Volume Title: Annals of Economic and Social Measurement, Volume 2, number 2

Volume Author/Editor: NBER

Volume Publisher: NBER

Volume URL: http://www.nber.org/books/aesm73-2

Publication Date: April 1973

Chapter Title: The Current Population Survey: An Overview

Chapter Author: Marvin Thompson, Gary Shapiro

Chapter URL: http://www.nber.org/chapters/c9885

Chapter pages in book: (p. 105 - 129)

Annals of Economic and Social Measurement, 2/2, 1973

THE CURRENT POPULATION SURVEY: AN OVERVIEW

BY MARVIN M. THOMPSON AND GARY SHAPIRO

The Current Population Survey has long been recognized as one of the most important sources of up-to-date demographic information on the population of the United States. The survey also provides a large amount of detail not otherwise available on the economic status and activities of families and individuals. These data are available for use in analyzing and interpreting complex labor market phenomena. The flexibility of the survey, achieved by the inclusion of supplementary inquiries, contributes to the vast store of statistics for use in planning and development of public and private programs.

This paper provides an overview of the survey to assist users of these data to understand the operations involved in sampling, data collection, and processing for the CPS.

INTRODUCTION

The Current Population Survey has been conducted by the Bureau of the Census as a monthly household survey continuously for over thirty years. The versatility of this survey has been demonstrated by the variety of socioeconomic data that have been collected and issued. In addition, advancements in the field of data processing have been utilized to enhance the usefulness of this collection mechanism and to meet the increasing demand for comprehensive and current data. This paper provides some insight into the operational aspects of the Current Population Survey, including a review of sample design changes, conceptual definitions, data collection, and data processing procedures.

HISTORY

The CPS resulted from a need for reliable and up-to-date estimates of unemployment in the late 1930's. The first attempt to estimate unemployment nationally using probability sampling was the Enumerative Check Census taken as part of the 1937 unemployment registration. In the late 1930's, the Works Progress Administration began developing techniques for measuring unemployment, and this work, along with the experience with the Enumerative Check Census, provided the basis for a Sample Survey of Unemployment. This sample survey started in March 1940 as a monthly activity by the Works Progress Administration. Responsibility for the Sample Survey of Unemployment was transferred to the Bureau of the Census in August 1942.

This survey has continued without interruption to the present time. During the thirty years the survey has been operating, there have been revisions in the sample design, the questionnaire content, and data processing procedures. These changes are described in a joint publication of the Bureau of the Census and the Bureau of Labor Statistics, "Concepts and Methods used in Manpower Statistics from the Current Population Survey."[1] More detailed technical descriptions of the survey design may be found in Bureau of the Census *Technical Paper No. 7.*

[1] *Current Population Reports*, Series P-23, No. 22, U.S. Department of Commerce, Bureau of the Census.

This paper will deal with some of the areas not covered in those publications, and will present new developments in the Current Population Survey.

Survey Content

The CPS provides a large amount of detail not otherwise available on the economic and social status of the population of the United States. In the economic area, it is the only source of estimates of total employment and unemployment and provides, as well, information on the personal characteristics of the labor force. Statistics on self-employed persons, domestic workers, and unpaid family workers are obtained from the CPS. The survey provides data on hours worked and permits separate analyses of part-time workers and workers on overtime. Following recommendations of the President's Committee to Appraise Employment Statistics,[2] detailed information on reasons why persons are looking for work is provided on a regular basis. Additional data also are collected on persons classified as not in the labor force. These data provide information on the labor reserve, such as what their past work experience has been, whether they intend to reenter the labor market and reasons for not looking for work.

Additional subjects are included in the survey periodically as supplemental inquiries. These inquiries usually focus on a specific area, such as duration of unemployment and work experience during the calendar year. Other inquiries may relate to demographic and social characteristics, such as marital history, number of children ever born, and expected number of children.

Analysis of data on the labor force is done by the Bureau of Labor Statistics and the data are regularly published in monthly press releases and in *Employment and Earnings*, a monthly publication of the Bureau of Labor Statistics. Supplementary data collected through the survey are analyzed and published by the various sponsors.

Sample Design

The sample design used for the CPS is based to a large extent on the distribution of the population reported in the most recent decennial census. With the lapse of time since the last census, the efficiency of the sample declines and, although the estimates continue to be unbiased, the sampling errors tend to increase. This increase occurs because the population distribution does not remain constant. Consequently, it has been the practice to revise the CPS sample after each decennial census. At this time, the CPS sample is being revised to take account of the results of the 1970 Census, with the changes scheduled for the period between December 1971 and February 1973. Therefore, some parts of the following description of the revised design apply to only a portion of the sample during the transition period.

By March of 1973, the sample will be located in 461 sample areas comprising 924 counties and independent cities, with coverage in every State and the District of Columbia. These areas were selected by dividing the entire area of the United

[2] *Measuring Employment and Unemployment*, President's Committee to Appraise Employment and Unemployment Statistics, U.S. Government Printing Office, Washington, D.C.

States, consisting of 3,146 counties and independent cities, into 1,931 primary sampling units. With some minor exceptions, a primary sampling unit (PSU) consists of a county or a number of contiguous counties. Each of the 237 standard metropolitan statistical areas (SMSA's) constitutes a separate PSU. Outside SMSA's, counties normally are combined, except where the geographic area of the single county is excessive. The more heterogeneous each PSU is, the more reliable the sample results. Greater heterogeneity can be accomplished by combining a large number of counties and by combining, in particular, different types of counties. However, another important consideration is to keep the PSU sufficiently compact in area so that a small sample, spread throughout, can be efficiently canvassed by one interviewer. This is important for both travel costs and interviewer time. A typical PSU, for example, includes both urban and rural residents, across all economic levels, and provides, to the extent feasible, diverse occupations and industries.

Following identification, the 1,931 PSU's were grouped into 376 strata. One hundred fifty-six of the largest PSU's are strata by themselves. Other strata were formed by combining PSU's which are similar in such characteristics as geographic region, population density, rate of growth in the 1960–1970 decade, proportion nonwhite, principal industry, number of farms, retail sales per capita, and relative number of hotels and motels, etc. A study was made of characteristics that could be used as a basis of stratification, and these were the ones that were regarded as most appropriate and as having the greatest impact on the data collected in the survey. The more successful this endeavor is, the better the reliability of the sample estimates. Except for the large PSU's that form strata by themselves, the strata were established so that their 1970 populations are approximately equal.

The more strata there are, the more sample PSU's there are, and thus the more reliable the data. However, when the strata become too small, the workload per PSU gets so small that the cost per interview becomes much higher. In the sample redesign now taking effect, the strata that existed for the old design were taken as the starting point and changes made as required to meet the objectives discussed above. The figure of 376 was not predetermined, but occurred as the result of these changes, and represents an approximate upper bound to the number of strata that can be found before the cost per interview becomes excessive. The only modifications in PSU definitions that were made were due to changes in SMSA definitions.

In half of the strata containing more than one PSU, a single PSU was selected, in a random manner for each stratum, as a representative of the stratum. In the other half, two independent selections of PSU's were made. Since, within each of these strata, the two PSU's were selected with replacement, it occasionally happened that the same PSU was selected both times. This process resulted in the selection of 461 PSU's from the 376 strata.

Each month, 47,000 occupied units are designated for interview. About 1,700 of these households are visited but interviews are not obtained because the occupants are not found at home after repeated calls or are unavailable for other reasons. This represents a noninterview rate for the survey of about 4 percent. In addition, there are about 7,500 sample units in an average month which are visited but found to be vacant or otherwise not to be enumerated.

The overall sampling ratio used at the present time (1972) is approximately 1 in 1,300. The sampling ratio is automatically modified over time so that the size of the sample is held relatively constant despite the overall growth of the population. The within-PSU sampling ratio is determined in such a way that the overall sampling rate for each household in the survey is equal.

Within each of the 461 PSU's, the number of households to be enumerated each month is determined by the application of the within-PSU sampling ratio, rather than through the assignment of a fixed quota. Two stages of sampling are used in selecting the units to be enumerated in each PSU. The first step is the selection of a sample of census enumeration districts (ED's). These are administrative units designated in the 1970 Census and contain, on the average, about 300 households. ED's are selected systematically from a geographically arranged listing, so that the sample ED's are spread over the entire PSU. The probability of selection of any one ED is proportionate to its 1970 population.

The next step is to select a cluster of approximately four addresses to be enumerated within each designated ED. Whenever possible, the four units, comprising a "segment," are geographically contiguous. In the old sample design, clusters of six addresses were selected so that they were nearby, but not contiguous to, each other. Variance and cost studies that were undertaken indicated that a change to compact clusters of the smaller size would be more efficient. The selection of clusters of living quarters is done, wherever possible, from the list of addresses for the ED compiled during the 1970 Census or, if the addresses are incomplete or inadequate, by area sampling methods. The address lists are used in about two-thirds of the ED's; these are primarily in urban areas. Area sampling is applied in the remaining ED's.

The list sample is supplemented by a selection of the appropriate proportion of units newly constructed in the PSU since the census date. The sample of new construction units is mainly selected from records of building permits in permit-issuing offices in the areas. A special procedure of updating parts of the census lists is used to reflect units missed in the census or new construction in areas where there is no adequate system of building permits.

In those enumeration districts where area sampling methods are used—mainly rural areas—the ED's are subdivided into small land areas with well-defined boundaries. Generally, these area segments have an expected "size" of eight to twelve housing units or other living quarters. For each subdivided enumeration district, one area segment is designated for the sample, with the probability of selection proportionate to the estimated "size" of the segment. When available advance information indicates that a selected segment contains about four addresses, all units within the segment are included in the sample. In cases where the advance information indicates the "size" of a segment is several times four units, several samples are systematically drawn, so as to achieve the equivalent of a four household cluster in each sample taken from the area. In both the list and area segments, a set of living quarters is the sample unit and the interview is conducted with the occupants even if they change while the unit is in sample.

Part of the sample is changed each month. A primary reason for rotating the sample is to avoid the poor cooperation which may result from interviewing a

constant panel indefinitely. Another reason for replacing households is to reduce the cumulative effect of biases in response which are sometimes observed when the same persons are interviewed indefinitely. For each sample, eight systematic subsamples or rotation groups are identified. Segments in a given rotation group are interviewed for a total of eight months, divided into two equal periods. The segment is in the sample for four consecutive months one year, out of sample for the following eight months, and then returns for the same four calendar months the next year. In any one month, one-eighth of the sample segments are in their first month of enumeration, another eighth are in their second month, and so on, with the last eighth in for the eighth time. Under this system, 75 percent of the sample is common from month to month and 50 percent from year to year. This procedure provides a substantial amount of month-to-month and year-to-year overlap in the panel, thereby reducing discontinuities in the series of data without burdening any specific group of households with an unduly long period of inquiry.

Field Supervision and Training

Data collection activities are carried out by the twelve Data Collection Centers. These activities include hiring and training of interviewers, supervision of the interviewer staff by observation of interviews, review of completed work, conduct of the reinterview program, and periodic refresher training sessions. A member of the staff is designated as the CPS Program Supervisor with responsibility for the field collection, control, and processing activities. That person is assisted by an alternate supervisor and may call on other office supervisory staff and especially trained senior interviewers as needed.

The field interviewing staff consists of approximately 1,000 interviewers nearly equally divided among the 12 Data Collection Centers. Each CPS interviewer undergoes an intensive training program consisting of a total of $25\frac{1}{2}$ hours of self-study using programed training materials and two days of classroom instruction. The first period of $12\frac{1}{2}$ hours of self-study followed by the classroom instruction precedes the first field assignment. During the first field assignment, a supervisor provides two days of on-the-job training. During the interval between the first and second field assignments, the interviewer completes the remaining 13-hour self-study programed training course. A supervisor spends another day with the interviewer for on-the-job training at the time of the second assignment. A third day of on-the-job training and observation is scheduled between the third and the sixth month. The interviewer's work is reviewed carefully during these initial months and additional training is provided as necessary. If the work performed is unsatisfactory and further training appears fruitless, the interviewer is released. In addition to the above described initial training program, the interviewer completes approximately two hours of study each month covering supplemental inquiries as well as reviewing basic concepts and procedures. During the course of a year, interviewers participate in three scheduled group sessions. Although emphasis in these sessions may be on a particular supplemental inquiry or specific problem area, a general review of the basic program is always included.

Interviewing Procedures

Interviewing takes place during the week containing the 19th day of the month. The interview covers labor force activities during the preceding week (the week containing the 12th day of the month). A typical interviewer assignment may consist of 50–60 sample units. Upon receipt of the assignment, the interviewer verifies that segment folders, listing sheets, and Control Cards are consistent with the assignment sheet. The interviewer also organizes the assignment to minimize travel from home to segment and between segments. Addresses to be visited for the first time are usually contacted as early as possible during interview week to ensure sufficient time for callback visits, if necessary. Addresses which have been contacted in previous months may be contacted by telephone provided that the occupants have a telephone, have agreed to be interviewed by telephone, and are still living in the sample address. Additionally, interviewers are required to conduct the first interview in each four-month period in person.

After contact with the household is made, the interviewer conducts an interview with a responsible household member. This person is usually the housewife but may be any member of the household who is knowledgeable of the activities of the other members. After verifying that the correct address has been located, the interviewer prepares a roster of the household members and obtains personal characteristics such as age, race, sex, marital status, veteran status, and educational attainment. This record card or Control Card is returned to the interviewer each month the unit is in sample. By reference to the Control Card, the interviewer identifies each person for whom labor force data are to be collected and asks the questions accordingly. Labor force information for each civilian household member 14 years old and over is obtained from the household respondent. The roster of household members is updated at each interview.

Each day during interview week, the interviewer must carefully review all completed schedules and transmit them to the Data Collection Center. This review includes checking the accuracy of transcription of personal characteristics and other identifying information from the Control Card and checking the completed labor force items to ensure that the correct sequence of questions has been completed and all necessary information has been obtained. In some cases, a telephone call to the respondent may be required to complete missing information.

The daily receipts from the interviewers are reviewed by the Data Collection Center and, if necessary, the interviewer is contacted to discuss incorrect application of procedures and any other problem areas. However, since the time period for collection of data is the week of the month containing the 19th, the office has only a limited amount of time for making such contacts and must make the final transmittal of questionnaires not later than Tuesday following the interview period.

Field Edit and Control Procedures

Each interviewer's assignment is carefully controlled to ensure that each assigned sample case is either interviewed or appropriately classified by type of noninterview. Each unit assigned is accounted for and additional or extra units

discovered in the interview process are identified and reviewed for proper handling. Any units removed from the sample for such reasons as demolition, merger, or conversion to nonresidential use are also noted.

Completed work is reviewed clerically in the Data Collection Center. This review consists of an item by item check to ensure that each item requiring an entry has been filled and that the interviewer demonstrates an understanding of the concepts and is following the appropriate questioning procedure. Each error discovered is recorded on a "Tally of Interviewer Errors" form. In addition, all data entries on the CPS-1 documents submitted to the central processing office are edited by computer and a printout containing each error is prepared for every interviewer. This information combined with the office clerical review is used to compute an error rate. This rate reflects the number of errors made per page filled.

Currently, an interviewer maintaining an error rate of 7.5 or less ($7\frac{1}{2}$ errors per hundred completed pages) achieves "qualified edit" status. Work done by Qualified Edit interviewers is not reviewed on an item by item basis in the office, but is edited only by computer and a new error report is provided each month.

Observation and Reinterview

Continuing observation of the interviewer staff is an integral part of the CPS program. Each interviewer is observed by supervisory personnel a minimum of once each year. During the time of this observation, the interviewer goes about her normal work routine, including locating sample households and identifying the correct sample unit, explaining the survey to households visited for the first time, completing all Control Card and questionnaire items, and maintaining proper mileage and payroll records. Special problems an interviewer has with an assignment are reviewed. These problems include unusual or difficult listing problems, high error rates, high noninterview rates, low production, and difficult respondents. By discussion, review of manual instructions, and suggestion of alternatives, the supervisor assists the interviewer to perform a better job.

In addition to the regularly scheduled observations, any interviewer having unusual difficulties requiring immediate correction is scheduled for a "special needs" observation as quickly as possible. This observation concentrates on the special problem the interviewer has and retraining or other assistance is provided as necessary. The results are then monitored over the next several months to ensure that quality and production standards are maintained.

Another facet of the quality control program is the reinterview program. Each month, a sample of primary sampling units is selected for the reinterview sample. Within each PSU, a sample of the interviewers is selected and, further, a sample of each interviewer's work is identified for reinterview. One-sixth of the interviewers are included in reinterview each month and one-third of each interviewer's assignment is reinterviewed. Although each interviewer knows that her work will be reinterviewed periodically and on a sample basis, the interviewer does not know which units or in which month this will occur. The sample selection is also done in such a way that the reinterviewer does not know in advance where he will be doing his work. The sample is identified in the Data Collection Center, and during the check-in of the daily receipts, the reinterview sample units are

laid aside. Transcription of key information is then made to a special reinterview form which is assigned to the reinterviewer. This person is either the program supervisor, one of his assistants, or a member of the senior interviewer staff who has received special training in the conduct of the reinterview.

At the time of the reinterview, the reinterviewer explains the purpose of the visit and conducts the interview in the normal manner. After completing the CPS-1, the reinterviewer looks at the data transcribed to the special reinterview form by the office and, if necessary, reconciles differences between the original and the reinterview. The reason for the difference is noted. Any further action to be taken depends on the reason for the difference. If the respondent indicates that the interviewer did not ask for the information or must have misunderstood the respondent's reply or some other similar reason, the reinterviewer will discuss the circumstances with the original interviewer. Additional instruction or retraining is provided, if required. In some cases, the differences may be the result of the respondent obtaining additional or new information since the original interview, different respondent for the reinterview, memory failure, or other similar causes.

The results of the reinterview are processed and analyzed as a means of monitoring the quality of interviewing over time. The immediate feedback to the interviewer is also a prime benefit to the overall program. The results are not used to correct the original interview since such correction would have little effect on the overall quality of the current month's data and the monthly data processing is usually complete before reinterview ends.

Data Processing

Daily shipments of questionnaires are made by the Data Collection Center to the central processing office located at Jeffersonville, Indiana. Each shipment is logged in and the count of documents verified. Next, the documents are separated into interviews and noninterviews. After verification, the noninterview documents are grouped into work units and sent to the microfilm unit. The interview documents are sent to the industry and occupation coding unit. Clerks assigned to this coding operation receive specialized training and records are kept on their performance to determine quality of work done. All work is 100 percent verified until a coder has coded a minimum of 6,000 schedules over a period of 8 months and has achieved a satisfactory error rate after which 10 percent of his work is verified. Currently, a dependent verification system is being used to determine acceptable quality of work. Under this approach, a second coder reviews the codes assigned with knowledge of the original code. Experimental work is being done on an independent verification system. This approach provides for the work to be coded independently by two additional coders without knowledge of the original code. These codes are then compared and errors assessed when one of the codes disagrees with the other two. If all three disagree, no error is assessed, but the information is used to make the coding materials more precise. Operational and time constraints have hampered development of this system. However, we are currently working toward this objective.

In the coding operation, the clerk assigns industry codes by reference to a precoded list of company names containing the 1970 Census industry code. From

60 to 70 percent of the industry codes can be assigned from this list. The remainder are assigned by reference to the coding manuals used in the 1970 Census. After assigning the industry code, the clerk assigns the occupation code from the written entries, again using the 1970 Census coding manual. These codes are assigned at the three-digit level.

After coding and verification, the completed work is microfilmed, using the automatic filming equipment developed for the decennial census. The microfilm and documents are then sent to Washington, where transfer of the data from microfilm to magnetic tape takes place. This is done through the FOSDIC system. FOSDIC is an acronym derived from Film Optical Sensing Device for Input to Computer. The first computer checks are made at this stage for acceptability of data. Although filming, lighting, and development conditions are carefully controlled, occasionally tolerances are exceeded and work units may be rejected and require refilming at this stage.

After transfer of the data to magnetic tape, batches or groups of data tapes are processed through the computer. This "pre-edit" phase of the processing is to ascertain the quality of the data before final processing. Two outputs are obtained from this phase. The first is a "reject" listing which identifies each document that does not meet acceptable standards. A document may be rejected for such reasons as incomplete or blank control number, incomplete document, and FOSDIC failure to read parts of a document. Each of these documents is located clerically and the necessary corrections made. These documents are then refilmed and reprocessed.

The second output from the "pre-edit" is the error listing and preliminary tally of labor force status. This information is used to make a preliminary assessment of the quality of the interviewing, coding, microfilming and FOSDIC operations. For the first batch processed, each error, which may be an inconsistency or an omission, is clerically verified to ensure that the mechanical equipment is functioning properly. Subsequent to this check, each item exceeding an error rate of one-half of one percent is clerically checked to determine the source of error. This check will usually reveal problems such as camera malfunctions, FOSDIC maladjustments, and the like.

The preliminary tally of persons by labor force status is an unweighted count of persons by employment, unemployment, and not in the labor force. This count is used in determining that the recode and allocation program is functioning properly. After all work units have been processed through the "pre-edit" and the data determined to be complete and acceptable, the full file is processed through the final edit, recode, and allocation run.

Edit, Recode, and Allocation

Because of the uses made of the basic data, the questionnaires are subjected to an extensive edit and allocation procedure. Thus, the final record for each person is complete and internally consistent and data can be cross tabulated using any combination of variables to provide consistent tables. In all phases of the operation, a very high standard of quality is maintained. As a result, very little allocation is done in the computer operation. For key items relating to labor

force status and personal characteristics, the overall nonresponse rate averages 0.5 percent on an item basis. However, an elaborate and complex procedure for editing and allocating has been developed to ensure that the data are complete and internally consistent.

The first principle followed is to identify missing data in an ordered sequence and, if an item is missing, information available from that person's record is used in assigning the missing value, if possible. For example, if the characteristic "sex" is blank and the marital status of the person is "wife of head," we conclude that the person's sex can be assigned as "female." Secondly, if an item is missing and the characteristic cannot be assigned as mentioned, a value is allocated from another record for a person with similar characteristics. For example, if the entry for number of hours worked is missing, the value from the previous record in the file for a person in the same age bracket, sex, and occupation group is assigned. Whenever a value is assigned in this manner, a flag is attached to the item so that, if necessary, a review of the allocation procedure can be accomplished. We should also note here that the characteristics defining each matrix from which an allocation may be made differ, depending on the nature of item. Some matrices may contain only a few cells. On the other hand, for allocation of missing income data in the March supplement, a matrix may contain 680 cells of data.

Estimation Procedure

The procedures used in the sample design to establish strata and PSU's, and to draw a sample of ED's make extensive use of available auxiliary data, i.e., data on characteristics of the survey population related to those characteristics to be investigated in the survey. However, it is possible to develop estimation procedures which make use of additional auxiliary data to obtain more reliable estimates. For this reason, two stages of ratio estimates and a composite estimate are used. A seasonal adjustment procedure is also used for some of the data.

Even before any of these estimates are applied, an adjustment is made to account for households eligible for interview but not interviewed because of absence, impassible roads, refusals, or unavailability for other reasons. No unbiased method of making these noninterview adjustments is known. This bias, however, can be reduced by making the adjustments separately by groups of PSU's and within these by race-residence groups, rather than by making a single across-the-board adjustment. This is due to a degree of similarity of households within a single race-residence group, within a group of similar PSU's. The residence categories now used in SMSA's are central city, balance urban, and balance rural. In non-SMSA's, the categories are urban, rural nonfarm, and rural farm. The adjustment is made within each rotational group and the basic weight for an individual household record (the reciprocal of the sampling fraction) is multiplied by the appropriate noninterview factor.

The distribution of the population selected for the sample may differ somewhat, by chance, from that of the Nation as a whole in such basic characteristics as age, race, sex, and farm–nonfarm residence, among other things. These particular population characteristics are closely correlated with labor force participation and other principal measurements made from the sample. Therefore, some of the

sample estimates can be improved substantially when, by appropriate weighting of the original returns, the sample population is brought as closely into agreement as possible with the known distribution of the entire population, with respect to these characteristics.

The purpose of the first stage ratio adjustment is to reduce the error that arises from the sampling of PSU's, i.e., the sampling error that would still be associated with the estimates if each month the survey included all households in every sample PSU. Consequently, this adjustment is applied only to PSU's that are in strata containing more than one PSU. The adjustment takes into account differences at the time of the last decennial census in the distribution by race, residence, and region of the population estimated from the sample PSU's and that of the total population. The appropriate first stage factor is then superimposed on the previously applied noninterview factor for PSU's in strata that contain more than one PSU.

The second stage of ratio estimation takes account of current differences between the population distributions of the sample and that of the Nation as a whole by age, race, and sex. Independent estimates of the entire population, by these characteristics, are prepared at the Census Bureau each month. They are calculated by carrying forward the most recent census data to take account of subsequent aging of the population, mortality, and migration between the United States and other countries.[3] The CPS sample returns, taking into account the weights determined after the first stage ratio estimate, are in effect used to determine only the percentage distribution within a given age–race–sex group by employment status and various other characteristics. To estimate absolute numbers, these percentage distributions are multiplied by the independent population estimate for the appropriate age–race–sex group.

The independent population estimates used in the estimation procedure may also provide a source of error, although on balance, their use substantially improves the statistical reliability of many of the important figures. Errors may arise in the independent population estimates because of under-enumeration of certain population groups or errors in age reporting in the last census, which serves as the base for the estimates, or similar problems in the components of population change such as mortality, immigration, etc., since that date.

The next stage in the preparation of estimates makes use of a composite estimate. In this procedure, a weighted average is obtained of two estimates for the current month for any particular item. The first estimate is the result of the two stages of ratio estimates noted above. The second estimate consists of the composite estimate for the preceding month to which has been added an estimate of the change from the preceding month to the present month, based upon the 75 percent of the sample which is common to both months. While the weights for the two components of such a composite estimate do not necessarily have to be equal, in this instance the weights used for combining these two estimates are each one-half. Equal weights in this case satisfy the condition that for most items there will be some gain in reliability over the estimation procedure after the first two stages of ratio estimates.

[3] U.S. Bureau of the Census, *Current Population Reports*, Series P-25 No. 352, November 18, 1966, contains a description of the methods used in preparing these independent population estimates.

The gains in reliability from use of the composite estimate are greatest for estimates of month-to-month change, although gains are also usually obtained for estimates of level in a given month, change from year to year, or change over other intervals of time.

Finally, a seasonal adjustment is applied to the most important data. This is done to adjust for the normal seasonal variations in order that meaningful comparisons between months can be made. For example, the unadjusted unemployment rate in June is generally much higher than that for May because of the influx of students into the labor force. However, after seasonal adjustment, the unemployment rates for the two months should be about the same if there were no significant changes in the economy during that time period. Seasonal adjustment of the data is done by the Bureau of Labor Statistics. A detailed description of the method is given in the booklet, *The BLS Seasonal Factor Method* (1966).

Cost of Data Collection and Processing Activities

The field collection cost per completed interview household in the continuing CPS program is approximately $8.00 per interview. This includes the salary and travel reimbursement payments to interviewers plus recruitment and training of replacement interviewers, observation, reinterview, supervision, and the field office clerical work. These costs are based on the present average interviewer pay rate of $2.85 per hour and 11 cents per mile. The turnover rate of the interviewer staff averages about 25 percent per year.

The cost of the data preparation and processing activities on a current basis is approximately $1.50 per household. This does not include the substantial cost involved in the initial programing of the numerous computer runs required for processing although continuous programing effort is required for updating and modification of the standard programs.

Accuracy

Modern sampling theory provides methods for measuring the range of errors due to sampling where, as in the case of the Current Population Survey sample, the probability of selection of each member of the population is known. Methods are also available for measuring the effect of response variability, undercoverage, and noninterviews in the Current Population Survey. A measure of sampling variability indicates the range of difference that may be expected because only a sample of the population is surveyed. A measure of response variability indicates the range of difference that may be expected as a result of compensating types of errors arising from practices of different interviewers and the replies of respondents. These would tend to cancel out in an enumeration of a large enough population. In practice, these two sources of error—sampling and response variability, as defined above—are estimated jointly from the results of the survey. The computations do not, however, incorporate the effect of response bias as would occur, for example, if respondents, by and large, tended to overstate hours worked. Response biases occur in the same way in a complete census as in the sample, and, in fact, they may be smaller in a well-conducted sample survey because there it is feasible to pay the price necessary to collect the information more skillfully.

Exhibit 2 in the Appendix contains more detail on the various sources of error. It includes discussion of the source, frequency, and availability of information on errors, how the information is released to the public, and how the errors are controlled.

Supplements to the Current Population Survey

The CPS is used frequently as a vehicle for obtaining data on a variety of subjects relating to the general population. In recent years, supplemental inquiries have included questions on immunization against selected diseases, school enrollment, recent college graduates, voting in national elections, hired farm wage workers, private pension plan coverage, participation in adult education, marital history, fertility, birth expectations, participation in welfare programs, multiple jobholding, work experience, and income. In most months of the year, a supplemental inquiry is included in the survey. By utilizing the continuing program and a trained staff, the initial contact for labor force data, the availability of personal characteristics as well as labor force status, and a rapid, efficient collection and processing system, a substantial amount of additional data can be obtained at a very reasonable cost. Without doubt, the supplemental inquiries mentioned earlier would not have been collected if a separate sample, staff, and processing system were required for obtaining the data.

Supplements to the CPS may be recurring or they may be single-time supplements conducted for a special purpose. Examples of recurring supplements include the work experience and income supplement collected in March, the multiple jobholding–premium pay supplement collected in May, the immunization survey in September, the school enrollment supplement collected in October, and the survey of hired farm wage workers in December.

The method of collecting supplementary data varies depending on the nature of the inquiry, whether a specified respondent is required, and the time period allowed for collection. For example, an inquiry on recent college graduates involved identifying a special sub-group of the population at the time of the labor force interview and leaving a drop-off questionnaire to be completed by the designated respondent and returned by mail. This technique permitted a somewhat more comprehensive questionnaire than could have been included on the basic CPS-1 and also permitted the obtaining of data from a designated respondent.

Length of interview, availability of knowledgeable respondent, space on the questionnaire, and processing requirements must be considered. If extensive coding or clerical editing is required, a supplement is usually not included on the CPS-1 because of the time constraints. Supplements requiring more than some 20–35 minutes of interviewing time usually must be modified or use the drop-off mail-return approach. Although fixed rules have not been established, each inquiry is evaluated concerning its relationship and possible effect on the primary purpose of the survey, which is to collect labor force data. (Exhibit 1 in the Appendix contains a description of recent supplements to the CPS.)

Another use of the CPS is as a source of sample for independent surveys. This may involve the use of one or more rotation groups that have completed the interviewing cycle, or may involve the identification of selected sub-groups of

the population. These households may then be contacted either in person, by telephone, or by mail depending on the nature of the inquiry, length of interview, and cost and time constraints. An example of this approach is the Longitudinal Retirement History survey sponsored by the Social Security Administration. A sample of persons 55–64 years of age was identified from the CPS after completion of their last interview period. These households will be visited biennially over a ten-year period.

Availability of Data

Data produced from the CPS are in the form of tabulations and on data tapes. A large quantity of data are tabulated on a monthly basis for the Bureau of Labor Statistics. In addition, numerous quarterly and annual averages are prepared for analysis.

Data from these tabulations are published monthly by the Bureau of Labor Statistics in *Employment and Earnings* and in *Monthly Labor Review*.

By averaging data for the year, reliable estimates for the 10 largest States and the 20 largest SMSA's are prepared. Summary statistics are also produced on an annual basis on metropolitan/nonmetropolitan and farm/nonfarm residence. Although a wide variety of statistics are available from the CPS, there are limitations on tabulation areas. The sample size does not permit, for example, tabulation of data for individual States or individual SMSA's on a monthly basis.

Computer tape copies provide another source of data from the CPS. Tape copies currently are produced to meet the specifications of the requesting group as long as the provisions of Title 13 (United States Code) regarding confidentiality of the individual's report are not violated. This is accomplished by identifying the individual's area of residence broadly. Specifically, no area with a population of under 250,000 is identifiable. To date, requests for tape relate primarily to the March CPS basic file with the supplemental data on work experience, family data, and income included. Since these tape copies are "tailor-made" to user specifications, the cost has been in the neighborhood of $5,000 for the complete March file. A standardized format for the March file is now under development. Utilizing experience gained from user requests, we have developed a proposed record format for a standardized file which would make the file available to users at a considerable reduction in cost. A standardized format for the basic monthly file will follow the March file. However, to date, there has been little demand for tape copies of the monthly data.

Standardized formats for other supplements are less certain. Most of the supplemental inquiries are modified from time to time, which makes the investment in programing for a standard format subject to considerable risk. In all cases, tape copies must be modified from the output created in the regular processing to preserve confidentiality.

Future Developments

In recent years, increased interest in area data has required the expansion of the tabulation package on State and SMSA data. At the present time, BLS pub-

lishes data on an annual basis for the 10 largest States and for the 20 largest SMSA's. Additional SMSA's are desired and examinations of the reliability of data including the 100 largest SMSA's are being made. Since data for the 20 largest SMSA's are now produced on an annual basis, an expansion of the sample would permit the publication of semiannual or even quarterly data for the larger SMSA's and annual data for many of the smaller SMSA's. Sample expansion would permit publication of data for more States as well. Another benefit from sample expansion would be the increase in reliability of data for blacks.

Increased use of data from the income/work experience supplement suggests that supplemental samples would be desirable. Since changes in a supplemental inquiry as complex as the March survey are costly and have an impact on the time series, it would be extremely useful to have an independent sample that would permit a variation in the questions to be included. Of course, as mentioned earlier, this involves a higher cost since the basic survey is not utilized.

Another area of increasing concern is improvement of data on Spanish-Americans. Present plans are to add to the sample in March those persons of Spanish origin who are identified in the fall of the year. Normally, these sample households are not interviewed in March because of the rotation pattern. This source of additional sample is being utilized to supplement the persons of Spanish origin that will be identified in the March survey.

Finally, a proposal has been made for collecting migration data in the fall of the year rather than in the spring. At the present time, the March survey is quite comprehensive and extensive, covering work experience, income, migration, ethnic origin, and date of first marriage questions. By moving the migration questions to October, additional space would be available in the data record and the length of interview would be reduced somewhat, permitting some revision and expansion in the scope of both the migration and school enrollment supplements. However, this development is still in the very early planning stages.

Summary

In the thirty years that the CPS has been in operation at the Census Bureau, the survey has grown rapidly and has played a leading role in the collection of statistical data in the Federal Government. The future undoubtedly will provide expanding opportunities and challenges to this important source of data.

Bureau of the Census

EXHIBIT 1
SUPPLEMENTS TO THE CURRENT POPULATION SURVEY

January–December 1972

1. *Annual Demographic Supplement (Census/BLS)—March*
   To obtain data on family characteristics, household composition, relationship to head, marital status, migration of population since March 1, 1970, income from all sources during the calendar year 1971, and information on weeks worked full-time or part-time, time spent looking for work or on layoff from a job and the occupation and industry of the longest job held during the year. (Full CPS sample).
2. *Ethnic Origin (Census)—March*
   To obtain information on the socioeconomic characteristics of the different ethnic groups in the United States. (Full CPS sample).
3. *Pension Plans and Health Insurance Coverage (Labor, Treasury, HEW)—April*
   To provide data on the number of workers who are covered by private or government pension plans other than Social Security, Railroad Retirement or Veteran's pensions. Information will be gathered about the length of time the person has been employed at the establishment, the number of different jobs under which he might be covered, the transferability of the pension and the size of the establishment. Data will also be obtained on the extent of health coverage (hospital, surgical, or doctor's bills), whether the plans cover other family members, and who pays the premium. (Employed and Unemployed persons in one-half of CPS sample).
4. *Survey of Multiple Jobholding and Premium Pay (BLS)—May*
   Information relating to incidence and characteristics of persons working at more than one job during survey week, and to determine whether wage and salary workers reporting more than 40 hours of work during the reference week received premium pay for their overtime hours, and to measure the extent of usual overtime work. (Full CPS sample).
5. *Survey of Persons Participating in Adult Education (OEd)—May*
   To provide information on persons 17+ years of age who have participated in some form of adult education during the 12 months prior to May 1972. Questions will cover the type of activity, reasons for participation, sponsorship, method and place of instruction, length of scheduled and actual participation, source of payment, and type of credit received. (Full sample).
6. *Children Ever Born and Expectancy of Children (Census)—June*
   Questions will be asked of women 14–59 years of age concerning total number of children, date of birth of most recent child, and date of first marriage. Women 14–40 years of age will be asked if they expect to have more children and if so how many, and when do they expect the next child to be born. This information will be used in developing projections for birth rates. (Full CPS sample).
7. *Welfare Recipients (HEW)—June*
   This supplement is designed to determine the number of welfare recipients, the types and amounts of assistance, and the number of persons in the household receiving such aid. The amount of the payments will be collected for the single month of May in order to compare those payments as reported in a CPS type sample versus the amounts reported by the assistance programs which are on a monthly basis. The households will also be queried as to whether any member received any medicaid or food stamps. (Full sample).
8. *National Immunization Survey (PHS)—September*
   This supplement is designed to obtain current data about the extent of protection against influenza, polio, diphtheria, whooping cough, tetanus, measles, and mumps. (Three-quarter CPS sample).
9. *School Enrollment (Census/BLS/OEd)—October*
   To obtain information on school enrollment, date last attended school, and date of high school graduation. Information will also be gathered on Junior College enrollment. Data are provided for persons 3 through 34. (Full CPS sample).
10. *Survey of Voting (Census)—November*
    Questions are directed at registration and voting in 1972 Presidential election to obtain data on the characteristics of voters, nonvoters who are registered to vote, and those not registered to vote. (Full CPS sample).
11. *Spanish Origin (Census)—November*
    Tentatively scheduled for November are questions which will be used to identify persons of Spanish origin. The purpose of this supplement is to provide an additional number of persons of Spanish origin for inclusion in the March 1973 CPS sample. (Full CPS sample).
12. *Farm Wage Workers (USDA)—December*
    To obtain information on total farm days and wages, total nonfarm days and wages, chief activity during the year, and migratory status of hired farm workers (some 2,500 cases screened from full CPS sample).

EXHIBIT 2

INFORMATION ON ERRORS IN THE CURRENT POPULATION SURVEY

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Sampling Errors	There are literally thousands of separate statistics published each month, and each one is subject to sampling error. The Technical Note in the monthly report on "Employment and Earnings" contains tables that can be interpolated to provide approximations to standard errors for each statistic shown. Current figures for some key statistics are as follows:	Since the CPS is based on a strict probability sample it is possible to compute estimates of sampling errors from the sample data themselves. The cost of performing such computations for all of the thousands of statistics is prohibitively high, and therefore it is done for a sample of items, selected to be representative, in some sense, of all statistics tabulated. Forty-five such items are currently used, and computations are performed routinely each month on this set of items. The results are then generalized to represent all statistics collected in CPS. (These 45 items do not apply to the various supplementary inquiries attached to CPS, e.g. income, education, mobility, etc. Separate computations involving different sets of items are performed for them.)	The major labor force report issued to the public is the monthly report on "Employment and Earnings." Each issue contains a section which shows standard errors for key statistics and tables that can be used to approximate standard errors for other data. These tables are not necessarily based on the most recent month's computations. The published data are normally revised only when significant changes occur. There are also labor force reports put out on various special subjects, e.g. poverty areas, large SMSA's or states, etc. Normally, each report contains a section on sampling errors. In some cases, analysts who work closely with the data, in particular those at BLS, require more precise or detailed data than is provided by the published tables. Those are usually supplied in the form of separate memoranda.	Constant attention is paid to all aspects of sample selection and estimation methods in CPS, both to guard against deterioration and to explore possibilities of improvement. Theoretical and applied research, both at the Bureau and elsewhere, have developed techniques that have been adopted in CPS with a consequent reduction in sampling errors. Also, after each decennial census the sample is revised to reflect the latest information on population distributions as described in the section on sample design.

Statistic	*Standard error of* Monthly Level	Month-to-month change
Total labor force	190,000	145,000
Total employed	190,000	145,000
Agr. empl.	120,000	100,000
Unemployed	75,000	80,000
Negro and other race employed	40,000	45,000
Negro and other race unemployed	30,000	35,000

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Sampling Errors (Contd)	Sampling errors of seasonally adjusted series are about the same as the unadjusted one, and consequently only one set of standard errors is normally shown. It should be noted that the sampling errors, as computed, include simple response variance, and part of the component of enumerator variance.			
Undercoverage	Coverage of the population in CPS normally runs about 3 percent below the coverage levels of the recent decennial censuses. The censuses themselves have been about 3 percent below the independent estimates of the population, so that CPS as enumerated, is typically about 6 percent low. However the CPS estimation procedure brings coverage up to the level of the Census. The published figures are thus, on the average, about 3 percent too low. Of course, some statistics may be affected somewhat more and others less. The available data indicates that the distributions are probably only trivially distorted by the undercoverage, but only a few studies have been made and their accuracy is uncertain.	The level of undercoverage in CPS is routinely derived each month by age–sex–color, by comparing unbiased estimates of the population to independently estimated totals. In addition, as part of the reinterview conducted each month, coverage checks are made and these are cumulated to produce quarterly averages.	The extent of undercoverage is published in occasional technical reports. Unpublished current figures are circulated in memorandum form within the Census Bureau and BLS each quarter. Data on how the apparent undercoverage may affect CPS statistics are shown in the reports of the results of these studies.	One part of the initial interview with each household is devoted to probing questions related to coverage. The questions have been revised from time to time in an attempt to improve the results. Coverage is also included in the reinterview program applied to each interviewer's work. Monthly reports on coverage are routinely examined by the planning staff, and whenever there is any sign of deterioration, appropriate actions are taken.

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Noninterview	Noninterview rates (defined as the proportion of occupied sample households at which an interview is not obtained) typically vary from 3 to 5 percent of the households in the sample. There is some seasonal variation—the higher levels usually occur in July and August, when people are on vacation and thus unavailable for interview. About ½ of the noninterviews are due to refusals, ⅓ to no household members at home despite repeated callbacks, and ⅓ to a variety of miscellaneous reasons. The adjustment procedure used to compensate for noninterview in CPS appears to successfully eliminate virtually all biases caused by noninterviews. For example, in one study, total labor force and unemployed appeared to be affected only to the extent of 0.03 percent; the error in full-time employment was 0.04 percent. The only statistic seriously affected was "with a job but not at work," where an error of 0.20 percent was recorded (for a statistic which measured 4.00 percent of the labor force).	Enumerators submit a report on each noninterview household giving reason for noninterview as well as location and race of the household head. These are tabulated each month to provide noninterview rates. The effect of noninterviews on labor force distributions is based on special studies done in 1963 and 1965.	The level of noninterview is shown in virtually every report issued on the CPS. Summary results of the 1963 and 1965 studies have been included in various technical papers—two were given at annual meetings of the A.S.A. and one will be in a forthcoming Bulletin of the I.S.I. A more complete report of these studies has been circulated internally within the Census Bureau and at BLS. Copies have been made available to others upon request.	There is a considerable amount of control at the interviewer level to keep the noninterview rate as low as possible. It is stressed in training; each interviewer's rate is regularly computed and examined by his supervisor; it is considered an important feature of the evaluation of the interviewer's work. Supervisors must be notified of all refusals and are required to personally contact the households by mail, telephone or visit, to see if they can persuade them to report. Several research projects were conducted a few years ago to see if there was any practical way of contacting people on vacation, in order to reduce the summer increase in noninterview rates.

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Nonresponse	Nonresponse covers items left blank, for an otherwise complete questionnaire. It includes items inadvertently omitted by the enumerator as well as those not reported by respondent, either because he did not have the information or because he refused to report it. Breakdowns of these various sources of nonresponses have not been made. The overall nonresponse rate for labor force items averages less than 0.5 percent, on an item basis (i.e., for each item, the number of blanks divided by the total number of times the item should have been reported). On a questionnaire basis, it is about 5 percent—that is 5 omissions per 100 questionnaires. For income information, however, the nonresponse rates are much higher. In 1970, at least 1 component was not reported for about 14 percent of all families and 11 percent of unrelated individuals 14 years old or over. Overall, about 10 percent of all persons 14 years old or over that were interviewed did not report complete information. The 1970 rates were better than the figures for the past few years and about the same as in the early 1960's.	Computer listings are prepared each month, showing the total number of blanks and inconsistencies for each labor force and identification item.	No public release has been made because of the low level of nonresponse for labor force characteristics.	The monthly error listings are prepared separately for each interviewer's assignment and the Field Offices are notified of the error rates. Also, each month's listing is watched to determine which items, if any, appear to be most difficult to the enumerators. Additional emphasis is then placed on these items in subsequent training materials and in home study exercises. For income data, the missing income items are imputed or allocated by values which are obtained from persons who reported income information with similar economic and demographic characteristics. In the last three years, the allocation was made separately for each missing item. Characteristics used in this imputation are age, sex, family status, race, number of weeks worked, and major occupation group. The income amount assigned to a nonrespondent is that observed for another person with similar demographic and economic characteristics who did respond. The impact of nonresponse on the CPS income aggregates is considerably less than the nonresponse rates suggest, because

EXHIBIT 2 (Continued)

early 1960's.

considerably less than the non-response rates suggest, because

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Nonresponse (Contd)				families at the higher income levels tend to report their main sources income but omit relatively minor amounts received from interest, dividends, and similar sources. In 1969 and 1970, experiments were instituted to test the effect of various changes in procedures on nonresponse rates. Several devices appeared to be useful and have now been adopted as standard practice.
Response Biases	Measurements of certain types of response bias are made regularly. It is not possible to say whether they represent "total bias" since this implies an ability to define the true values and establish standards for their measurements, which has not been feasible for most labor force items. The reinterview program produces estimates of response bias based on reinterviews by more experienced and better personnel using the same questionnaire and procedures. These estimates are probably (though not necessarily) lower bounds of the true biases. Estimates of understatements in CPS for key statistics are as follows: Labor force 1.1% Employed 0.8	The CPS reinterview is conducted monthly and summarized quarterly. Monthly tabulations are also performed to measure the rotation group effect. A number of special tabulations and field studies were also made to analyze further the rotation group bias and attempt to measure its cause, magnitude and direction. Special samples have been selected and utilized to investigate other potential sources of errors, such as the effect of using specific household members as respondents, or the effect of using independent interviews from one month to the next, on the stability of estimates of month-to-month change. No	The reinterview results have been published in Technical Paper No. 19 and Technical Paper No. 6. Current figures are prepared each quarter and circulated within the Census Bureau, BLS, and OMB. Summaries of the other research studies have been included in various technical papers presented to the A.S.A. or other professional associations. Memoranda containing more detailed results have been circulated within Census, BLS and OMB, and also supplied to others interested in the subject.	Interviewer error is kept to a minimum by elaborate and detailed initial training when an enumerator is first hired, and a program of keeping him in shape through the use of monthly home study training materials, group training sessions conducted three times each year, reinterview procedures, and periodic observations by the supervisory staff. The reinterview results and other measures of quality are constantly watched to see if any problems are developing, to be stressed in the training. Special research studies are instituted from time to time to see if changes in the questionnaire or in procedures would improve the quality of the statistics.

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Response Biases (Contd)	Employed in agr. 1.6 Unemployed 3.8 Not in labor force —1.4 Specific industry groups 0 to 3.6% Specific occupation groups 0 to 5.2% There is evidence of a type of bias related to the length of time a household has been interviewed (referred to as "rotation group bias.") Whether this results in CPS overstating or understating various statistics is not known. It is generally believed that although response bias affects the measurements of monthly level, it is fairly consistent over time, and thus the month-to-month changes are only trivially affected. Each year, the CPS income aggregates are compared with estimated benchmarks developed by the Office of Business Economics. The comparisons show that CPS data are consistently low. For example, the 1971 CPS was 88 percent of the benchmark. Wages and salary incomes are almost completely reported; in 1971, they came to within 3 percent of the benchmark. The differences are primarily in other types	significant biases were discovered in these tests. Other one-time studies include matching CPS with results for the same individual in the 1950, 1960 and 1970 Censuses, and a current program of matching occupation and industry reports with employer reports for the same persons.		

cent of the benchmark. The differences are primarily in other types

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Response Biases (Contd)	of income. The most serious deficiency is in property income, for which CPS came to only 42 percent of the benchmark.			
Response Variance	Various indices of response variance have been developed. See the U.S. Census Bureau Publication Technical Paper No. 19, The CPS Reinterview Program, for their definitions and values. Using the index of inconsistency to measure simple response variance in CPS, values for key statistics during the period 1961–1966 are as follows: Labor Force 0.037 Employed 0.031 Employed in agr. 0.056 Unemployed 0.141 Negro and other races employed 0.040 Negro and other races unemployed 0.160 As mentioned earlier, the method of computing sampling errors implicitly includes a substantial part (approximately 40 percent) of the interviewer effect portion of response variance as well as all of simple response variance. Response variance behaves like sampling variance in the way the variability of month-to-month change is related to monthly level.	Most of the data come from the monthly CPS reinterview. Additional information is available from the CPS–Census Match conducted in 1950 and 1960. Data will be available next year from the 1970 CPS–Census Match. The 1950 and 1960 CPS–Census Match results are generally consistent with the reinterview results.	Reinterview data have been published in Technical Papers No. 6 and 19. Summaries for both the 1950 and 1960 CPS–Census Match are included in the introductory chapter of Volume 1 of the 1950 U.S. Census results. Current quarterly figures from the reinterview are circulated in Census, BLS, and OMB. Working Paper No. 36, recently published, provides estimates of the interviewer's contribution to response variance.	Control on response variance is similar to that for response bias, described in the preceding section.

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Processing Errors	The occupation and industry coding error rate in recent years has averaged less than one percent. The only other significant source of processing error is FOSDIC misreads, resulting in blank or inconsistent items. These normally run roughly 1 per 2,000 pages processed. The misreads account for only about 1 percent of all blank or inconsistent items. Because of the low processing error rates, the possible effect on statistics has not been analyzed.	Information on coding errors comes from the quality control system of verifying coding. Results are available monthly. Fosdic error rates are derived from a 100 percent clerical check of all blank and inconsistent items found in the first 3,000 documents processed.	Regular release of these data has not been considered necessary.	Occupation and industry coders are subject to sample verification (at a 10 percent level) or 100 percent verification, depending on their experience and past performance. All blank and inconsistent items are listed as part of the CPS processing. All such errors in the first 3,000 documents are clerically checked to determine whether the source is Fosdic or interviewer error. Clerical spot-checks are made on any item which has more than 1 error per 200 pages during any day of processing. In addition, Fosdic rejects any group of microfilmed documents when certain types of errors reach given levels. These errors are of the types usually caused by faulty microfilming or a malfunction in Fosdic itself. The rejection of such groups at this time of processing makes possible the early detection and correction of problems. Control of the survey schedules to and from the field offices, and through the various stages of processing has never been

processing has never been

EXHIBIT 2 (Continued)

Source of Error	Available Information	Source and Frequency of Information	Method of Release to Public	Method of Control
Processing Errors (Contd)				provided on a schedule-by-schedule basis; rather, such control is based on overall counts within acceptable limits of tolerance. On occasion, concern has been expressed whether these tolerances have produced any significant level of error in the survey results, and we have conducted detailed investigations during specific months to determine the extent of such error. Such investigations have invariably revealed a nonsignificant (less than 1 percent) level of error, indicating that the expenditure of funds for more elaborate control systems would be unwarranted.