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Travis A. Smith

Assistant Professor

Department of Agricultural and Applied Economics

The University of Georgia

E-mail: tasmith@uga.edu

Pourya Valizadeh

PhD Student

Department of Agricultural and Applied Economics

The University of Georgia

E-mail: pouryav@uga.edu

Shelly Ver Ploeg

Economist

Economic Research Service

United States Department of Agriculture

E-mail: sverploeg@ers.usda.gov

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Travis A. Smith¹, Pourya Valizadeh¹ & Shelly Ver Ploeg²

¹The University of Georgia, ²Economic Research Service-USDA



THE UNIVERSITY OF GEORGIA
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ENVIRONMENTAL SCIENCES

Introduction

- The Supplemental Nutritional Assistance Program (SNAP), formerly known as Food Stamp program, is the nation's largest food assistance program.
- Standard economic theory states that receipt of predictable income should not affect spending or consumption patterns. Moreover, the in-kind nature of the benefit transfer should not alter spending as long as the level of benefit is less than usual food budget.
- Empirical evidence indicates that SNAP households not only treat benefit income differently than cash income, they also have higher expenditures shortly after receiving benefits and lower food consumption toward the end of the benefit month.
- In contrast to previous research that has mostly focused on the *quantity* and *quality* of food purchases to explain the sensitivity of expenditure to receipt of SNAP benefits, we hypothesize that the decrease in food expenditures could also be induced by changes in *prices* paid by households.

Objectives

- Examine whether SNAP households pay different prices throughout the benefit month.
- Investigate whether price changes are driven by households purchasing behaviors.
- Explore explanations for price-seeking behavior of SNAP households. In other words, why do SNAP households pay different prices over the benefit month?

Data and Methods

- The National Food Acquisition and Purchase Survey (FoodAPS) data for administratively confirmed SNAP participants.
- Our sample includes all food items purchased by SNAP households from SNAP-authorized stores over a seven-day survey period.
- In household expenditure surveys, prices are unobserved. Instead, we use *unit prices*, obtained by dividing expenditure on food items by their quantities (Deaton 1988).
- Households can pay lower unit prices through several purchasing strategies: **using coupons**, **purchasing on sale**, **buying in bulk**, **buying store brands**, and/or **choosing store types**.
- The hedonic price model capturing the unit price response to monthly SNAP benefit receipt is:

$$\ln(P_{ijt}) = \beta_0 + \sum_{t=2}^4 \beta_{1t} WEEK_t + X_{ij}\beta_2 + DOW_t\beta_3 + DOM_k\beta_4 + f_j + h_i + \epsilon_{ijt},$$

where the dependent variable is the log unit price paid by household i for food item j in week t ; $WEEK$ is a set of indicators for weeks of the benefit month; X is a row vector of dummies for coupon usage, store sale, bulk size, store brand, and store types; DOW and DOM are vectors of dummies for the days of the calendar week and month in which household purchased food items; f and h are food-type and household fixed effects, respectively; and ϵ is an idiosyncratic error.

- To investigate the impacts of different purchasing behaviors on unit prices, in our hedonic model we replace X_{ij} by $\sum_{t=1}^4 WEEK_t \times X_{ij}$.

- Identification of the effect of benefit arrival on unit prices relies on randomization of households interview dates:

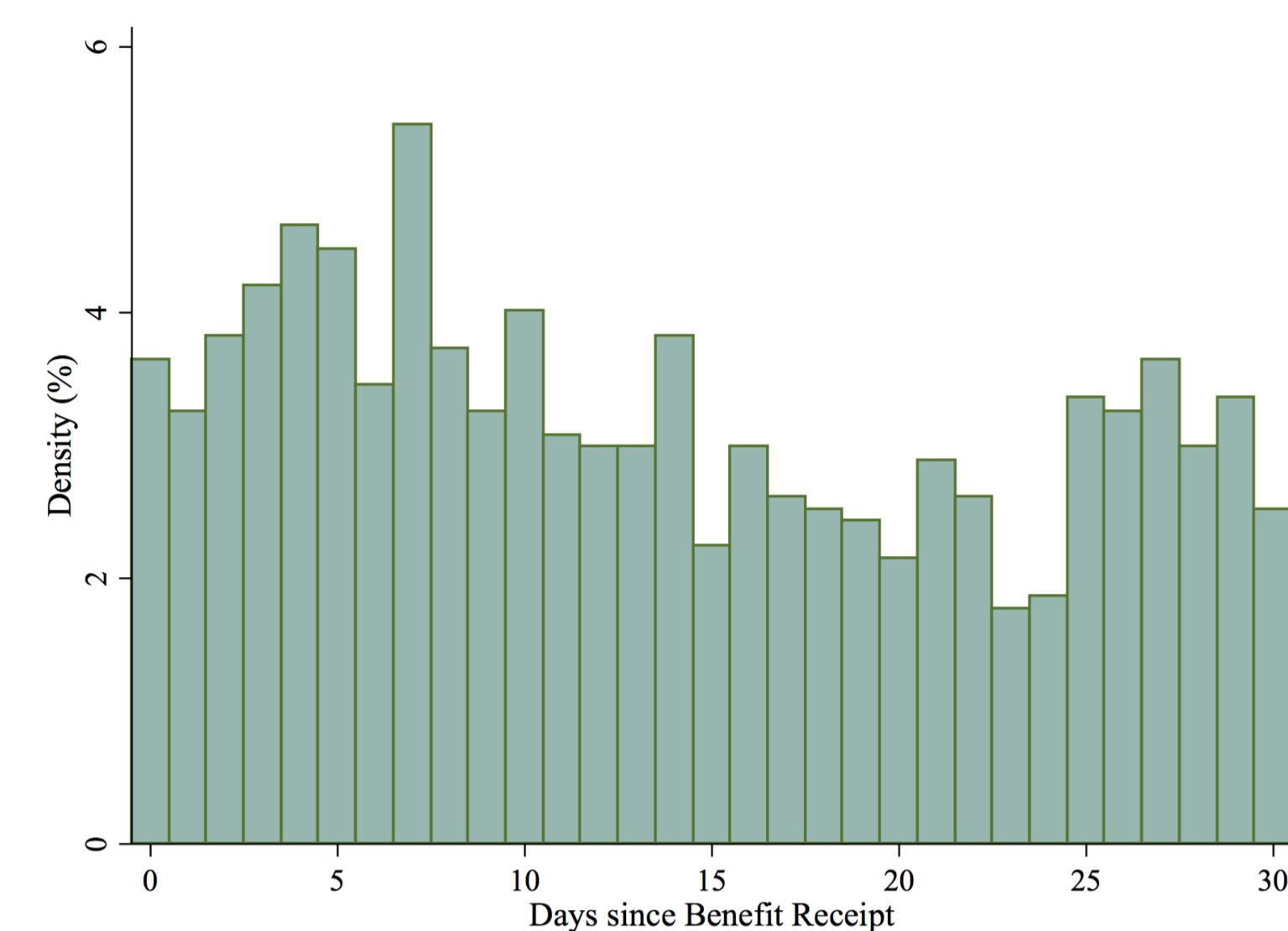


Figure 1: Interview date over the benefit month

- Considering the largest quintile of package size within several food categories as *bulk* size, we examine the effect of bulk purchasing on unit prices (Griffith et al. 2009).
- We examine unit price patterns for broad food product classifications including general and frozen food, refrigerated food, beverages and alcohol accounting for 46%, 34%, and 20% of households total food expenditures, respectively.
- We also compare unit price patterns by household's poverty level, shopper type (frequent grocery list user and frequent nutrition facts user), and car ownership.

Table 1: Summary Statistics

Variable	Week 1 ^a	Week 2	Week 3	Week 4 ^a
Log (unit price)	5.210 (0.037)	5.144 (0.039)	5.212 (0.054)	5.008 (0.045)
Coupon	0.015 (0.007)	0.005 (0.001)	0.008 (0.005)	0.009 (0.003)
Store sale	0.159 (0.020)	0.152 (0.017)	0.147 (0.022)	0.133 (0.027)
Store brand	0.213 (0.013)	0.190 (0.013)	0.223 (0.015)	0.207 (0.016)
Store type I ^b	0.522 (0.038)	0.463 (0.042)	0.495 (0.050)	0.445 (0.059)
Store type II ^b	0.449 (0.036)	0.509 (0.043)	0.463 (0.049)	0.513 (0.058)
Store type III ^b	0.028 (0.014)	0.027 (0.008)	0.041 (0.010)	0.042 (0.011)
Below 100% poverty	0.578 (0.053)	0.560 (0.048)	0.512 (0.075)	0.567 (0.072)
Grocery list user	0.729 (0.051)	0.668 (0.047)	0.707 (0.061)	0.818 (0.042)
Nutrition facts user	0.482 (0.051)	0.616 (0.049)	0.716 (0.052)	0.543 (0.075)
Own car	0.707 (0.1047)	0.715 (0.047)	0.704 (0.070)	0.813 (0.044)
Observations	26,868		Households	1,018

Notes: All calculations use survey weights. Standard errors in parentheses are clustered at the household level.
^aWeek 1 is defined as days 0 – 6 of the benefit month. Week 4 corresponds to days 21 – 27 of the benefit month. Days past 27th day are excluded from the sample.
^bStore type I is defined as club stores, and supercenters. Store type II includes supermarkets, large grocery stores, and dollar stores. Convenience stores, gas stations, pharmacies, small grocery stores and all other small stores are defined as store type III. These store types account for 40%, 52%, and 8% of households total food expenditures, respectively.

Results

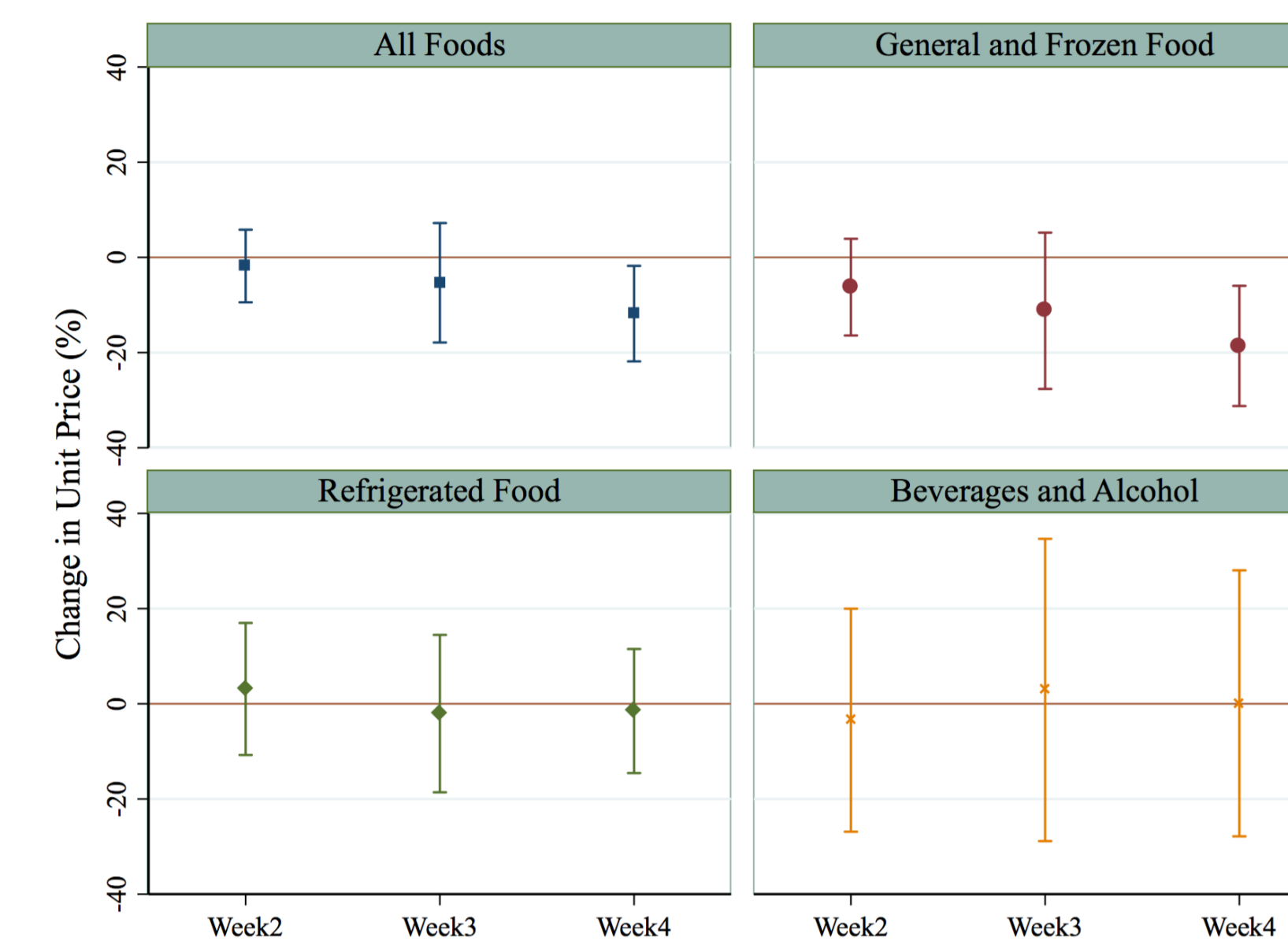


Figure 2: Unit price patterns over the benefit month

Notes: All calculations use survey weights. All point estimates are accompanied by 90% confidence intervals. Standard errors are clustered at the household level. Week dummies are relative to week 1. General food mostly includes storable foods such as cereal and breakfast, condiments and sauces, cookies and crackers, snacks, dried and canned fruit, dried and canned food, dried vegetable, sugar, flour, pasta, etc. Refrigerated food includes perishable items such as dairy, fresh produce, refrigerated meat, etc.

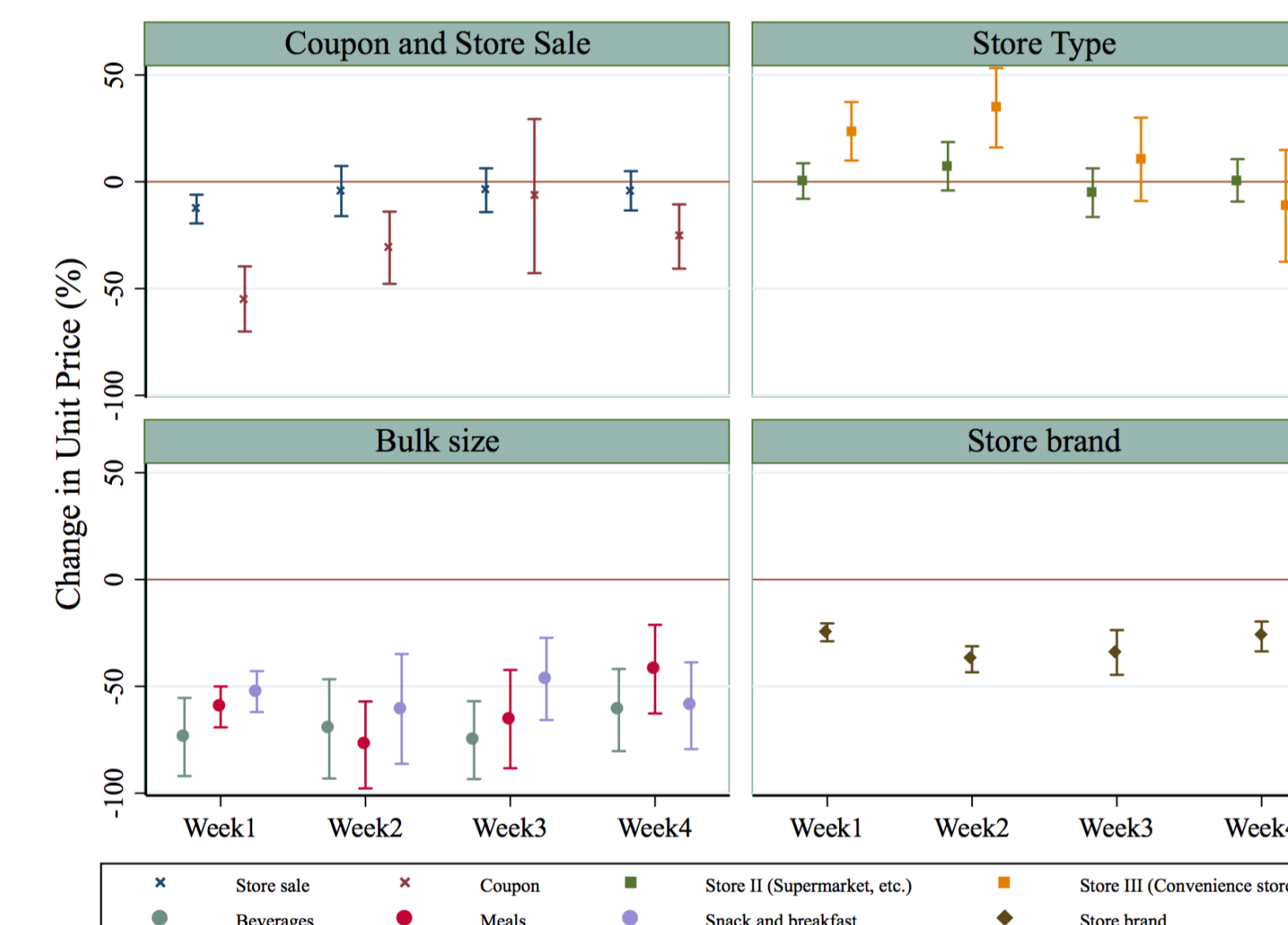


Figure 3: Impacts of different purchasing behaviors on unit prices

Notes: All calculations use survey weights. All point estimates are accompanied by 90% confidence intervals. Standard errors are clustered at the household level. Week dummies are relative to the omitted category. Bulk size dummies are relative to second smallest quintile.

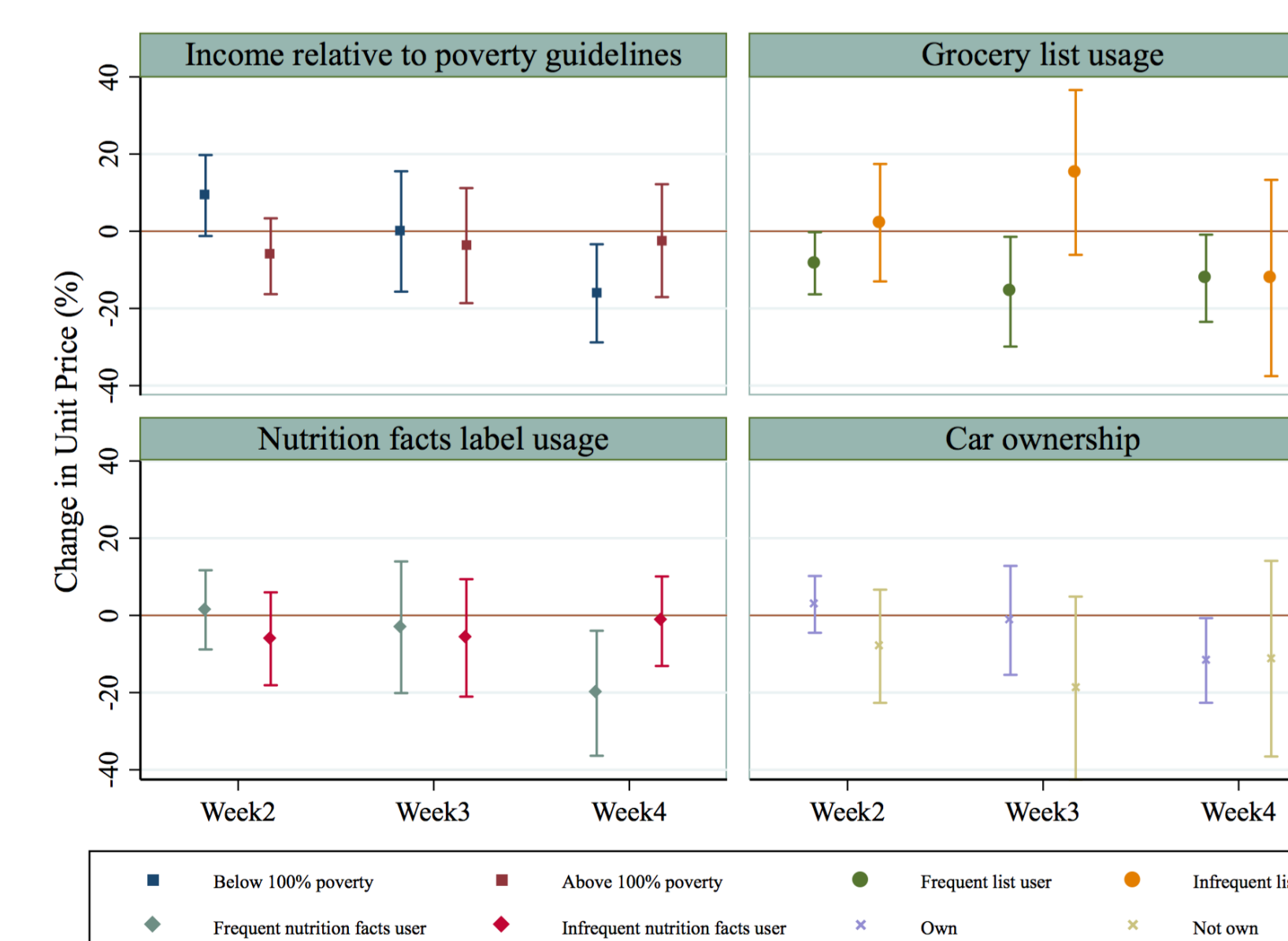


Figure 4: Unit price patterns by poverty level, shopper type, and car ownership

Notes: All calculations use survey weights. All point estimates are accompanied by 90% confidence intervals. Standard errors are clustered at the household level. Week dummies are relative to week 1.

Conclusions

- Our findings indicate that the SNAP benefit cycle is partially due to a decline in prices paid. We find that unit prices in the last week of the benefit month are about 12% lower relative to the first week.
- Changes in prices paid over the month varies by food classifications. The decrease in prices is largely driven by general and frozen (storable) foods; refrigerated (perishable) items and beverages do not reveal any significant decreasing trend.
- Our results suggest that while households use coupons, take advantage of in-store sales, and also lower unit prices for larger package size foods, decline in prices is almost unrelated to these purchasing strategies.
- Decline in prices could be moderately due to higher prices paid by SNAP households at smaller stores during the first half of the benefit month. It also might be induced by cheaper store brand items. This impact, however, is small.
- We find evidence that changes in unit prices over the benefit month is related to income constraints.
- In addition, we show that those who frequently use a grocery list and nutrition facts pay lower unit prices at the end of the month. This implies that savvy shopping and comparing prices can help SNAP households to stretch their food dollars further.
- Lastly, households owning a car or having access to a car, also pay lower prices. These household, on average, travel longer distances and can shop around looking for lower prices.

Forthcoming Research

Future work will combine generated prices by households into a demand framework in order to estimate changes in welfare over the benefit month.

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Contact Information

- Travis A. Smith, Assistant Professor, Department of Agricultural and Applied Economics, University of Georgia; tasmith@uga.edu
- Pourya Valizadeh, PhD Student, Department of Agricultural and Applied Economics, University of Georgia; pouryav@uga.edu
- Shelly Ver Ploeg, Economist, Economic Research Service, United States Department of Agriculture; sverploeg@ers.usda.gov