

## REPORTING OF INCOME RECIPIENCY BY SELF AND PROXY RESPONDENTS IN SIPP

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### INTRODUCTION

Household members are interviewed at four month intervals in the Survey of Income and Program participation (SIPP) and information is obtained for the four months preceding an interview (reference period). As part of each interview, respondents are asked to place specified events within individual months of the reference period. Because of the recall this requires, there are concerns about the accuracy of this dating and its consistency with responses given at the previous interview. Additionally, a wide variety of changes in personal and household situations from one interview to the next can affect the quality of responses.

One set of variables that is important in SIPP and has been examined closely is the receipt of benefits from various governmental and private sources. For seven of these sources Burkhead and Coder (1985) showed that a large proportion of the changes between receipt and nonreceipt (transitions) were reported as occurring between the last month of one reference period and the first month of the next (at the seam). This reported transition pattern (called the seam problem) is obviously a data quality problem, since approximately the same number of transitions should be reported each month. The seam problem is not a phenomenon of SIPP alone, as Hill (1987) has shown a similar pattern for the Panel Survey of Income Dynamics which has a one year reference period. Due to the magnitude of this problem, the Census Bureau has devoted considerable resources to attempt to determine causes of the seam transition dominance and ways to reduce it. The latter has been attempted unsuccessfully through changes in the core questionnaire and emphasizing the problem during interviewer training.

This paper summarizes a comparison of receipt information for specified benefit sources as reported by self and proxy respondents, and includes a corrected analysis of the effect of changing interview status (self/proxy) on reported transitions at the seam from that given in Weidman (1986). It also looks at whether changing interviewers contributes to the seam problem. Whether or not any differences between self and proxy responses are a reflection of lower quality data from proxies is open to debate. In general, Moore (1987) has argued that if interview status is affected by variables being measured (e.g., employment status), then for those variables and related variables, differences observed in many data studies are reflections of this rather than of data quality differences. Comparison of the quality of self and proxy respondents in SIPP via matching SIPP data with administrative records is being carried out at the Census Bureau. Moore and Marquis (1989) have at this point found virtually no difference in quality.

### SCOPE OF THE COMPARISON

The comparison of information reported by

self and proxy respondents about the receipt of benefits from specified sources is carried out by examining the following questions.

1. Is the proportion of transitions reported at the seams versus within reference periods higher when at least one of the interviews has a proxy respondent than when there is a self respondent for both interviews?
2. Do seams that include a proxy respondent for at least one of the two interviews have a higher proportion of reported transitions than seams with self respondents for both interviews?
3. Do proxy respondents report benefit receipt less often within reference periods than self respondents?
4. Do proxy respondents report fewer transitions within reference periods than self respondents?

In addition, a comparison of same versus different interviewers at the seam is carried out by looking at a question corresponding to (2).

5. Do seams that include two different interviewers have a higher proportion of reported transitions than seams with a single interviewer?

Note that the answers to questions (1)-(4) are interrelated. E.g., if the answer to (3) is yes, that also suggests that the answer to (4) is yes. Looking at the separate questions is an attempt to cover all possible differences between self and proxy respondents in patterns of reporting reciprocity and transitions. The use of tests for proportions to derive statistical answers to these questions is discussed in the following two sections. However, our interest goes beyond questions of statistical difference to major causes of the seam problem, which would be indicated by "large" differences in the proportions being compared in the questions. This will be discussed more fully in Section 5.

Reported receipt of benefits from the following sources are analyzed: social security (SS), federal and state supplemental security income (SSI), state and supplemental unemployment benefits (UE), veterans compensation or pension (VA), aid to families with dependent children (AFDC), food stamps (FS), child support (CS), and private pension (PEN).

Because of the availability of the files used in Weidman (1986), the same time period was used again in this study, the first four interviews of the 1984 panel. The conclusions of that previous study were incorrect because only persons that had received one of the benefits during the specified time period were used in the analysis, thus excluding most of the persons in the panel. Information about persons who did not receive benefits was obtained from a specially constructed file that has all interviews for each person in the panel matched sequentially on a single record. For convenience, only persons who were respondents

in each of the first four interviews (about 33,930) were included in the calculations.

#### METHODOLOGY

In this section the use of tests for binominal proportions, corresponding to questions (1) to (5), is discussed. First, note that there are two possible approaches to these questions, depending on whether our interest is in the reported frequency of receipt for just the sample or the resulting estimates of receipt and transition counts for the population. Because it is the unweighted counts that show the large proportion of transitions at the seam (and lead to the same phenomenon for population estimates), we will proceed with tests appropriate for the sample and not the population.

As an example, consider the question of whether or not proxies report within interview transitions less often than do self respondents. The test is to determine if the proportions of reported transitions are statistically different for the two interview statuses. The usual way to do this is to consider a Bernoulli response variable for each interview, where 0=no transition within interview and 1=transition within interview, and the probability of a 1 being reported for a person at an interview is independent of all other person-interview reports. Sum this variable over interviews 2, 3 and 4 for all self responses and proxy responses separately, the total number of responses being about  $3(33930)=101,790$ . A single asymptotically normal test statistic is computed from the resulting proportions.

There are two ways in which the independence assumption is violated. One is when a person acts as a self respondent and as a proxy for others. At a particular interview this person may report all transitions for himself and others as occurring at the seam, rather than reporting the actual months of occurrence. Any correlation introduced in this way should be small because there is seldom more than one person in a household receiving a particular benefit, although it happens more often for some of the sources (e.g., social security) than for others. The other violation arises because for each person responses for three different interviews are used, and, e.g., all transitions for a person may be reported at the seams. Any correlations introduced in this way should be small because there are very few people with multiple transitions during the period of interest.

According to the preceding discussion, questions (2), (3), (4) and (5) are answered via use of asymptotically normal tests for the comparison of binomial proportions, although independence assumptions are violated slightly. For (1) the situation differs somewhat because we are considering conditional probabilities, so define the Bernoulli variable as whether or not the transition was reported at the seam, and arguments similar to those above justify use of the same test statistic.

#### HYPOTHESES

For each of the questions of interest we

define the appropriate test of proportions.

1. Let  $P_{SS}$  (seam/T) be the probability that if a person who is a self respondent in consecutive interviews reports a transition at an interview it is at the seam, and  $P_{\bar{SS}}$  (seam/T) be the same probability for the other self-proxy combinations. The hypotheses tested are

$$H_{10}: P_{SS}(\text{seam/T}) = P_{\bar{SS}}(\text{seam/T}) \text{ vs}$$

$$H_{1a}: P_{SS}(\text{seam/T}) < P_{\bar{SS}}(\text{seam/T}).$$

2. Let  $P_{SS}(T)$  be the probability that a person who is a self respondent in consecutive waves reports a transition at the seam, and  $P_{sp}(T)$ ,  $P_{ps}(T)$  and  $P_{pp}(T)$  be the corresponding probabilities for the other self-proxy combinations. Initially it was thought that the appropriate null hypothesis would be that  $P_{SS}(T) = P_{\bar{SS}}(T)$ , where  $\bar{SS}$  denotes the complement of SS. However, a quick look at table 2 shows that  $P_{pp}(T)$  is always smaller, usually considerably, than the other seam transition probabilities. Thus use of PP would distort the comparison of interest, so the hypotheses tested are

$$H_{20}: P_{SS}(T) = P_{sp,ps}(T) \text{ vs } H_{2a}: P_{SS}(T) < P_{sp,ps}(T).$$

3. Let  $P_s(R)$  and  $P_p(R)$  be the probabilities that a self and a proxy respondent report receipt from a specified source within an interview. The hypotheses to be tested are

$$H_{30}: P_s(R) = P_p(R) \text{ vs } H_{3a}: P_s(R) > P_p(R).$$

4. Let  $P_s(T)$  and  $P_p(T)$  be the probabilities that a self and a proxy respondent report a within interview transition from a specified source. The hypotheses to be tested are

$$H_{40}: P_s(T) = P_p(T) \text{ vs } H_{4a}: P_s(T) > P_p(T).$$

5. Let  $\Pr(T/SI)$  and  $\Pr(T/\bar{S}\bar{I})$  denote the probabilities that a transition is reported at the seam if there is the same interviewer for both interviews and if the interviewer changes. The hypotheses tested are

$$H_{50}: \Pr(T/SI) = \Pr(T/\bar{S}\bar{I}) \text{ vs}$$

$$H_{5a}: \Pr(T/SI) < \Pr(T/\bar{S}\bar{I}).$$

#### RESULTS

The observed proportions and values of the statistics used in the tests of hypotheses are given in Tables 1 through 5. Before drawing conclusions based on the values of the statistics it must be noted that the sample sizes for the proportions in each of the cells of tables 2, 3, 4 and 5 are extremely large, and very small absolute differences may be statistically significant. (The sample sizes are about 66,879 for self and 34,908 for proxy in each column of tables 3 and 4, about 57,083

for SS, 20,461 for SP,PS and 24,243 for PP in each column of table 2, and about 75,626 for same and 26,158 for different in each column of table 5. The sample sizes differ somewhat between sources due to item nonresponse.) For table 1 the sample size for each cell, the number of transitions reported at an interview for the given interview status combination, is much smaller. For all these tables we are interested in "practical differences" and their resultant effects on the seam problem, as well as statistical differences.

The main means of determining if proxies alone make a major contribution to the seam transition problem is through the analysis of Question 1. If the actual number of transitions is about equal for each month and self respondents report the timing of transitions fairly accurately, then the number of transitions reported at the seams for SS should be about 1/4 of the total number reported. A look at the SS row of table 1 shows that for all the sources except UE a minimum of 59% of the transitions are reported at the seam. Therefore, even without proxy respondents the seam problem exists. The proportions reported at the seam for SS are higher for all sources than for SS, with half of the differences being statistically significant. These higher proportions for SS can be due to more transitions being reported at the seams, fewer transitions being reported within waves, or both. Questions 2 looks at possible seam differences and questions 3 and 4 at possible within wave differences.

It is thought that switching respondents and use of proxy respondents leads to an increase in the number of transitions reported at the seams because of the inconsistency introduced. However, table 2 shows that this is not the case, with differences generally in the opposite direction. The test statistic indicates whether or not switching between self and proxy respondents results in a significant increase as compared to having self response around the seams. Only for SS and UE does SP,PS have a higher proportion of transitions than does SS, and only the UE difference is significant. One might think that PP always having the lowest rate at the seam is quite surprising, but the table 3 results show the reason for this.

Questions 3 and 4 concern possible differences in within interview data as reported by proxy and self respondents, and they show a consistency of results. Table 3 shows that a lower proportion of proxies report receipt for all of the income sources. For SSI, UE and VA the differences are relatively minor, but for the others self respondents report receipt two to five times more frequently. If the rate at which proxies report transitions relative to self respondents is the same as the rate for reporting receipt, we expect similar values when taking the ratios of the self and proxy proportions in the columns of tables 3 and 4 that correspond to that source. The results are as expected, except that for VA and PEN the relative rates for proxies are notably lower. Why these two sources should exhibit such behavior is open to speculation.

The last question asked is whether having

different interviewers in consecutive waves results in more transitions being reported at the seam than when the same interviewer is used. Such an increase could be due to respondents' unfamiliarity with a new interviewer or subtle differences in interviewer technique, such as differences in probing for responses. In general there are more reported transitions, as can be seen in table 5. However, about two thirds of the cases have the same interviewer, so that the observed differences only add slightly to the number of transitions reported at the seams. (Interviewers are identified on the file by code. In some cases interviewers that stopped working on SIPP had their code reassigned to a new interviewer. Since we had no way of identifying these cases, a small number of different interviewer cases were inadvertently included in the same interviewer calculations.)

#### SUMMARY

The results presented in the previous section may be summarized as follows:

(1) The seam transition problem occurs for the cases with self respondents at both of the interviews defining a seam. The addition of cases which include proxy respondents increases the problem slightly (table 1).

(2) In general, larger proportions of seam transitions are reported when different interviewers are used on each side of a seam. Again, this tends to increase the problem slightly compared to what happens when the same interviewer is used (table 5).

(3) Proxy respondents report receipt of benefits from the examined sources less often than do self respondents (table 4). The same result holds for within wave (table 3) transitions.

Neither the use of proxy respondents nor different interviewers in consecutive interviews causes much of an increase in the overall proportion of persons with reported transitions at the seams. Thus we should look elsewhere for a solution to the seam problem. However, proxy and self respondents do report both receipt and transitions within waves at different rates. In fact, the differences between SS and SP,PS in table 1 are due to these lower transition rates reported by proxies, not due to higher rates reported at the seams when proxies are involved.

There are two opposing viewpoints of why proxies report receipt and (consequently) transitions from the examined benefit sources less frequently than self respondents. The first is that proxy respondents lack the knowledge to report accurately, and the other is that in many cases proxies are used because the person is working and less likely to be receiving income from any of these sources. SIPP is unusual, possibly unique, in that there is an ongoing study that is looking at the question of the comparative accuracy of self and proxy reports via comparison with administrative records (Moore and Marquis (1989)). So far it suggests that there is no difference between the two, supporting the latter viewpoint. Of course, there are other questions in SIPP where the reason for having a proxy is unrelated to the possible responses and similar comparisons of self and proxy respondents could lead to

different conclusions.

The work reported on here is only a part of the Census Bureau effort to determine causation of the seam problem and ways to reduce it. We feel, and the PSID results seem to also suggest this, that many respondents simply report the current state as being applicable to all months of a reference period. A major reason for this is that it requires less effort than trying to recall the timing of all events that SIPP asks about. A major project that has recently begun is the use of cognitive research to determine reasons for respondents answering questions the way they do. The findings of this research will be used to redesign the phrasing, etc. of SIPP questionnaires in order to elicit more accurate responses, and then data from the new and old questionnaires will be compared to evaluate the success of the research.

\* 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.

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TABLE 1

Proportions of Transitions Reported at Seams vs. Interview Status Combinations

	SS	SSI	UE	VA	AFDC	FS	CS	PEN.
SS	.593 (543)	.608 (148)	.456 (1494)	.750 (68)	.609 (361)	.593 (933)	.618 (406)	.764 (258)
SS	.662 (390)	.667 (72)	.462 (1159)	.871 (31)	.733 (120)	.664 (438)	.647 (102)	.784 (116)
Z value	-2.15*	-.85	-.34	-1.51*	-2.59*	-2.60*	-.54	-.45

Number of reported transitions in parentheses  
 Z value = test statistic \* = significant at .10 level

TABLE 2

Seams: Proportions Reporting Transitions vs. Interview Status Combinations

	SS	SSI	UE	VA	AFDC	FS	CS	PEN
SS	.00564 (322)	.00158 (90)	.0119 (681)	.00089 (51)	.00385 (220)	.00967 (552)	.00440 (251)	.00345 (197)
SP, PS	.00611 (125)	.00132 (27)	.0174 (357)	.00068 (14)	.00259 (53)	.00889 (182)	.00225 (46)	.00274 (56)
Z value	-.75	.85	-5.40*	1.00	.94	2.87	4.98	1.62
PP	.00549 (133)	.00087 (21)	.0115 (279)	.00054 (13)	.00144 (35)	.00450 (109)	.00082 (20)	.00144 (35)

Number reporting transitions in parentheses

TABLE 3

Within Interviews: Proportions Reporting Receipt vs. Interview Status

	SS	SSI	UE	VA	AFDC	FS	CS	PEN
Self	.229 (15313)	.022 (1487)	.022 (1493)	.022 (1446)	.024 (1583)	.051 (3428)	.025 (1671)	.057 (3812)
Proxy	.114 (3969)	.016 (559)	.020 (696)	.016 (564)	.007 (246)	.017 (607)	.005 (179)	.027 (936)
Z value	49.03*	7.06*	2.03*	6.22*	22.49*	30.70*	27.79*	24.23*

Number reporting receipt in parentheses

TABLE 4

Within Interviews: Proportions Reporting Transitions  
vs. Interview Status

	SS	SSI	UE	VA	AFDC	FS	CS	PEN
Self	.00453 (303)	.00096 (64)	.0148 (989)	.00034 (23)	.00272 (182)	.00754 (504)	.00356 (238)	.00151 (101)
Proxy	.00272 (95)	.00052 (18)	.0128 (447)	.00009 (3)	.00054 (19)	.00344 (120)	.00060 (21)	.00040 (14)
Z value	4.75*	2.59*	2.60*	2.96*	9.18*	8.94*	11.16*	6.01*

Number reporting transitions in parentheses

TABLE 5

Seams: Proportions Reporting Transitions  
vs. Same or Different Interviewer

	SS	SSI	UE	VA	AFDC	FS	CS	PEN
Same	.00543 (411)	.00124 (94)	.0129 (973)	.00083 (63)	.00284 (215)	.00804 (608)	.00284 (215)	.00275 (208)
Different	.00646 (169)	.00168 (44)	.0132 (344)	.00057 (15)	.00356 (93)	.00898 (235)	.00390 (102)	.00306 (180)
t value	-1.82*	-1.55*	-.35	1.43	-1.71*	-1.42*	-2.45*	-.80

Number of reported transitions in parentheses