Design A Evaluation

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Questions

• What are the design’s strengths and weaknesses?
• Which users is this design optimal for?
• What will the output of data collection look like?
• What statistical procedures will need to be applied?
Users for Design

• Target users: CPI
• Federal and state programs that use information at the level of the CPI or in aggregation
• Economic research, but not in the ideal form
Strengths / priorities unique to A

• Accurate reporting of concurrent expenses using records to the extent possible
  – Relatively short, but intensive collection to minimize respondent fatigue
  – Focus on relatively easy modes of recording items in natural units and in real time to minimize recall bias
Strengths / priorities unique to A

• Keep sample design and data collection simple
  – Focus on reducing measurement error and increasing response rates
  – Keep costs low
  – Simplify logistical operations of a new survey
  – Simplify post-data collection statistical processing
Questions

• Is 2 weeks too long for accurate reporting for all household members?
  – When does respondent fatigue start affecting quality?
  – What is the statistical gain of the 2\textsuperscript{nd} week in a single reporting period?
  – Some models to consider: Dietary intake surveys, maybe some media surveys that require recording prospectively (radio listening survey)
Questions

• What does “recall” mean for the larger or recurring items?
  – Many of these items often have records associated with them
  – Develop methods to encourage record use here

• Is there sufficient sample size for special CPI calculations?
  – Survey has tons of data for modeling
  – Small area estimation might mitigate the need for direct estimates in smaller domains
Structural constraints

• Does not provide a direct and complete picture of household spending and income over the time periods of interest to economic researchers
  – With CPI as a goal, effort is devoted to expense detail, compromising time span of data collection
  – Statistical modeling can be used to bridge this gap
  – Survey has lots of data to support longitudinal modeling of aggregate categories of interest to researchers
Data for 2-wk data collection event

• Household or person-level
  – Demographics, life events (person)
  – Income, assets, labor force participation (person)
  – Recurring expenses (household, maybe person)
  – Larger purchases (household, maybe person)

• Expenditure-level by person
  – Individual purchases for items by person

• All expense and income data are in natural units for accurate reporting amounts
### Data structure over time

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Minimum statistical processing

• Translate the entered data into units that are comparable across individuals and households
  – Could be done by survey instrument
  – Could offer this as a check to respondents
• Diagnostics, editing for microdata
• Sample and nonresponse weighting, variance estimation variables
• Calculate CPI budget shares
  – Need a model to estimate quarter, annual params
Some additional opportunities

• More detailed nonresponse adjustment
• Small area estimation for specific CPI domains
• Measurement error modeling
  – Strong interest in seasonality → repeated observations
  – Evaluate quality of information (possibly for comparison within an experimental setting)
  – Potential bridge for uses beyond the CPI and state/federal programs
Example: dietary intake surveys

• Focus is on parameters from the “usual intake” distribution across individuals
  – Distn of indiv means: annual mean daily consumption of a dietary component for an indiv

• Food frequency: estimate of typical daily intake as a direct measure of usual intake
  – Shown to have considerable measurement error

• 24-hr dietary intake record or recall: more accurate information on a short period of time
  – Better quality, wrong concept
  – Can be related to usual intake via a model
Example: dietary intake surveys

24hr recall = usual intake + error

\[ D_{ij} = U_i + e_{ij} \]

- \( D_{ij} \): 24 hr recall for individ i on day j (NHANES: 2 days)
- \( U_i \): usual intake for individ i (indiv mean over days)
- \( e_{ij} \): error in 24hr recall as an est of usual intake

- Interest is in parameters for distn of usual intake
  \( \rightarrow \) estimate this distribution
Vitamin B$_6$ (mg/d), women 19-50 yrs

Ear = 1.1

Usual intake

24-hr recall
Example: dietary intake surveys

- Lots of different nutrients, foods, etc.
  - Goal of methodology development was to serve the full range of behaviors
- Food intakes, for example, have many 0 values
  - Is this a structural 0 (not a consumer of the food) or a 0 on that day (consumer)
  - Mixture model to allow for a parameter that
- Ratios
  - Dietary component in relation to calorie intake
- Policy analysis
  - Food fortification alternatives