Household Food Waste Trending Upwards in the United States: Insights from a National Tracking Survey

Ran Li[1], Yiheng Shu[2], Kathryn E. Bender[3], Brian E. Roe[1]

[1]Department of Agricultural, Environmental, and Development Economics, Ohio State University
[2]School of Business, Jiangnan University
[3]Department of Economics, University of Delaware

Multiscale RECIPES The Ohio State University

江南大学 University of Delaware

Introduction

- Three successive administrations have supported the United States 2015 goal to reduce food waste (USDA 2015 & 2018, White House 2018).
- Households waste more food than other supply chain segments, however, few data sources are available to track US households' progress toward this goal (ReFED 2022).
- Given the ongoing discussion of how food waste
- might be addressed via the 2023 Farm Bill the lack of such data hampers informed policy discussion.
- We provide insights from the first four waves of a novel national survey designed to track such waste.
- We are the first to provide nationally representative tracking data with regards to household food waste in the United States.

Methods

- We collected household food waste data via self-administered surveys (van Herpen et al. 2019, Shu et al. 2021) in February (361 completed), July (419 completed), and December of 2021 (610 completed) and in February of 2022 (587 completed) from samples of consumers drawn from throughout the United States.
- Respondents were directed to monitor discarded food over the next 7 days and then administered a survey a week later to report waste from the previous week in 24 distinct categories.
- Wave-by-wave means were calculated using post hoc weights with confidence intervals constructed using robust standard errors.
- Censored regression analysis was used to associate per-person household waste with household and respondent characteristics.

Insights from the National tracking survey

➢ 280% year-over-year household food waste increase.
- Household food waste generation increased between each of the four waves of data collection and resulted in a 280% year-over-year increase between the first and fourth waves (Figure 1).

- Fresh produce was the largest fraction of waste in each wave, with each of the eight categories of waste detailed in Figure 1 increasing significantly between the first and fourth waves.

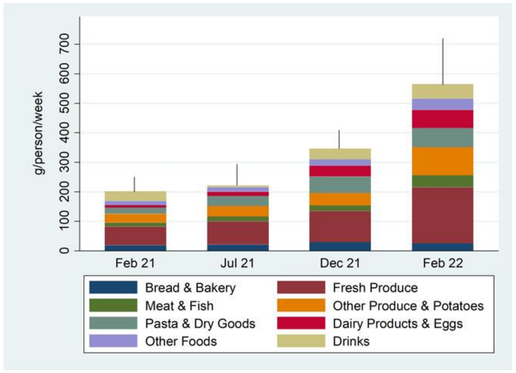

Figure 1: Mean weekly waste (g/person) by food category and data collection wave. Whiskers represent 95% confidence intervals.

➢ Strong association between household food waste and dining out.
- In February 2021, more than a quarter of sample households reported that all meals were prepared at home, which dropped to 19% in both July 2021 and December 2021 and to 7% in February 2022.
- We revealed a strong association between food waste and dining-out behaviors, with about an 18 grams increase in waste/person/week for every additional percent of the sample that reports some dining-out behavior (Figure 2).

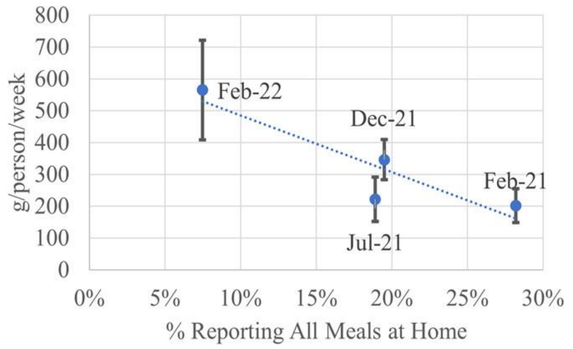

Figure 2: Scatterplot of mean food waste (g/person/week) and the % reporting no dine-out meals by survey wave. Vertical error bars are 95% confidence intervals. Dotted line is the best-fit regression line.

- The association between consuming all meals at home and waste is strongest for the drinks category and also statistically significant for fresh produce (Figure 3).

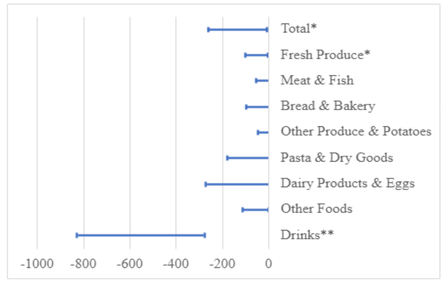

Figure 3: Censored regression coefficients and 95% confidence intervals for all meals consumed at home. Categories with *, ** have effects that are significantly different from zero at the 5% and 1% levels, respectively.

➢ Self-reported causes of food waste changed over the course of the COVID-19 pandemic and are associated with household waste levels.
- The issues most frequently reported were waste due to dining out unexpectedly, which increased significantly from about 12% in February 2021 to 32% a year later (Figure 4).

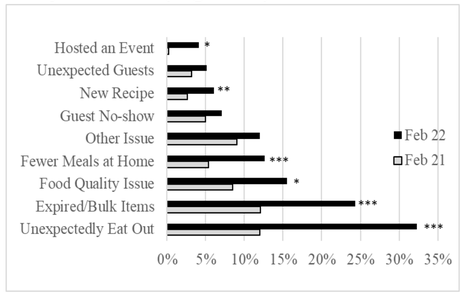

Figure 4: Percent of Sample Providing Reasons for Unexpected Food Waste. *, **, *** denotes statistically significant differences between 2021 and 2022 values

- There was a positive and significant association between reporting such events and total waste, with the largest effect holding for waste in the drinks category and dairy/eggs category (Figure 5).

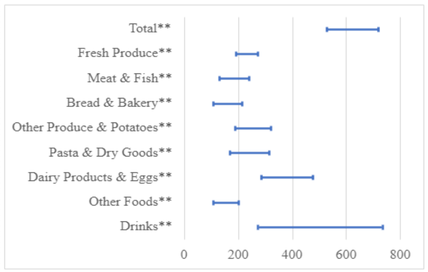

Figure 5: Censored regression coefficients and 95 % confidence intervals for if self-reported issues during reporting week. Categories with *, ** have effects that are significantly different from zero at the 5% and 1% levels, respectively.

➢ Household food waste patterns differed by shopping frequency.
- Respondents who shop infrequently (less than once a week) declined from 23% in February 2021 to 12% a year later.
- Those who shop once a month or less frequently waste significantly less food overall and significantly less fresh produce in particular than those who shop more frequently (Figure 6).

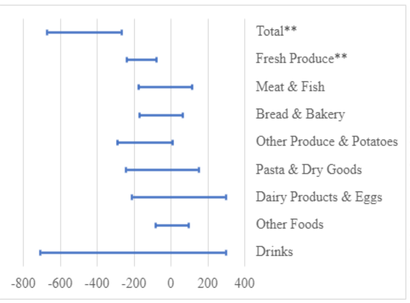

Figure 6: Censored regression coefficients and 95% confidence intervals shops for food once a month (vs. multiple times/week) by waste category. Categories with *, ** have effects that are significantly different from zero at the 5% and 1% levels, respectively.

Discussion

- Food prices increases have not appeared to temper increases in household food waste, though additional price increases experienced during 2022 and forecasted for the following year could lead to threshold effects that motivate changes in household behaviors and lead to less waste.
- We note the challenges of reducing waste as food routines evolve from patterns observed during the early stages of the pandemic, which points to the need for tools to help consumers improve food-management skills and desires.

Reference
- Reducing food waste through economics and data (ReFED). 2022. ReFED Data Insights Engine.
- Shu, Y., B. E. Roe, and K. Bender. 2021. "Adapting, Refining and Expanding a Validated Questionnaire To Measure Food Waste in US Households." MethodsX 8: 101377.
- USDA. 2015. USDA and EPA Join with Private Sector, Charitable Organizations to Set Nation's First Food Waste Reduction Goals. Release No. 0257.15.
- USDA. 2018. Trump Administration Launches "Winning on Reducing Food Waste" Initiative. Press release no. 0221.18, Oct. 18.
- van Herpen, E., L. van Geffen, M. Nijenhuis-de Vries, N. Holthuysen, I. van der Lans, and T. Quested. 2019. "A Validated Survey to Measure Household Food Waste." MethodsX 6: 2767–75.
- White House. 2021. FACT SHEET: Biden-Harris Administration Commit to End Hunger and Malnutrition and Build Sustainable Resilient Food Systems. September 23.

Acknowledgments
- Roe acknowledges funding from the National Science Foundation (grant #2115405), Ohio State University's Van Buren Fund, USDA National Institute of Food and Agriculture, Hatch project OHO01419 and OHO01546. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Availability of data
- The data that support the findings of this study are openly available in the Environmental Data Initiative at https://doi.org/10.6073/pasta/33762da1c9eb20ba3e12d23fe73e67f7