



Assessing Measurement Error in the CE

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Introduction

- Goal is to develop specific measure that can be used on an ongoing basis to track measurement error in the Consumer Expenditure Survey (CE) over time
- As a practical matter, most of the measures proposed track overall error in the CE, not just measurement error

Background

- Many methods have been used to assess error in the CE, each with their strengths and weaknesses
- We recommend an multi-method-indicators (MMI) approach that consists into three main categories:
 - Internal indicators (based solely on CE data or paradata)
 - External indicators (compare estimates from the CE to an external data source)
 - Record check studies

Internal Indicators

- Some are based solely on CE data or information about the data collection process—Internal indicators
- Examples
 - Compare Interview Survey with Diary Survey
 - Compare across waves or across groups (for example, the proportion of CE respondents consulting bills or other records during the Interview Survey)
 - Develop latent class models based on several types of data/paradata
 - Use multi-level models to identify item or R characteristics associated with error
- Weakness—Can't really estimate the magnitude of the errors (for example, proportion of Rs consulting records); these are indirect indicators

External Indicators

- Comparison to external data sources
- Two main external sources
 - Personal Consumption Expenditures from NIPA (National Income and Product Accounts)
 - Compare CE estimates with other surveys (e.g., MEPS, PSID, RECS)
- Weakness—Although PCE is covers many categories and a lot of work has gone into establishing “concordance” of PCE/CE categories, errors in PCE are not well established; not clear external benchmarks are really more accurate than the CE

Record Check/Validation Studies

- Compare CE reports to actual bills or other records
- In principle, this is a good method but it has many practical difficulties
 - Burdensome; likely to produce high rates of unit and item nonresponse
 - Some types of purchase unlikely to generate records
 - Recent feasibility study by Geisen and colleagues—Rs produced records for 36 percent of reported purchases

Selection Criteria for Internal Indicators

- **Sources of error:** Should give some indication of magnitude of different types of reporting error (forgetting, conditioning, satisficing)
- **Relation to error:** Should be predictive of level of error
- **Availability/stability:** Should tap data that will be available over time
- **Utility for improving items or survey procedures:** Should help identify problems that can be fixed

An Illustrative Set of Internal Indicators

- In the Diary Study, interviewer assessments of the diary keeper's level of diligence in recording entries before pickup versus data collected by recall (recall error);
- The ratio of the number of entries in diary week one and diary week two (conditioning);
- The percentage of respondents who use records during the Quarterly Interviews (recall error);
- The length of interview (satisficing?);
- The average number of contact attempts needed to complete Quarterly Interviews (reluctance).

Selection Criteria for External Indicators

- Cover a range of categories, including some that differ in the likely availability of records;
- Include both regular (e.g., rent/mortgage, utilities) and irregular (e.g., clothing) expenditures;
- Include both large and small expenditures;
- Focus on categories in which the external source uses a definition that is reasonably consistent with the CE definition.

An Illustrative Set of External Indicators

- Comparisons with other surveys
 - ACS estimates for rent (6.1%) and mortgage (6.4%);
 - ACS estimates for utilities and fuel (7.5%);
 - Residential Energy Consumption Survey (RECS) estimates for utilities and fuel (7.5%);
 - MEPS estimates for hospitalization and health insurance (Healthcare 6.7%);
 - MEPS estimates for medical and health;
 - PSID estimates for medical and health.

An Illustrative Set of External Indicators

- Comparisons with the PCE
 - Household appliances (major and small appliances 0.6%);
 - Rent (6.1%) and utilities (7.5%);
 - Food purchased offsite (Food away 5.3%);
 - Women's and girl's clothing (1.5%);
 - Men's and boy's clothing (0.8%).

Record Check/Validation Study

- Use many of the same categories as in external Indicators to assess convergence
- An illustrative set:
 - Women's and girl's clothing;
 - Men's and boy's clothing;
 - Rent and utilities;
 - Food purchased offsite; and
 - Hospitalization and health insurance

Topics for Pre-Implementation Research

- Test protocols for obtaining records for more expenditure categories and for a higher percentage of survey reports
 - Should we try to collect records for all expenses or only for select categories?
 - What expenditure categories and what types of records raise privacy concerns?
- Determine the sample size for a records validation study
- Attempt to access respondents' electronic records more effectively
- Develop improved methods to measure under- and overreporting of expenditures (as opposed to amounts)

Topics for Ongoing Research

- Examine interrelationships among indicators
 - Are the indicators unidimensional or multidimensional?
 - Factor analyze internal and external indicator values over time
 - Other approaches (like LCA) may be useful
- Ongoing research to identify more effective internal indicators will be needed, especially if the CE survey design changes.

Additional Considerations

- **Cost:** What inputs are needed to develop each MMI component?
- **Duration for development:** How long will the development efforts take?
- **Applicability:** Is the component applicable only to the current CE design or will it remain applicable to other designs?
- **Periodicity:** How often can the indicators be tracked?

Summary

- No one approach is perfect
- We recommend building on past efforts
- Develop a time series with multiple indicators
 - Internal indicators
 - External indicators
 - These are both inexpensive
 - Still, given the flaws, they should be supplemented with periodic (but regular) record check studies
 - Have overlapping expenditure categories to assess convergence across methods