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**Explaining disparities in the cost of healthier food.**

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**Abstract**

This study examines the relative price of a standard market basket of food items and a market basket of healthier alternatives. Because people in low-income neighborhoods may have fewer grocery stores and transportation alternatives, the effects of store size and competition on the price of a market basket is estimated.

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## **Introduction**

A higher incidence of chronic disease has been associated with diets that are low in fiber, low in the consumption of fruits and vegetables, and high in fat, especially saturated fat. People in low-income neighborhoods tend to have poorer diets, and a higher incidence of diabetes, heart disease and cancer. There is a growing consensus that the environment can support or discourage healthy eating. Neighborhood differences in the price and quality of food may partially explain disparities in dietary behavior and chronic disease. No studies have documented the availability and price disparities between standard and healthier food baskets in neighborhoods with different median incomes. The purpose of this study is to determine: 1) the relative price of a standard market basket of food items and a market basket of healthier alternatives (i.e. white vs 100% whole wheat bread, whole vs non-fat milk, etc.); 2) whether prices paid for the healthier market basket by people in low-income neighborhoods is greater than the amount paid by people in higher income neighborhoods; and 3) examine how neighborhood characteristics related to transportation alternatives (percentage car ownership, access to public transportation), store size and degree of competition influence the prices paid for standard and healthier market baskets in neighborhoods with different median incomes.

## **Disparities in obesity, disease, and diet**

Low socioeconomic status (SES) is strongly associated with higher rates of obesity and high rates of the leading causes of illness and death. For instance, results from the National Health Interview Survey show that adults with less than a high school diploma are more likely to be overweight compared to those

with a graduate degree (60.4% vs. 42.4%) (Schoenbom et al, 2002). Low SES adults are more likely to have diabetes, cancer, heart disease, and hypertension compared to those in with higher SES (Mokdad et al., 2001; Paeratakul et al., 2002).

Diet may play an important mediating role in explaining socioeconomic disparities in health status. Analyses of data from the Continuing Survey of Food Intakes of Individuals (CSFII) indicate that wealthier respondents eat more fruits and vegetables, and eat a greater variety of foods, than their lower-income counterparts (Haan et al, 2001). Income appears to have a lesser effect on energy intake compared to diet quality.

Higher rates of obesity also are associated with neighborhood-level measures of SES. For instance, researchers in Scotland documented significantly higher body mass index among residents of the poorest neighborhoods in Glasgow (Ellaway et al., 1997). A similar graded relationship was found between in poorer neighborhoods and higher body mass index a study in Holland (van Lenthe, 2002). This relationship could be due to a higher concentration of low-income residents or it could be due to the characteristics of low-income neighborhoods.

### **Disparities in access to supermarkets**

In a study on the distribution of supermarkets in 21 large U.S. cities, Cotterill and Franklin (1995) discovered that, except for one city (Cleveland), a supermarket gap existed in low-income neighborhoods. Neighborhoods that lacked supermarkets were also correlated with a large number of persons on

public assistance and a large number of households without a car. In Los Angeles, Sloane et al. (2002) found that convenience stores were highly concentrated in low income compared to higher income census tracts. Moreland, in her study including four counties in the eastern U.S., found an inverse relationship between neighborhood income and supermarkets. She also found a significant inverse relationship between neighborhood racial segregation (greater proportion of African American residents) and fewer supermarkets (Morland et al., 2002).

The food store industry has also undergone significant change in the type of food store available to shoppers. Since the 1980s there has been a substantial increase in the number of warehouse and supercenter stores have offer a variety of services at relatively low-prices (Connor). Studies have also shown that the rise in the number of low-priced warehouse and supercenter food stores has largely bypassed low-income neighborhoods (Troutt 1993; Crockett et al. 1992; Kaufman et al, 1999). These stores are more likely to be found in middle income urban neighborhoods or in suburbs.

A grocery gap in low-income neighborhoods could result in a poor diet, as some research suggests that access to healthier foods is associated with consumption of healthy foods. For instance, one study found that people who live near supermarkets that sell low-fat milk and whole wheat bread are significantly more likely to purchase those healthy choices (Cheadle et al., 1993). Conversely, people who live farther from supermarkets are likely to consume fewer servings of fruits and vegetables (Morland et al., 2002). In a study examining the welfare effects to food stamp recipients of increasing access to *supermarkets* that accept food stamps, the change in consumer welfare was

positive and significant for those groups which lacked transportation (Feather 2003).

Important store attributes to consumers picking which store to shop in are cleanliness, fresh fruits and vegetables, fresh meats, low prices and friendly service (Food Marketing Institute 2004). While most consumers are satisfied with their primary food store, many low-income consumers are dissatisfied with the food store choices available to them. In research completed by the authors of this proposal, of 25 stores surveyed in the Sacramento and Los Angeles areas, three stores are places the surveyors (Do you mean, the survey responders?) would not frequent due to a lack of cleanliness and poor quality fruits and vegetables. All of these stores are located in low-income neighborhoods.

#### Does price influence the selection of healthier foods?

Public health researchers have just begun to investigate the role of food prices on the selection of foods. One study suggests that price is a significantly stronger influence on healthy food choice compared to labeling healthy foods (French, 2003). In an experiment manipulating prices and labels on foods sold in vending machines, the authors found that price reductions of 10%, 25% and 50% on lower fat snacks resulted in an increase in sales of 9%, 39% and 93%, respectively, compared with usual price conditions.

A recent study suggests that the low price of energy dense foods encourages low-income consumers to make unhealthy choices (Drewnowski, 2004). The author used linear programming models to generate a low-cost diet to meet caloric, but not health, requirements. The result was a diet low in fruit

and vegetables, whole grains, and lean meats, and similar to a diet eaten by lower income consumers.

In addition to these important issues, the relationship between retail food prices, and firm conduct and market structure are of special interest. In the United States in 2000, supermarket sales were \$337 billion compared with \$73 billion for small grocery stores, and \$49 billion for convenience stores. Thus, of total grocery store earnings of 458 billion, approximately 74, 10, and 16 percent, respectively, went to these three types of stores. Compare this with the situation twenty years earlier when supermarkets earned \$157 billion and small grocery stores and convenience stores earned \$30 billion and \$19 billion, respectively, and it is interesting to note that while total food retail dollars earnings have more than doubled the relationship between small and large store shares of that total has not changed much. What has changed over this time period has been a decline in the number of firms collecting those dollars. Acquisitions and consolidations are commonplace in the retail food industry. Between 1997 and 2000, some 4,100 supermarkets were acquired by another firm. In 1992, the eight largest supermarket chains accounted for roughly 25 percent of the food retail market; today, the share of the top eight is more than 40 percent with the top four firms accounting for nearly 30 percent of the total share alone (Kaufman, 2002).

As the studies alluded to above suggest, the relationship between food prices and nutrition is an important one. Therefore, because of ever increasing consolidation, it is especially important to consider the relationship between the structure (including size, number, and location) of firms in a given market and the competitiveness of food prices. One issue of particular importance is

whether or not, because of geographic concentration or firm location, poor people pay more for food.

### **What an empirical analysis will tell us.**

The empirical analysis that we propose is adapted from methods used by Alvarez et al. (2000) on imperfect competition in a spatial market setting and an analysis performed by Cotterill (1986) on supermarket concentration and imperfect competition. Specifically, we seek to determine how the price level of particular food retail establishments are related to local and regional measures of market structure such as firm locations, ownership structure, cost and quality factors, and measures of concentration, while taking into account consumer attributes such as population density and demographics including local per-capita income, race, and ethnicity.

The analysis to estimate whether food stores located in low-income neighborhoods are imperfectly competitive will include variables to account for concentration, distance of food stores from each other, number of competitors within a specified radius of each food store, store size, access to stores as measured by percentage car ownership and the number of public transportation lines from which a store may be reasonably accessed, and neighborhood demographic variables. Concentration will be measured by creating a Herfindahl-type index based on square footage, as we do not have access to sales data. Square footage is a reasonable measure to use in place of the sales data as sales volume would be correlated with floor space. Distance of food stores from each other and the number of competitors within a specified radius of each food store will be obtained using geographic information system (GIS) mapping. The

Information Center for the Environment (ICE) will complete the GIS mapping. Data on square footage for supermarkets, and large and small grocery stores are available from county tax assessors. The data on car ownership and other neighborhood demographic variables can be gathered from the Census Bureau's census tract statistics. The data on public transportation lines are easily gathered from public transportation maps.

## **RESEARCH METHODS**

Most people tend to shop for food within five miles of their residences. To evaluate whether low-income neighborhoods have imperfectly competitive food stores, we will compare the price of the Thrifty Food plan and measures of imperfect competition between a core low-income area, and an area of five-mile radius around the core areas.

**Market Basket survey:** The items included in the survey are taken from the Thrifty Food Plan. (USDA 1999; Andrews et al. 2001). The items on the list make up the basic market basket food items for which we obtained prices, availability and nutrition information where applicable. For example, we collected data on the percentage fat for each type of ground beef sold in each store. The standard market basket of food items contains the less healthy alternative and the healthy market basket, the healthier alternative. For example, the standard market basket has white bread, the healthier alternative 100% whole wheat bread. The standard market basket has whole milk, and the healthier non-fat milk. The lowest price per unit was recorded for each food item. Thirteen stores in Sacramento, CA and 12 stores in Los Angeles, CA were surveyed. To

control for quality, the accuracy of the surveys were verified by having a second surveyor do an in-store check of the recorded prices.

**Identification and verification of food stores:** A geocoded dataset was obtained from a marketing firm that includee North American Industrial Classification (NAIC) codes to identify supermarkets, grocery stores, and specialty stores such as butcher shops, vegetable markets, and ethnic markets. The dataset was be augmented by an internet search of current listings for each city. After eliminating duplicates, we also verified the stores on the list using a phone survey. Finally, for stores that were non-respondents to the phone survey a drive-by survey was completed. The stores were coded as a supermarket, large grocery store, small grocery store, warehouse, convenience store or specialty market based on the availability and variety of individual food items.

### **Conclusions**

Appropriate policies to address the unique needs of the low-income population regarding access to an affordable and healthier diet can only come about through a thorough understanding of the food environment in low-income neighborhoods. If the dispersion of food stores does results in areas of imperfect competition, then policies developed to expand access would be appropriate. For example, policies to encourage the use of supermarket shuttles to transport people from supermarkets to low-income neighborhoods, and expand the areas of competition may be a viable policy option.

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