changes in prices and personal consumption expenditures between 2011 and 2012. The computation used the two sets of demand elasticities and compared the simulated changes to show the influence of intergroup substitution on measures of changes in total nutritional intake.