

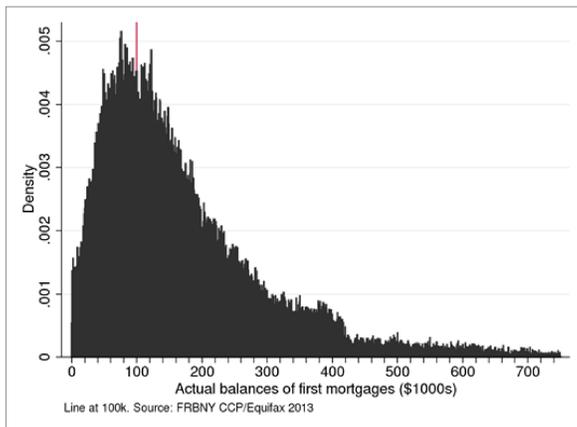
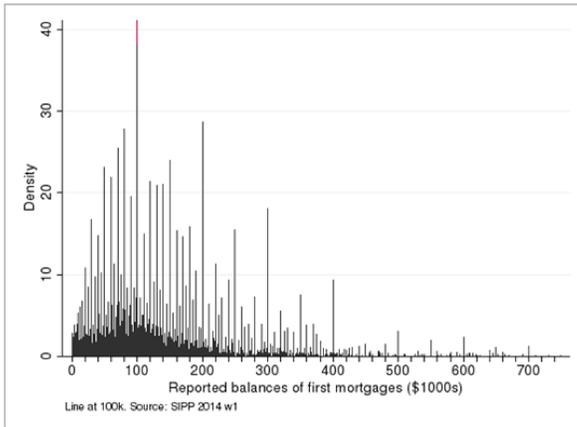
Heaping at Round Numbers on Financial Questions: Satisficing and Fatigue

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Background

- “Exact values” on survey data show a lot more heaping at round numbers than administrative data
- Valid inference and estimation depend on why heaping exists (see Heitjan and Rubin, 1991), yet little is known about its causes
- Rounding might reflect **satisficing**: “good enough” rather than “optimal” response



- Krosnick (1991) theorizes that probability of satisficing is:

$$p(\text{satisficing}) = \frac{a_1(\text{task difficulty})}{a_2(\text{ability}) \times a_3(\text{motivation})}$$

- This project: examine if rounding consistent with satisficing, using paradata on timing and questions answered
- We assume time on question is a measure of motivation, and number of questions answered is a proxy for decision fatigue
- If rounding consistent with satisficing
 - ↑ motivation → ↓ rounding
 - ↑ fatigue → ↑ rounding

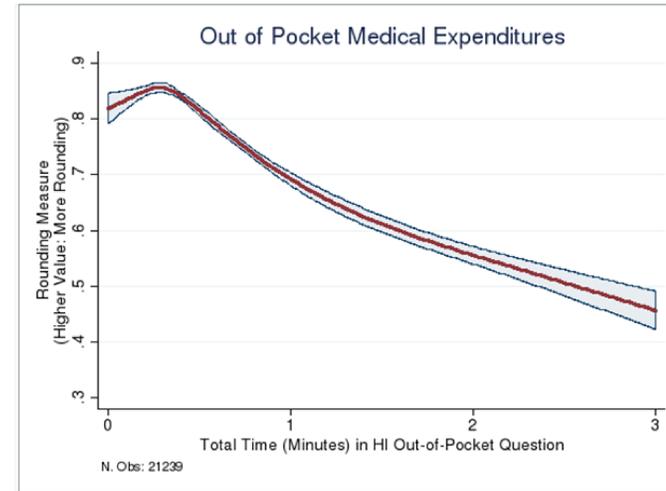
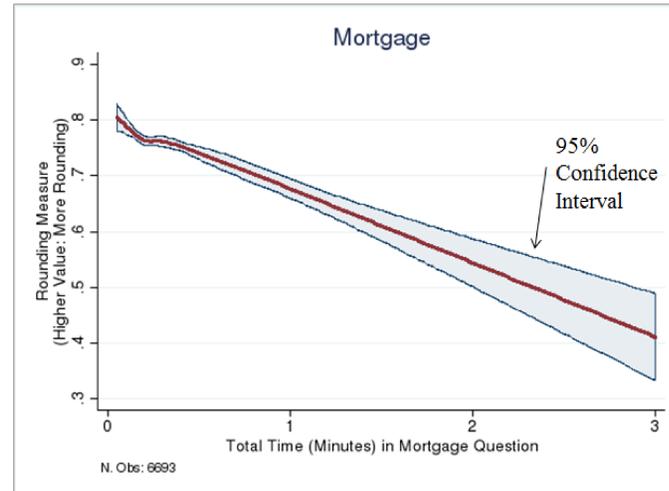
2014 Panel of the Survey of Income and Program Participation (SIPP)

- Sponsored & collected by U.S. Census Bureau. Computer Assisted Personal Interviewing (CAPI). Nationally representative of U.S. households. Wave 1: Sample size of 31,000 households
- Sample restrictions: non-proxy interviews, completed interview in one session → 21,000 households
- Paradata from SIPP Instrument Audit Trails (Key Stroke File): Time per question, Time in Survey, Number of Questions Answered
- Focus on rounding on home value, mortgage, checking accounts, credit cards and social security income

Is rounding associated with motivation and fatigue?

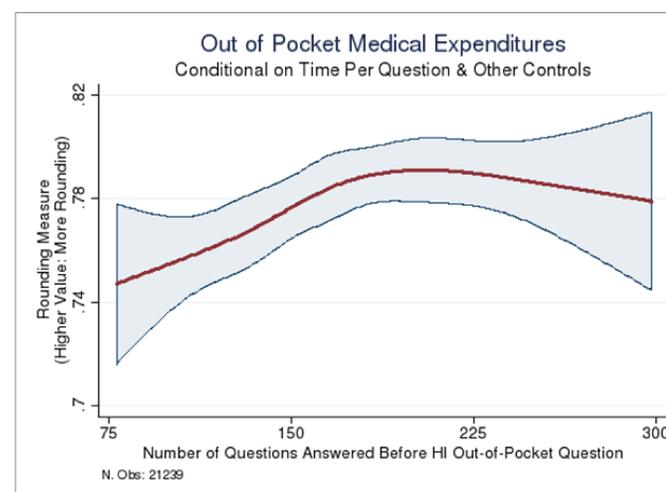
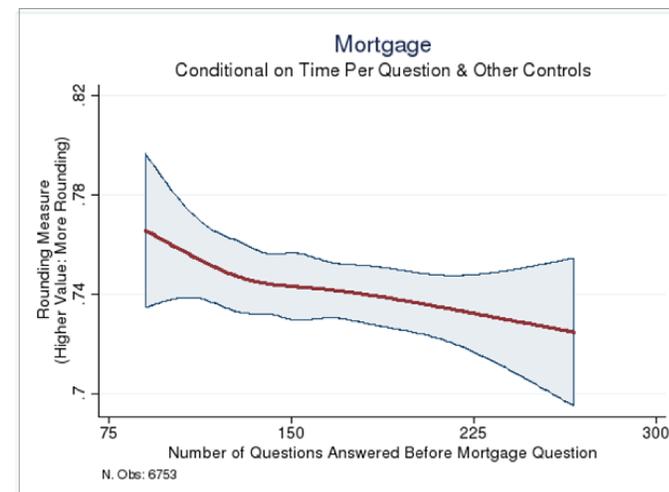
$$\text{rounding} = \frac{\# \text{ of reported zeros}}{\# \text{ of possible zeros}}$$

Rounding is negatively associated with motivation (time spent on question)



SOURCE: Survey of Income and Program Participation (SIPP) 2014 Wave 1. NOTE: The pattern holds across all questions we analyzed, which includes home value, mortgage balance, checking account balance, credit card balance and social security income

Inconclusive evidence about association of rounding and decision fatigue (number of prior questions), after controlling for heterogeneity in effort across respondents



SOURCE: Survey of Income and Program Participation (SIPP) 2014 Wave 1. NOTE: Due to differences in paths taken through the SIPP, there is considerable respondent-level variation in the number of questions answered prior to each of our questions of interest

Technical details:

- Regression of rounding on fatigue, controlling for demographic characteristics and across-person observed motivation on previous questions

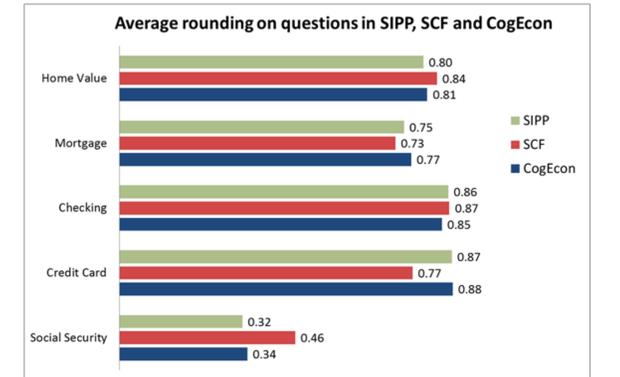
$$\text{rounding}_{qi} = f(N_{qi}) + a_1 TPQ_{qi} + a_2 TPQ_{qi}^2 + X_i \beta + \epsilon_i$$

- Time per question (TPQ_{qi}) equals T_{qi}/N_{qi} , the time spent on survey before being asked question (T_{qi}) divided by the number of questions answered before question q (N_{qi})
- $f(N_{qi})$ is a cubic spline with five knots
- Use predicted values computed from model estimates to show the relationship between number of questions and rounding

Rounding on similar questions across surveys

- Strong order effects should generate different levels of rounding when questions in different orders
- Focus on questions asked in SIPP, the Survey of Consumer Finances (SCF) and the Cognitive Economics Study (CogEcon), and reported in Gideon et al. (2016)

Different question order yet similar rounding



SOURCE: SCF 2013, CogEcon 2011, SIPP 2014 Wave 1. NOTE: there are slight differences in questions across surveys, in terms of whether the question asks about self only, or joint with spouse/partner, and whether about the primary account or all accounts

Summary

- Survey responses frequently display patterns of heaping at round numbers
- On financial questions, rounding is associated with motivation
- Inconclusive evidence about whether rounding is associated with fatigue

References

- Gideon, Michael, Joanne W. Hsu and Brooke Helppie McFall. 2016. “Heaping at Round Numbers on Financial Questions: The Role of Satisficing.” Working paper.
- Heitjan, Daniel F. and Donald B. Rubin. 1991. “Ignorability and Coarse Data.” The Annals of Statistics. Vol 19, No. 4, 2244-2253.
- Krosnick, Jon A. 1991. “Response Strategies for Coping with Cognitive Demands of Attitude Measures in Surveys.” *Applied Cognitive Psychology* 5: 213-236.

