CHARACTERISTICS OF INCOME NONRESPONDENTS IN THE CURRENT POPULATION SURVEY*

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Introduction

One of the significant problems encountered in household surveys which depend upon public cooperation to obtain information on social and economic characteristics is that of missing information. Missing information is the result of either noninterviews or nonresponses. Noninterviews are failures either to contact sample units or to obtain their cooperation after they are contacted. Nonresponses are partial or complete failures to obtain information for particular items from respondents.

Income nonresponses have been an important problem in collecting income data from the March Supplement of the Current Population Survey (CPS). In this survey, interviewers ask eight income questions for each person 14 years old or over living in the sample household. A person is designated a nonrespondent if he fails to answer one or more of the eight questions. A family is considered a nonrespondent if any member of the family 14 years old or over does not answer one or more of the eight income questions.

Attempts to reduce nonresponse rates have resulted in lower rates over the past 3 years.[1] The income improvement program has reduced the family nonresponse rate from 19.0 percent in the March 1969 CPS to 14.3 percent in the March 1970 CPS. In the March 1971 CPS, it was 14.6 percent, about the same as that for the previous year.

In order to maximize the amount of income information available from the March CPS, missing income information is imputed or allocated to nonrespondents using "fully reported" income information obtained from respondents with the same social and economic characteristics as those of nonrespondents. This allocation procedure is necessary since nonrespondents usually have different social and economic characteristics from respondents. If this were not the case, missing income information could be adjusted uniformly to control totals.

The purpose of this paper is to describe the characteristics, such as age, education, occupation, work experience, and family relationship of nonrespondents and to show the effect of the allocation procedure on the income data.

This paper is divided into four parts. The first part outlines major characteristics of income nonrespondents. The second part describes the income allocation method and traces some of the impact of income allocation on the income data. The third part notes the difference in the NA rate when a person for whom the information is being obtained is interviewed instead of interviewing a "proxy" family member. The fourth part summarizes the general findings covered in this paper.

Characteristics of Nonrespondents

The income nonresponse (NA) rates for white families were generally higher than rates for families of Negro and other races. This statement also held true for unrelated individuals. The NA rates for white families and families of Negro and other races were about three and five percentage points higher than those for unrelated individuals, respectively.

The NA rate for men was usually higher (about three percentage points in the March 1971 CPS) than the rate for women. Among males, white persons had higher NA rates than persons of Negro and other races (about one percentage point higher in the March 1971 CPS). Among females, white persons had an NA rate of 9.5 percent compared with 7.7 percent for persons of Negro and other races. The difference in the NA rate by sex can be attributed to several reasons. A larger proportion of men have income. A larger proportion of men are self-employed. Also, a larger proportion of men have property income. It is more difficult to estimate self-employment income and property income than other types of money income.

Overall, an income nonrespondent is more likely to have the following characteristics: White male who is self-employed, a male between the ages of 45 and 64, a person who completed 12 or more years of school, a year-round full-time worker, or a male who lives in a large metropolitan area with a population of a million or more persons.

Because these characteristics are also those of persons with higher than average incomes, incomes of nonrespondents, after allocation, are usually higher than those for respondents. Thus, the mean income of male nonrespondents (from the March 1970 CPS) was $8,013, about 13 percent higher than the mean for male respondents ($7,087). However, since male nonrespondents represented only 12 percent of all male persons 14 years old and over, the overall mean income ($7,202) of male persons was only about 2 percent higher than the income level for male respondents.

The NA rate for self-employed workers was about twice that for wage and salary workers. As shown in table A, the NA rate for self-employed workers not in agriculture was 25 percent as compared with 12 percent for wage and salary workers in the same classification. Table A also shows the NA rate by type of earnings. This information shows that the NA rate for self-employment income for nonagricultural self-employed workers was about 19 percent. On the other hand, the NA rate for wage and salary income for nonagricultural wage and salary workers was about 10 percent. It is clear from these data that reporting of self-employment income presents more problems than reporting for wage and salary income. This is

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understandable since self-employment income is more difficult to account for than wage or salary income, which is regularly received and recorded for tax accounting purposes. Furthermore, self-employed workers are more independent and less likely to release personal income data for business reasons.

Table A shows that the professional and managerial self-employed workers in nonagricultural industries not only had higher NA rates, but also higher mean earnings than other self-employed workers in the same industrial classification. Thus, the NA rate for the professional and managerial workers was 28 percent as compared with the NA rate of 19 percent for other self-employed workers. The mean earnings value of professional and managerial self-employed workers ($11,478) was almost double the mean earnings value of other self-employed workers ($5,527.)2/ The NA rate for workers in agricultural industries was lower than the NA rate for workers in nonagricultural industries.

The NA rates among occupation groups varied from a high of 19 percent for managerial workers to 8 percent for farm laborers.3/(See table B.) When self-employed workers were excluded, the NA rate for managerial workers dropped to 16 percent. The overall NA rate for salaried professional workers was 12 percent and it varied from 22 percent for physicians and surgeons to 10 percent for primary and secondary school teachers. The only other occupation having an NA rate above the overall average for male workers (13 percent) was for sales workers (15 percent).

Other variables associated with income NA rates were age and education and residence.

The NA rate for men in different age categories varied from 7 percent for men 14 to 19 years old to about 16 percent for men between 45 and 64 years old. (See table C-1.)

For men 25 years old and over, the NA rate by years of school completed varied from 10 percent for men with less than 8 years of school, 14 percent for men who completed high school only, to 16 percent for men who completed college. (See table C-1.)

The NA rate also varied with age when the educational level was kept constant. For college graduates, the NA rate rose monotonically from 10 percent for men age 25 to 34 years to 26 percent for men 65 years old and over (presumably associated with the high NA rates for self-employed professional and managerial workers). For high school graduates, the NA rate peaked at age 55 to 64 years and for elementary school graduates, the NA rate peaked at 45 to 54 years old.

The proportion of year-round full-time workers was disproportionately greater for nonrespondents who were high school graduates and college graduates in the age groups having the peak NA rates compared to respondents in the corresponding groups.4/ Thus, for nonrespondents who were high school graduates, 55 to 64 years old, 87 percent were year-round full-time workers as compared with 77 percent for respondents. Within this age and education grouping, the NA rate for year-round full-time workers was 20 percent compared with 11 percent for other workers. As shown in table C-2, similar results were obtained for college graduates 65 years old and over.

The NA rate also differed by residence and region. Thus, the NA rate for men residing in metropolitan areas was 13 percent as opposed to 10 percent in nonmetropolitan areas. Moreover, the NA rate in larger metropolitan areas (population of 1 million or more) was higher than in small metropolitan areas. The NA rate, however, was not significantly different between males residing inside central cities and outside central cities. The NA rate in the Northeast region was about 15 percent. This compared to about 11 percent in each of the other three Census regions. (Table D.)

Impact of Allocation on Income

The next topic is concerned with the income allocation method and its impact on income data. The income allocation procedure is designed to allocate an amount (a positive or negative dollar amount or "none") for each income item that was unanswered by the respondent. The allocated amount is derived from a reported income value of an income respondent with similar social and economic characteristics who precedes the nonrespondent. That is, the income amount(s) assigned to a nonrespondent is the income amount(s) stored from the last respondent with similar characteristics.

There are eight separate income questions on the March CPS Supplement schedule.5/ These income questions can be grouped into two categories: (1) Earnings and (2) income other than earnings.

The socioeconomic characteristics used in the earnings allocation procedure are: (1) Number of weeks worked last year, (2) occupation of longest job last year, (3) family relationship, (4) sex, (5) age, (6) race (white or Negro and other races), and (7) class of worker. These seven characteristics are combined in various ways to create 235 mutually exclusive classes. A person who failed to answer a particular earnings item is allocated the earnings amount from the last person in that class who reported on all three earnings items.

Two important items considered in creating these 235 classes were: (1) Characteristics for each class should be correlated with earnings, i.e., the classes should be homogeneous, and (2) the number of persons in each class should be large enough to avoid having many persons' earnings allocated from the same person's amount.

Income types other than earnings are allocated based on the following socioeconomic characteristics: (1) Total earnings, (2) family relationship, (3) sex, (4) worker-nonworker status, (5) age, and (6) race (white or Negro and other races). These six characteristics are grouped to form 286 mutually exclusive classes. As in the earnings allocation procedure, nonrespondents in a particular class are allocated amounts from the last person within the class that reported the missing item.6/

In order to analyze the impact of the CPS income allocation procedures, analytical data were tabulated separately for income respondents and income nonrespondents. As indicated earlier, nonrespondents tend to be persons with social and economic characteristics similar to those for income respondents who have higher than average incomes, e.g., college graduates, middle-aged persons, self-employed professional and self-employed managerial workers, or residents of large metropolitan areas. Therefore, the general effect of the allocation procedure is to shift the income size distribution upward and to raise the overall level of income above that of respondents.

Table E shows income size distribution data obtained from the March 1970 CPS for (1) Respondents, (2) nonrespondents, and (3) respondents and nonrespondents combined, by male and female persons.

The effect of allocation on the income size distribution was most noticeable for incomes of $15,000 or more. About 11.6 percent of the male nonrespondents had incomes of $15,000 or more while only 7.4 percent of the respondents had incomes above that amount. The effect of allocating income to the nonrespondents was to increase the percent of males with incomes above $15,000 to 7.9 percent.

The allocation process affects the mean of the income distribution to a greater extent than the median. This is to be expected since the mean is affected more by high income amounts than the median, which is a positional value. For males, the difference between the medians for nonrespondents and respondents was 6.4 percent. The corresponding difference in the mean was 13.1 percent. The effect of allocating income to the nonrespondents, however, was to increase the final median above the reported median by only 0.8 percent and increase the final mean above the reported mean by 1.6 percent.

The percent of persons with allocated income by income intervals is shown in table E. The percent of persons with allocated income (the NA rate) rose sharply for the two highest income intervals. The NA rates were 17 and 22 percent for the $15,000 to $24,999 interval and the $25,000 and over interval, respectively, for male persons.

Family Relationship and Type of Respondent Queried

The problem here is to determine to what extent the NA rate differed by type of respondent queried. Overall, 49 percent of all males and 67 percent of all females were persons who answered for themselves in the March 1970 CPS. As expected, data showed that NA rates were lower for persons responding to the question for themselves (designated as self) as compared to persons for whom questions were answered by another member (designated proxy) of the household. For all males, the NA rate for "self" responses was 7.5 percent and for "proxy" responses, the rate was 14.7 percent. The corresponding rates for females were 5.9 percent and 8.7 percent, respectively.

Family heads who answered for themselves had lower nonresponse rates than for heads whose answers were given by some other member of the family. Approximately 46 percent of all family heads answered for themselves. These heads had a nonresponse rate of 7.5 percent. This compared to a 12.1 percent nonresponse rate for "proxy" responses.

Seventy-seven percent of the wives of family heads answered for themselves in the March 1970 CPS. These "self" respondents had a nonresponse rate of 4.8 percent. The nonresponse rate for "proxy" respondents who answered for the wife of head was 8.5 percent.

Twenty-two percent of other family members responded for themselves. For family members who responded for themselves, the nonresponse rate was 5.2 percent. For family members who did not respond for themselves, the nonresponse rate was 8.3 percent.

Eighty-six percent of all unrelated individuals answered for themselves. The nonresponse rate for these unrelated individuals was 9.4 percent. However, the NA rate for unrelated individuals who did not answer for themselves was 26 percent, the highest of NA rates among the different categories noted above.

These data show that by directly contacting the person for whom information is being obtained, the NA rate could be reduced. It is noted that 46 percent of family heads answered for themselves in the March 1970 CPS, and since the family head is generally the main source of income for the family, direct interviews with family heads may be a way to reduce family income nonresponse rates.

Summary

In summary, findings indicate that income nonrespondents tend to have the following characteristics: White males, self-employed workers, men between the ages of 45 and 64 years, men who completed 12 years of school or more, year-round full-time workers, or men who live in metropolitan areas with populations of a million or more persons. Since these characteristics are associated with persons with higher than average incomes the level of NA rates is directly related with the level of income. Hence, income allocations tend to raise the average level of income and to shift the overall income size distribution upward. Moreover, the impact of the allocations is greater on the mean than on the median. With respect to the income NA rate, it is lower for "self" respondents than for "proxy" respondents.

Table A.--NONRESPONSE RATES AND MEAN EARNINGS IN 1969, OF CIVILIAN MALES 14 YEARS OLD AND OVER BY CLASS OF WORKER, IN THE UNITED STATES

Class of worker	Total (thousands)	Nonresponse rate	Approximate nonresponse rate on major type of income[1]	Mean earnings of respondents[2]
Total worked last year[3]	55,111	12.7	(X)	$7,261
Wage and salary workers	49,137	11.7	9.4	7,146
Self-employed workers	5,974	21.1	15.9	7,446
In agriculture	3,594	11.5	(X)	3,266
Wage and salary workers	1,676	9.1	7.9	2,012
Self-employed workers	1,918	13.7	9.5	4,414
Not in agriculture	51,517	12.8	(X)	7,542
Wage and salary workers	47,461	11.8	9.5	7,430
Self-employed workers	4,056	24.5	18.9	9,082
Professional and managerial	2,544	27.9	(NA)	11,478
Other self-employed workers	1,512	18.8	(NA)	5,527

X Not applicable.
NA Not available.
1/ It is assumed that the major type of earnings is the type consistent with the class of worker.
2/ Mean earnings were used because mean income was not available. The latter would have been preferred because persons are grouped by total income nonresponses rather than earnings nonresponses.
3/ Excludes unpaid family workers.

Table B.--INCOME NONRESPONSE RATES AND MEAN INCOME IN 1969, FOR CIVILIAN MALES 14 YEARS OLD AND OVER BY OCCUPATION OF LONGEST JOB, IN THE UNITED STATES

Occupation	Total (thousands)	Nonresponse rate	Mean income		
			Total	Respondents	Non-respondents
Total worked last year	55,700	12.6	$7,779	$7,654	$8,641
Professional, technical, and kindred workers, total	7,193	14.1	12,047	11,796	13,585
Self-employed, total	690	30.0	21,447	22,045	20,030
Physicians and surgeons	133	33.8	33,563	40,546	(B)
Other self-employed	557	29.1	18,531	17,908	20,064
Salaried, total	6,500	12.4	11,054	10,928	11,948
Engineers, technical	1,207	12.4	13,632	13,700	13,150
Physicians and surgeons	101	21.8	14,661	14,699	(B)
Teachers, primary and secondary	846	9.5	9,857	9,732	11,054
Other salaried workers	4,348	12.7	10,488	10,319	11,649
Farmers and farm managers	1,841	13.4	5,048	5,190	4,125
Managers, officials and proprietors, exc. farm, total	7,053	19.1	12,542	12,526	12,609
Self-employed, total	1,854	27.2	9,425	9,324	9,697
In retail trade	820	28.4	8,713	8,426	9,435
Other self-employed	1,034	26.2	9,991	10,015	9,924
Salaried	5,199	16.3	13,652	13,518	14,341
Clerical and kindred workers	4,068	11.7	6,850	6,881	6,619
Sales workers, total	3,262	15.0	8,132	7,821	9,877
In retail trade	1,467	15.5	5,326	4,898	7,632
Other sales workers	1,795	14.6	10,407	10,164	11,824
Craftsmen, foremen, and kindred workers, total	10,667	11.3	8,094	8,109	7,973
Foremen	1,451	10.3	9,760	9,823	9,214
Craftsmen	9,216	11.4	7,831	7,836	7,796
Operatives and kindred workers	10,842	10.0	6,251	6,260	6,167
Private household workers	110	27.3	1,857	1,546	(B)
Service workers, except private household	3,995	12.4	4,536	4,514	4,689
Farm laborers and foremen	1,805	8.1	1,746	1,638	2,901
Laborers, except farm and mine	4,861	10.3	3,596	3,593	3,619

B Base less than 75,000.

Table C-1.--INCOME NONRESPONSE RATES AND MEAN INCOME IN 1969, FOR MALES 14 YEARS OLD AND OVER BY AGE AND YEARS OF SCHOOL COMPLETED, IN THE UNITED STATES

Characteristic	Total (thousands)	Non-response rate	Mean income		Proportion of civilians with income working year round full time	
			Respondents	Non-respondents	Respondents	Non-respondents
AGE						
Total	69,027	12.0	$ 7,087	$ 8,013	58.3	63.7
14 to 19 years	11,125	7.4	1,051	1,587	6.0	8.1
20 to 24 years	7,067	10.1	4,287	2,828	41.1	37.3
25 to 34 years	12,045	9.6	8,333	8,798	78.7	80.8
35 to 44 years	11,087	12.9	9,995	10,360	84.0	84.5
45 to 54 years	11,081	16.0	9,827	10,113	80.6	81.6
55 to 64 years	8,561	15.4	8,143	9,828	68.5	76.5
65 years and over	8,062	13.1	4,200	5,004	13.5	18.7
YEARS OF SCHOOL COMPLETED 1/						
Total	50,835	13.3	8,330	9,084	68.1	71.2
Elementary, total	14,352	11.3	8,330	9,084	68.1	71.2
Less than 8 years	7,575	10.3	4,064	5,780	41.0	49.4
8 years	6,778	12.5	5,699	6,573	53.0	55.4
High school, total	23,632	13.1	8,262	8,496	75.2	75.4
1 to 3 years	8,171	12.3	7,236	7,586	67.2	65.5
4 years	15,461	13.5	8,811	8,932	79.6	80.1
College, total	12,851	15.7	12,520	12,293	80.0	79.9
1 to 3 years	5,548	14.9	10,351	10,592	78.7	78.4
4 years or more	7,303	16.4	14,200	13,462	81.1	81.0

1/ Limited to persons 25 years old and over.

Table C-2.--INCOME NONRESPONSE RATES AND MEAN INCOME IN 1969, FOR MALES 14 YEARS OLD AND OVER BY AGE AND WORK EXPERIENCE, BY YEARS OF SCHOOL COMPLETED, IN THE UNITED STATES

Characteristic	Total (thousands)	Non-response rate	Mean income		Proportion of civilians with income working year round full time	
			Respondents	Non-respondents	Respondents	Non-respondents
ELEMENTARY SCHOOL GRADUATES BY AGE						
25 to 34 years	572	11.4	$ 6,389	7,710	71.1	67.9
35 to 44 years	1,051	14.6	6,849	6,374	74.7	75.9
45 to 54 years	1,370	12.3	7,146	7,369	76.7	73.3
55 to 64 years	1,665	13.6	6,328	8,179	65.2	67.1
65 years and over	2,120	11.1	3,549	4,226	13.4	13.8
HIGH SCHOOL GRADUATES BY AGE						
25 to 34 years	4,807	9.4	8,148	7,985	83.5	81.9
35 to 44 years	3,848	12.3	9,573	9,724	87.1	84.6
45 to 54 years	3,696	16.7	9,760	9,577	84.7	86.6
55 to 64 years	2,081	18.2	9,094	9,418	76.5	86.7
65 years and over	1,029	16.2	5,218	5,700	19.8	23.1
COLLEGE GRADUATES BY AGE						
25 to 34 years	2,413	9.9	10,946	11,784	79.7	84.9
35 to 44 years	1,934	14.5	15,831	17,460	92.2	95.3
45 to 54 years	1,457	21.3	17,934	13,965	91.4	89.9
55 to 64 years	860	23.0	16,719	13,852	80.6	81.2
65 years and over	640	26.3	10,763	7,735	26.1	34.9

Table D.--NONRESPONSE RATES AND MEAN INCOME IN 1969, FOR MALES 14 YEARS OLD AND OVER, BY RESIDENCE AND REGION, IN THE UNITED STATES

Residence/region	Total (thousands)	NA rate	Mean income		
			Total	Respondents	Nonrespondents
RESIDENCE					
Nonfarm	65,181	12.1	$7,352	$7,236	$8,163
Farm	3,846	10.6	4,658	4,599	5,133
In metropolitan areas	44,820	13.1	7,901	7,829	8,358
1,000,000 or more	24,272	14.0	8,390	8,352	8,612
Less than 1,000,000	20,548	12.1	7,326	7,228	8,010
In central cities	20,108	13.3	7,080	7,007	7,680
Outside central cities	24,712	13.0	8,541	8,484	8,911
Outside metropolitan areas	24,207	9.8	5,911	5,771	7,155
REGION					
Northeast	16,791	15.0	7,536	7,431	8,104
North Central	19,449	11.4	7,561	7,457	8,341
South	20,938	10.7	6,223	6,075	7,398
West	11,849	11.0	7,857	7,796	8,341

Table E.--INCOME RESPONDENTS, NONRESPONDENTS, AND NONRESPONSE RATES BY TOTAL MONEY INCOME IN 1969, BY SEX, IN THE UNITED STATES

Income	Male				Female			
	Total	Respondents	Nonrespondents	Percent with allocated income	Total	Respondents	Nonrespondents	Percent with allocated income
Total	69,028	60,756	8,272	(X)	76,277	69,639	6,638	(X)
Percent with income	92.5	92.1	95.9	(X)	65.8	64.4	80.5	(X)
Percent with no income	7.5	7.9	4.1	(X)	34.2	35.6	19.5	(X)
Percent with income	100.0	100.0	100.0	(X)	100.0	100.0	100.0	(X)
$1 to $999 or loss	10.9	10.9	10.5	12.1	29.1	29.8	23.2	8.5
$1,000 to $1,999	8.6	8.6	8.3	11.9	19.0	19.0	19.3	10.8
$2,000 to $2,999	7.5	7.5	7.4	12.3	12.0	12.0	12.4	11.0
$3,000 to $3,999	6.6	6.9	5.7	10.6	10.9	10.9	10.9	10.7
$4,000 to $4,999	6.2	6.3	5.4	10.6	8.8	8.9	8.9	10.7
$5,000 to $5,999	7.0	7.1	6.9	12.1	6.9	6.8	8.1	12.4
$6,000 to $6,999	7.6	7.6	7.5	12.4	4.8	4.7	6.2	13.7
$7,000 to $9,999	21.6	21.8	19.8	11.4	5.9	5.6	7.5	13.4
$10,000 to $14,999	16.2	16.1	17.0	13.0	1.9	1.9	2.5	13.9
$15,000 to $24,999	6.1	5.8	8.3	17.0	0.4	0.3	0.6	18.5
$25,000 and over	1.8	1.6	3.3	22.0	0.1	0.1	0.3	23.0
Median	$6,429	$6,378	$6,788	(X)	$2,132	$2,090	$2,554	(X)
Mean	7,202	7,087	8,013	(X)	2,945	2,891	3,402	(X)

X Not applicable.

FOOTNOTES

1/ For a more detailed discussion of the CPS income improvement program, see paper by Mitsuo Ono entitled "Current Developments on Collecting Income Data in the Current Population Survey," presented at the 1971 annual meeting of the American Statistical Association. Nonresponse rates cited below and in the first two paragraphs of the next section were obtained from table 1 of Dr. Ono's paper.

2/ Mean earnings were used because mean income was not available. The latter would have been preferred because persons are grouped by total income nonresponses rather than earnings nonresponses.

3/ Excluding the small number of private household workers.

4/ There are large sampling errors within the age-education-work experience groups. Hence, these estimates are subject to further analysis.

5/ In the March 1970 CPS the eight questions covered the following: Earnings--(1) Money wages or salary; (2) net income from nonfarm self-employment; (3) net income from farm self-employment; Other income--(4) Social Security; (5) dividends, interest, rent, income from estates or trusts; (6) public assistance or welfare payments; (7) unemployment compensation, workmen's compensation, government employee pensions, or veterans' payments; (8) private pensions, annuities, alimony, regular contributions from persons not living in this household, royalties, and other periodic income.

6/ For a more detailed discussion of the income allocation procedures used in the March CPS, see a paper by E. Spiers and J. Knott entitled, "Computer Method to Process Missing Income and Work Experience Information in the Current Population Survey," Proceedings of Social Statistics Section, American Statistical Association, 1969.