

Nonresponse in U.S. Government Household Surveys: Consistent Measures, Recent Trends, and New Insights

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Nonresponse rates provide critical measures of survey quality, but consistent measures that are comparable across surveys and over time remain scarce, even in continuing large surveys. The consistent response and nonresponse measures developed in this article are comparable across surveys. Several comparisons are shown for the years 1990 to 1999 in six continuing household surveys that provide data for key national social and economic statistics in the United States. Examining these nonresponse measures provides new insights into recent nonresponse trends. Additional consistent nonresponse rates addressing panel surveys are also defined. These rates show the value of using information already available to portray special aspects of nonresponse and suggest additional research.

Key words: Initial interview; panel survey nonresponse; components of nonresponse.

1. Introduction

Survey nonresponse rates are important to data users as indicators of the amount and quality of information available from a survey. Survey organizations use nonresponse rates to guide improvements in survey designs and collection processes. While many reasons for nonresponse are specific to a particular survey, such as its burden and complexity, many other reasons, such as major design features and economic conditions, are more general in nature. Therefore, formulating nonresponse rates that are comparable across surveys and organizations yields further understanding of trends and reasons for nonresponse.

This article develops sets of consistent nonresponse measures for six major U.S. government household surveys. The measures, based on data from 1990 through 1999, reflect the experiences of the surveys as they are currently conducted. This work was conceived by the U.S. Interagency Household Survey Nonresponse Group (IHSNG, established in 1997 by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics), which recommended developing consistent measures and making them readily available (Atrostic and Burt 1999). Other survey research organizations, both public and private, have voiced the

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need for establishing comparable definitions for at least fifteen years (CASRO 1982; U.S. Bureau of Labor Statistics 1987). Continuing calls for consistent definitions appear in the literature (e.g., Johnson, Botman, and Basiotis 1994; Groves and Couper 1998; Lynn, Laiho, Martin, and Beerten 2000). The American Association for Public Opinion Research (AAPOR) recently recommended a set of standardized operational definitions and formulas for response rates in household surveys (AAPOR 1998).

The article first describes the six surveys (Section 2), then defines household-level response and nonresponse measures that are comparable across the various designs (Section 3). Section 4 provides a nonresponse measure appropriate for comparing the first to the subsequent interviews of surveys that conduct repeated interviews of the same unit. Section 5 presents conclusions and recommendations.

2. Six U.S. Federal Household Surveys

Nonresponse measures are developed for six household surveys that provide data for key national social and economic statistics in the United States: the Current Population Survey (CPS), the Consumer Expenditure (CE) Diary and Quarterly Surveys (CED and CEQ), the National Health Interview Survey (NHIS), the National Crime Victimization Survey (NCVS), and the Survey of Income and Program Participation (SIPP). The Census Bureau, the Bureau of Labor Statistics, the National Center for Health Statistics, and the Bureau of Justice Statistics sponsor the surveys.

The surveys share several design and collection features. They are large, continuing surveys for which the Census Bureau collects the data. The first interview is always conducted by personal visit after an introductory letter is sent to the address. The surveys generally accept information provided by knowledgeable respondents in a household, if over a certain age. In most instances, each survey attempts to collect information about each person in the household. The surveys also differ in a number of basic features widely hypothesized to affect nonresponse rates, including subject matter, structure, length of interview, frequency of interviews, total number of interviews (or waves), length of interview period (or time in the field), whether households and individuals who move remain in the sample, and interview mode after the first interview. The surveys' main design and collection features are listed in Table 1.

NHIS is an annual survey that interviews sample units only once. CPS has eight interviews: four monthly interviews for the first four months, and then, after eight months, a second set of four monthly interviews. The first and fifth CPS interviews are usually conducted by personal visit, the others by telephone. CEQ has five interviews, each three months apart, and all are personal visits. CED is a diary survey with two contiguous weeks of data collection. The diary is placed and picked up during three personal visits. NCVS has seven interviews, each six months apart. The first interview is in person and most subsequent interviews are by telephone. Some CPS and NCVS telephone interviews are conducted at a Census Bureau computer-assisted telephone interviewing centralized facility, and some are conducted at the field interviewer's home. SIPP is a longitudinal survey that follows individuals, rather than addresses, with up to 12 interviews per panel.

Such design differences mean that the annual response and nonresponse rates currently published by the Census Bureau and the sponsoring agencies are not comparable across

the surveys. For example, the CPS annual response rate includes units that have been interviewed between one and eight times, over a period of 16 months. By contrast, the SIPP annual response rate includes units that have been interviewed between one and twelve times, over a period of as many as four years. The surveys also differ in the sample units they include in the annual rates. For example, if the household originally interviewed in the first CPS interview moves, CPS interviews the new residents and does not follow the household that moved. CEQ and NCVS have similar procedures. SIPP has a different procedure. If members of the original household move, SIPP attempts to follow them.

3. Initial Nonresponse Rates

The six surveys studied share one important design characteristic: the *initial* interview is a personal visit. Household nonresponse rates measured at the initial interview offer valid comparisons across different surveys because they control to some degree differences in the design and collection features outlined above. Since the first interview is conducted by personal visit in all six surveys, initial nonresponse rates also are not affected by differences in the interview mode used in subsequent contacts. Based upon the level of detail currently available, a set of core nonresponse measures that reflect the major components of nonresponse at the initial interview are defined.

Reasons why households do not respond are classified by all six surveys in four broad categories: refusals, no one home, temporarily absent, and a residual “other” category. The no one home category reflects units where an eligible respondent is never contacted despite repeat visits; the temporarily absent category reflects units where an eligible respondent is never contacted, but it is determined the inhabitants are away during the entire field period, for example on vacation. The “other” category includes reasons such as medical problems or a death in the family. This category also includes respondent cases converted to nonrespondents as a result of editing. An additional category is included by two surveys, nonresponse due to language, which occurs when an eligible English-speaking respondent cannot be contacted and an interpreter cannot be provided during the interviewing period. These outcomes yield a set of seven core rates. Table 2 gives their operational definitions, variables, and computations. For each rate, the denominator excludes sample units found ineligible (e.g., vacant, under construction, entire household has a usual residence elsewhere) or out-of-scope (e.g., demolished, converted to a business, moved out of country).

Three features of the definitions are important to understand what these rates represent. First, they are based on the first time a unit is included in the sample. For surveys where the unit of interest is an address, and there are repeated interviews at that address, this means using only the first outcome with the address. For longitudinal surveys that follow people, this means using units in the first round or wave of interviewing. For one-time, annual surveys, this means using units in the sample at a specified time. Second, they include sample units whose eligibility for the survey could not be determined. Such units are considered eligible and placed in the denominator (and numerator, where appropriate) when calculating the rates. Third, the rates are calculated using the final, edited outcome codes. After the interviewers collect the data, edit checks are run that may result in changes to the nonresponse outcome reported by the interviewers.

Table 1. Survey design and data collection characteristics of the six surveys

	CED	CEQ	CPS	NCVS	NHIS	SIPP
Subject Matter	Consumer Expenditures and Income	Consumer Expenditures and Income	Employment, Unemployment, and Labor Force Characteristics	Crime Victimization	Health Status	Income, Labor Force, Program Participation
Structure	Diary	Panel	Panel	Panel	One Interview	Longitudinal
Unit surveyed	Consumer unit(s) at sample address	Consumer unit(s) at sample address	Household at sample address	Household at sample address	Household at sample address	Person
Number of Eligible Units at the Initial Interview in 1999	10,155	10,565	77,398	15,415	42,900	13,142
Number of Interviews or Waves	3	5	8	7	1	12
Frequency of Interviews	Weekly	Every 3 months	Monthly for 4 months, none for 8 months, monthly for 4 months	Every 6 months	Once	Every 4 months

Time in Survey	2 consecutive weeks	13 months	16 months	37 months	1 day, or until complete	Varies: 30 to 48 months
Recall Period	1 week at pickup, if diary not completed	1 month first interview, 3 months in others	Varies: 1 week, 1 month	6 months	Varies: 2 weeks, 3 to 12 months	4 months
Average Interview Length	25 minutes per interview 15 per day diarykeeping	90 minutes	10 minutes	25–30 minutes per person	70 minutes per person	30 minutes per person
Initial Interview	PV	PV	PV	PV	PV	PV
Subsequent Interviews	PV	PV	PV or telephone	PV or telephone	N/A	PV or telephone
Survey Mode	PAPI/Diary	PAPI	CAI	PAPI/CAI	CAI	CAI
Time in the Field	1 week	1 month	10 days	2 weeks	2 weeks	1 month
Mover Follow-Up	No	No	No	No	N/A	Yes
Respondent Age Limit	16+	16+	15+	12+	18+	15+

PV Personal Visit Interview
PAPI Paper and Pencil (personal) Interview
CAI Computer-Assisted (personal or telephone) Interview
N/A Not Applicable

Table 2. Definitions of initial response and nonresponse rates

Rates	Definition	Computation
Initial Response Rate	Number of interviewed units divided by the number of eligible interviewing units	$(NINT/NEU) \times 100$
Initial Nonresponse Rate	Combination of eligible interviewing units not interviewed due to language problems, refusal, no one home, temporary absence or other reasons, divided by the total number of eligible interviewing units	$(NENIU/NEU) \times 100$
Initial Refusal Rate	Number of eligible interviewing units not interviewed because occupants refused to participate divided by the total number of eligible interviewing units	$(NREF/NEU) \times 100$
Initial No One Home Rate	Number of eligible interviewing units not interviewed because no one was at home during the interview period divided by the total number of eligible interviewing units	$(NEUNH/NEU) \times 100$
Initial Temporarily Absent Rate	Number of eligible interviewing units not interviewed because occupants were temporarily away the interview period divided by the total number of eligible interviewing units	$(NEUTA/NEU) \times 100$
Initial Language Problem Rate	Number of eligible interviewing units not interviewed because of language problems divided by the total number of eligible interviewing units	$(NEUL/NEU) \times 100$
Initial Other Noninterview Rate	Number of all other eligible interviewing units not interviewed or screened out during editing divided by the total number of eligible interviewing units	$(NEUE/NEU) \times 100$

NEU	Number of Eligible Units	Interviewing units in the sample considered to be eligible for interview, including units of unknown eligibility
NINT	Number of Interviewed Units	Interviews considered by a predetermined definition to be complete
NENIU	Number of Eligible NonInterviewed Units	Interviewing units eligible for interview that were not interviewed because of language problems, no one home, temporarily absent, refusal, or other reasons
NEUE	Number of Eligible Nonrespondent Units Excluding: refusals, language problems, no one at home, and temporarily absent	Interviewing units that are eligible for interview, or with unknown eligibility, that were not interviewed or were not considered respondents for reasons other than: a refusal, a language problem, not one being home, or the interview unit being temporarily absent
NREF	Number of Eligible Units Refusing to be interviewed	Interviewing units eligible for interview where the respondent refused to be interviewed
NEUNH	Number of Eligible Units not Interviewed due to No one Home	Interviewing units eligible for interview never interviewed because no one was ever found at home within the interview period
NEUTA	Number of Eligible Units not Interviewed due to Temporary Absence	Eligible interviewing units never interviewed because it was determined occupants were away temporarily (e.g., vacation) during the field interview period
NEUL	Number of Eligible Units not Interviewed due to Language Problems	Interviewing units eligible for an interview where an interview was not obtained because the respondent could not converse in the language of the interviewer or available translator

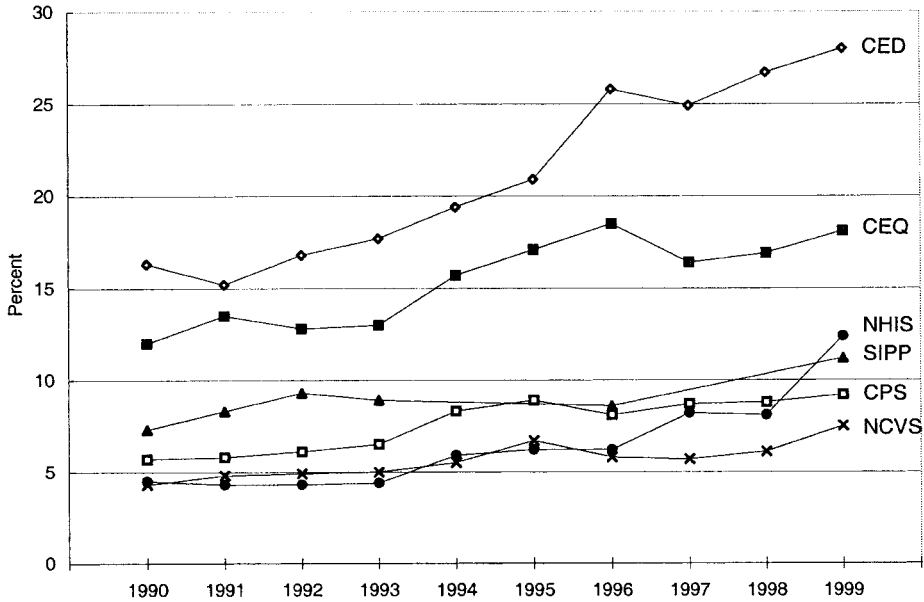


Fig. 1. Initial nonresponse rates, 1990-1999

The rates defined in Table 2 share many similarities with the *Standard Definitions* published recently by AAPOR (1998). The Initial Interview Response Rate, for example, is very similar to AAPOR's Response Rate 2. Response Rate 2 is the number of completed and "sufficient" partial interviews divided by the number of completes and partials plus the number of noninterviews (refusals/breakoffs plus noncontacts plus other noninterviews) plus all cases of unknown eligibility. Likewise, the Initial Interview Refusal Rate is similar to AAPOR's Refusal Rate 1 which reflects the number of refusals divided by the number of completes and partials plus the number of noninterviews (refusals/breakoffs plus noncontacts plus other noninterviews) plus all cases of unknown eligibility. However, the AAPOR rates, like the U.S. Census Bureau's current annual rates, may include the outcomes of both initial and subsequent attempts to interview a sample unit. By contrast, the rates presented here are based only on outcomes the first time a unit is in sample.

Figures 1 to 3 illustrate several of the initial nonresponse statistics for the years 1990 to 1999. Note that NCVS refusal rates are available beginning in 1992, and for CPS and NCVS the no one home rates are available beginning in 1994. Note also that the last data point for SIPP refers to Wave 1 from the 2000 panel, since no panel was initiated in 1999. The rates shown for CED and CEQ exclude the government shutdown weeks from November 1995 through January 1996.

The initial nonresponse rates, presented in Figure 1, have been increasing to some degree for all six surveys since the beginning of the 1990s. Some of the increases may be attributed to survey automation and/or concomitant changes in survey design and field operations. The noticeable increase in the nonresponse rate for CPS between 1993 and 1994 followed a comprehensive questionnaire redesign effort accompanied by a mode change from paper and pencil to computer-assisted interviewing (CAI). Likewise, the

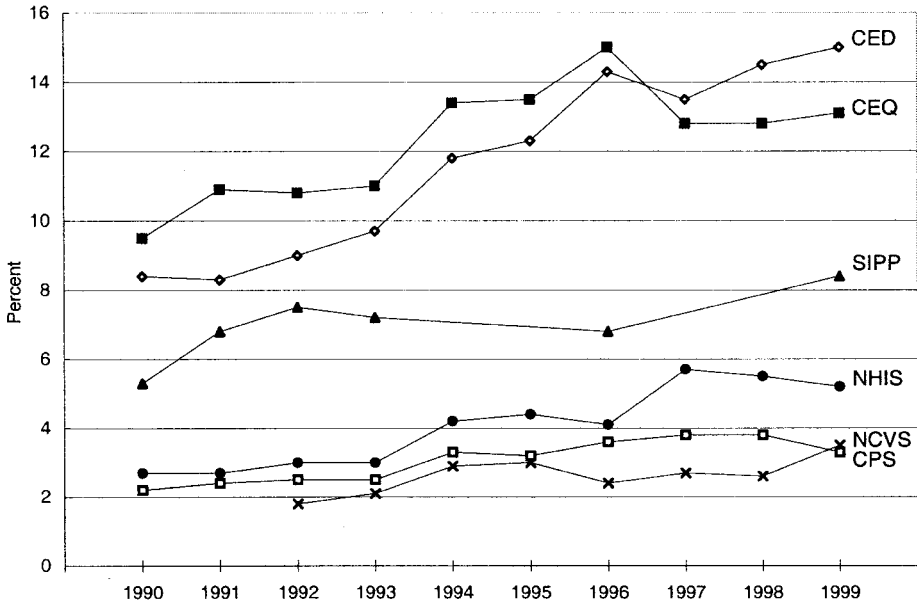


Fig. 2. Initial refusal rates, 1990-1999

increase for NHIS in 1997 followed the totally new design of the questionnaire and the switch to automation that year. These results are similar to those presented in recent studies by the U.S. Census Bureau and by other countries' statistical agencies (U.S. Census Bureau 1998; Clark, Martin, and Bates 1998). Despite the growth in initial nonresponse rates since 1990, the rates for CPS and NCVS remain below 10 percent.

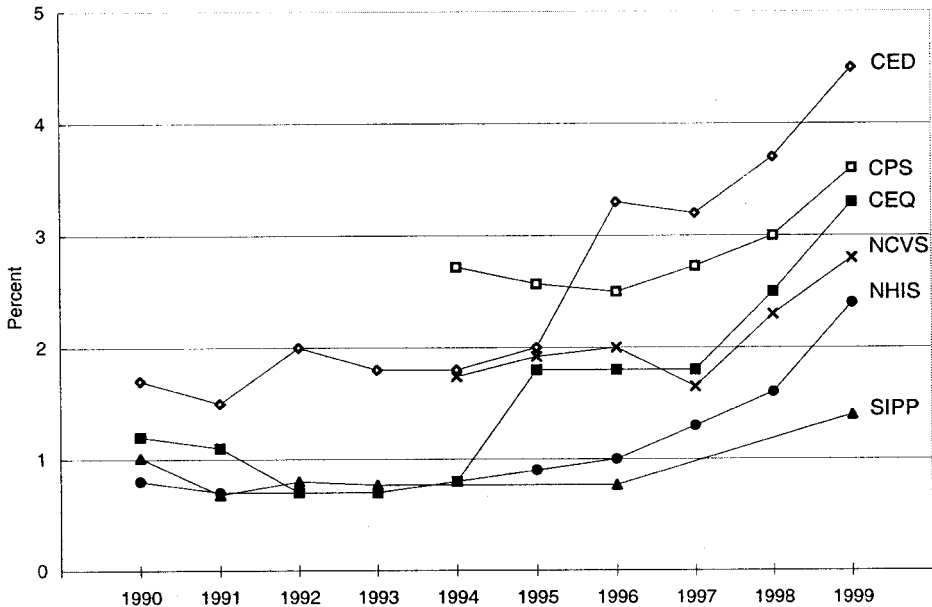


Fig. 3. Initial no one home rates, 1990-1999

Table 3. Initial nonresponse rates, initial refusal rates, and initial no one home rates, 1990 and 1999

	CED ^a %	CEQ ^a %	CPS %	NCVS %	NHIS %	SIPP ^b %
<i>Initial Nonresponse Rates</i>						
1990	16.3	12.0	5.7	4.3	4.5	7.3
1999	28.0	18.1	9.2	7.5	12.4	11.2
<i>Initial Refusal Rates</i>						
1990 ^c	8.4	9.5	2.2	1.8	2.7	5.3
1999	15.0	13.1	3.3	3.5	5.2	8.4
<i>Initial No One Home Rates</i>						
1990 ^d	1.7	1.2	2.7	1.7	0.8	1.0
1999	4.5	3.3	3.6	2.8	2.4	1.4
<i>Refusals as a Percent of Nonresponse</i>						
1990	52	79	39	42	60	73
1999	54	72	36	47	42	75
Difference	2	(-7)	(-3)	5	(-18)	2
<i>No One Home as a Percent of Nonresponse</i>						
1990	10	10	47	40	18	14
1999	16	18	39	37	19	13
Difference	6	8	(-8)	(-3)	1	(-1)

^aThe rates shown here were calculated according to Table 2 definitions. These definitions, and not only the restriction to the first interview, differ from the definitions used in the nonresponse rates shown in CE publications. (See U.S. Bureau of Labor Statistics 1999.)

^bThe SIPP did not initiate a panel in 1999, therefore the SIPP 2000 Panel wave 1 is used.

^cFor NCVS, the initial refusal rates are available starting in 1992.

^dFor CPS and NCVS, initial no one home rates are available starting in 1994.

Initial nonresponse rates at the beginning and end of the 1990s are shown in Table 3. CPS and NCVS had the lowest percentage point difference increase (3.5 percent and 3.2 percent, respectively), while CED had the highest (11.7 percent). The two expenditure surveys (CEQ and CED) also display the highest absolute levels of initial nonresponse. This higher rate is consistent with findings documented over the decade for other countries' expenditure surveys, particularly those requiring a diary (DeHeer 1999; Martin and Matheson 1999). While changes in the questionnaires were made during the decade in both CED and CEQ, the basic questionnaires and procedures remained the same. However, on two occasions during the decade there were changes in the sample: 1) the introduction in 1996 of PSUs based on the 1990 Census, and 2) a fifty percent sample expansion starting at the end of 1998 and continuing to 1999. Not unexpectedly, higher nonresponse rates are noted for these years.

The initial refusal rates for 1990–1999 are presented in Figure 2. The rates reflect the level of non-interviews resulting from households refusing to participate. Initial refusal rates, like initial nonresponse rates, increased across all six surveys between 1990 and 1999. Table 3 shows initial refusal rates at the beginning and end of the decade and refusals as a percent of total nonresponse at the initial interview. By 1999, refusals increased as a proportion of the initial nonresponse rate for NCVS and slightly for CED and SIPP. Refusals comprised around three-quarters of the initial nonresponse for CEQ and SIPP and over half for CED, both at the beginning and at the end of the decade.

For NHIS, what appears to be a relatively large decrease in refusals as a percent of total initial nonresponse (–18 percent) is actually the result of a relatively large increase in the ‘insufficient partial’ noninterview units in 1999. These units were originally coded as interviews and later converted to insufficient partial noninterviews based on data review by the sponsoring agency, and they are included in the residual ‘other’ category (data not shown). For NHIS, this definition was changed in 1999. Likewise, the sponsoring agency for CED includes a post survey screening that ‘reclassifies’ diaries into nonresponse if certain quality criteria are not met. Although an adjustment to the criteria was made in 1999, there was no increase in the rate of reclassified diaries (around 3 percent of eligible units). Current variations among agencies in the post-survey editing procedures reduce somewhat the comparability of the nonresponse rates shown.

One source of the variation in Figure 2 and Table 3 may be understood when the variation of the no one home rates is considered. The shorter the field period, the greater the chance of finding no one home. In recent years the no one home rates have increased greatly in all six surveys, especially toward the latter part of the 1990s, as depicted in Figure 3. But for CED and CPS, which give a short time to locate and initiate the survey, this component has the highest levels of nonresponse among the six surveys. As noted in Groves and Couper (1998), many household, societal, and demographic level changes over time potentially explain this increase. For example, the increased occurrence of one-person households and increased number of dual income married-couple households over the decade implies that fewer people are home during the day. Also, as populations living around metropolitan areas have become more suburban and spread further from the central cities, commuting times grow longer, reducing the amount of time spent at home.

The language problem rate needs further research, since currently there are too few data points. Only SIPP and NHIS now record this reason as a separate noninterview category, and they only began collecting these data in 1995 (SIPP) and 1996 (NHIS). Both the temporarily absent and residual “other” rates were calculated and both appeared relatively stable over time (figures not shown).

4. Initial versus Subsequent Nonresponse in Panel Surveys

Panel surveys conduct repeated interviews to the same unit, and for these surveys nonresponse needs to be measured not only at the initial interview but also at subsequent interviews. Nonresponse rates, and especially refusals, are expected to increase with time in sample because of the increasing burden placed on respondents (Bailar 1989). This section examines the patterns of nonresponse across panel interviews, or waves, for the three panel surveys discussed in the article: CPS, CEQ, and NCVS. Although the three surveys all have a panel design, many of their design elements and collection methods differ, especially the frequency of contact and the number of interviews. For these reasons, they provide good examples of the different nonresponse patterns that may result in panel surveys. The *panel-based nonresponse rates* shown here represent cumulative nonresponse rates at each wave of selected panels. The rates are derived by following monthly panels through the full length of the interviewing cycle and are computed by dividing the number of the nonrespondent units at a given wave by the number of eligible units at the same wave. The rates are defined the same way as the initial rates in Table 2, but they are computed by

grouping the number of eligible units and nonrespondents in a panel wave rather than the number of units for a given calendar year.

To compute the panel-based rates, parallel data structures were developed for the three surveys, taking advantage of the following design similarities. The surveys are all continuing surveys and their samples (of addresses) are subdivided into monthly *panels*. New panels are introduced every month and their initiation is staggered in such a way that all waves are represented at any given month. Units that fail to become respondents at a given wave and continue to be nonrespondents after being recontacted (attrition cases) are carried over cumulatively in the nonresponse rates. The panel-based rates represent the nonresponse history for a panel throughout the various waves. However, the rates do not represent the nonresponse history of individual units within a panel, since some of the units may have moved, becoming ineligible to be in the panel. Conversely, a panel includes in-moving units and new units (as is the case for new houses recently completed) at a sample address. Nonresponse rates by wave computed cross-sectionally for a year (not shown) exhibited patterns similar to panel-based rates, due to the consistent design and procedures across time.

Figures 4 to 6 depict the nonresponse rates by wave for the three surveys. The rates are averages of several panels' nonresponse experience. Twelve panels were included for CEQ-initiated from June 1993 through May 1994, with the last panel ending in June 1995. (The use of more recent panels for CEQ was precluded due to a break in the panel cycle when the 1990-based sample was introduced in 1996.) Twelve panels were included in NCVS-initiated from January through December 1994, ending in December 1997. Nine panels were included for CPS-initiated from January to September 1997, ending in December 1998.

The three patterns are different and the expectation of rising trends of nonresponse by wave is met only in some cases. An increasing trend is indeed revealed for refusal rates in CEQ and NCVS, at least for the first few waves. (See Figures 4 and 5.) The incline tapers off in later waves, and this may be due to several factors. For example, more cooperative units tend to remain in panel and their refusal rate tends to decline. In CEQ, the nonresponse rates follow the refusal trend, since refusals represent about three quarters of the nonresponse cases. In NCVS, instead, the nonresponse trend, after a decline at the second wave, may be characterized as nonincreasing. This pattern results from an increasing trend of refusals and a declining trend of nonresponse for other reasons. In CPS the combination of the various components creates a nonresponse pattern with unique characteristics. The initial nonresponse rate is higher than the rate for all subsequent waves except the fifth. There is also a drop in the rates of both nonresponse and refusals at the second wave. (See Figure 6.)

Several factors seem to influence the different patterns across the surveys: 1) refusals over the duration of the panel, 2) noncontacts over the duration of the panel, 3) procedural differences, 4) mode differences, and 5) panel composition changes. These factors and the differences among the surveys are described below.

Refusals: The major portion of the cumulative refusal rates by wave is encountered during the first interview in all three surveys, i.e., the starting point contributes to most of the end point in the curves. In CPS, however, refusal rates are not always increasing after the first interview, since some initial refusals are converted to responses in the next interview.

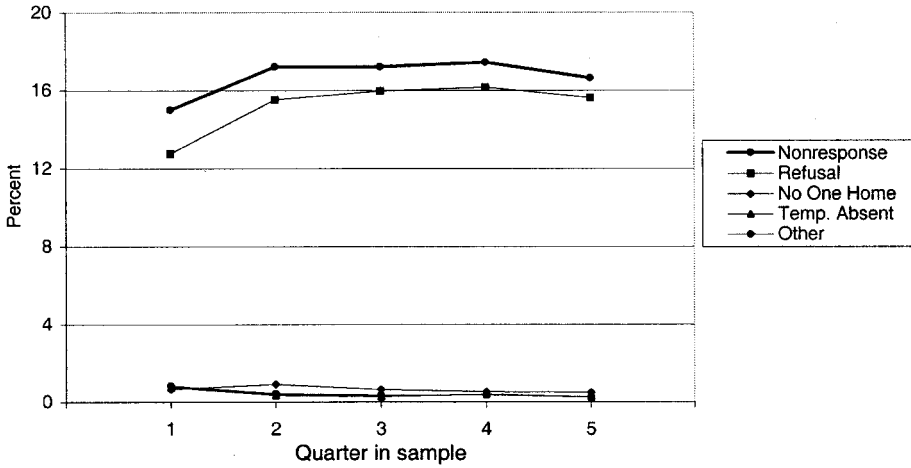


Fig. 4. CEQ panel nonresponse rates: 1993-1995

Harris-Kojetin and Tucker (1997) in a study of CPS households that were eligible in all eight interviews found that two percent refused all eight interviews, but 2.8 percent refused the first interview, yet participated for the other seven. (They noted that the majority, 82 percent, of eligible units in CPS participated in all eight waves.) Although new refusals may be encountered in the second interview, the net effect is that the second interview has the lowest refusal rate of all the interviews. Refusal rates tend to increase after the second interview, with a peak at interview five and a slight decline thereafter.

Noncontacts: Units that cannot be contacted by the closing date influence the wave-to-wave comparisons of nonresponse rates, since their willingness to respond is not known. Repeated interviews in panel surveys tend to increase the chance of locating units, and potential respondents, after the first wave. This factor tends to counteract the negative effects of a short field period allotted to some surveys. In CPS and NCVS, the rates of no one home and other noncontacts comprise a large portion of the initial nonresponse,

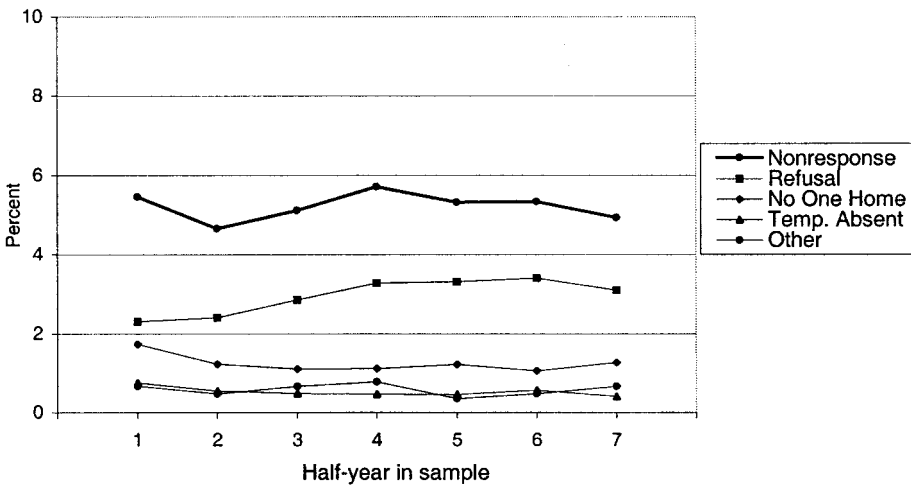


Fig. 5. NCVS panel nonresponse rates: 1994-1997

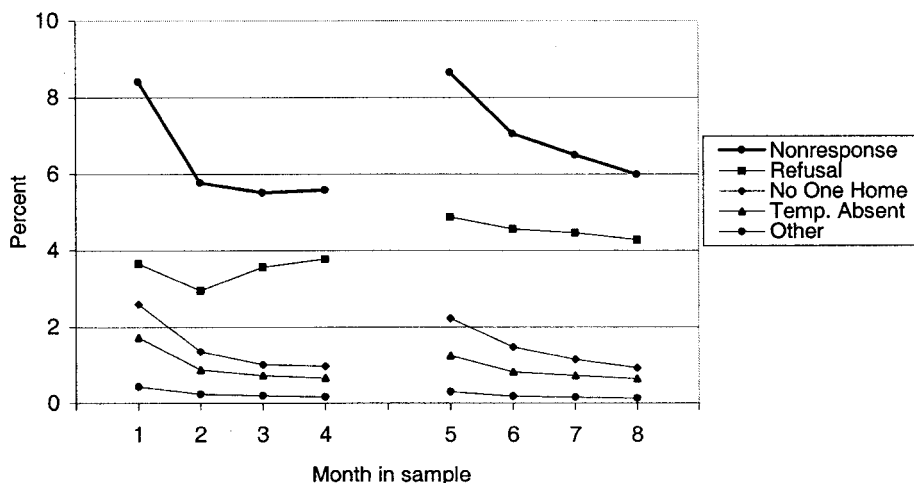


Fig. 6. CPS panel nonresponse rates 1997-1998

and, therefore, a sharp decline in these rates at the second interview has a major effect on the nonresponse pattern. CEQ is in the field for a month, and a small portion of nonresponse is due to noncontacts. Therefore, changes in this component at subsequent interviews have a smaller influence. As seen in Figure 3, however, in more recent years these rates are on the increase in CEQ as in the other surveys.

Survey procedures: Panel surveys span long periods of time. Changes may occur in the prevailing circumstances in the field, and the person who is actually responding, or not responding, may be different from one interview to the next. The interviewer may occasionally be different as well. Changes in survey managers may also have an impact on response rates. In addition to these changing circumstances, field procedures may change somewhat in the course of the same panel. For instance, a greater effort may be made to obtain the second interview if a panel initially experiences a lower than usual response. Normal procedures may be followed for most respondents, but for respondents that are reluctant to participate again, additional follow-up procedures may be instituted. An analysis of these factors would be useful, but such detailed data are not available. Even with changing circumstances, though, the wave-to-wave patterns appear consistent from one panel to the next.

Mode of contact: While CEQ is always administered by personal visit, there are mode changes in NCVS and CPS in the course of the various panel interviews. In NCVS, the telephone is used in most interviews after the first. In CPS, there is a change from personal visit to telephone in the second interview, a change to personal visit in the fifth interview, and a change again to telephone in the sixth interview. The effects of telephone interviewing on nonresponse are difficult to assess. On the one hand, Groves and Couper (1998) found that some respondents prefer the telephone for fear of crime at the door or having strangers in their house. By contrast, Tucker and Kojetin (1994) concluded that computer-assisted telephone interviews, especially from a centralized facility, are sometimes associated with higher nonresponse compared to personal visits, probably because the rapport with respondents is diminished. On the other hand, the change to computer-assisted

telephone interviewing is not accompanied by an interviewer change when these interviews are conducted from the interviewers' homes, and, in this case, the rapport established during the first interview continues. In CPS, most (85 percent) of the telephone interviews are conducted from the interviewers' homes and the positive effect of the continuing rapport could be added to the possible benefits of the less intrusive telephone interviews.

Panel composition: Compared to the other interviews, the fifth interview of CPS exhibits relatively high rates of nonresponse in all components. One explanation may be that the eight-month interval between the fourth and fifth interviews affects negatively the already established rapport with respondents. Another explanation may be that a relatively large number of new units joined the original panel, resulting from the normal process of units moving into the sample addresses. If so, the personal visit in the fifth interview may effectively mark the beginning of a new round of monthly interviews in CPS, with difficulties similar to those in the first interview. An analysis is needed to isolate the various cohorts within a panel, i.e., original units versus new units.

An analysis is also needed of the nonresponse experience of individual panel units across interviews. This study examined the cumulative nonresponse rates at the panel level. A review of specific panels revealed the nonresponse *patterns* were similar through time within each survey, but the charts of more recent panels were, in general, at higher *levels* than less recent panels. Although some increments in nonresponse may be found in all waves, upward changes in the first interview nonresponse rates were the primary source of higher nonresponse rates of subsequent interviews.

5. Conclusions and Recommendations

The response rate obtained in a survey is a critical determinant of the survey's data quality. Hence survey organizations expend great efforts in assessing and improving response, and especially so in continuing surveys. The first task in improving response is the documentation of response and nonresponse rates and trends. This article suggests better uses of existing survey data in order to document and compare nonresponse across surveys. Rates computed using only the first interview allow surveys of varying designs to be compared more properly than by using all interviews. Nonresponse rates that include all interviews of panel surveys are not comparable to each other or to rates for one-time surveys because the panel surveys differ in design and collection methodologies in ways that affect nonresponse rates.

The ten-year trends analyzed in this article show nonresponse and its components are increasing in all six surveys. This suggests common factors may be contributing to the increases. Starting with 1994, five of the six surveys discussed display higher nonresponse levels than in previous years, and these levels appear to have become permanent changes in the following years. (For one of the surveys, CED, the starting point of the increase appears to be 1992.) Several hypotheses are introduced in the article to explain the increasing trends in some of the surveys, i.e., changes to computer-assisted interviewing and more complex questionnaires. However, one of the surveys, CEQ, did not make these changes and yet displays the start of an increase at approximately the same time. This finding is an insight that needs further and more detailed research. Appropriate comparisons with other

surveys, especially if carried out outside the Census Bureau, may point to global contributing factors (e.g., the economy, consumer sentiment), as researched by Harris-Kojetin and Tucker (1999) for earlier years.

Another aspect of nonresponse that is revealed in the article is the changing relative importance of major components of nonresponse. While it is apparent that these components all show increasing trends during the 1990s, some of them are becoming more prevalent than in earlier years. Refusal rates display patterns similar to the overall nonresponse, since they are a major component in all the surveys. On the other hand, the no one home rates, while well below five percent in most surveys, show the greatest relative increase. The growing inability to make contacts with households is documented in the literature and its effect is discussed in the article. Again, the trends of the six surveys point to the mid-decade as a starting point for greater increments than in prior years for this nonresponse component.

Understanding the basis for the relative importance of the components of nonresponse requires detailed information on reasons for nonresponse. Such information is not currently collected consistently. Survey instruments should be expanded to provide interviewers with better opportunities to record different reasons for refusals. Likewise, it would be extremely helpful to capture case histories detailing outcomes each time a contact attempt was made, differentiating whether it was to collect data or merely to make appointments. Retaining interim outcome codes would give researchers access to a wealth of information behind the broader noninterview categories currently retained, such as the number of contacts and whether each contact resulted in the same or a different type of outcome.

The nonresponse patterns for panel surveys provide an insight on the effects of the various designs on subsequent interviews. The article points out that similar patterns specific to each survey are maintained through time, even though nonresponse levels are gradually rising. Routinely producing this set of panel response rates would improve the statistical organizations' ability to monitor nonresponse trends at each wave of the panel. Additional, more refined, panel rates should also be developed on a consistent basis. One such measure would distinguish between units eligible at the beginning of the panel cycle and units that joined the panel in subsequent waves. This refined measure would make it possible to understand whether the proportion of units that participate in all interviews is declining and the proportion of units that participate in some but not all the waves is increasing. Another measure may address the issues of refusal conversion and of attrition, which indicates the point in the panel cycle when units become permanent nonrespondents. Finally, research should be expanded to evaluate the effects on the estimates produced by the changing composition of panel units due to movers.

The article also includes nonresponse trends for a longitudinal survey, SIPP. For this survey, units and individuals are followed at different addresses. Special nonresponse rates have been developed for SIPP (e.g., the sample losses due to movers that cannot be located), but they are not shown because additional work is necessary to provide consistent definitions that apply to this and other longitudinal surveys. In addition, four of the six surveys (CPS, NCVS, NHIS, and SIPP) attempt to collect most of the data separately for each individual in the household. The other two surveys (CED and CEQ) collect work experience and income information for each adult in the household. Monitoring item nonresponse, partial responses, and the use of proxy response for individuals are cri-

tical elements for these surveys. Consistent survey-specific nonresponse rates should be developed to make appropriate comparisons possible between household surveys that collect data from individuals.

Previous versions of this article recommended that statistical agencies routinely produce the set of core measures of nonresponse at the initial interview detailed in the article. The U.S. Census Bureau subsequently adopted this recommendation (Bates, Doyle, and Winters 2000). Efforts to develop and publish consistent sets of core nonresponse rates (as suggested by Lynn et al. 2000) should be initiated in other national statistical agencies. Such efforts will provide nonresponse rates that are consistent in each agency and will make it easier to draw appropriate comparisons across statistical organizations. Comparing trends in other U.S. household surveys, and trends in similar household surveys conducted by other national statistical agencies, will shed light on the relative importance of factors under the control of statistical organizations.

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