Examining the relationship between the accuracy of self-reported data and the availability of respondent financial records

Emily Geisen
Charles Strohm
M. Christopher Stringer
Brandon Kopp
Ashley Richards
Disclaimer

The findings and conclusions in this presentation are those of the authors and do not necessarily reflect official views of the U.S. Bureau of Labor Statistics or the U.S. Census Bureau.
Introduction

- **Problem**: self-reported data are subject to recall error due to the following:
  - Event characteristics
  - Question characteristics
  - Respondent characteristics

- **Possible solution**: incorporate the use of respondent records

- **Limitation**: records can be incomplete and not available for all survey items of interest
Research Questions

- What impact does an incomplete set of records have on our ability to measure and reduce recall error?
  - Are respondents more or less likely to have records for events they recall accurately?
  - How does the relationship between records and accuracy affect estimates of recall error?
U.S. Consumer Expenditure Quarterly Interview Survey

- Monthly survey, captures continuous information about buying habits of Americans.

- Data used to calculate the weight of index items in the Consumer Price Index (CPI), a leading economic indicator

- U.S. Census Bureau conducts survey for Bureau of Labor Statistics
Survey Data: Consumer Expenditure Records Study

- Non-probability, feasibility study of 115 participants
- Designed to explore:
  - Availability and feasibility of using financial records
  - Direction and magnitude of measurement error in CE
- Respondents completed 2 interviews in 7-day period
  - 1st interview: abbreviated version of the CEQ interview
  - 2nd interview: participants reviewed receipts and other financial records with interviewer
- Compared self-reports to records to determine accuracy
Statistical Methods

1. Determine if there is potential for bias in the availability of records

2. Determine if there is measurement error bias

3. Use logistic regression to predict probability of having a record and create 5 propensity strata

4. Examine how accuracy of self-reports changes across propensity strata
### 1a. Demographic factors affecting likelihood of having a record

<table>
<thead>
<tr>
<th>Respondent Characteristic</th>
<th>Odds R</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Size</td>
<td>0.89</td>
<td>0.18</td>
</tr>
<tr>
<td>Age</td>
<td>1.01</td>
<td>0.32</td>
</tr>
<tr>
<td>Non-Hispanic White (vs other)</td>
<td>1.60</td>
<td>0.04</td>
</tr>
<tr>
<td>Owners (vs renters)</td>
<td>1.73</td>
<td>0.06</td>
</tr>
<tr>
<td>High income (vs low income)</td>
<td>3.68</td>
<td>0.02</td>
</tr>
<tr>
<td>High education (vs low education)</td>
<td>9.85</td>
<td>0.02</td>
</tr>
<tr>
<td>North Carolina (vs DC)</td>
<td>0.66</td>
<td>0.17</td>
</tr>
<tr>
<td>Working (vs not working)</td>
<td>0.86</td>
<td>0.48</td>
</tr>
<tr>
<td>Female (vs male)</td>
<td>1.59</td>
<td>0.05</td>
</tr>
<tr>
<td>Married (vs not married)</td>
<td>0.70</td>
<td>0.32</td>
</tr>
</tbody>
</table>
1b. Item characteristics affecting likelihood of having a record

<table>
<thead>
<tr>
<th>Item Characteristic</th>
<th>Odds R</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order reported</td>
<td>0.96</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Recent (vs not recent)</td>
<td>1.36</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Amount of item ($)</td>
<td>1.01</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Housing expenditures (vs. other)</td>
<td>7.84</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Phone expenditures (vs. other)</td>
<td>8.78</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Utility expenditures (vs. other)</td>
<td>7.47</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Appliance or furniture exp (vs. other)</td>
<td>0.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Clothing expenditures (vs. other)</td>
<td>1.19</td>
<td>0.46</td>
</tr>
</tbody>
</table>
2. Measurement Bias

- Respondents reported 3,039 expenditures (Interview 1)
- Records available for 36% of expenditures (Interview 2)
- Of expenditures with records: 54% of self-reports were accurate (<10% difference)
- Magnitude of misreporting was 29.9% on average
3. Propensity Strata

Likelihood of having a record

- Stratum 1 (Low)
- Stratum 2
- Stratum 3
- Stratum 4
- Stratum 5 (High)

- Predicted
- Actual
4. Relationship between likelihood of having a record and accuracy of self-report

Accuracy

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Accuracy</th>
<th>F Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratum 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratum 2</td>
<td></td>
<td>5.80</td>
<td>.0001</td>
</tr>
<tr>
<td>Stratum 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratum 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stratum 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Implications

- When using an incomplete set of records, it is important to investigate the impact on measurement error.

- In the CE records study, even an incomplete set of records can reduce error associated with recall failure.

- Although respondents only had records for roughly 1/3 of reported expenditures, they were more likely to have records for expenditures they were WORST at recalling.
Limitations

- Non-probability, feasibility study limited to 115 people
- Study data were about financial expenditures. It is unclear how well this would apply to other types data where records can be used
- We do not know the accuracy for the self-reports without records.
- There may be other factors affecting availability of records and accuracy that we did not examine.
Next Steps

- Continue using records to supplement recall and reduce respondent burden
- Consider having respondents collect records proactively (instead of retroactively)
- Explore the use of records as a primary source of data collection
Corresponding author:

Emily Geisen
RTI International
919-541-6566
egeisen@rti.org