

THE EFFECTS OF "IMPROVED" METHODS OF COLLECTING INCOME STATISTICS ON NON-RESPONSE RATES--1969 CPS EXPERIMENTS

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I. Introduction

The interest in and use of CPS (Current Population Survey) income statistics have increased in the recent past as the study of socio-economic problems such as poverty or underemployment among different socio-economic classes and geographic areas has been found increasingly necessary.

However, the accuracy of the CPS income statistics has been the matter of serious concern among the users of these statistics because of high nonresponse rates 1/ (14.0% in 1965, 14.8% in 1966, 21.9% in 1967, and 17.2% in 1968) and underreporting of some income items such as the income earned from sources other than wages and salary. The nonresponse rates on income statistics are considerably higher than the ones on the labor force statistics (Approximately 6%) which also are collected by the CPS sample.

Research projects to explore possible ways to improve the quality of the income data were begun at the Census Bureau at a modest level in 1968 and at more extensive level in 1969 and is continuing in 1970.

The purpose of this paper is to present a global analysis of the results of the 1969 CPS experiments to improve the quality of income statistics, which were conducted in March and April of 1969. Particularly, this paper focusses its attention on the effects of various "improved" CPS income collection methods (see the following section for the description of the methods tested) on the nonresponse (NA) rates.

A. Brief Description of the Programs to Improve Quality of Income Statistics.

The 1969 CPS projects ^{2/} on improvement of quality of income statistics are divided into two parts. The first consists of improvements in the "field procedures"--(1) increased amount of interviewer training and changing the time of training, (2) expansion of field office editing procedures, (3) review and expansion of clerical coding procedures, (4) modification of questionnaire content and design, and (5) extension of the interview period.

The second consists of experimental study of "improved" CPS income statistics collection methods.

The first part of the project was designed to be implemented without further testing the effectiveness of each of the five improvements and the second part was designed to test experimentally the effectiveness of the various collection methods.

B. Brief Description of the 1969 CPS Experimental Design

B.1 Collection Methods Tested: The following are modifications or additions to the previous CPS procedures tested experimentally in an effort to examine whether these new methods may improve the quality of income statistics.

(1) Advance letter before the regular interview (A.L.). An advance letter solicits the cooperation of respondents and it provides an advance income form in which respondents are asked to record their answers prior to the regular interviews.

There are a number of causes of the nonresponse rates--sloppiness in leaving blank entries that could be zero, unavailability of information because the wrong household member is being interviewed, refusal, etc. The advance letter might make it possible for more persons in the household to participate in providing response and it would give them more opportunity to consult records, and thus, reducing some of the elements of the causes of nonresponses.

(2) Change of the time of collecting income data from March to April (I_A).

(3) Income (I) and work experience (WE) questions are asked in a single interview. Previously income questions were asked in March and work experience in February and April. The regular CPS procedure is that the income statistics are collected in March and work experience (labor force characteristics) in February; for the two new rotation groups in March (i.e., 1st and 5th month-in-sample), work experience is collected in April. The second procedure (collection of income statistics close to the income return deadline) above was tested to see whether more accurate (less NA rates and less underreporting of income) could be obtained and the third procedure was tested to see whether work experience questions would jog the respondents memory so that more accurate income is reported.

B.2 Assignment of the Collection Methods to be Tested to CPS Subsamples

There are eight independent rotation groups in CPS sample--each representing a random sample of approximately 6000 households. 3/ The assignment of these methods to be tested is presented in Table 1.

B.3 Experimental Group Composition

For the purpose of comparing different collection methods, the experimental groups are formed as shown by Table 2. It is noted from Tables 1 and 2 that each experimental group is treated with a different income collection procedure. For example, Experimental Group C for 1969 includes rotation groups which were enumerated for income items in the month of April.

B.4 Analysis of the Experimental Results

The analysis presented in this paper is based on the cross classification of nonresponse rates by four types of income ("wage and salary," "nonfarm self-employment income," "farm self-employment income," and "income other than earnings") and by three person characteristics for all persons 14+ ("with total income," "with no income of specified type" and "with income of specified type.") The method of analysis used consists of comparisons of non-response rates among the various experimental groups (see Table 2) for which different income collection procedures are applied. In order to assess the "significance" of the differences of nonresponse rates, the standard errors for the estimated nonresponse rates are estimated. 4/

II. Evaluation of the NA Rates on Income Items by Experimental Groups

This study explores possible answers to the four basic questions (see Table 3) and the results are summarized briefly below.

(1) The 1969 March CPS NA rates in most cases are not lower than the 1968 March CPS and in most of the cases studied the 1969 March CPS rates are significantly higher than the 1968 rates in a statistical sense.

(2) The March 1969 CPS with advance letter did not produce better results than the March 1968 CPS; but the former seems to be a better procedure than the March 1969 CPS procedure without advance letter.

(3) The collection of income information in April 1969 does not seem to be a better procedure than (a) the 1968 March CPS procedure, (b) the 1969 CPS with advance letter, and (c) the 1969 March CPS without advance letter. And this seems to be true for all the categories included in the study.

(4) The 1969 April CPS with work experience and income combined seems to be no better than any of the 1968 CPS procedures, but better than the 1969 April CPS with income only. Of course, this does not mean that the procedure "work experience and income combined" itself is not better than other CPS procedures included in the experiments. In other words, if the procedure "work experience and income combined" had been used in March CPS rather than in April CPS, the results might have indicated the NA rates for the procedure to be smaller than those for other CPS procedure tested in the experiments. In fact, "work experience and income combined" procedure has been tested in March 1970 and the preliminary results indicate that the NA rates are lower for this procedure than the ones for other procedures.

FOOTNOTES

1/The nonresponse rate for a given sample in this paper is defined as the ratio of the number of sample elements (households) with one or more income items allocated over the total number of elements (households) in the sample after allocation.

2/More detailed accounts of the projects are given by the internal memorandum (U.S. Bureau of the Census) from D.B. Levine, et.al. to C.F. Taeuber and M.H. Hansen dated September 11, 1968.

3/See U.S. Bureau of the Census, THE CURRENT POPULATION SURVEY--A REPORT ON METHODOLOGY, Technical Paper No.7, U.S. Government Printing Office, Washington, D.C.

4/The estimates of the standard errors for the estimated nonresponse rates (Tables C and D) may be obtained from the author upon request.

5/Due to the limitation of space, no supporting data, except Table A, are included in this report. However, these data are available from the author upon request.

* Views expressed in this paper are those of the author and not necessarily those of the Bureau of the Census. The author gratefully acknowledges the assistance and comments given by Joseph Waksberg, Barbara Boyes, M. Ono, and other members of the Bureau of the Census.

Table 1. Assignment of the CPS Income Statistics Collection Methods				
CPS Sample	Rotation Group	February * Month 1	March Month 2	April Month 3
A23	8	(8)WE		
A24	1	(7)WE	(8)AL&I	
	2	(6)WE	(7)I	(8)LF
	3	(5)WE	(6)I	(7)LF
	4		(5)LF	(6)I&WE
	5			(5)LF
A25	4	(4)WE		
	5	(3)WE	(4)I	
	6	(2)WE	(3)LF	(4)I
	7	(1)WE	(2)I	(3)LF
	8		(1)I	(2)WE
	1			(1)LF
<p>* This is the regular CPS Procedures, i.e., no changes in the CPS procedure in February.</p> <p>This table shows the CPS sample for 1969 only.</p> <p>WE = Work experience AL = Advance letter I = Income LF = Labor force</p> <p>() The numbers in parentheses indicate month of enumeration; e.g., (8) denotes the 8th or the last month of enumeration.</p>				

Table 2. Experimental Group Composition			
Exp. Group	Collection Methods Applied	Rotation Group and Month-in-Sample*	
		1969	1968
A	All with income data collected in March	1(8), 2(7), 3(6), 5(4) 7(2), and 8(1)	1(4), 3(2), 4(1), 5(8) 6(7), and 7(6)
B	March: income data, no advance letter	2(7), 3(6), 5(4), 7(2) and 8(1)	1(4), 3(2), 4(1), 6(7) and 7(6)
C	All with income data collected in April	4(6), and 6(4)	1(4), and 7(6)
D	March: Advance letter	1(8)	5(8)
E	April: Income and work experience	4(6)**	7(6)
F	April: Income only	6(4)**	1(4)
<p>*Month-in-samples are given in parentheses.</p> <p>**These indicate the month-in-samples in April, 1969.</p>			

Table 3. Questions and Experimental Groups Compared	
Questions	Experimental Group Compared*
1) Did the 1969 Procedures produce better results than the 1968 CPS Procedures? ('Better' in the sense that the 1969 NA rates are lower than the 1968 NA rates.)	A ₆₉ and A ₆₈
2) Did the 1969 March CPS with the advance letter for collecting income information produce better results than (a) the 1968 March CPS? (b) the 1969 March CPS without the letter?	D ₆₉ and D ₆₈ B ₆₉ and D ₆₉ , B ₆₈ and D ₆₈
3) Is the collection of income data in the month of April better than the collection of income data, (a) in March 1968? (b) in March 1969 with the advance letter? (c) in March 1969 without the advance letter?	C ₆₉ and C ₆₈ C ₆₉ and D ₆₉ , C ₆₈ and D ₆₈ C ₆₉ and B ₆₉ , C ₆₈ and B ₆₈
4) Is the combination of work experience and income as a single interview a better procedure for collecting income data than (a) the 1968 March CPS procedure? (b) the 1969 March CPS procedure with the advance letter? (c) the 1969 March CPS without the letter? (d) the 1969 April CPS in which only income items were asked?	E ₆₉ and E ₆₈ E ₆₉ and D ₆₉ , E ₆₈ and D ₆₈ E ₆₉ and B ₆₉ , E ₆₈ and B ₆₈ E ₆₉ and F ₆₉ , E ₆₈ and F ₆₈
*Subscripts indicate year in which a particular experimental group was enumerated.	

Table A--Nonresponse Rate in Percent by Type of Income and Rotation Groups
for all Persons 14+: 1968 and 1969 CPS

Type of Income		Rotation Group ^{1/}								
		All Rotations	1(8,4) AL	2(7,3)	3(6,2)	4(6,1)WI	5(4,8)	6(4,7)IA	7(2,6)	8(1,5)
Wage and Salary Income:										
Total persons 14+		1969 7.98	6.93	8.21	8.27	8.62	8.81	10.18	7.74	5.07
		1968 6.10	6.43	7.22	6.68	4.64	6.61	6.46	6.21	5.02
		1969 less 1968 1.88*	.55	.99	1.59	3.98	2.20	3.72	1.53	.05
With no income of specified type		1969 2.20	1.98	2.40	2.45	2.10	2.55	2.47	2.33	1.74
		1968 1.02	.91	1.52	1.22	.66	1.05	1.17	.82	.82
		1969 less 1968 1.88*	1.07	.88	1.23	1.44	1.50	1.30	1.51	.92
With income of specified type		1969 11.87	10.25	12.09	12.09	13.21	12.94	15.62	11.34	7.55
		1968 9.59	10.19	11.03	10.27	7.32	9.83	10.20	9.95	7.89
		1969 less 1968 2.28*	.06	1.06	1.82	5.89	3.11	5.42	1.39	-.34
Mean income after allocation		1969 \$5,101	\$5,247	\$5,517	\$4,770	\$5,209	\$4,826	\$4,933	\$4,987	\$5,563
		1968 \$4,629	\$4,703	\$4,602	\$4,137	\$4,702	\$4,874	\$4,743	\$4,565	\$4,790
		1969 less 1968 \$ 472	\$ 544	\$ 915	\$ 633	\$ 507	\$ - 48	\$ 190	\$ 422	\$ 773
Non-farm Self Employment Income:										
Total persons 14+		1969 5.45	4.96	5.63	5.90	5.96	6.36	6.17	5.19	3.44
		1968 3.48	3.68	3.94	3.48	2.76	3.48	3.85	3.72	2.91
		1969 less 1968 1.97*	1.28	1.69	2.42	3.20	2.88	2.32	1.47	.53
With no income of specified type		1969 4.58	4.24	4.68	4.99	5.15	5.45	5.20	4.24	2.67
		1968 2.70	2.86	3.18	2.64	1.98	2.77	3.00	2.95	2.19
		1969 less 1968 1.88*	1.38	1.50	2.35	3.17	2.68	2.20	1.29	.48
With income of specified type		1969 21.51	18.22	23.06	22.48	21.45	23.00	24.22	22.11	17.54
		1968 18.22	19.07	18.34	18.11	16.16	17.73	20.79	19.36	16.61
		1969 less 1968 3.29*	-.85	4.72	4.37	5.29	5.27	3.43	2.75	.93
Mean income after allocation		1969 \$7,929	\$5,319	\$8,326	\$4,734	\$7,395	\$7,591	\$6,926	\$15,144	\$7,250
		1968 \$6,008	\$6,420	\$6,388	\$6,187	\$7,290	\$7,097	\$5,062	\$ 4,755	\$4,893
		1969 less 1968 \$1,921	-\$1,101	\$1,938	-\$1,453	\$ 105	\$ 494	\$1,864	\$10,389	\$2,357

Table A--Nonresponse Rate in Percent by Type of Income Rotation Groups
for all Persons 14+: 1968 and 1969 CPS (continued)

Type of Income		Rotation Group ^{1/}								
		All Rotations	1(8,4) AL	2(7,3)	3(6,2)	4(6,1)WI	5(4,8)	6(4,7)IA	7(2,6)	8(1,5)
Farm Self Employment Income:										
Total persons 14+		1969 5.08	4.66	5.19	5.59	5.54	5.99	5.82	4.86	3.02
		1968 2.95	3.02	3.61	2.92	2.27	2.95	3.28	3.27	2.32
		1969 less 1968 2.13*	1.64	1.58	2.67	3.27	3.04	2.54	1.59	.70
With no income of specified type		1969 4.96	4.60	5.08	5.42	5.41	5.88	5.60	4.75	2.91
		1968 2.79	2.90	3.40	2.73	2.10	2.88	3.06	3.03	2.24
		1969 less 1968 2.17*	1.70	1.68	2.69	3.31	3.00	2.54	1.72	.67
With income of specified type		1969 10.11	7.44	9.91	12.74	10.45	10.14	13.19	9.29	7.07
		1968 9.06	8.69	11.95	10.41	7.76	6.03	10.67	12.36	5.05
		1969 less 1968 1.05	-.25	2.06	2.33	2.69	4.11	2.52	-.07	2.02
Mean income after allocation		1969 \$2,366	\$2,216	\$2,780	\$2,682	\$2,937	\$1,013	\$2,298	\$2,687	\$2,261
		1968 \$3,208	\$ 961	\$2,980	\$5,718	\$2,370	\$4,397	\$4,428	\$1,991	\$2,329
		1969 less 1968 -\$ 842	\$1,255	-\$ 200	-\$3,036	\$ 567	-\$3,384	-\$2,130	\$ 696	-\$ 68
Income other than Earnings:										
Total persons 14+		1969 10.22	8.96	10.80	10.17	12.18	11.33	12.30	9.22	6.83
		1968 7.44	7.80	8.65	6.82	5.47	8.13	8.59	7.70	6.33
		1969 less 1968 2.78*	1.16	2.15	3.35	6.71	3.20	3.71	1.52	.50
With no income of specified type		1969 7.60	7.02	8.05	8.07	8.56	8.89	8.26	7.03	4.73
		1968 6.17	6.36	7.67	5.75	4.27	6.64	7.21	6.38	4.97
		1969 less 1968 1.43*	.66	.38	2.32	4.29	2.25	1.05	.65	-.24
With income of specified type		1969 15.10	12.37	15.90	14.06	19.59	15.99	20.34	13.21	10.34
		1968 10.17	10.96	10.82	9.13	7.79	11.54	11.68	10.71	9.08
		1969 less 1968 4.93*	1.41	5.08	4.93	11.80	4.45	8.66	2.50	1.26
Mean income after allocation		1969 \$1,588	\$1,547	\$1,460	\$1,560	\$1,600	\$1,762	\$1,719	\$1,371	\$1,626
		1968 \$1,511	\$1,390	\$1,394	\$1,610	\$1,371	\$1,497	\$1,534	\$1,598	\$1,703
		1969 less 1968 \$ 77	\$ 157	\$ 66	-\$ 50	\$ 229	\$ 265	\$ 185	-\$ 227	-\$ 77

*The difference (1969 NA rate less 1968 NA rate) for "all rotations combined" is statistically significant at 2 sigma level.
The numbers in the parentheses indicate month-in-sample. The first numbers are the rotation groups that are enumerated in 1969 and the second numbers are those enumerated in 1968.
A--Advance letter; WI--Work experience and Income in April. IA--Income in April.