

# The Effect of Grocery Shopping Frequency on the Healthfulness of Food Purchases

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## Why Study Food Choices?

- Health issues in the US population
  - i. High rates of chronic and acute diseases
  - ii. Diet quality linked to four major causes of death: coronary heart disease, cancer, stroke, and type 2 diabetes
- Government assistance programs target healthy eating
- Literature focuses on the impact of demographics, food environment, and food prices – on food choices.
- The effects of time shopping and temptations at the grocery store have been scarcely analyzed.

## Study Focus and Contributions

- We analyze the impact of grocery shopping frequency on the healthfulness of food purchases
- There are two mechanism through which shopping frequency may affect the healthfulness of food purchases:
  - i. A higher shopping frequency makes it possible to purchase foods with short shelf lives, i.e. fresh fruits and vegetables. This case implies a positive impact of shopping frequency on the healthfulness of food purchases.
  - ii. Visiting the grocery store often, may lead to households purchasing *temptation* foods more frequently. These are pre-prepared calorie-dense foods, often placed in shelves by the check-out line. This case implies a negative impact of shopping frequency on the healthfulness of food purchases.
- We use household-level food purchase data to study the relationship between shopping frequency and the healthfulness of food purchases for US households.

## Empirical Methods

- We estimate the following empirical model:

$$H_{litm} = \alpha_0 + \beta_1$$

$$F_{lit} + \sum_{k=1}^K \gamma_k P_{kjt} + \delta_j g$$

$$S_{git} + \sum_{j=1}^J \theta_j HC_{jit} + \varepsilon_{litm}$$

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■  $H_{litm}$  denotes the healthfulness of the

food purchases by household  $i$ , in month  $t$ , using

- To conduct the empirical analysis, we use the 2004-2010 Nielsen Homescan dataset
- i. Representative of the US population
- ii. Households in the panel report information on each of their shopping trips. Such information includes: price, quantity, and product characteristics, promotions, type of store, and date of purchase.
- iii. A rich set of demographic variables is included in the data.
- iv. Sample size: 134,484 households report their purchases for an average duration of 66.3 months

- We use the Quarterly Food at Home Price Database to aggregate foods into 52 categories, and to obtain food price indices.

■  $S_{git}$  denotes the share of expenditures by

## Selected Results

- The preliminary regression results show that:
  - i. The coefficient on shopping frequency is negative. This indicates that a higher shopping frequency leads to less healthful food purchases, evaluated at the mean.
  - ii. The impact of shopping frequency on the healthfulness of food purchases is statistically significant but economically small.
  - iii. The impact becomes larger when using instrumental variables' method to account for endogeneity.
  - iv. The healthfulness of food purchases and demographic variables have to a great extent the expected correlation. Working longer hours is correlated with a poorer diet. Higher income is correlated with a healthier diet, and so is education. Household size and the presence of children under 18 both have ambiguous impacts on the healthfulness of food purchases. In our sample, being white is correlated with a less healthful diet, *ceteris paribus*. Purchases made in smaller stores tend to be less healthful than those made in larger stores.

Selected Results of Estimating the Impact of Shopping Frequency on the Healthfulness of Food Purchases\*

	Model 1**	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Shopping Frequency	-0.060*** (0.00)	-0.030*** (0.00)	-0.068*** (0.00)	-0.038*** (0.00)	-6.134*** (1.38)	-3.044*** (0.60)	-1.949*** (0.67)
Demographics	No	Yes	No	No	Yes	Yes	Yes
Food Price Indices	No	Yes	No	Yes	Yes	Yes	Yes
Year Fixed Effects	No	No	No	Yes	No	No	No
Instrumental Variables	No	No	No	No	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes	No	No	No
N	3,977,661	3,977,615	3,977,661	3,977,615	3,977,615	3,888,165	3,888,165

Standard errors in parentheses; \* p<0.10; \*\* p<0.05; \*\*\* p<0.01  
The sample excludes outliers in the number of shopping trips and outliers in monthly food expenditures.

\*\* Model 1: Basic OLS; Model 2: OLS with Demographics and Price Indices; Model 3: Household and Year Fixed Effects; Model 4: Household and Year Fixed Effects, and Price Indices; Model 5: IV #Severe Weather Events, and Price Indices; Model 6: IV # All Stores and # Severe weather events, and Price Indices; Model 7: IV # All Stores, and Price Indices.

## Ongoing Work

- In our empirical analysis, we make use of instrumental variables and panel data methods (i.e. fixed effects), in order to identify the causal impact of shopping frequency on the healthfulness of food purchases.
- We use alternative ways of measuring the healthfulness of food purchases, including:
  - i. Alternative scores proposed by Volpe et al. (2013), which distinguish between food categories USDA recommends for increased consumption versus decreased consumption
  - ii. Analyzing expenditures on each food category separately - e.g. Fruits, Vegetables, Meat, Commercially prepared items - as outcome variables
- We use alternative ways of measuring the main explanatory variable. We specify this variable as the distribution of food expenditures over time, as proposed by Beatty (2008).

### References:

1. Beatty, T. K. M. (2008). Expenditure Dispersion and Dietary Quality: Evidence from Canada. *Health Economics*, 1014(17), 1001–1014.
2. Volpe, R., Okrent, A., & Leibtag, E. (2013). The Effect of Supercenter-format Stores on the Healthfulness of Consumers' Grocery Purchases. *American Journal of Agricultural Economics*, 95(3), 568–589.

Calculated (or Derived) based on data from The Nielsen Company (US), LLC and marketing databases provided by the Kilts Center for Marketing Data Center at The University of Chicago Booth School of Business.