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Examining Diet Quality Disparities of US Households during the COVID-19 Pandemic through Scanner Data: Comparisons between Pre-pandemic and Pandemic

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Objectives

- This study aims to investigate and compare diet disparities among US households before and during the pandemic based on their socio-demographics using Nielsen household scanner data.
- First, we examine if there is any changes in terms of diet quality and food consumption patterns by comparing pre-pandemic (Jan 2019-Mar 2020) and during the pandemic (Apr-Dec 2020).
- Second, we investigate if the changes in food consumption among US household differ by their demographics.

Data

- Nielsen household panel data collected in 2019 and 2020 are utilized.
- Over 41,000 households which reported their grocery purchases at least one time per month during the time frame.
- Data sets utilized in this study include the USDA Food Plans and Thrifty Food Plan provided by Food and Nutrition Service.

Figure 1. Average Monthly Expenditure per Food Category in 2019-2020

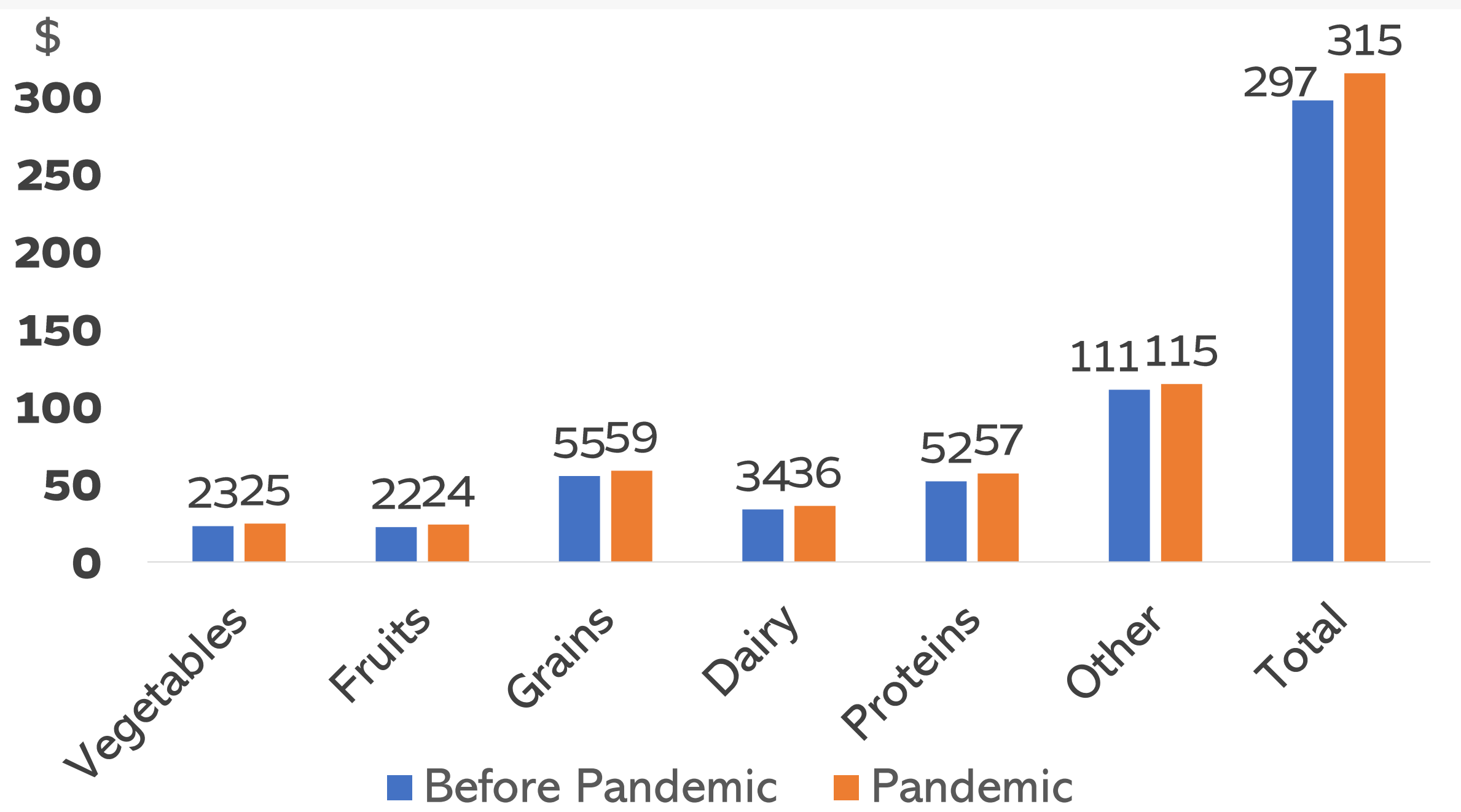
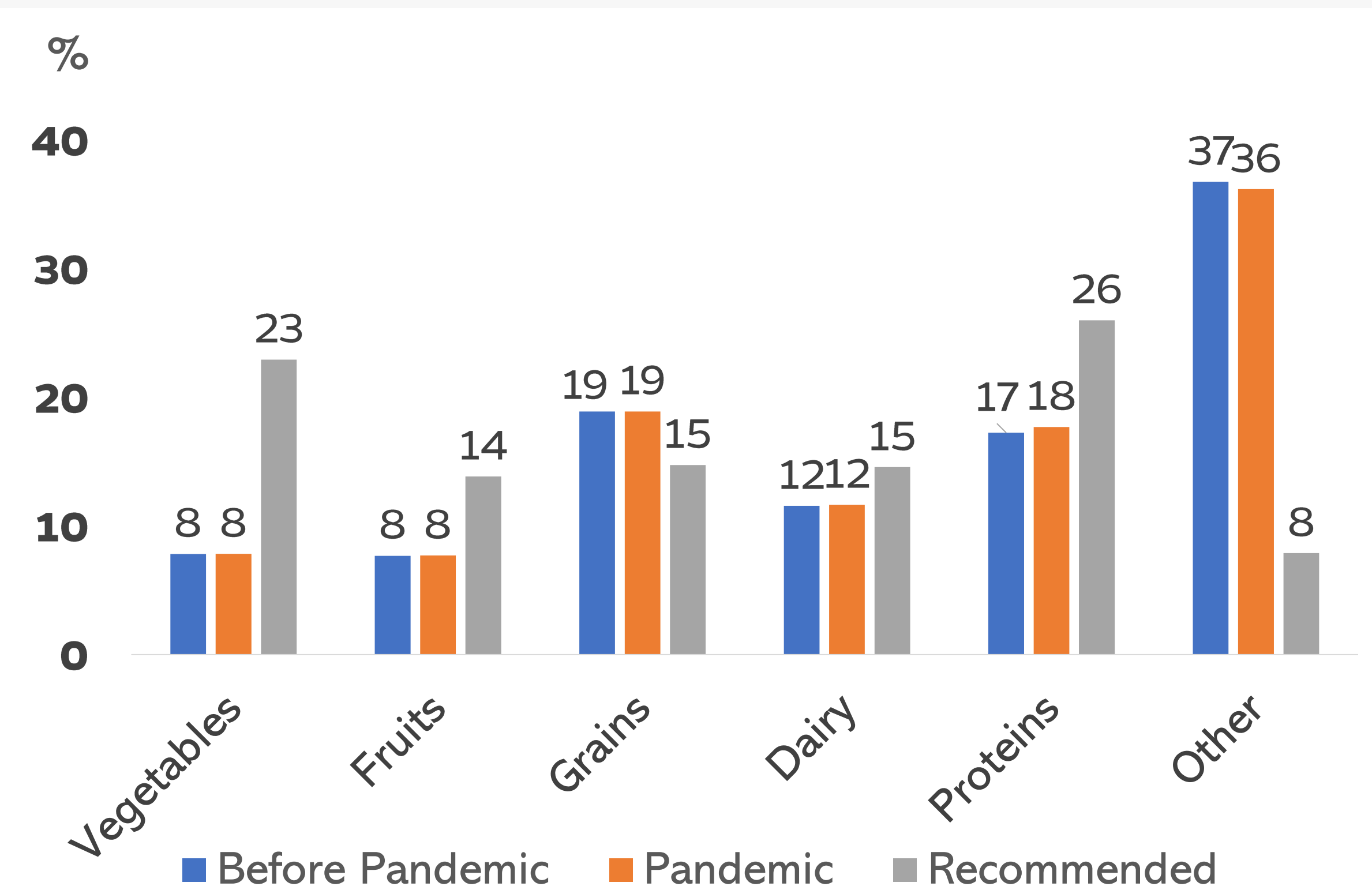


Figure 2. Household Expenditure Shares (Actual vs. Recommended) during 2019-2020



Main Findings

- During the pandemic, there was no significant change in dietary quality based on grocery food purchases for at-home consumption, either overall or between households with varying demographics.
- Spending on dairy, proteins, and grains increased, while spending on other food like prepared foods, oils, sugars, desserts, and drinks, decreased.
- Household characteristics were significant predictors of discrepancies in food consumption patterns.

Table 1. Socio-demographic Determinants of Food at Home Consumption Patterns

	USDA Score	Vegetables	Fruits	Grains	Dairy	Proteins	Other
Pandemic	0.065	-0.002	0.001	0.006*	0.013*	0.013*	-0.020*
Household size	-0.083*	-0.023*	-0.010*	0.033*	0.017*	0.002	-0.009*
Heads (Two heads)							
Male head only	-0.840*	-0.078*	-0.003	-0.047*	-0.085*	-0.023*	0.018*
Female head only	-0.086	0.033*	0.039*	-0.054*	0.024*	-0.063*	0.032*
Married	1.014*	0.098*	0.023*	-0.019*	0.075*	0.088*	-0.051*
Presence of kids	-0.070	-0.045*	0.142*	0.103*	0.054*	-0.080*	-0.044*
Income (logged)	0.480*	0.042*	0.052*	-0.020*	0.012*	0.033*	-0.018*
Education							
Some college	0.132*	0.018*	0.042*	-0.028*	0.042*	-0.016*	-0.004
College	0.582*	0.044*	0.146*	-0.037*	0.064*	-0.040*	-0.032*
Graduate school	1.040*	0.088*	0.237*	-0.058*	0.093*	-0.063*	-0.062*
Age (35-54 years)							
Under 35	1.049*	0.110*	0.111*	-0.004	0.092*	-0.019*	-0.057*
Above 54	0.564*	0.049*	0.099*	-0.011*	-0.037*	0.083*	-0.045*
Race (Black)							
White	-0.524*	0.035*	-0.203*	0.081*	0.359*	-0.269*	0.021*
Asian	0.396*	0.077*	0.007	-0.032*	0.062*	-0.107*	-0.022*
Other	-0.186	0.052*	-0.128*	0.041*	0.283*	-0.211*	0.012
Hispanic	0.541*	-0.021*	0.111*	-0.028*	-0.024*	0.052*	-0.018*
Region (West)							
Northeast	0.687*	0.064*	0.014*	0.045*	0.038*	-0.015*	-0.044*
Midwest	-0.333*	-0.024*	-0.042*	0.052*	-0.023*	-0.034*	0.017*
South	-0.180*	0.015*	-0.064*	0.019*	-0.079*	0.015*	0.019*
Total grocery purchase							
Constant	5.525*	-2.737*	-2.342*	-1.361*	-2.049*	-2.280*	-1.272*
N	82,748	82,506	82,462	82,740	82,661	82,632	82,747
R ²	0.037	0.494	0.404	0.656	0.558	0.577	0.765

Table 2. Estimated Coefficients of Interaction Terms between Pandemic and Demographics

	USDA Score	Vegetables	Fruits	Grains	Dairy	Proteins	Other
Pandemic X Kids	-0.011	0.035*	-0.042*	-0.020*	-0.009	0.020	0.006
Pandemic X Income	0.063	0.008	-0.019*	0.002	0.014*	0.007	-0.004
Pandemic X Under 35	0.146	-0.005	-0.006	0.016	0.033*	-0.011	-0.013
Pandemic X Above 54	0.060	0.026*	-0.013	0.004	-0.005	0.010	-0.007
Pandemic X White	-0.118	0.000	-0.017	0.004	-0.009	-0.008	0.014*
Pandemic X Asian	0.353	0.053*	-0.005	-0.013	0.003	0.016	-0.012
Pandemic X Other	-0.078	0.003	-0.018	0.003	-0.010	0.009	0.003
Pandemic X Northeast	0.110	-0.008	-0.007	-0.001	0.001	0.034*	-0.009
Pandemic X Midwest	0.118	-0.010	-0.008	0.001	0.002	0.023*	-0.008
Pandemic X South	0.188	0.001	-0.013	0.004	0.002	0.025*	-0.008

Notes: * p<0.05, standard errors in the models are based on robust variance estimates. Expenditure on each food category is logged.

Introduction

- The COVID-19 pandemic has disproportionately affected racial/ethnic minorities and disadvantaged groups. However, little is known about how the diet quality has changed among various types of American households.
- Given the close connection between dietary patterns and health outcomes, previous studies about food consumption change during the early pandemic centered around presenting a general picture of food consumption changes due to limited data.

Method and Model Specification

- Food at home diet quality is examined by the USDA Score, developed by Volpe & Okrent (2012). The healthfulness measure for household i in period t for a given food group j is given as:

$$USDA\text{Score}_{ijt} = 1 / \sum_j (ExpShare_{ijt} - CNPPExpshare_{ijt})^2$$

where $CNPPExpshare_{ijt}$ denotes recommended expenditure shares by USDA, and $ExpShare_{ijt}$ denotes expenditure share for household i .

- The dietary quality change during the pandemic is identified as:

$$USDA\text{Score}_i = \alpha + \delta Pandemic_i + X_i' \beta + \varepsilon_i$$

where X_i is a vector of household characteristics, $Pandemic$ is the pandemic dummy indicator. Spending change on each food category (logged) is also examined using the similar model specification.

- Varying levels of food consumption change during the pandemic are identified by the interaction terms between the pandemic indicator and demographics.

Results

- The real average monthly at-home food expenditure rose from \$297 to \$315 during the pandemic (↑6%).
- Inflation-adjusted increases range from 3% to 10% across six food categories.
- Households allocated less of their food budgets to vegetables, fruits, protein, and dairy; but more for grains and others.
- The average healthfulness of American households' food shopping basket did not significantly change during the pandemic. This did not vary across HHs with different characteristics.
- Households with a male head only and lower income and education are associated with poorer diet quality.
- Average expenditure share on "Other" is more than four times larger than the recommended, negatively affecting the healthfulness. Household spending on this category dropped 2% during the pandemic.
- Household characteristics explain different food consumption behaviors as well as different changes in the food groups during the pandemic.