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On the Definitions of Response Rates

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ABSTRACT

In this paper, different types of response/nonresponse and associated measures such as rates are provided and discussed together with their implications on both estimation and administrative procedures. The missing data problems lead to inconsistent terminology related to nonresponse such as completion rates, eligibility rates, contact rates, and refusal rates, many of which can be defined in different ways. In addition, there are item nonresponse rates as well as characteristic response rates. Depending on the uses, the rates may be weighted or unweighted.

KEY WORDS: Eligibility; Completion; Contact; Refusal; Response Rates.

1. INTRODUCTION

The census or sample survey data are gathered by any one of such procedures as personal interview, telephone, or mail. It sometimes happens that some units may not respond for such reasons as "not at home", "away on vacation", "units closed", "respondent refusal", "unit vacant" or "demolished", etc. Other units may respond only partially, e.g. some but not all persons within a dwelling may respond or the units may respond to some but not all questions. Furthermore, units may respond to questions but provide incorrect or inaccurate responses.

Thus, any survey, whatever its type and method of data collection, will suffer from missing data due to nonresponse. Nonresponse has been generally recognized as an important measure of the quality of data since it affects the estimates by introducing a possible bias in the estimates and an increase in sampling variance because of the reduced sample. The relationship between sampling variance and the nonresponse rate is fairly straightforward. However, the relationship between the bias and the size of nonresponse while perhaps more important is less obvious since it depends on both the magnitude of nonresponse and the differences in the characteristics between respondents and nonrespondents. One can speculate that the nonresponse bias is proportional to the nonresponse rate. For a given response rate, the percentage bias would then be independent of sample size. However, the sampling variance is affected by the sample size and is inversely proportional to the responding sample size. Thus, the nonresponse bias may not be nearly so serious relative to the sampling errors for small samples as it is for large samples. The apparent confidence interval may cover the true value in the case of small samples but may not in the case of large samples in the presence of nonresponse bias. If we measure the "seriousness" of the nonresponse bias by the ratio of the nonresponse bias to the coefficient of sampling variation, then the "seriousness" of the nonresponse bias is proportional to the square root of the responding sample size times the nonresponse rate.

In a more practical way, the size of response/nonresponse may indicate the operational problems and provide an insight into the reliability of survey data. However, different types of response/nonresponse rates are used for these two purposes, depending upon whether or

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or not a contact has been made with a designated unit. One can therefore distinguish between "contact" and "no contact" of types. One type such as "no one at home" or "temporarily absent" is in fact a "no contact" problem and is primarily operationally oriented. The other type is the true nonresponse problem, where contact has been made with the selected unit but no response or acceptable response is obtained.

In an interview process itself an interviewer may find units in the sample that should not be there (ineligible for the sample). Also, there will be units with questionnaires only or partially completed as well as units with all questionnaires completed. Each of these events may be defined as a rate, i.e. eligibility rate, item response rate, completion rate, etc. The distinction between the "true" nonresponse and other causes affecting the total size of nonresponse rate may give rise to different interpretations.

The interpretation of response/nonresponse rates is particularly difficult when one deals with complex survey designs since the concentration of nonresponse may be higher in one area or class than in another. Still, response rates have been used as proxies for data quality by almost all survey statisticians. That is why the interest in collecting data on nonresponse and the evaluation of it has usually been part of survey taking. However, only the measures of bias, variance, and the resultant mean square error from all sources of sampling and nonsampling errors can provide an informed basis for evaluating survey results.

Recently, nonresponse has been increasing in many surveys in Canada and elsewhere. Consequently, there is a greater need than ever before to monitor nonresponse rates, to make comparisons between surveys, countries, survey organizations, and to ensure some degree of comparability. There have been attempts to standardize the definition of response rate and its complement, the nonresponse rate; see for example, Kviz (1977), Cannell (1978). Problems of inconsistent definitions of response rates related to telephone surveys are described by Wiseman and McDonald (1980).

There are also problems of inconsistent terminology with regard to response/nonresponse in surveys. Terms such as completion rate, contact rate, and under-coverage rate have been used in different contexts in reports and articles dealing with data collection. While these terms may be readily distinguished in an individual report, they may be confusing and subject to conflicting interpretations, when studying different reports.

To consider response/nonresponse problems, a distinction must be made between unit and item nonresponse rates. Unit nonresponse rates generally pertain to the level at which survey data are gathered during the first contact. Examples of the level could be a dwelling, individual, store or establishment. However, in the case of multi-stage sampling, there may be nonresponse of all units within clusters or even primary sampling units (psu) so that unit nonresponse could apply to a selected cluster or psu as well as a dwelling or individual.

Item nonresponse usually pertains to the questionnaires, where information has been provided for some questions but not to all that should have been provided. However, if a unit fails to respond, it automatically fails to respond to any item. Hence, unit nonresponse and item nonresponse are distinct events that should be dealt with separately.

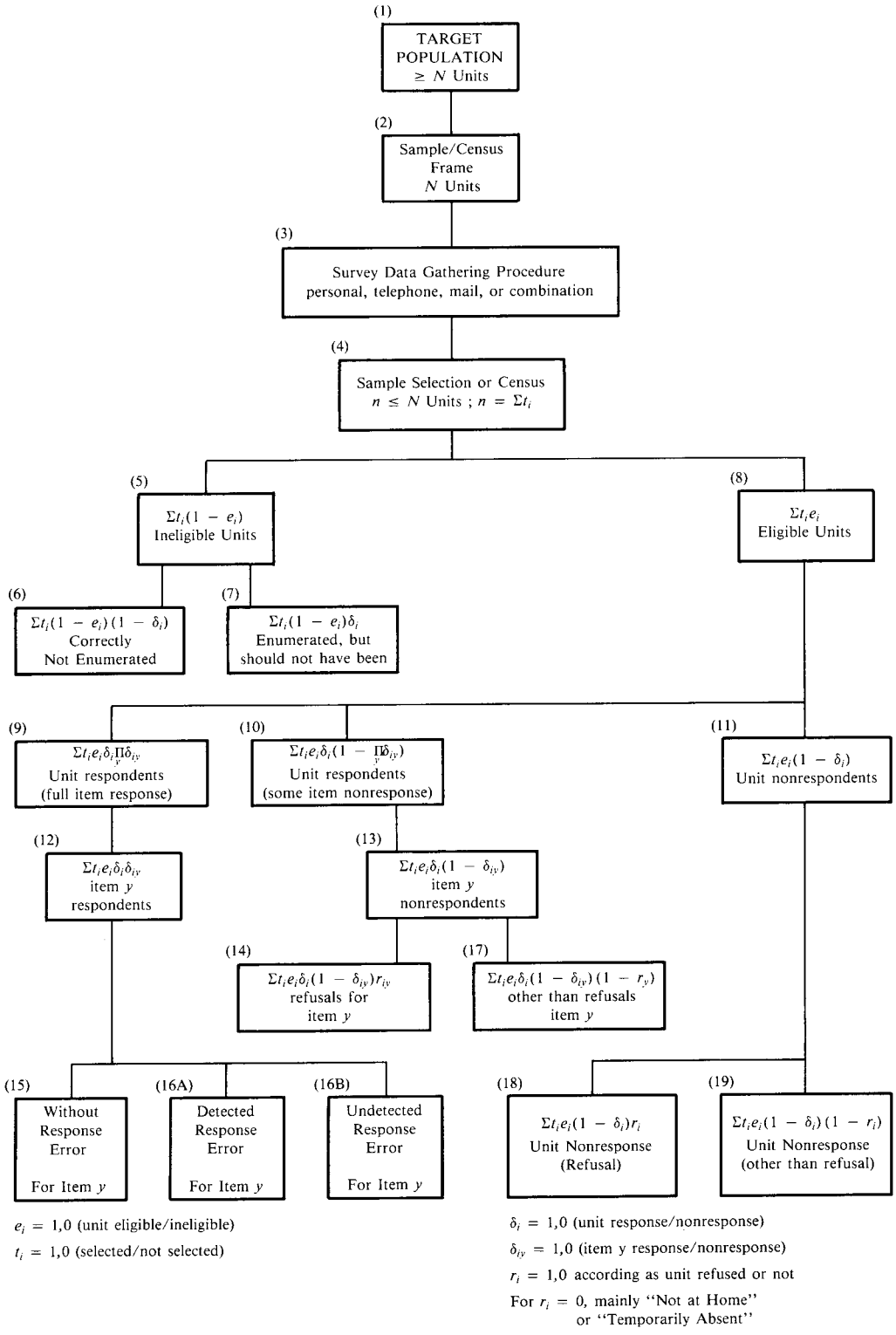
The response rates may pertain to the whole sample and part of a sample such as design-dependent areas or they may apply to administrative areas such as an interviewer assignment, or a group of assignments overseen by a supervisor or field office.

2. RESPONSE/NONRESPONSE COMPONENTS

In order to define various response rates and discuss their uses and applications, it is necessary to split up the target population for the sample or census into the various components, by type of response/nonresponse. Table 1 accomplishes this very purpose, indicating most of the important components of the whole survey that will be used in the rates. Once a target population (Box 1) is defined for a survey, a survey frame of N units (Box 2) is then determined.

Table 1

Response/Nonresponse Components



e_i = 1,0 (unit eligible/ineligible)

t_i = 1,0 (selected/not selected)

δ_i = 1,0 (unit response/nonresponse)

δ_{iy} = 1,0 (item y response/nonresponse)

r_i = 1,0 according as unit refused or not

For r_i = 0, mainly "Not at Home" or "Temporarily Absent"

It should be mentioned that as a result of possible under- and over-coverage of units the frame may not correspond exactly to the target population. Since under- coverage is usually more prevalent than over-coverage in practice, the actual target population usually contains more than N units.

For the survey to be taken, a data gathering procedure (Box 3) and an appropriate design are decided upon, by or census $n = \Sigma t_i$ units are selected, where:

t_i = 1 or 0 according as unit i is selected or not,

$\sum$ = summation over all N units in the survey frame.

Often, in a sample frame, N may not be precisely known but rather can only be estimated from the sample. This is often the case in multi-stage probability samples with area sampling at earlier stages of selection.

Out of the sample of n units, $\Sigma t_i e_i$ are eligible (Box 8) and $\Sigma t_i(1-e_i)$ are ineligible (Box 5) for the survey, where

e_i = 1 or 0 according as unit i is eligible or not.

Sometimes the eligibility criterion may not be determined if the unit cannot be contacted while at other times the eligibility criterion is obvious from the physical appearance, such as vacant/non-vacant dwellings in a household survey.

The $\Sigma t_i(1 - e_i)$ ineligible units of (Box 5) may be split up between $\Sigma t_i(1 - e_i)(1 - \delta_i)$ units not interviewed just as they should not have been (Box 6) and $\Sigma t_i(1 - e_i)\delta_i$ units incorrectly interviewed (Box 7). One hopes that the number of such units in Box 7 is non-existent or at least very small. However, if such units are discovered, they should be deleted from the sample. In the above and in the breakdowns that follow, δ_i = 1 or 0 according as unit i responded or did not respond.

The $\Sigma t_i e_i$ eligible units (Box 8) may be split up between $\Sigma t_i e_i \delta_i$ unit respondents (Box 9 + Box 10) and $\Sigma t_i e_i(1 - \delta_i)$ unit nonrespondents (Box 11), i.e. they provided no usable survey data and little, if anything, is known about the units, except perhaps their geographic location.

The $\Sigma t_i e_i \delta_i$ units respondents may be split up first between $\Sigma t_i e_i \delta_i \prod_y(\delta_{iy})$ units, free of item nonresponse, but with possible response errors (Box 9) and $\Sigma t_i e_i \delta_i[1 - \prod_y(\delta_{iy})]$ units with item nonresponse in at least one characteristic but not in all characteristics (Box 10). Here δ_{iy} = 1 or 0 according as responding unit i responds or does not respond to item or characteristic y. In (Box 9), δ_{iy} = 1 for unit i and all items while in (Box 10), δ_{iy} = 0 for one or more items but not for all of them. For a particular item y, some of the $\Sigma t_i e_i \delta_i \delta_{iy}$ item y respondents (Box 12) come from those unit respondents, free of item nonresponse in (Box 9) while the remainder come from those unit respondents with some item nonresponse among one or more items other than item y. The $t_i e_i \delta_i(1 - \delta_{iy})$ item y nonrespondents of (Box 13) come from those unit respondents with some item nonresponse of (Box 10) that include item y.

The item y respondents of (Box 12) may be decomposed into three components, (i) those units with item y free of response error, (ii) those with a detected response error for item y, and (iii) those with an undetected response error for item y, in Boxes 15, 16A, and 16B respectively.

The $\Sigma t_i e_i \delta_i (1 - \delta_{iy})$ item y nonrespondents (Box 13) all come from the unit respondents, i.e. $\delta_i = 1$, $\delta_{iy} = 0$. These item nonrespondents may be decomposed into 2 components, viz., (i) those who refused to reply to question y or those who terminated the interview prior to item y (Box 14) and (ii) those who failed to reply to supply data for item y because of misunderstanding by either the respondent or interviewer or because of other reasons such as failure to follow the proper path in the questionnaire.

Finally, the unit nonrespondent (Box 11) may be split up among refusals (Box 18) and other than refusals (Box 19) mainly non-contacts with reasons such as not at home or temporarily absent. Here, $r_i = 1$ for refusal and $r_i = 0$ for cases of "other than refusal". The cases of "other than refusals" pertain mainly to "not at Home" or "Temporarily absent."

In order to count the respondents and nonrespondents according to type and reason, careful records must be kept of every sampled unit. This is essential if a probability sample is not to deteriorate into a quota sample, for example, because of ad hoc treatment of nonresponse, such as arbitrary substitution of other units for the nonrespondents. In the case of quota samples, it is sometimes difficult or impossible to distinguish substituted units from originally selected units when survey takers try to reach the quota with easy-to-obtain survey data from co-operative respondents rather than attempt call-backs of nonrespondents.

Even in probability samples with units carefully labelled and monitored according to plan, it is sometimes difficult to determine precisely the reason for nonresponse among the units that failed to be contacted. The problem is usually most straightforward in the case of personal interviews. However, even in that case, it may be difficult to distinguish "no one at home" from "temporarily absent" or "refusals" from "non-contacts" when persons are obviously at home but refuse to answer the door. In the case of telephone interviews, "no answer" or "busy signal" reveals nothing about the lack of contact of the selected unit although "refusals" of contacted units by telephone may be evident. In the case of mail surveys, when the mail is not returned, the reason could be "refusal" just as easily as "temporarily absent". The "not at home (unit)" in the usual context of nonresponse studies as distinguished from "away from home (unit)" does not apply to mail surveys. In mail surveys, the reason for nonresponse usually must be determined by personal or telephone follow-up of the unit, often by sub-sampling nonrespondents, some of which may become respondents while others may remain nonrespondents for reasons that may be determined.

The eligibility of selected units is usually evident in the case of personal interviews although failure to contact the units may result in an interviewer's inability to screen out undesirable types of units for a particular survey. No phone answers or busy signals may result in a complete failure to determine either the eligibility or type of nonresponse of the unit. Disconnected telephone numbers or ineligible telephone respondents in a screening survey will provide some measures of ineligibility in a telephone survey. In the case of mail surveys, some returned mail or addresses non- existent among selected units may yield clues about some types of ineligibility while other types may be discernable only by means of personal or telephone follow-up.

3. DEFINITIONS OF VARIOUS RATES

The sample of $n = \Sigma t_i$ units decomposed in Table 1 in section (2) into eligibible units, unit respondents/nonrespondents, refusals, item respondents/non-respondents, etc. leads to many different types of rates which are defined below. For each rate, the numerator is a particular subset of the denominator. Wherever possible, the rate is defined in terms of the counts of units as broken down in Table 1.

(a) *Eligibility Rate*

The eligibility rate is given by:

$$\bar{e} = \sum_i t_i e_i / \sum_i t_i, = \text{(Box 8)/(Box 4)}. \tag{3.1}$$

Wiseman and McDonald (1980) used the term "incidence rate" but applied the term only to selected persons of telephone samples that actually answered (responded) at the screening phase to determine their eligibility for the survey.

The eligibility rate, as in (3.1), demonstrates the quality of the survey design in selecting eligible units from a frame, where the eligibility may not be readily determinable without some cursory contact or observation. The rate provides, at the screening stage, information to determine how many eligible units will result at the survey data gathering stage. Thus, the rate may be employed at the design stage if data on eligibility are available from earlier studies. Depending upon the nature and procedure of the survey, the eligibility of units may not be determinable among non-contact or even refusable units. There are two alternatives to the definition of eligibility rate and response rates (which will be defined later) pertaining to eligible units. One can assume, for conservative estimates of data quality and the quality of the procedure for gathering survey data that all non-contacts and refusals would be eligible even though realistically the proportion of eligible units among such nonrespondents is often lower than among respondents and non-respondents for which the eligibility criteria are known. Under the above assumption a lower bound for the response rate and an upper bound for eligibility rate would be obtained. Alternatively, one can assume the same proportion of eligible units among units whose eligibility cannot be determined as among those whose eligibility are known. Under that assumption we would likely have a slight over-estimate of eligibility rate and some of the other rates.

(b) *Response and Completion Rates*

(i) According to one of two alternative definitions provided by the U.S. Federal Committee on Statistical Methodology (1978), the response rate is the percentage of the eligible sample for which information (survey data) is obtained. Thus the response rate is defined as:

$$R_{(1)} = \sum_i t_i e_i \delta_i / \sum_i t_i e_i \tag{3.2}$$

$$= \text{[(Box 9) + (Box 10)]/(Box 8)}.$$

The above is the most commonly employed response rate in practice as it yields the percent of the sample for which some useful survey data are obtained once the ineligible units are deleted. All types of non- respondents of eligible units are included in the denominator.

The inverse of the above rate at an adjustment cell is frequently used as a weight adjustment to compensate for missing data of nonresponding units, for example, such rates are frequently use in the Canadian LFS for weight adjustments (see Platek and Gray 1985).

The above rate or its complement, the nonresponse rate, is frequently used for administrative and operational assessments of survey organizations. The rates are also used to assess interviewer's ability to contact respondents and to elect this co-operation to provide usable survey data, e.g., response/nonresponse rates by interview assignment. The nonresponse rate includes both refusals, which may be controlled by good public relations and diplomacy, and non-contacts, which may be beyond the control of the interviewer. Hence,

whereever possible, the nonresponse rates are frequently split up by reasons. The overall response rate in LFS is abour 95% in most months. Out of the 5% nonresponse about 1% are refusals.

A similar rate to the above was defined as a completion rate by Kviz (1977), who included the whole sample in the denominator. Such a rate may provide a more conservative estimate of quality that (3.2) in that ineligible units such as vacants are included in the denominator. For example, in the LFS, the completion rate by Kviz's definition would drop from 95% according to 3.2 to about 85%.

(ii) Another definition by the above-mentioned committee is the percentage of times an interviewer obtains interviews at sample addresses, where contacts are made given by:

$$R_{(2)} = \sum_i t_i \delta_i \Big/ \sum_i t_i [\delta_i + (1 - \delta_i) r_i], \tag{3.3}$$

where unit i refused or did not refuse according as $r_i = 1$ or 0 respectively. The above was defined as a completion rate by O'Neill Groves, and Cannell (1979). If as in (3.3) the eligibility of all units that are contacted can be determined, then another and perhaps superior (known or estimated) definition of the above rate pertaining to eligible units can be given by

$$R_{(3)} = \sum_i t_i \delta_i e_i \Big/ \sum_i t_i e_i [\delta_i + (1 - \delta_i) r_i] \tag{3.4}$$

$$= [(\text{Box } 9) + (\text{Box } 10)] / [(\text{Box } 9) + (\text{Box } 10) + \text{Box } 18)]$$

where e_i, the eligibility criterion is defined after Table 1.

The above rates (3.3) and (3.4) may be useful in personal and telephone surveys where nonrespondents may include non-contacts and refusals. The rates are not practival in mail surveys unless there is a telephone or peronal follow-up of nonrespondents since in most pune mail surveys, the survey organization is forced with either response or nonresponse with unknown reasons. Where the above rates may be useful, however, they measure the ability of a data collection method to elect co-operation of responsible respondents at selected units, given that they are contacted. The non-contacts, that may be beyond the control of interviewers in some survey procedures are removed from the rates entirely.

The response rate in (3.4) was also defined as completion rates by Klecka and Tuchfarber (1979), who assumed, perhaps unrealistically, that all refusals were eligible for the survey. The completion rate would then have ben a conservative estimate for the measure of performance of the data collection method in eliciting the co-operation of eligible units. Alternatively, one may assume the eligibility among refusals to be the same proportion among refusals as among completed and other limits whose eligibility criteria is known.

(c) *Contact Rates*

A "contact rate", defined by Hauck (1974) is the percentage of sample units that are contacted as:

$$R_{(4)} = \frac{\text{Completed interviews} + \text{Refusals (contacted)}}{\text{Completed interviews} + \text{Refusals (contacted} + \text{Noncontacts)}}$$

where the "Noncontacts" were assumed to be eligible for a conservative estimate of the success in contacting sampled units. The "Refusals" may include "Terminations" or "Incomplete Interviews" that are essentially "Refusals" for some items as in (Box 10) of Table 1.

The algebraic expression for the contact rate is given by:

$$R_{(4)} = \frac{\sum_i t_i \delta_i e_i + \sum_i t_i (1 - \delta_i) r_i \hat{e}_i}{\sum_i t_i \delta_i e_i + \sum t_i (1 - \delta_i) r_i \hat{e}_i + \sum_i t_i (1 - \delta_i)(1 - r_i)\hat{e}_i} \tag{3.5}$$

$$= \frac{\text{(Box 9) + (Box 10) + (Box 18)}}{\text{(Box 9) + (Box 10) + (Box 18) + (Box 19)}}, \text{ where}$$

$\hat{e}_i = e_i = 1$ or 0 if eligibility criterion is known,

and, for non-contacts,

$\hat{e}_i = 1$ according to Hauck definition,

or $\hat{e}_i = \bar{e}$, the average eligibility rate among those units whose eligibility criteria are known.

The contact rate measures the ability of the survey organization or interviewers to contact respondents whether or not they succeeded in eliciting their co-operation. In the LFS, the contact rate among non-vacant dwellings is around 96% each month.

(d) *Refusal Rate (Non-refusal Rate)*

Two definitions of refusal rates are given by Hauck (1974) and Wiseman and McDonald (1980) respectively as:

$$F_1 = \frac{\text{number of refusals}}{\text{number of completed interviews and refusals}}$$

$$= \sum_i t_i \hat{e}_i (1 - \delta_i) r_i / [\sum_i t_i e_i \delta_i + \sum_i t_i \hat{e}_i (1 - \delta_i) r_i] \tag{3.6}$$

$$= \text{(Box 18)/[(Box 9) + (Box 10) + (Box 18)]} = 1 - R_{(3)}.$$

and $$F_2 = \frac{\text{number of refusals}}{\text{number of all selected units}}$$

$$= \sum_i t_i (1 - \delta_i) r_i / \sum_i t_i \tag{3.7}$$

$$= \text{(Box 18)/(Box 4)}.$$

With the eligibility criteria taken into account, the refusal rate in (3.7) may be given by:

$$F_3 = \sum t_i \hat{e}_i (1 - \delta_i) r_i / \sum t_i \hat{e}_i \tag{3.8}$$

$$= \text{(Box 18)/(Box 8)}, \text{ where } \hat{e}_i \text{ is defined after (3.5).}$$

The refusal rate measures the extent of the inability of the survey organization or the interviewer to elicit the co-operation of units to provide usable survey data, relative to all contacted units (3.6), relative to the whole sample (3.7) or relative to the eligible sample (3.8). In (3.6), one may wish to determine a "pure" refusal rate without non-contacts that are often beyond the interviewers' control in order to study the efficiency of a questionnaire or effect of the survey topic on the co-operation of contacted units. Alternatively, in (3.7) amd (3.8), one may prefer to examine the refusals rate as one, of several components of overall nonresponse.

(e) *Item Response/Nonresponse Rates*

Complex questionnaire design may result in item nonresponse of specific questions for reasons other than refusals, as noted in Box 17. A controversial or personal question or termination of the interview may result in a refusal to provide data for a specific item as in (Box 14).

Thus, one may measure the overall item nonresponse rate for item y, relative to all responding units, given by:

$$R_y = \frac{\text{(Box 13)}}{\text{(Box 9)} + \text{(Box 10)}}$$

or if item y is relevant only for some units (questionnaires) but not for all of them, one may measure the item nonresponse relative to only those responding units for which item y is relevant (eligible). Consequently, one may define a whole set of item response/nonresponse/eligibility rates, analogous to the unit rates replacing in the rates the number of units (eligible/ineligible)/(responding/refusing, etc.) with the number of responding units (eligible or relevant for item y, irrelevant, responding for item y/refusing for item y etc.) respectively. Most of the rates pertaining to units other than contact rates should have their item y counterparts readily defined by making the proper substitutions in the expressions. However, it may be more difficult to record the reasons for item nonresponse, compared with unit nonresponse, as frequently the item nonresponse is detected only through an edit and imputation routine.

(f) *Weighted Rates and Characteristic Rates*

In the case of sample with different sample weights Π_i^{-1}'s for the units as in probability proportional to size (*pps*) sampling, all of the above rates may be defined as weighted rates by applying the sample weight Π_i^{-1} with the sample selection indicator variable t_i in all the expressions. In the case of self-weighting samples in an area or class for which the rates are calculated the sample weights are redundant. In *pps* sampling at the final stage, however, the usual tendency is for large units to respond more readily than small ones so that weighted response rates, with smaller sample weights applied to the large units than for small units, tend to be smaller than unweighted rates based on the counts of units as in Table 1.

The weighted response rates estimate the proportion of the population that would have responded to the survey under similar survey conditions while the unweighted response rates provide a measure of data collection performance only for the sample or sub-sample pertaining to a specified area or class.

By estimating the nonresponse rate for the entire population rather than for the sample as the unweighted rates do, the weighted rate may provide misleading information on the quality of the data since it may distort the distribution of characteristics in the sample. The advantage of the weighted rates, however, is that the units are added to population levels

rather than sample levels so that one obtains an estimate of the rate that would prevail at census levels under similar conditions of gathering survey data. The weighted response rates may under some circumstances be used as weight adjustment factors to inflate the respondents to the full sample in adjustment cells.

When defining characteristic response rates factors include the observed response y_i among item respondents, the imputed value z_{iy} for item nonresponse and the imputed value for z_i for unit nonresponse, which is usually the mean of the respondents in an adjustment cell. If some auxiliary value X_i is known for all units, whether or not they respond, then a characteristic x response rate may be readily calculated and used as a weight adjustment when x is highly correlated with y. The characteristic y response rate, weighted by Π_i^{-1} or unweighted, may be useful in studying the potential nonresponse bias by comparing the charcteristic y response rates with the weighted or unweighted response rates based on counts of units.

4. FINAL REMARKS

Standardization of the definitions of the rates appears to be difficult, owing to the variety of uses and studies of nonresponse and owing to the careful record keeping demanded of survey takers. As long as the rates are unambiguously defined and appropriately applied in their analysis standard definitions for all types of surveys and survey data gathering procedures, may not be all that important. However, in each particular case, the rate should be carefully defined with clear demonstration of the purpose for which it is intended and the reason why it is adopted.

Another issue of standardization dealing with the topic of response/non- response rates is the standard of what is expected from past experience for given surveys, type of survey, subject matter and interview procedure. For example, the response rate, according to 3.2, in the LFS, is expected to be in the 93 to 95% range, with slightly lower rates in the summer months. Out of the 5 to 7% nonresponse, 1% or so may be expected to be refusals. The overall rates have been remarkably consistent for the history of the survey.

It has been observed (see Platek 1977) that finance-oriented surveys tend to have lower response (higher nonresponse) rates than surveys dealing with other topics. The finance surveys appear to be around 25% nonresponse while most of the others centre around 10 to 15%. Also, telephone surveys appear to have a slightly higher nonresponse rate (by about 2 to 3%) than personal surveys for similar subject matter. Thus, from experience, one can determine a standard objective for surveys of a given subject and interview procedure.

It has been observed in publications such as Wiseman and McDonald (1980) that there are many opinions of the way nonresponse should be defined and measured. Thus, it appears that one must grapple with the alternative definitions and terms and obtain relationships between them under various survey conditions. We have attempted to focus on the problems of the various definitions, terms and standards of response rates but have not solved the problems. A proper study can really be undertaken only with a thorough evaluation of survey records, which is possible only when good records are kept. Often, particularly in the case of quota samples, in telephone and mail surveys, nonrespondents are set aside and other units are substituted for them and treated like the originally selected units. The result is a higher observed quality of survey than is the case in reality because of the hidden nonresponse bias. Consequently, the way of treating nonrespondents and the evaluation of nonresponse, completion, etc. must be planned in advance of the survey data gathering in order to deal with it properly rather than during or after the survey.

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