

Nonresponse Research Plans for the Survey of Income and Program Participation

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Abstract: Nonresponse bias is an important concern for longitudinal surveys such as the Survey of Income and Program Participation (SIPP). Previous panels started with nonresponse rates around 7.5% in the first wave and climbed to around 20% by the eighth wave. We are making changes to the 1996 panel that are expected to increase nonresponse rates: the panel length will increase to four years, we will introduce computer assisted personal interviewing (CAPI), and the panel size will be larger than previous panels (so many interviews will not have previous experience with the SIPP). The U.S. Census Bureau has initiated several projects with the goal of reducing nonresponse bias. This paper briefly describes these projects.

Key Words: Imputations; weighting; incentives.

1. Introduction

Nonresponse bias is an important concern for longitudinal surveys such as the Survey of Income and Program Participation (SIPP). The SIPP interviews sample households every four months over a period of years. The rate of household nonresponse increases with each successive wave. Past panels started with nonresponse rates around 7.5% in the first wave and ended with rates around 20% in the eighth wave. We are making changes to the 1996 panel that are expected to increase nonresponse rates to as much as 30% by the end of the panel.

- The 1996 panel will have 12 waves rather than 8. This will increase the length of the panel to 4 years.
- We will begin computer assisted personal interviewing (CAPI). Other surveys have experienced increased nonresponse rates when CAPI was started. The SIPP used CAPI in a 1995 dress rehearsal rates of around 12%.
- The size of 1996 panel will increase to approximately 50,000 interviewed households. As a result, many interviewers will not have had previous experience with the SIPP.

The longer panel will improve the utility of SIPP data for longitudinal analysis, but nonresponse bias will be a concern. Sampling variances of estimates will be smaller due to the larger panel size. The accuracy some statistics, for example the poverty rate, might not improve if nonresponse bias increases too much.

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The U.S. Census Bureau has initiated several new research projects with the goal of measuring and reducing nonresponse bias. The goals of the projects fall into the three general categories below.

- Measurement of nonresponse bias
- Reduction of nonresponse
- Improvements to nonresponse adjustment methodology

The specific projects are discussed in the next section.

2. Nonresponse Projects

2.1 Examining nonresponse/attrition by field representatives

This project will gather information from field representatives (FR's) and supervisory field representatives (SFR's) about effective methods of obtaining interviews, finding movers, and converting refusals to interviews. FR's and SFR's who historically maintain high response rates will be asked to discuss methods they use to find movers and convert refusals. It is hoped that analysis of this information will provide insights on how training materials and data collection procedures can be improved.

We plan to use information from this project in interviewer training for the 1996 panel.

2.2 Re-assessing how we inform respondents and interviewers about the importance of the survey

Purpose is to better motivate respondents and interviewers about the importance of the SIPP.

We've been told by our regional offices that we need to do a better job of publicizing the value of the SIPP to the nation and local communities. This project will examine our current practices of publicizing the SIPP and that of other surveys. The expected results are:

- Recommendations about how to improve the way we use our current materials.
- Ideas for new ways to publicize the SIPP and inform sample households about why it is important that they respond.

C. Nonresponse follow-up study

Household nonresponse in wave 1 (the first interview) of the SIPP averaged about 7% for the 1984 thru 1991 panels. The two most recent panels (1992 and 1993) had average nonresponse rates over 9% in wave 1. Since the SIPP is a longitudinal survey, nonresponse rates are cumulative. Households that do not respond in wave 1 or in two consecutive later waves are not interviewed for the remainder of the panel.

Field representatives try to obtain some information about wave 1 interviews, such as race and tenure, for use in nonresponse adjustment. Additional information would allow us to better

understand the characteristics of wave 1 nonrespondents and seek ways to reduce nonresponse bias. We would like to evaluate:

- Differences of distributions of wave 1 respondents versus nonrespondents for variables such as income, poverty, and program participation.
- The effectiveness of the current nonresponse adjustment reducing bias
- Alternative nonresponse adjustments

Plans for this study call for a short questionnaire to be mailed to all wave 1 nonrespondents. Nonrespondents will be asked to fill in basic information on income, program participation, and household membership. Information from returned questionnaires will be used to prepare a new noninterview adjustment and weights. We will use the alternative and original weights to form two set of key estimates. The ability of the nonresponse follow-up to reduce bias will be evaluated by comparing the two sets of estimates. In addition, we will compare the differences between respondent and nonrespondent populations.

D. Accuracy of "Type Z" Imputations

We call noninterviews of persons within interviewed households a type Z noninterview. Households in which at least one person was interviewed are interviewed households. Type Z nonresponse is the second most prevalent type of nonresponse at the person level in waves 2 and later. About half of wave 1 type Z cases are never interviewed during the panel.

We use hot deck imputation to fill in data for Type Z noninterviews. Type Z cases are matched to donors and data from the donor case is substituted for missing interview. Other types of nonresponse are generally handled by weighting adjustments.

In this project, we plan to study:

- Alternative field procedures to reduce the amount of type Z nonresponse.
- the effect of type Z nonresponse on key estimates.

Table 1. Percent of nonresponse of persons in 1991 panel by type of nonresponse.

Wave	Type Z	Whole Household Refusal	Mover	Other
2	34.1%	39.1%	14.8%	12.0%
3	30.3%	42.0%	19.6%	8.2%
4	29.2%	41.8%	23.0%	6.0%
5	28.6%	39.9%	24.0%	7.5%
6	27.6%	40.0%	26.6%	5.8%
7	30.1%	38.2%	26.3%	5.4%
8	30.7%	36.7%	27.7%	4.8%

The first part will consist of reviewing of field procedures. Changes to proxy rules and other procedures might improve the chances of collecting at least some information for all household members.

The second part will consist of an evaluation of the hot deck procedure. Additional type Z's will be created from fully reported cases and imputed for missing data. Key statistics, such as poverty rates, will be retabulated and compared with the original estimates. If significant differences are observed on the key statistics, alternative imputation procedures will be tried.

E. Carry - over Imputation

The SIPP provides longitudinal weights for the analysis of persons over a particular calendar year or over the panel. Persons who are classified as interviewed (self, proxy, or imputed) for the appropriate period receive a positive weight. Starting with the panel, we began using data from surrounding interviews to fill in data for a missing interview. A random procedure is used to determine the number of months (0 to 4) that will be imputed with data from the last month before the missing wave, and the number of months imputed the data from the first month after the missing wave. We restrict this procedure to filling in missing interviews that are bounded on two sides by a self or proxy interview. the 199 panel was used to test carry over imputation. The impact of carry over imputation on the number of positively weighted cases is shown below.

Table 2. Increase in positively weighted persons in 1990 panel due to carry-over imputation

Weight	Increase in positively weighted cases	
	Number	Percent of Designated Sample
Panel	3521	5.7%
1990 Calendar Year	2450	4.0%
1991 Calendar Year	2095	3.1%

The number of positively weighted cases can be increased by imputing interviews for other nonresponse patterns. For example, we can increase the number of positively weighted cases about 1% by imputing for 2 consecutive noninterviews bounded by interviews.

This study will explore the merits of extending carry-over imputation to may increase bias in some estimates, such as number of transitions into and out of poverty. We will weigh the benefits of additional positively weighted cases against possible increases in bias.

F. Incentives Test

Past research has shown that incentives are effective in increasing response rates. A calculator incentive was tested in the SIPP 1987 panel (Butler, 1991). The calculator incentive resulted in a 2% increase in final response rates compared to the control(non-incentive) group. Another study (Willimack, 1995) offered a nice ball point pen, which increased response rates from 76% to 81%. Other studies have shown that the number of callbacks needed is reduced when incentives are given, which decreases interviewing costs.

The incentives test will be conducted during wave 1 of the SIPP 1996 panel. Three treatments are proposed:

Control:	No incentive
Treatment 1:	\$10 or \$20
Treatment 2:	Non-cash gift with value up to \$20

Field representatives will distribute the incentive to sample households prior to the first interviews. The experimental design calls for stratifying PSU's according to size into 3 strata. Within each strata, treatments will randomly be assigned to PSU's. The incentives test is expected to answer the following:

- Do incentives significantly increase wave 1 response rates
- Do incentives in wave 1 increase response rates in later waves
- Do incentives reduce the number of callbacks
- Does the effect of the incentive depend on the value of the incentive

G. Effect of Second State Weighting on Nonresponse Adjustment

SIPP cross-sectional (and longitudinal) weights are the result of a series of adjustments to designed to make the distribution of sample characteristics more closely resemble the general population. The components of cross-sectional weights are listed below.

- **Base Weight (BW)** - The inverted probability of selection of a person's household
- **Duplication Control Factor (DCF)** - Adjusts for subsampling done in the field
- **Wave 1 Noninterview Adjustment Factor (F_{N1})** - Adjusts for noninterviewed households in wave 1.
- **Movers Weight (MW)** - Adjusts for persons in the SIPP universe who move into sample households after wave 1
- **Wave 2+ Noninterview Adjustment Factor (F_{N2})** - Adjust for noninterviewed households in waves 2 and later that were interviewed in wave 1
- **Second Stage Adjustment Factor (F_{28})** - To adjust estimates to population controls

The second stage adjustment is large for some populations. For example, the number of black households increased by 14.3% in the March 1991 second stage adjustment. Black households in poverty increased even more, 22.3%.

It is possible that effectiveness of nonresponse adjustment is reduced by the second stage weighting adjustment. A few reasons why this seems plausible are:

- We have investigated a number of alternative wave 2+ nonresponse adjustments. After each alternative, second stage adjustment factors were computed to obtain final weights. Estimates of key statistics using the original weights and alternative weights were all very similar to each other.
- In raking adjustments of two or more marginals, the sum of weights corresponding to a given marginal will not agree with the controls of that marginal after raking on other marginals. This situation is comparable to the situation in the last two stages of weighting.

We will investigate the effect of the second stage adjustment on the nonresponse adjustment by computing alternative weights. The alternative weights will be obtained by starting with wave 1 final weights and then doing the last three stages of weighting. Second stage factors are expected to be smaller (and effect the nonresponse adjustment less) under the original procedure. Estimates of key statistics will be compared to evaluate the importance of any effect. If differences are found. We will investigate weighting alternatives with combined nonresponse and second stage adjustments.

3. Conclusion

The long length of the 1996 SIPP panel will make nonresponse an important concern throughout the panel. Wave 1 nonresponse is particularly important since wave 1 nonrespondents are nonrespondents for the entire panel. Three projects focus primarily on wave 1.

- Examining nonresponse/attrition by field representatives
- Incentives Test
- Nonresponse follow-up study

The first project looks for ways to improve interview training; the second project will study the effect of incentives distributed in wave 1 on response rates; and the third project will collect information on wave 1 nonrespondents.

We have initiated new research projects that seek to reduce nonresponse bias by:

- characterizing nonrespondents and measuring nonresponse bias,
- reducing nonresponse rates,
- and improving nonresponse adjustment methodology

We are also continuing to work on other investigations:

- Regression weighting methods (An, Breidt, and Fuller 1994)
- Using Internal Revenue Service (IRS) income data to improve weighting (Dorinski and Huang 1994)

4. References

An, A., F. Breidt, and W. Fuller (1994). Regression Weighting Methods for SIPP Data. American Statistical Association 1994 Proceedings of the Section on Survey Research Methods.

Butler, D. (1994). SIPP 1987: Gift Experiment Results. Internal Census Bureau Memorandum from Butler to Singh, April 2, 1991

Dorinski, S., and H. Huang (1994). Testing a New Attrition Nonresponse Adjustment Method for the SIPP. American Statistical Association 1994 Proceedings of the Section on Survey Research Methods.

Willimack, D., H. Schuman, B. Pennell, and J. Lepkowski (1995). Nonmonetary Incentives in Face-to-Face Surveys. *Public Opinion Quarterly*, 59, 78-92.