Data Quality Session
Developing a Data Quality Profile for the Consumer Expenditure Survey

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Presentation Outline

To share the challenges encountered in the initial stages of this development process, report on interim progress, and thoughts for next steps.

- What is a Data Quality Profile (DQP)
- Challenges
- Iterative approach to development
- Interim results
- Moving forward
What is a Data Quality Profile (DQP)?
“A comprehensive report prepared by producers of survey data that provided information data users need to assess the quality of the data”

Survey Research Center (2010)

“To provide researchers and data users with a single source for a wide range of information on the quality of AHS data”

Quality Profile of the American Housing Survey (1996)
More Example:
Vary in Breadth and Depth of Coverage

BRFSS 2013 Summary Data Quality Report

Table of Contents

Introduction
Interpretation of BRFSS Response Rates
BRFSS 2013 Call Outcome Measures and Response Rate Formulae...
Tables of Outcomes and Rates by State
References

American Housing Survey 1996 Quality Profile

Chapter 1. Introduction and Summary
Introduction
Objectives of the Report
Sources of Data on Quality for AHS
Sources of Additional Information
Structure of the Report
Summary
Sample Design, Frames, and Undercoverage
Potential Sources of Errors in the Data Collection Procedure
Listing error
Problems with the coverage improvement screening procedure
Errors in Classification of Housing Units
Nonresponse Error
Unable-to-locate units
Noninterviews
item nonresponse
Measurement Errors
Questionnaire design, content, and wording
Interview mode

✓ RESPONSE RATES
✓ 23 PAGE
✓ Annual publication


✓ TOTAL SURVEY ERROR DIMENSIONS
✓ 80 + PAGE
✓ 1996

https://www.census.gov/content/dam/Census/programs-surveys/ahs/publications/h12195-1.pdf
Data Quality Profile for the CE

“Monitoring; Establish baselines”

“Fitness for Use”
Definition of Data Quality for CE
Multi-dimensional Definition of Data Quality adopted for CE

Interpretability

Accessibility

Total Quality Management Dimensions (TQM)

Timeliness

Relevance

Accuracy

Coherence

Total Survey Error Sources (TSE)

Frame (coverage)  Specification (construct)

Sampling  Measurement

Non-response  Processing (data edit)

Post-survey adjustment

(Gonzalez et al 2009)
Challenges
To achieve **reproducibility and interpretability of metrics**

**Metric Documentation:** efficient and robust

**Infrastructure:** Continuous and adaptable to change
CE DQP Challenges

1. Requires participation and coordination across the survey program

2. Resource intensive to develop and maintain
CE Strategy to identify metrics
TQM: Survey as a manufacturing process

Relevance

Accuracy

Total Quality Management Dimensions (TQM)

Coherence

Timeliness

http://www.freepik.com/free-vector/industry-and-technology-background_1048768.htm Designed by Freepik
Proposed Framework

**Identifying key stages in CE life cycle**
- For each stage, identify major activity
- For each activity, identify issue(s) of concern
- Propose how to monitor issue identified
- Identify quality dimension(s) affected

(Fricker et al 2012)
Example of metric metadata description using a template

- Metric Name
- Description
- Metric interpretation
- Survey
- Quality dimension

CALCULATION
- Formula
- Data source and variables
- Frequency
- Level of aggregation
- Maintained by

MONITORING
- Target / Threshold / Tolerance
- Presentation / display

NOTES/COMMENTS
Proposed framework: Criteria for Metric Prioritization

S.M.A.R.T

Specific – targeted at identified risk
Measurable – can be used to determined progress
Achievable – realistically attainable
Relevant – not just “good to know”, actionable
Timely – available when needed
Iterative approach to DQP development
“Learn by **doing**, **Refine** and **Scale** up!”
LESSONS LEARNED

2011
- Understand the task for which we want to develop metric
- Importance of metric metadata documentation for reproducibility and interpretation over time

2012
- Propose framework for DQP
- Ensure consistency in documenting key elements of metric metadata
  - Use of a template

2013-14
- Measurement error study (Westat contract)
  - No single “best” method
  - Multiple method and indicators (MMI) approach

2015
- DQP version 1
  - Response rates and edit rates

2016
- MMI follow-up
  - External indicators feasibility study

2017
- DQP version 2 in progress

In 2009, DQ definition adopted for CE
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  → USE OF A TEMPLATE

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• NO SINGLE "BEST" METHOD
  → MULTIPLE METHOD AND INDICATORS (MMI) APPROACH

2015
DQP VERSION 1
• RESPONSE RATES AND EDIT RATES

2016
MMI FOLLOW-UP
• EXTERNAL INDICATORS FEASIBILITY STUDY

2017
DQP VERSION 2 IN PROGRESS

In 2009, DQ definition Adopted for CE
Example of CE DQP Version 1

1. Response Rates
2. Nonresponse rates
3. Expenditure Edit Rates
4. Income Imputation rates

* Reporting period: 2010 - 2013

https://www.bls.gov/cex/ce_dqreport.pdf
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Overview
The Consumer Expenditure Survey (CE) has historically provided some limited metrics for data users to evaluate the overall quality of output provided in its products. Published tables provide standard errors; the public-use microdata user guide provides response rates, and the datasets contained in the public-use microdata provide all the variables and flags necessary for users to create his or her own quality measures. There has long been a recognition for the need for more comprehensive data quality metrics that are timely, routinely updated, and accessible to data users from a single source, a Data Quality Profile (DQP). However, there is also recognition of the high cost in terms of resources and commitment to identifying appropriate metrics and establishing the information base necessary to routinely
DQP Version 2: Scale up from DQP version 1

Contents

► Updated metric reporting period: 2010-2015
► New metric added: Use of Records by Survey Mode
► Metrics refined:
  • Responses rates: Additional breakouts by collection wave (Internal)
  • Expenditure edit rates: Differentiated between processed and reported data (Internal)
► Addition of visual summary of metric trends
DQP Version 2: Scale up from DQP version 1

🛒 Production Process

► Coordinated team from 3 areas of the CE Program
► Use of metric metadata template for Documentation
► All coding for analysis of metrics and graphs produced within SAS
Moving forward
Lessons Learned from DQP 2

- Spend more time for creating and reviewing the data
- Spend more time for exploring and discussing metric ideas, and document!
- Consult “topic experts”
- Moving the DQP to routine production will need further consideration about the infrastructure needed to support that
Next

- Upcoming: Data Quality Profile version 2 will be available for public users on SEPTEMBER

- We will appreciate your feedbacks and comments!
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