



Utilizing the USDA's National Household Food Acquisition and Purchase Survey to Calculate a Household-Level Food Environment Measure

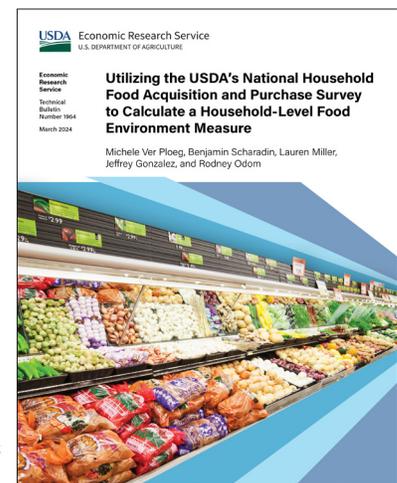
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What Is the Issue?

Many commonly used food retail environment (FRE) measures are based on the presence or number of food stores within a specified area. These measures often treat stores equally and do not account for factors such as varying distances and the healthfulness of available choices, which limit their accuracy and usefulness. Utilizing the National Household Food Acquisition and Purchase Survey (FoodAPS), in conjunction with Circana's (formerly IRI), OmniMarket Core Outlets (formerly IRI InfoScan), and USDA's Purchase to Plate Suite (PP-Suite), the authors developed a household-level Food Retail Environment Healthfulness Quality (FREHQ) measure to address these limitations. The measure approximates a household's exposure to a healthy food retail space by first proxying the healthfulness of the food inventory in stores near a household and then considering the location of each household relative to each store and discounting the weight of a store by its distance from each household. When compared with a homogenous geographic measure—a county-level, low-income, low-access measure—the new measure allows for greater household heterogeneity and provides opportunities to extend analysis on the impact of the food retail environment. The purpose of developing the FREHQ is to provide current and future FoodAPS users a household-specific measure of the FRE that may be used to consider the impact of the FRE on food spending, food security, and other outcomes in a more nuanced way in future studies. This study describes how USDA, Economic Research Service conceptualizes and calculates the FREHQ measure. The measure has advantages over other measures of the FRE in that it allows researchers to investigate the influence of the FRE for households that reside in the lowest quality food retail environments. Further, because it is a household and not a geographic measure, it allows researchers who use this measure to partially address endogeneity concerns by applying econometric techniques, such as geographic-fixed effects.

What Did the Study Find?

The authors constructed four versions of the household-level FREHQ, first using the straight-line versus road network distance between the household and store and then separately considering whether a household had access



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to a car. The average FREHQ for households that lived in an urban area is statistically significantly higher than the average for households that lived in a rural area in 2012–13 (the most recent available data). Differences in the average FREHQ were also observed across race, ethnicity, and income:

- Households with incomes above 185 percent of the poverty threshold had a higher average FREHQ measure across all FREHQ constructions.
- No statistically significant differences were found between the average FREHQ scores for White and Black households, with average scores close to 40. However, Asian and Hispanic households both have statistically significant higher FREHQ scores than White and Black households, with scores ranging between 41.3 and 42.4.

A component of the calculation of the FREHQ is to estimate the healthfulness of the products purchased in stores in each household's choice set—the collection of stores from which households can choose to shop. To do so, the authors calculated the FREHQ as a store-level 2020 Healthy Eating Index (HEI-2020) score, which ranges from 0 to 100, to reflect how closely a basket of food meets the 2020 Dietary Guidelines for Americans for each Circana retailer in 2012 and 2013 near FoodAPS households. These store-level estimations provide novel information about the healthfulness of stores by type:

- The mean HEI-2020 score of purchased products for grocery stores was 51.6. This score was close to the national HEI-2020 average scores estimated at the individual and household level based on food intake data, which follows intuition because a large portion of an average household's food at home is purchased at grocery stores.
- Dollar stores had an average HEI-2020 score of about 41.9. This suggests that in 2012 and 2013, the types of foods sold and purchased at dollar stores were dissimilar to the types of foods sold and purchased at grocery stores.

How Was the Study Conducted?

The FREHQ was constructed for each household in the FoodAPS, a nationally representative survey fielded in 2012 and 2013. Store locations from the OmniMarket Core Outlets for the corresponding period were used to calculate straight-line and network distances between stores and households. All stores within a 20-mile radius of each household were included in the sample. USDA, Economic Research Service's PP-Suite was used to link each food item in the OmniMarket Core Outlets with detailed nutrition information to calculate a store-level HEI-2020 score, which is used to measure store healthfulness in each household's FREHQ measure. Descriptive statistics for the four versions of the FREHQ were compared with expected trends based on past literature. While the data used to calculate the FREHQ for this study are from 2012–13 FoodAPS data, which are the only available source of comprehensive national-level data on household food purchase and acquisitions behaviors that allow linking to rich geographic information, future FoodAPS users can easily update the FREHQ as new data become available.