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I. INTRODUCTION

The Survey of Income and Program Participation (SIPP) is a longitudinal household survey which is designed to provide comprehensive information on the economic situation of households and persons in the United States. The SIPP regularly collects information on cash and noncash income, eligibility and participation in various government transfer programs, and labor force status. In addition, the SIPP periodically collects information on many other topics such as assets and liabilities, child care, and health care (Nelson, et al., 1985).

When the SIPP was started, it was generally believed that the only way to effectively collect the complex and sensitive SIPP data was through personal visit interviewing. As a result, telephone interviewing is conducted only when an interview cannot be conducted in person and the field representative has supervisory approval. During the first year and a half of the survey, about 95.5 percent of all SIPP interviews were conducted by personal visit (Kalton, et al., 1986). However, in a continuing effort to make the SIPP design more efficient, and with the approval and encouragement of the Office of Management and Budget, the Census Bureau began exploring the use of telephone interviewing in the SIPP in 1985.

The Bureau conducted a small feasibility pretest in June 1985 (see Durant and Gbur, 1988) and then a two-phased national level experiment in 1986 and 1987. The objective of the national level experiment was to determine whether a nationwide sample of live SIPP households could be primarily interviewed by telephone while maintaining cross-sectional and longitudinal data quality.

For the national experiment, a description and initial cross-sectional analytic results are given in Gbur and Petroni (1989). This paper provides further cross-sectional and initial longitudinal analytic results. The paper provides an overview of the SIPP design and of the design for the two phases of the national level experiment, and a summary of initial cross-sectional results (Section II); the analytic procedures, additional cross-sectional and initial longitudinal results (Section III); and a discussion of the results and conclusions (Section IV).

II. OVERVIEW

A. The Survey of Income and Program Participation

The SIPP is a nationally representative sample of housing units drawn from the noninstitutionalized resident population of the United States. Interviewing for the first panel (i.e. sample), the 1984 panel, began in October 1983. The 1985 and 1986 panels were introduced respectively in February 1985 and February 1986.

Each panel is divided into four approximately equal subsamples, called rotation groups. One rotation group is interviewed per month. Thus, one cycle, or wave, of interviewing (using the same questionnaire) usually takes four consecutive months to complete. Wave 3 of the 1986 panel has three rotations.

Each rotation group is interviewed once every four months for about two and one-half years. At each interview, respondents are asked a core set of questions about their income and labor force and program participation during the previous four-month period. At Waves 2 and beyond, respondents are also asked a set of supplementary (topical module) questions which vary by wave. The 1986 panel topical modules for Wave 2 are: Reciprocity, Marital, Migration, Fertility, Work Disability, Employment, and Education and Training Histories; Family Background; and Household Relationships. For Wave 3 they are: Child Care Arrangements and Child Support Agreements, Support for Nonhousehold Members, Job Offers, Health Status and Utilization of Health Care Services, Long Term Care, and Disability Status of Children. For Wave 4 they are: Assets and Liabilities, Retirement Expectations and Pension Plan Coverage, and Real Estate Property and Vehicles.

Each panel differs in the number of waves, the length of certain waves, and the contents of the topical modules. There are sometimes two or three panels in the field at the same time. A detailed description of the SIPP is given in Nelson, et al. (1985).

B. Testing Maximum Telephone Interviewing

1. Design and Objectives

For the months of the experiment, approximately half of the SIPP sample households were designated as maximum telephone interview (MTI) cases, and half as maximum personal interview (MPI) cases. The assignments were random. For

MTI cases, field representatives (FRs) were directed to obtain interviews by telephone if at all possible. However, the goal was to obtain the interview - even if it required not using the telephone. MPI cases were to be done similarly. FR assignments were made without regard to the amount of SIPP or telephone interviewing experience or the cases' designated interview modes. Each FR completed a telephone self-study prior to beginning his/her telephone assignment.

The telephone interviews were conducted from field representatives' homes and respondents were mailed letters to let them know that their next interview may be by telephone and to provide them flashcards for use during the interview. Although there were no specific rules for maximizing self response, FRs were instructed to use the same procedures for both telephone and personal visit interviewing.

Phase I was conducted during the 1986 panel using households interviewed in two rotations of Wave 2 (August and September, 1986) and Wave 3 (October and November, 1986). Phase II was conducted in three of the 1986 panel Wave 4 rotations (February-April, 1987). Households designated as MTI (MPI) in Phase I, were also designated for MTI (MPI) for Phase II. Objectives for conducting the study in two phases and further details on the design and differences between the phases are given in Gbur and Petroni (1989).

The telephone experiment was designed to compare the designated rather than the executed interview modes. This is because the aim is to compare results from the potential interviewing procedure (i.e. maximum telephone interviewing) with current interviewing procedures rather than to compare telephone versus non-telephone results.

2. Initial Cross-Sectional Results

Initial cross-sectional analysis included comparisons by designated mode of: 1) weighted summary statistics (household size distribution, self/proxy response rates, and proportion of households with noninterviewed persons); 2) household and person nonresponse rates; 3) item nonresponse rates; and 4) various other estimates (reciprocity, low income status, and median monthly income). Some estimates showed significant differences between designated interview modes. However, analysis of these estimates gave no indication of an overall significant mode effect.

III. ANALYSIS

A. Overview of Analytic Approach

Topical module and longitudinal data analyses are provided in the following sections. For topical modules in the waves during which the tele-

phone test was conducted, item nonresponse and estimates of levels and rates were examined. For each topical module, estimates which Census Bureau demographic analysts identified as important were analyzed. Section III.B discusses the results.

The estimates examined for the longitudinal analysis included: spells of unemployment, monthly transitions of reciprocity and amounts of selected income sources, hourly wage rates and household income after a spell of unemployment, annual income, income to poverty ratios, year-to-year change in poverty status, number of months with some characteristic (receiving assistance, on layoff, with low income, etc.), and number of months for which assistance programs provided at least half of total income. These particular estimates were selected due to their availability. Since time constraints required that readily obtainable estimates be selected, estimates covering the full range of estimates available from the SIPP could not be analyzed. Thus, the conclusions which can be drawn from this longitudinal estimate analysis are limited.

Differences between modes in item nonresponse rates and estimates were tested at the 10 percent level of significance with chi-square tests for distributions and t-tests for proportions and medians. For comparisons of unweighted estimates, design effects were used to adjust the simple random sample variance for the complex sample design. Sampling errors of the weighted estimates were calculated using generalized variance parameters estimated for the SIPP and adjusted for the experimental design.

Many of the estimates analyzed are not disjoint. Thus, a statistically significant result for one estimate may result in significance for another estimate.

The topical module estimates are from the individual waves' cross-sectional data files. The longitudinal estimates are from the 1986 SIPP Research Panel File using the first 24 or 28 months of interviewing.

B. Topical Modules

1. Item Nonresponse

Topical module item nonresponse rates were compared by MPI and MTI for Waves 2 and 3 for all items for which rates could be calculated and for Wave 4 for a representative selection of items for which rates could be calculated. The number of persons responding to a question, rather than the number eligible to respond, was used as the rate's denominator, because the latter cannot always be determined. This was the case since skip patterns were not always followed properly. However, analy-

sis of response behavior (Gbur, et al., 1990) suggests no consistent pattern of differences between MPI and MTI interviews.

Waves 2 and 3 show no overall mode effect for item nonresponse. For Wave 4 estimates where the MPI nonresponse rates are below 20%, none of the comparisons showed a significant difference. Of the five questions where this rate is over 20%, the difference is significant in three. (All three questions relate to retirement assets or earnings. In fact, all but one of the questions having nonresponse rates greater than 10% ask about dollar amounts that are not easily known.) Over all comparisons, the MTI response rate is greater than the MPI rate about half the time for Waves 2, 3, and 4.

2. Estimates of Levels and Rates

Comparisons of estimates for levels and rates were made for many of the Waves 2, 3, and 4 topical module questions. Based on the analysis, there is no detectable difference between data collected by MPI and MTI. Out of several hundred comparisons, fewer than ten showed statistically significant differences.

For Wave 2, the distributions of children ever born to a woman who had a child "last year" differed for MPI and MTI cases. The difference is due mainly to the percentages of women reporting one, two, or three children ever born - 31.1, 38.5, and 26.9%, respectively, among MPI households, and 46.4, 28.0, and 16.2% among MTI households.

Of the 80 Wave 3 topical module estimates and twelve distributions examined, only three estimates and one distribution resulted in a significant difference between MPI and MTI cases. A significantly higher percentage of MPI respondents reported second and third youngest children in day care. Among MPI households with at least two children, 4.07% reported keeping their second youngest child in day care. The same percentage was only 0.83 among MTI households. For the third youngest child, the respective percentages were 3.60 and 0.00. One of the long term care questions revealed a significant difference.

Wave 4 estimates of the mean amounts of money in nonbanking institutions were compared by designated interview mode. The result of the comparison of total assets over all respondents, indicates the general direction of the comparisons for the demographic subgroups. Here, the mean amount is greater for MPI than MTI respondents but not statistically significant. A majority of the subgroup comparisons show a slight but nonsignificant positive difference.

Over the three waves, there is a small general trend of higher reporting among MPI cases. That is, the amounts of money received or expended tend to be slightly larger, and their participation rates in programs tend to be slightly higher. However, the differences for the most part are not significant.

C. Longitudinal Estimates

1. Levels and Rates

Table 1 provides the median family income of persons for calendar year 1986 by demographic and geographic characteristics. Only one statistically significant difference is observed in comparing these estimates by designated mode. Comparison of calendar year 1987 estimates also produces only one significant difference. (Note that although only 18 median income estimates are displayed in table 1, a total of 32 such estimates were examined. Of the additional estimates, none were significant for calendar year 1986 and only one was significant for calendar year 1987.)

Table 1 also provides mean income-to-poverty threshold ratios for calendar year 1986 by demographic and geographic characteristics. In comparing differences between MTI and MPI ratios, there are no significant differences. For the 1987 calendar year, MTI and MPI ratios for Hispanics are statistically significant. There is some indication of higher MTI estimates for 1986 and 1987, but the differences are so small no conclusive statements can be made.

Another type of estimate examined is the mean number of months, over a period of 28 months: that respondents were in (1) a major assistance program, (2) a cash assistance program, or (3) the food stamp program; and in which cash assistance or food stamps accounted for (4) 100% or (5) at least 50% of the respondent's total income. The means for these five measurements were computed and compared by designated interview mode. The estimates were calculated by characteristics such as: sex, race, age, education, and geographic region. Subgroups were defined according to the number of months the respondents spent: in a married-couple family, as a never-married mother of children under six years of age, on layoff or looking for work, and other categories. Within each subgroup, the mean number of months in the assistance program (or in which assistance accounted for the specified part of total income) was tested for a difference in interview mode. Estimates (1) through (5) are provided by mode in table 2 only for total and Black persons.

Although MPI respondents tended to report slightly longer periods on assistance than MTI

respondents, there are no statistically significant differences at the national level in the mean values for the five measurements described above.

For the various subgroups, the only consistently significant differences occurred for Blacks. For Blacks, the MPI cases consistently reported a longer period in the assistance programs than MTI cases.

In several cases, significant differences appeared in some of the subgroups according to the number of months the respondent spent in a married-couple family. However, the MPI cases reported significantly more time on assistance for some estimates, but less time for others. (Note that these estimates are not included in table 2.)

Comparisons by mode were made for the mean percent of total income accounted for by assistance programs - (6) cash programs alone, and (7) cash programs and food stamps. These means were compared for total and for the various subgroups. Again, differences at the national level between MTI and MPI estimates are not statistically significant. Among the subgroups, significant differences occurred only for Blacks. Results appear in table 2 for total and Black persons.

For the seven measures discussed above, estimates and distributions were compared by designated interview mode and demographic and geographic characteristics. For example, the percent of total income accounted for by cash assistance (measure (6) above) was divided into categories 0%, 1-9%, 10-24%, 25-49%, 50-74%, 75-99%, and 100%.

The results of many comparisons yielded conclusions similar to those already observed. The only consistently significant differences occurred for Blacks.

2. Transitions

Transitions are estimates of a change in state for a particular characteristic. For this analysis, a reciprocity transition occurs when a person changes from receiving to not receiving a given income source (a total of 26 income sources were analyzed) or vice versa between two consecutive months. The base for the percent of reciprocity transitions is the number of persons ever receiving the income source in a 24 month period. Comparisons were made between MTI and MPI cases for these estimates for all five seam month pairs (i.e., two consecutive months which are from different interviews) and two of the non-seam month pairs. These comparisons show only three significant differences and no indication of mode effect.

Transitions in amount (of at least 5 percent) received from a given income source were analyzed.

The base for the percent of transitions between two months is the number of persons receiving the income source in both months. Comparisons were made between MTI and MPI cases for the same monthly pairs compared in the above reciprocity transition analysis. There are no significant differences between modes and no indication of mode effect in any of the monthly pairs.

Year-to-year estimates of the percent of persons who changed poverty status between 1986 and 1987 are given in table 3. The results indicate that the percent of persons going into poverty for MTI cases is generally lower than that for MPI cases. In four of the ten comparisons they are significantly lower. The estimates of the percent of persons leaving poverty show no general trend in the direction of the estimates.

3. Spells

A spell is defined to be the length of time during which a person has a given characteristic without interruption. Estimates of characteristics, spell length, and spell outcome for persons with a completed unemployment spell were compared by designated interview mode. These comparisons show a significantly higher percentage of females with a completed unemployment spell for MTI cases than for MPI cases. In addition, MTI households have a significantly higher percentage of persons with an unemployment spell ending in employment. This is true for total persons and for all categories of sex and race. However, there is no significant difference between MPI and MTI households for average spell length and the percent of persons with a spell of a given length. (See table 4. Note that table 4 does not include the estimates of demographic characteristics nor the percent of persons with a spell of a given length.)

Mean hourly wage rates for persons ending an unemployment spell in employment and mean monthly household income for persons whose spell ended with their leaving the labor force were compared by designated mode. Throughout these analyses, for a given month, persons with no job who spent no time on layoff or looking for work were defined as not being in the labor force. Persons with a job for the entire month who worked some or all weeks but did not miss any weeks due to layoff were defined to be employed. All other persons were defined to be unemployed.

MTI and MPI wage rates were compared by race and spell length. The wage rates are significantly higher for persons in MTI than for persons in MPI households for total and Black persons. (The MTI and MPI estimates (standard errors) are \$6.78 (\$0.18) and \$6.30 (\$0.19) for total persons,

and \$6.03 (\$0.51) and \$4.56 (\$0.59) for Black persons.) Mean monthly household income for MTI households is significantly higher than that for MPI households only for persons with spells between 5 and 11 months. (The MTI and MPI estimates (standard errors) are \$1,110 (\$153) and \$1697 (\$234).)

D. Future Analysis

Although some differences were found, further analysis of the data may be required before any final statement can be made on the effect of telephone interviewing on the SIPP. Any additional analyses may include detailed longitudinal estimate evaluation and comparison of cross-sectional bivariate correlations by mode.

IV. CONCLUSIONS

For some surveys, telephone interviewing has been an effective mode for obtaining quality data and reducing survey costs. SIPP results to date suggest minimal effects on cross-sectional estimates and biases in some selected longitudinal estimates. Any final decision on whether and how telephone interviewing should be implemented in the SIPP will depend not only on the SIPP telephone experiment results but also on experiences from the use of maximum telephone interviewing for other Census Bureau surveys.

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ACKNOWLEDGEMENTS

The authors wish to thank Lynn Weidman and Susan Vick for the topical module item nonresponse rate analysis; Donna Ricinni's staff and Angela Feldman-Harkins for computer programming support; Kathryn Quade and Sandra Carnegie for clerical support; and Dennis Schwanz, William Mockovak, and Karen King for helpful suggestions.

** This paper reports the general results of research undertaken by Census Bureau staff. The views expressed are attributable to the authors and do not necessarily reflect those of the Census Bureau.

For the following tables: 1) '+' indicates that the estimate is significantly different from the personal visit estimate at the 10% level, 2) MPI (MTI) is designated for maximum personal visit (telephone) interviewing, 3) SE is standard error, 4) standard errors are calculated assuming a correlation of 0, 5) all longitudinal estimates are from the SIPP 1986 Longitudinal Panel File, and 6) Hispanic estimates include persons of any race.

Table 1: Median Family Income of Persons and Mean Income-to-Poverty Ratios for Calendar Year 1986 by Various Characteristics and Designated Interview Mode

| Characteristic | Median Family Income | | | | Income-to-Poverty Ratios | | | | | |
|-------------------------|----------------------|--------|-------|-----------|--------------------------|----------|----------|----------|----------|------|
| | Base | MPI | MTI | Income SE | Income SE | Ratio SE | Ratio SE | Ratio SE | Ratio SE | |
| Total | 114961 | 113217 | 28284 | 436 | 28786 | 445 | 3.49 | 0.04 | 3.51 | 0.04 |
| Male | 54999 | 54810 | 30439 | 378 | 30667 | 417 | 3.68 | 0.06 | 3.68 | 0.06 |
| Female | 59962 | 58407 | 26145 | 538 | 26773 | 552 | 3.31 | 0.05 | 3.35 | 0.06 |
| White | 98065 | 96239 | 30226 | 317 | 30557 | 304 | 3.70 | 0.04 | 3.71 | 0.05 |
| Black | 13815 | 13614 | 18506 | 1485 | 16335 | 1225 | 2.02 | 0.08 | 2.09 | 0.08 |
| Hispanic | 8438 | 8223 | 22133 | 843 | 21132 | 653 | 2.35 | 0.09 | 2.32 | 0.21 |
| Not HS Graduate | 20048 | 19169 | 16100 | 640 | 15943 | 491 | 2.43 | 0.07 | 2.46 | 0.09 |
| HS Graduate, no college | 29574 | 28886 | 26830 | 645 | 27979 | 769 | 3.40 | 0.06 | 3.46 | 0.07 |
| 1-3 yrs college | 20617 | 20184 | 33969 | 848 | 33705 | 868 | 4.22 | 0.11 | 4.12 | 0.09 |
| 4+ yrs college | 15234 | 14933 | 42412 | 1232 | 42683 | 1098 | 5.66 | 0.15 | 5.69 | 0.15 |
| Northeast | 23068 | 21905 | 30657 | 632 | 32250 | 1016 | 3.70 | 0.09 | 3.75 | 0.08 |
| Midwest | 31169 | 30986 | 28487 | 825 | 29477 | 779 | 3.50 | 0.07 | 3.55 | 0.08 |
| South | 38658 | 37712 | 25521 | 630 | 25242 | 580 | 3.29 | 0.07 | 3.24 | 0.07 |
| West | 22066 | 22614 | 30311 | 714 | 30898 | 667 | 3.60 | 0.09 | 3.67 | 0.09 |
| Metropolitan | 87158 | 84927 | 30763 | 316 | 30767 | 353 | 3.68 | 0.05 | 3.69 | 0.05 |
| Central City | 34078 | 33226 | 24860 | 601 | 24055 | 536 | 3.25 | 0.08 | 3.18 | 0.07 |
| Balance | 53080 | 51701 | 33864 | 501 | 34741 | 562 | 3.95 | 0.06 | 4.02 | 0.06 |
| Nonmetropolitan | 27803 | 28290 | 22034 | 471 | 23483 | 551 | 2.89 | 0.07 | 2.96 | 0.09 |

Table 2: Mean Number of Months with a Reciprocity Characteristic and Mean Percent of Income From Income Assistance Programs by Race and Designated Interview Mode

| Reciprocity Characteristic/ Income Source | MPI | | MTI | |
|--|-------|------|-------|-------|
| | Mean | SE | Mean | SE |
| Mean Number of Months | | | | |
| (1) In a major assistance program | | | | |
| Total | 3.41 | 0.18 | 3.00 | 0.18 |
| Black | 11.12 | 0.52 | 8.53 | +0.53 |
| (2) In a cash assistance program | | | | |
| Total | 1.63 | 0.13 | 1.45 | 0.13 |
| Black | 5.71 | 0.43 | 4.54 | +0.44 |
| (3) On Food Stamps | | | | |
| Total | 2.11 | 0.14 | 1.90 | 0.14 |
| Black | 7.68 | 0.46 | 6.00 | +0.47 |
| (4) In which assistance accounted for 100% of income | | | | |
| Total | 0.90 | 0.09 | 0.81 | 0.09 |
| Black | 3.67 | 0.35 | 2.61 | +0.33 |
| (5) In which assistance accounted for at least 50% of income | | | | |
| Total | 1.45 | 0.12 | 1.27 | 0.12 |
| Black | 5.45 | 0.41 | 3.88 | +0.40 |
| Mean Percent of Income | | | | |
| (6) From cash assistance programs | | | | |
| Total | 6.17 | 0.48 | 5.46 | 0.47 |
| Black | 21.60 | 1.59 | 15.31 | +1.48 |
| (7) From cash assistance programs and Food Stamps | | | | |
| Total | 6.87 | 0.47 | 6.13 | 0.46 |
| Black | 23.66 | 1.51 | 17.25 | +1.44 |

Table 3: Year-to-Year Percent Change in Poverty Status for 1986 to 1987 by Various Characteristics and Designated Interview Mode

| Poverty Status in 1986/Characteristic | MPI | | | MTI | | |
|---------------------------------------|--------|----------|------|-------|----------|-------|
| | Base | % Change | SE | Base | % Change | SE |
| Total | | | | | | |
| Below | 12833 | 24.7% | 2.0% | 13316 | 25.7% | 2.0% |
| Above | 102128 | 2.6% | 0.3% | 99901 | 1.9% | +0.2% |
| Male | | | | | | |
| Below | 4993 | 24.9% | 3.3% | 5537 | 27.5% | 3.2% |
| Above | 50006 | 2.2% | 0.4% | 49274 | 1.8% | 0.3% |
| Female | | | | | | |
| Below | 7840 | 24.6% | 2.6% | 7779 | 24.4% | 2.6% |
| Above | 52122 | 3.0% | 0.4% | 50628 | 2.0% | +0.3% |
| White | | | | | | |
| Below | 7990 | 29.5% | 2.7% | 7645 | 26.7% | 2.7% |
| Above | 90075 | 2.1% | 0.3% | 88594 | 1.7% | 0.2% |
| Black | | | | | | |
| Below | 4431 | 17.5% | 3.1% | 4987 | 25.5% | +3.3% |
| Above | 9384 | 6.6% | 1.4% | 8627 | 3.8% | 1.1% |
| Hispanic | | | | | | |
| Below | 1856 | 26.6% | 5.5% | 1748 | 26.8% | 5.7% |
| Above | 6582 | 6.9% | 1.7% | 6475 | 4.1% | 1.3% |
| Metropolitan | | | | | | |
| Below | 8578 | 24.2% | 2.5% | 8637 | 27.3% | 2.6% |
| Above | 78580 | 2.4% | 0.3% | 76290 | 1.5% | +0.2% |
| Central City | | | | | | |
| Below | 5309 | 23.1% | 3.1% | 5549 | 25.6% | 3.1% |
| Above | 28769 | 3.2% | 0.6% | 27678 | 2.4% | 0.5% |
| Balance | | | | | | |
| Below | 3269 | 26.0% | 4.1% | 3088 | 30.4% | 4.5% |
| Above | 49811 | 2.0% | 0.3% | 48612 | 1.0% | +0.2% |
| Nonmetropolitan | | | | | | |
| Below | 4255 | 25.8% | 3.6% | 4679 | 22.7% | 3.3% |
| Above | 23548 | 3.1% | 0.6% | 23611 | 3.0% | 0.6% |

Table 4: Percent of Spells Ending in Employment for 16+ Persons Beginning a Completed Unemployment Spell in 1986 by Sex and Race and Average Spell Length by Designated Interview Mode

| Characteristic | MPI | | | MTI | | |
|----------------------------|--------------|-------|-------|--------------|--------|-------|
| | Base (1000s) | % | SE | Base (1000s) | % | SE |
| Ending in Employment | | | | | | |
| Total | 13960 | 64.5% | 1.29% | 12019 | 69.9%+ | 1.34% |
| Male | 7014 | 72.3% | 1.71% | 5522 | 76.8%+ | 1.81% |
| Female | 6946 | 56.7% | 1.90% | 6497 | 64.0%+ | 1.90% |
| White | 11252 | 69.4% | 1.39% | 9812 | 73.7%+ | 1.42% |
| Black | 2234 | 42.3% | 3.87% | 1875 | 53.0%+ | 4.27% |
| Average length (in months) | 13960 | 3.12 | 0.07 | 12019 | 3.14 | 0.08 |