THE SURVEY OF INCOME AND
PROGRAM PARTICIPATION

QUALITY PROFILE FOR THE SURVEY OF INCOME AND PROGRAM PARTICIPATION

No. 30

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QUALITY PROFILE

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I. INTRODUCTION

This paper discusses the principal operations and sources of error found in surveys with reference to the Survey of Income and Program Participation. The discussion primarily focuses on potential sources of nonsampling error and what, if anything, is known about their effect on SIPP estimates. In addition, the report discusses SIPP sample size considerations, its effectiveness at detecting measures of change from year to year, and its reliability for subgroup analysis.

The paper unifies and summarizes many reports and memoranda developed during the last several years. It is an attempt to provide a comprehensive document on the potential sources of error in a major Census Bureau data collection program. While seeking to inform users of the SIPP data, it also helps staff at the Census Bureau to review the understanding of major error sources in SIPP and helps focus the SIPP's evaluation and testing activities, so as to guide survey redesign activities in the future.

The design of any large scale, complex survey involves many decisions on the combination of methods to be used. These decisions are based on considerations of the costs and errors associated with alternative methods, and are interdependent in two ways. First, with a given budget increased resources to reduce one source of error must be balanced by decreased resources and increased error elsewhere. Secondly, a change in methods to reduce one source of error may lead to an increase in another

source of error. The objective of survey design is to achieve an allocation of resources that minimized total survey error for a given budget. As with other large scale surveys, the design of the Survey of Income and Program Participation (SIPP) is the result of attempts to balance conflicting objectives and constraints. For example:

1. The use of a short reference period to reduce recall bias rather than a retrospective interview with a long reference period. The presumed advantage of less recall bias at each point in time is contrasted with the need for multiple interviews, which usually results in higher overall sample loss, and increased costs in both data collection and data processing when compared to point-in-time surveys.

2. For a given budget, one can either increase sample size and therefore, increase the reliability of cross-sectional estimates or one could increase the number of interviews each sample unit will have and therefore, increase the longitudinal utility of the survey.

3. For given amount of interview time, the use of fewer questions on many topics rather than detailed questions on only a few topics. Both points of view are valid; the latter potentially increases the overall usefulness and quality of the data on the specific topics; the former provides a broader understanding of more general problems.

4. For developing estimates questionnaire designs which implement dependent interviewing procedures (i.e., inform respondents of previous interview responses to improve recall for the current period) rather than independent interviewing procedures. The former may tend to underestimate change in status, while the latter may overestimate change in status.

The issues noted above are indicative of the kinds of design trade-offs which must be confronted in the development of any survey. Although the Census Bureau and the Department of Health and Human Services conducted an extensive development program prior to the collection of data in SIPP (Ycas and Lininger, 1981), many SIPP design decisions depended on the general knowledge and expertise of the Census Bureau staff.

II. GOALS AND OBJECTIVES OF SIPP

SIPP began as a response to the needs of policy makers and social scientists for comprehensive income and program data not available from existing sources. The absence of data for longitudinal analysis that could explain socio-economic processes was also apparent.

The overriding goal of SIPP is to provide policy makers with more accurate and comprehensive information about the economic situation of persons and households affected by government policy. This information is vital for improving the capability of federal agencies to formulate and evaluate their policies and programs in the areas of income and social welfare. The information is also important for social scientists to improve their understanding of the economic behavior of the U.S. noninstitutional population. For these purposes, both cross-sectional and longitudinal estimates are relevant and valuable.

To achieve this goal, we set three objectives: (1) to collect a wide array of information about characteristics such as income, program participation, labor force, etc.; (2) to make such data available in microdata files for simulation and other studies; and (3) to inform policy makers and others through a continuing series of publications. (See U.S. Bureau of the Census, 1986)

III. DESCRIPTION OF SURVEY

The Survey of Income and Program Participation (SIPP) is a nationwide survey designed to provide comprehensive information that reflects the financial situation of persons, families, and households in the United States (except persons in institutions). The survey population includes persons living in group quarters, such as dormitories and religious group dwellings, but excludes persons living in military barracks, correctional facility inmates and nursing home residents, etc. (See U.S. Bureau of the Census, 1978, Technical Paper 40)

A new sample panel of roughly 12,000 interviewed households (HHs) is introduced each year for 1986 and later. [The 1984 and 1985 panels started with larger samples--20,000 HHs and 14,300 HHs, respectively (See Moore, 1987).] Persons in HHs interviewed in the first visit are contacted once every four months for two and a half years for a total of eight interviews. Thus, SIPP will always have two or three panels in sample at the same time, which allows cross-sectional and longitudinal estimates from a combined sample from two panels. If sample persons move, they are interviewed at the new address. "New" persons living with sample persons are considered part of the sample while living with these sample persons.

To provide smooth and steady workload for data collection and processing and to reduce operational problems, each panel is divided into four approximately equal subsamples, called rotation groups. These rotation groups are interviewed over four months, one each month. (In general, one cycle of four interviews covering the entire sample, using the same questionnaire, is called a Wave.) Persons interviewed in a given month provide data for the previous four months. For more detailed information on SIPP design see Herriot with Kasprzyk (1984), David (1985), and Nelson et al (1985).

The initial interview takes an average of about 30 minutes for the first person and 15 minutes for each additional person 15 years of age or older in the household. An interview is divided into the three main groups of questions described below.

1. The Control Card.

The control card is used to obtain and maintain information on the basic characteristics associated with a household and its members, as well as to record information for operational control purposes. The characteristics recorded on the control card include age, race, ethnic origin, sex, marital status, educational level, relationships among household members, and whether the housing unit is rented or owned. This card is updated each wave, thus creating a

record of persons entering and leaving the household and their sources of income (Frankel, 1985).

2. The Core Questions

These questions are directed at assessing the economic situation of noninstitutional persons in the United States that are repeated each wave of interviewing. Questions cover subjects such as labor force participation, program participation, sources of income, wage and salary amounts, and occupations (Frankel, 1985).

3. The Topical Modules.

These questions are asked in addition to the core questions during specific waves,to cover topics that do not require repeated measurement during the year and are of particular interest cross-sectionally to the Census Bureau, other agencies in the government, and other researchers. Subjects covered by topical modules include personal and household assets and liabilities, marital history, fertility, migration, education, health and disability, and work history (Frankel, 1985).

IV. CONSTRUCTION AND MAINTENANCE OF SAMPLING FRAMES

A. Background

The SIPP universe is the non-institutional resident population, including persons living in group quarters, such as dormitories, rooming houses, religious group dwellings, and family type housing provided on military bases. The universe excludes persons living in military barracks, crew members of merchant vessels, and institutionalized persons, such as correctional facility inmates and nursing home residents.

The sample was selected from the following five frames. The percentage of sample from each frame is presented in table IV-1. These frames are also used for other demographic surveys of the Census Bureau. The detailed description of these frames is presented in U.S. Bureau of the Census, Technical Paper 40 (1978).

- <u>The Address-Type Enumeration Districts (EDs) Frame</u> is a list of addresses in EDs for which the Census Bureau had at least 96% of the ED's addresses complete when the frame was created, meaning they contained both a street name and house number. These addresses were on the 1980 census files or were keyed into computer files created prior to sample selection. (Note that 1980 census-based

materials were used for the 1985 panel and subsequent waves. 1970 census-based material was used for the 1984 panel.) Addresses listed as Special Places in the 1980 Census EDs were excluded from this frame, but included in the special place frame discussed later in this section.

- The Area-Type Enumeration Districts Frame consists of EDs in which more than 4% of the addresses in the EDs contained incomplete addresses, lacking a street name and/or house number when this frame was created or were newly constructed in areas where no building permits were issued (available) for them. These EDs are usually in rural areas or in areas of heavy growth. Area-type EDs are subdivided into "blocks" using the block definitions created by the 1980 census. Residential addresses are obtained for blocks containing sample areas by interviewers who visit the blocks a few weeks before the first SIPP interview and list all the addresses in the block.

- The New Construction Frame contains addresses of structures for which building permits were issued from roughly 1979 to present. Exact dates used as the beginning point vary for different types of structures. (See Statt et.al., 1981) This frame is the only frame that is updated continuously. (See Abramson, et al, 1981, for further information about the recommendation made for creating this frame).

- The Coverage Improvement Frame is a small frame consisting of addresses missed in the 1980 census. These addresses were found by comparing the 1970 design Current Population Survey (CPS) sample address lists and the 1980 census address lists [see Parmer, 1985). Note that the coverage improvement frame for the 1984 panel is different from the 1985 and later panels.

- The Special Places Frame consists of the group quarters, a subset of all special places. Group quarters are defined as any structure in which a special living arrangement of 5 or more unrelated persons share a kitchen (see U.S. Bureau of the Census, Technical Paper 40, 1978).

B. Summary of Knowledge

A multi-frame approach to sample selection provides strong advantages over a single-frame approach. The key difficulties of these frames are noted below. None is serious. The first two are related to the design of SIPP; the others arise from reliance on decennial census information or local permit information.

For SIPP, units that no longer contain original sample persons are dropped from sample because the new persons moving into these units will have incomplete data for longitudinal analysis. This policy was also put into effect for economic

reasons and because it is felt that persons moving into these units had the opportunity of being selected for sample at their old addresses. That chance does not exist for some individuals just entering the universe, such as immigrant persons or persons that have been living in institutions or military barracks since before the sample was selected. Such persons will be excluded from SIPP unless they move into a household being interviewed. This exclusion has a trivial effect on SIPP estimates for major demographic groups.

No additional New Construction sample is included for a SIPP panel once the panel is introduced. Again, persons residing in new units built since the sample was selected had the opportunity to be selected at their old addresses, except for those who are just entering the universe.

Permit offices may cross Primary Sampling Unit (PSU) boundaries. In such cases the office was assigned to one PSU or the other after the sample PSUs were selected depending on the proportions of permits issued to these PSUs.

More generally, address lists are subject to errors because of incorrect information from an original source and keypunch errors. Quality control reduces, but does not wholly eliminate, such errors. The following are examples of where this occurs in SIPP.

An address may appear more than once on the list of addresses obtained from the 1980 census. These duplicate addresses would appear in different form due to clerical mistakes.

In the Coverage Improvement Frame, there is no guarantee that the units were actually missed in the 1980 census. For example, the two address lists may have had the same address in different forms and, hence, units will be incorrectly identified as missed.

Addresses identified as an institution at the time of the census are excluded from the SIPP universe. Some of these change into residences of noninstitutional persons. Such units will not be included in our sample unless a permit was issued for structural changes or happened to be in an Area Type ED. The magnitude of such undercoverage is unknown.

C. Tables

Table IV-1. Composition of 1986 SIPP Sample from Various Frames

Type of Frame	Percent of Sample
Address	61.7
Area	28.2
New Construction	8.6
Coverage Improvement	0.1
Special Places	1.4

Note: The percentage of sample from the new construction frame increases slightly as time lag from 1980 decennial census increases.

V. IMPLEMENTATION OF SAMPLING SCHEME

A. Background

Primary Sampling Units (PSUs) for SIPP consist of a county or a group of contiguous counties. For the 1985 and subsequent panels, a PSU was self-representing (SR) if it had 184,000 or more housing units. Self-representing PSUs were included in the sample with certainty. All other PSUs were designated nonself-representing(NSR). Selection of nonself-representing PSUs began with the stratification of these PSUs by demographic and economic characteristics such as percent of urban population, percent of persons below poverty, and percent of minority headed households. For the 1985 and subsequent sample panels, in most of the strata, two PSUs were chosen using the Brewer or Durbin process. (See Cochran, 1977) In total, 86 SR and 198 NSR PSUs were selected. After a sample reduction, the number of NSR PSUs was 144.

Following PSU selection, two more levels of sampling were implemented. These were 1) the selection of groups of housing units (HUs) within the sample PSUs from the various frames defined in the preceding section, and 2) sampling and assigning addresses within a group of HUs to a particular panel. The selection procedure after the sample reduction produced an unequal probability sample.

For address-type EDs, the addresses within the sample ED were divided into clusters (measures) of two neighboring housing units. All such clusters in a sample PSU were then sampled and assigned to specific SIPP panels. (See Hubble, 1983, and Kobilarcik, 1984)

For the New Construction Frame, permit offices were considered the equivalent of EDs in the PSUs. Groups are formed to contain four permits, which when possible, are from the same permit office with a similar date of issue. These new construction measures are then sampled for a particular panel shortly before the panel is due to start, thus making the panel as up to date as possible with new construction. (See Moore, 1984)

For area-type EDs, the EDs within the selected PSUs were divided into blocks (chunks). From census files, the expected number of clusters of four housing units within each block was assigned. If a block contained less than three expected clusters, it was combined with another block. The clusters within the blocks of an ED were sampled using the same process that selected the address clusters in address-type EDs. Blocks containing clusters selected for sample were visited several weeks before interviewing began and all resident addresses were listed in the field. The listed addresses were divided into non-compact clusters containing four housing units. The number of clusters required

from this block as assigned during the sample selection process, was selected in a simple procedure and then assigned to a specific panel sample for interview. (See Kobilarcik, 1983, and Kobilarcik, 1984)

In the Coverage Improvement Frame, units found to be census misses in PSUs containing SIPP samples were assigned to each panel. (See Parmer, 1985)

In the Special Places Frame, clusters for the group quarters in sample EDs were formed. These special place clusters were sampled. Special places in Area-Type EDs were sampled along with geographically contiguous regular housing units, and thus, no special instructions were needed. (See Altmayer, 1984)

The sample for the 1984 panel was selected from reserve measures of the Current Population Survey. Only one NSR PSU per stratum was selected for the 1984 panel, whereas the 1985 and subsequent panels are based on a two PSUs per stratum design. (See U.S. Bureau of the Census, Technical Paper 40, 1978, and Dorsch, 1983(a), for more information about how the 1984 panel sample was selected.)

B. Summary of Knowledge

Listed below are sources of error in the SIPP sample. Each of these sources is common to all census surveys. The exact magnitude of such errors and the resulting bias in estimates is unknown, but expected to be extremely small.

- Units may have been missed within addresses in both the Area-Type and Address-Type ED frames.

- The wrong block may have had its addresses listed in the Area-Type ED frame. This type of error would most likely be detected during list verification. The trivial consequence of this, if not detected, is that SIPP and another survey might be interviewing the same unit.

- The wrong addresses may have been interviewed. This occurred for about 50 housing units in the first wave of the 1985 panel sample. In the second wave, the correct addresses were interviewed and the addresses interviewed by mistake were not revisited. For later panels, the procedures were revised to correct wrong addresses in the first month of interview.

- Due to unclear block boundaries, areas not in sample could be mistakenly included in sample blocks or areas in sample blocks could be mistakenly left off address listings. If this type of mistake occurs, it is usually detected during list verification.

VI. DATA COLLECTION PROCEDURES

A. Background

SIPP's procedures were designed to provide the best quality data possible under given constraints. Therefore, some trade-offs were made in the development of these procedures, as noted below.

- Respondent rules: SIPP uses both self response and proxy response, when one sample person answers the questionnaire for another sample person. A proxy response may not be as accurate as self response, but insisting on self response increases survey cost, and can also increase both person and household nonresponse. Table VI-1 in this chapter gives the percent distribution of self/proxy response pattern for the first three waves of the 1984 panel. (See Kalton et al, 1986(a))

- Interview mode: SIPP relies primarily on personal interviews, but allows telephone interviewing when needed. On average, about 4.5 percent of interviews were conducted by telephone over the first six interviews of the 1984 panel. (See Kalton et al, 1986(a))

- Mover follow up: Sample persons who move are followed to avoid the loss of our ability to observe the effects of

many major changes in the original sample household. Procedures to follow movers vary by the type of mover and are briefly discussed below. (See Jean and McArthur, 1984 and 1987.) Table VI-2 offers some information of how successful SIPP interviewers are at keeping movers in the survey.

Original sample persons: Movers who were interviewed in the first wave are interviewed at their new addresses, along with any other persons that may have joined the household at the new address. This procedure increases costs and interviewer burden, but preserves sample cases needed for longitudinal analysis. However, we do not follow original sample persons who have moved more than a hundred miles from a SIPP sample PSU <u>and</u> who are not reachable by telephone.

Children: Children who move unaccompanied by an original sample person and who are not yet fifteen are not followed. Thus we will occasionally lose a teenager who will become 15 years of age during a panel's lifetime.

Other Sample Persons: Interviewed persons who enter the household after the first interview are not followed if they leave the address unaccompanied by an original sample person. In addition, they are no longer interviewed if they remain at the same address, and all origi-

nal sample persons died or moved away. As a consequence of not following other sample persons (or not interviewing) depending on the circumstances), there is a lack of information for any months within the past four months of the reference period when these persons were still living with sample persons. The missing information is imputed for these individuals for those months in which they were members of an original sample person's household.

Persons Leaving the Universe: Data are not collected on original sample persons who leave the universe (by entering a military barracks, entering an institution, leaving the country, or by dying). Roughly 2% of the original sample persons left the survey universe by the end of the fifth wave of the 1984 panel. Here again, there are up to four months of the reference period when they were in the SIPP universe for which no data were collected. The missing data from these persons are imputed for the months that these persons were members of a sample household. In the procedures for the 1984 panel, if these persons returned to the universe, they are interviewed only if they began to live in a sample household. This procedure, however, was modified for the 1985 and subsequent panels. An original sample person who left the sample household in order to be institutionalized will now be followed but not interviewed. When and if these persons are released during the course of the panel, they will be interviewed whether or not they

return to the sample household. Interviewing Roommates in Group Quarters: At the start of a panel, all occupants of a room selected for sample are interviewed. If occupants move out, they are followed. In subsequent waves, only original sample persons are interviewed.

Interviewers are an important part of the survey, and uniform procedures aid their contributions to data quality. Procedures for conducting the survey are specified for the field staff in Interviewer and Office Manuals. These manuals are prepared and are thoroughly reviewed by Bureau staff.

Interviewers influence the quality of the data in all surveys, including SIPP. For example, they may not ask some questions, may rephrase and thus change the meaning of a question, may not probe enough to encourage respondents to provide better responses, may record information incorrectly, or may not edit properly. To minimize these natural human tendencies, improve understanding of the concepts and questions, and improve data quality, the Census Bureau provides intensive training for interviewers. The training includes an advance home study, classroom training, on the job training, and refresher training. The training is a continuous process and consists of the following steps:

Initial Training: New interviewers on the survey are given intensive training. An interviewer is given one day advanced self study and 3 days of classroom training. For the first wave of SIPP an additional training of about one half day is given for the listing operations (see Chapter V). The classroom training includes lectures, audio-visual aids, mock interview exercise and discussions. It includes comprehensive information on the interviewer's job, specific interviewing techniques such as probing, survey data related definitions, and concepts such as income, labor force, and housing unit etc.

Refresher Training: About twice a year interviewers are provided refresher training consisting of noninterview workshop, information on movers' rules, editing, transcription and new topical modules.

Supplemental Training: Interviewers who are weak in certain aspects of the survey (such as response rate, accuracy rate etc.) are provided supplemental training concentrating on weak areas to improve their performance to meet the Bureau's standard.

Interviewers Observation: As a part of the training program, the supervisor or supervisory Field Representative observes the interviewer during his/her first 2 or 3 days of interviewing, depending on her needs.

Questionnaire checks: The interviewer's work is checked on a computerized system which performs an edit of the control card and the corresponding questionnaires.

Performance Observation: In addition to observation under the training program, interviewers are observed once a year for checking their general performance in areas such as probing, establishing rapport with the respondent, recording answers, asking questions in an appropriate manner, etc. The results of the observations are discussed with the interviewer. Also, a special need to observe an interviewer may arise based on his/her noninterview rate and error rate. In such a situation, more performance observations will be conducted.

Reinterview Program: This program is designed to check the performance of the areas of household coverage, unit coverage and income sources. The program helps to identify the areas where improvement is needed either in the interviewer's performance or the field procedures.

About one-sixth of the interviewers are subject to reinterview checks each month in such a manner that each interviewer is checked at least once during a calender year. Reinterview is conducted on telephone by a supervisory Field Representative or a member of the supervisory staff. It is completed as soon as possible after the original interview.

The results of the reinterview program are used to take corrective action to improve the data quality. These actions include providing a supplemental training for those whose performance is below satisfactory, modifying field procedures, etc. A report is also prepared analyzing the reinterview program data (St. Clair, 1985).

B. Summary of Knowledge

Studies were done with the Income Survey Development Program (ISDP) 1979, SIPP's predecessor, on the effects of different respondent rules. The results show that a limited proxy rule (insisting on self response unless there was absolutely no other way of getting the information) was desirable from a data quality standpoint, but the benefits were not overwhelming. (See Survey Development Research Center For Income Reporting, September 1981 and October 1981)

A study of SIPP by Coder and Feldman, (1984) indicated that proxy responses do cause significantly higher nonresponse rates for some important items, such as hourly wage rate, monthly wage and salary income, and self-employment income.

A study by Weidman on the effect of self and proxy response on gross flows (transition from one state of condition (e.g. economic or labor) to another state) from SIPP found that proxy response increases gross flows. (See Weidman, 1986) In a 1983 American Housing Survey - National Telephone Inter-

a 1983 American Housing Survey - National Telephone Interview Experiment in which the effects of telephone interviewing on income items were studied, Parmer reported significant evidence that telephone interviewing increased the item nonresponse for these items. Item nonresponse rates from SIPP for telephone interviewing are not available. (See Parmer, draft)

In ISDP 1979, a procedure was tested in which movers were interviewed if they were within fifty miles of a PSU in sample. A cost analysis was done of this procedure by White and Huang. (See White and Huang, 1982) They found that following mover households cost about 7% of the total time charged and about 10% of the total mileage charged. They also found that about 13% of all mover households moved outside a sample PSU. About 7% of all mover households moved outside the fifty mile limit. Similar information is not available from SIPP. However, by using the 100 mile limit, most SIPP movers remain eligible for personal interview, since only about 4 percent of total U.S. population lived more than a hundred miles from a 1984 panel SIPP PSU. (See Jean and McArthur, 1984) This percentage for 1985 and later panels is much smaller since more PSUs have been designated as Sample PSUs in later panels.

C. Tables

Table VI-1. Distribution of Self (S) and Proxy (P) Response Patterns for the First 3 Waves of the 1984 SIPP Panel: Rotation Groups 1, 2, and 3

Waves			Percent
1	2	3	
S	S	S	49.4
S	S	P	5.9
S	P	S	6.0
P	S	S	5.8
S	P	P	6.2
P	S	P	3.5
P	P	S	5.1
P	P	P	18.1
Total			100.0

Source: Kalton, G., D. McMillen, and D. Kasprzyk (1986a). "Nonsampling Error Issues In the Survey of Income and Program Participation (SIPP)," Published in the Proceedings of the Second Annual Research Conference, Bureau of the Census.

Table VI-2. Movers' Interview Status at the Fifth Interview (Rotation Groups 1, 2, and 3 Persons 15+)

	Number	Percent
Total Movers	5,069	100.0
Movers interviewed all five waves	3,485	68.8
Movers who missed one+ interviews but interviewed in the fifth wave	436	8.6
Household refusals*	86	1.7
Moved to unknown address*	137	2.7
Moved to out of universe*	3	-
Other**	210	4.1
Movers missing at least fifth interview	1,148	22.6
Household refusals*	350	6.9
Moved to unknown address*	564	11.1
Moved to out of universe*	52	1.0
Other**	182	3.6

* Status recorded for first missed interview.

** Includes temporarily absent, no one home, etc.

Source: Jean, A. and E. McArthur, U. S. Bureau of the Census, (1987), "Tracking Persons Over Time", The SIPP Working Paper Series No. 8701.

D. Future Plans

During the 1986 panel, telephone interviewing has been tested in the field as a possible or partial alternative to personal visit interviewing, to explore whether we can reduce travel costs with little or no effect on data quality. Preliminary analysis of the results has begun by comparing estimates of various characteristics, item nonresponse rates, and the cost data for the two.

VII. NONRESPONSE ERROR

A. Background

Every survey includes individuals who respond partially, or not at all, to the questions posed. For technical analysis, we call these "errors" of nonresponse, and divide them into household or unit nonresponse, person or within unit nonresponse, and item or question nonresponse.

Unit nonresponse occurs when every member of the household refuses to cooperate, moves without leaving a forwarding address, moves more than 100 miles away from an in-sample PSU and a telephone number is not available to the interviewer, is temporarily unavailable, or is unavailable prior to leaving the universe. Units that do not respond to the first wave are not revisited except in the 1985 panel. Units that become noninterviews at the second and subsequent waves are visited once more the next wave and given the chance to respond. If they are not converted to interviews at that time no more attempts are made.

Person nonresponse occurs when a member of an interviewed household refuses to cooperate, or is unavailable for interview and a proxy interview is not obtained. An original sample person can miss any number of waves and still re-

enter the sample at a future time as long as his/her household did not miss two or more consecutive interviews.

Item nonresponse occurs when a respondent or proxy refuses to answer a question, does not know the answer, or is never asked the question. It may also occur because the interviewer fails to record the answer or because the answer was not keyed.

Much emphasis is placed on the prevention of nonresponse. Some of the steps taken to promote and encourage continued participation are the following. Letters from the Director of the Census Bureau to each sample household are sent in advance of each wave thanking them for their support and encouraging continued participation. Interviewers carry I.D. cards identifying them as Census employees and assure participants that their answers will be held in confidence. A brochure that mentions some of the more interesting facts found from analyzing SIPP data is given to sample participants. Finally, an interviewer's performance rating depends heavily on the unit nonresponse rate obtained, thus encouraging each to put every effort into persuading households to respond. (See Nelson, et. al., 1987).

To compensate for unit nonresponse in cross-sectional estimation, a noninterview adjustment procedure is included as

part of the weighting process. In this procedure interviewed households have their weights inflated to compensate for similar noninterviewed households. (See Chapter X for more details.) Imputation is used to compensate for person and item nonresponse. For both imputations, a cold deck procedure is used in which estimates based on experience or independent sources, fill the imputation matrices and provide the initial donor values. Before imputation occurs, one pass through of the SIPP data file is made to replace the cold deck values with hot deck values (actual responses from SIPP respondents) where possible. (See Fink, 1984, Nelson, et. al., 1985).

Currently, for longitudinal estimation; households not interviewed at Wave 1 are accounted for by the Wave 1 cross-sectional nonresponse adjustment factor. (See Chapter X for details.) In addition, longitudinal estimation requires information for each person for every interview within a given time period. Because there is not a suitable longitudinal procedure to impute for persons who miss interviews, the present procedure is to zero weight them and inflate weights of persons who respond at all interviews.

Imputed information for nonresponding individuals, received during cross-sectional estimation, is maintained on the longitudinal file for use in calculating household characteristics. If nonresponse occurs because the individual moves without leaving a forwarding address, imputed information is

maintained for the time period in which the individual was a member of the sample household. After editing is done for longitudinal consistency, imputed item responses from cross-sectional processing are also retained on the longitudinal file.

B. Summary of Knowledge

Sample loss due to unit nonresponse increases most during the first two waves of a panel. The sample loss between the first and second waves ranged from 4.1% to 6.1% for the 1984, 1985, and 1986 panels. Additional unit sample loss occurs at each subsequent wave at a lower rate. The total household sample loss for the 1984 panel was 22.3%. (See table VII-1 and Bowie, 1987.) In addition to household nonresponse, it is estimated that after five interviews, roughly 20% of persons who were interviewed in the first wave have been eligible for one or more interviews where no information was collected for them. (See Short and McArthur, 1986.) Additional person nonresponse occurs for topical modules. For example, for topical modules of Wave 4 of the 1984 panel, 3.3% of persons eligible to respond to the topical modules did not. (See table VII-2.) Item nonresponse rates vary among characteristics. For example, item nonresponse rates for income amount by types ranged from about 5% to 17% for the first quarter 1984. Nonresponse rates for asset items from the 1984 panel varied from approximately 13% to 42%. (See tables VII-3 and VII-4.)

Nonresponse in this discussion, refers to missing responses to specific questions or "items" on the questionnaire. Non-interviews or complete failure to obtain cooperation from any household member have not been considered in this examination of nonresponse rates. Thus, the overall nonresponse is higher than it appears. For example, overall nonresponse rate for market value of stocks and mutual fund shares is greater than 41.5%.

Short and McArthur's work from SIPP data showed that for persons who respond to the first interview, the Wave 1 characteristics of those who continue to respond may differ from those who eventually stop responding. They did their work on the first five interviews of the 1984 panel. Out of roughly 25 characteristics examined, they found that Wave 1 household monthly income, employment status, marital status, race, age, interview status, tenure, residence, relationship to reference person and region were significantly different for the two types of responders. (See Short and McArthur, 1986.) Previous work, done by Steven Heeringa, using household data from ISDP 1978 (SIPP's predecessor) showed no statistical evidence of differences using many of these same variables. This result may be attributed to the small sample size available to Heeringa. (See Heeringa, 1980.)

There is a possible alternative to the current longitudinal procedure of zero weighting all persons that have missed interviews. For persons who never missed more than one consecutive interview, retrospective data is gathered on critical transition items using a short questionnaire called the Missing Wave form. This information is collected at the first completed interview following the missed interview. Using the retrospective data, the remaining information could be imputed for the missing interview. This would make the use of these persons in longitudinal estimation more attractive. These data have not been put into use, but are presently being evaluated (Judkins, 1983). Graham Kalton's recent work with Michael Miller on the effects of adjustment for missing wave nonresponse, concluded that in the case of the three interview SIPP file, inflating the weight of interviewed persons, rather than imputing noninterviewed persons, may be the safer general purpose solution. (See Kalton and Miller, 1986.)

As of yet, there have been no studies on how well cross-sectional imputation handles person nonresponse. By design, the method results in consistent answers within the questionnaire. However, there are inconsistencies between questionnaires of persons within the same household/family. This affects household/family estimates for both cross-sectional and longitudinal estimation.

In cross-sectional item imputation, imputed data may be inconsistent with the rest of the questionnaire. This is due to the quality of the match variables used, the number of donated responses, and because imputed responses for a given questionnaire can come from more than one source.

Use of cross-sectionally imputed items in longitudinal estimation tends to increase change in transition items. This assumption was recently confirmed by the work of Kalton and Miller, and Weidman. Kalton and Miller found that when they excluded imputed values and outliers in a table showing the percentage of month-to-month change in Social Security income, on average 34.8% of amounts showed no change. If the imputed values were included, on average only 31.0% of amounts showed no change. Furthermore, when imputed values were included, 19.1% of amounts changed by more than 10%. When imputed values were excluded, only 12.1% changed by more than 10%. (See Kalton and Miller, 1986, and Weidman, 1986.)

In general nonrespondents may differ in some systematic way from respondents. Although complex techniques are used to compensate for nonresponse, the success of these techniques in avoiding bias is unknown and needs further analysis.

C. Tables

Table VII-1. Cumulative Percent Sample Loss* of Households for SIPP Panels

	Panels		
	1984	1985	1986
Wave 1	4.88%	6.69%	7.34%
2	9.42%	10.77%	13.44%
3	12.28%	13.26%	NA**
4	15.37%	16.27%	NA
5	17.42%	19.72%	NA
6	19.38%	NA	NA
7	20.99%	NA	NA
8	21.99%	NA	NA
9	22.33%	NA	NA

*Type A and D rates together represent sample loss. A type A noninterview household is a unit occupied by persons eligible for interview but for whom no questionnaires are completed. Type D noninterview households are eligible households that move to an undetermined location or to a location more than 100 miles from a SIPP PSU and cannot be interviewed by telephone.

**NA - not available

Source: Bowie, C., "SIPP Operational Statistics, Report #6," Internal Census Bureau Memorandum from Bowie to Distribution List, January 7, 1987.

Table VII-2. SIPP Topical Module Person Nonresponse Rates for 1984 Panel

	Wave		
	4	5	6
-Eligible Persons*	100.0%	100.0%	100.0%
-Some Topical Module Data	96.7%	96.9%	95.8%
-No Topical Module Data	3.3%	3.1%	4.2%

*Eligible persons - persons who were interviewed for core questions of the wave.

Source: Bowie, C., "SIPP Topical Module Response Rates," Internal Census Bureau Memorandum from Bowie for the Record, April 8, 1986.

Table VII-3. Item Nonresponse Rates [1] for the 1984 SIPP Panel and March 1985 CPS, for Selected Income Types

Income Type	SIPP 1st Quarter 1984 Monthly Average	SIPP 2nd Quarter 1984 Monthly Average	SIPP 3rd Quarter 1984 Monthly Average	SIPP 4th Quarter 1984 Monthly Average	CPS March 1985
Wage and Salary	7.2	7.5	7.5	7.6	18.9
Self-Employment Income	16.8	16.2	16.0	16.1	26.5
Supplemental Security Income (Federal)	7.6	8.4	8.1	8.4	19.9
Social Security	10.8	11.6	11.7	12.3	21.9
Aid to Families with Dependent Children	6.1	6.9	6.5	5.5	16.0
Unemployment Compensation	10.1	13.6	10.4	12.7	21.8
Company or Union Pension	13.9	14.0	12.8	14.7	24.0
Food Stamp Allotment	5.2	6.3	6.7	6.6	13.7
Veteran's Compensation or Pension	11.3	11.2	11.9	13.5	18.3

Source: U. S. Bureau of the Census (1985), "Economic Characteristics of Households in the United States," Current Population Reports, Series P-70, Report Numbers 3, 4, 5, and 6, Appendix D, Washington, D.C., U. S. Government.

[1] Noninterviews or complete failure to obtain cooperation from any household member have not been considered in this examination of nonresponse rates.

Table VII-4. Comparison of Item Nonresponse Rates for Asset Amounts Between SIPP and ISDP

Asset Type	Percent Rate	
	SIPP	ISDP
Amount in savings accounts.....	16.8	24.9
Amount in checking accounts.....	13.3	23.1
Amount in bonds and government securities.....	25.9	32.2
Market value of stocks and mutual fund shares.....	41.5	65.8
Debt on stocks and mutual funds shares.....	41.1	87.3
Face value of U.S. savings bonds.	24.9	35.8
Value of rental property.....	33.5	39.9
Value of own business.....	37.9	55.3
Debt on own business.....	28.8	50.4

Source: U.S. Bureau of the Census Report (1986), "Wealth Holdings of U.S. Households," Current Population Reports, Series P-70, Report Number 7, Washington, D.C., U.S. Government.

D. Future Plans

The Bureau is exploring whether inclusion of additional geographic and demographic categories in the current monitoring system would help identify ways to reduce nonresponse rates.

Analysis is being done on the potential benefits of using the missing wave section of the questionnaire to help in longitudinal imputation for waves in which an interview is not obtained. Preliminary evaluation of results shows that imputation could be used for certain items. (See Huggins, 1987.)

In Wave 1 of the 1987 panel, a sample of households will be offered token gifts of appreciation. Analysis will be done to determine if these help decrease household attrition.

VIII. MEASUREMENT ERROR

A. Background

Measurement error occurs when what is recorded does not reflect the respondent's experience. These errors occur for many reasons and have at least minor effects on virtually all survey data. Some examples are given here.

- Questionnaire Effect. Unclear or difficult-to-answer questions make it more difficult to obtain the desired data.

- Memory or Recall loss. Events can be forgotten by respondents due to the length of the reference period.

- Telescoping. Telescoping is the misplacement of events in time. External telescoping occurs when events from outside the reference period are mistakenly reported to be in the reference period. Internal telescoping occurs when events within the reference period are shifted either backward toward the beginning of the reference period or forward toward the end of the reference period.

- Time in Sample Effect. The number of times respondents are interviewed may affect their responses. This effect can manifest itself as learning effect or panel conditioning. With learning effect a respondent may deter-

mine, after one or more interviews, that answering a question leads to a battery of questions. To avoid these follow up questions, a respondent may alter his/her response. On the other hand, a respondent may understand the question better and the quality of the responses may improve. This behavior will affect estimates of change.

Panel conditioning, which is not a measurement error, occurs when a respondent's "truth" is changed through contact with an interviewer. For example, on a return visit an interviewer finds that a respondent, who in the previous interview asked what an IRA was, just opened an IRA account.

- Deliberate distortion. This includes intentional under-reporting or over-reporting of amounts. This is different from learning effect in the sense that it is not learned through the process of response,and may occur at any time during the survey, including the first wave.

- Poorly informed proxy respondents. Proxy respondents are sample persons who respond for other sample persons who are unavailable at the time of the interview.

- Interviewer's error. This includes skipping questions, rewording them, failing to clarify them correctly, recording their guesses instead of probing more for accurate answers, or incorrectly recording responses.

- Processing Error. Some data may be improperly altered as a result of being processed and prepared for weighting and estimation. See Data Preparation chapter for further details.

These errors are difficult to detect. The magnitude of each is unknown and may cancel each other. For instance, recall loss (the forgetting of events) tends to dampen the effects of external telescoping on our wave estimates, causing estimates of external telescoping to be too small for positive detection.

B. Summary of Knowledge

Measurement error increases transition or gross flows and mean square error of estimates. In addition, it adversely affects covariance structure of the data.

The tables given in this section give an indication of how SIPP's estimates compare to independent estimates from administrative records. For most items listed in tables VIII-1 and VII-2, SIPP gives an underestimate. However, these estimates have smaller bias compared to estimates from the Current Population Survey [see Kasprzyk and Herriot, Working Paper No. 8601].

Most recently evidence of misreporting in SIPP was found in a study by Kalton and Miller (1986) in their work on the effect of adjusting for wave nonresponse. They found that about 35% of recipients of Social Security reported no change in amounts received at a time when a cost of living increase was being given to every recipient. The discrepancy did not result from an adjustment process for wave nonresponse, because their calculations from SIPP data excluded all persons with imputed items or missing income sources.

A symptom of measurement error in SIPP is the inconsistency in amount of change in labor force and income recipiency status within waves and between waves. Burkhead and Coder (1985) found this uneven pattern of change in SIPP data which has been associated with respondents being interviewed every four months. Similar results were also reported by Moore and Kasprzyk (1984) in their ISDP study.

Special validation studies are used to assess the magnitude of reporting error. Several validation studies of AFDC reporting in the Income Survey Development Program (ISDP), SIPP's predecessor, were done to assess the quality of the data obtained in this survey. Both the ISDP Site research study reported by Klein and Vaughan (1980) and the ISDP 1978 study by Goudreau, Oberheu, and Vaughan (1984) used a sample

selected from administrative records so that response could be checked later. Each reported the presence of response error. In the Goudreau report, 74 percent (± 3 percent) of persons reported correctly that they did receive AFDC during the reference period. Each study partitioned the error into nonreporting and mis-classification where mis-classification was the more common problem. Each found that the majority of the nonreporting resulted from those who left the program early in the reference period. In the Klein report, 66% of the nonreporters had left the program during the reference period.

Judkins conducted a study to evaluate the bias in reporting for participation in the food stamp program. He compared the start up and exit rates (transition rates) using unweighted data for food stamp participation with comparable rates from administrative record data prepared by the Urban Institute for the Food and Nutrition Service. The study showed that the SIPP's transitions rates for a given calendar month were very close to the administrative benchmark. (See Singh, Weidman, and Shapiro, 1986, and Judkins, 1986.)

O'Connell evaluated SIPP child care cost data by comparing SIPP estimates for 1984 with similar estimates derived from published IRS data. He concluded that SIPP estimates were of good quality. (See Current Population Report, Series P-70, Report Number 9, "Who's Minding the Kids?")

External telescoping after the first wave is avoided by using bounded recall. Some preliminary work on recall effect was done in SIPP by Petroni (1986). No significant evidence was found. More research is needed in this area for conclusive results.

Basic survey items which should remain constant over time (race and sex) or change in predetermined ways (age) are also affected by measurement error. When inconsistencies in demographic characteristics occur, the case is returned to the field for verification and correction. Therefore, demographic data in the earlier waves may differ from this data in later waves. A change in sex is observed no more than 34 times between waves of interviewing for the first five waves of the 1984 panel. This is approximately 0.08 percent of the sample. (Kalton, McMillen, and Kasprzyk, 1986)

The current SIPP reinterview program is unsuitable for detecting measurement error. Very few questions are reasked in this reinterview program, and monthly details for many of the topics are lacking. Reinterviews in the Current Population Survey (CPS) March Income Supplement have been used to measure interviewer error. A 1966 study showed very little difference between original and reinterview results,

suggesting that interviewers were doing as well as could be expected. The study indicated that response variance was quite low and bias tended to dominate errors of reporting. (See U.S. Bureau of the Census, Technical Paper 19, 1968.) For more recent information on how CPS reinterview data has been used see O'Muircheartaigh, (1986).

C. Tables

Table VIII-1. Comparison of Estimated Numbers of Income Recipients by Income Type, Fourth Quarter 1984: SIPP vs. Independent Estimates

(Numbers in thousands)

Income Type	Monthly average recipients		SIPP as a percent of independent estimate
	SIPP estimate	Independent estimate	
Federal Supplement Security Income	3,568	3,637	98.1
Social Security income	32,604	33,438	97.5
Aid to Families With Dependent Children	2,913	3,609	80.7
Unemployment compensation	2,462	2,590	95.1
Food stamp allotment	18,181	19,830	91.7
Veterans' compensation or pension*	3,558	3,815	93.3

*Excludes dependents covered by payments.

Source: U. S. Bureau of the Census (1985), "Economic Characteristics of Households in the United States", Current Population Reports, Series P-70, Report Number 6, Appendix D, Washington, D. C., U. S. Government.

Table VIII-2. Comparison of Estimated Aggregate Income Amounts Received, by Income Type, Fourth Quarter 1984: SIPP vs. Independent Estimates

(Monthly averages. Figures in millions of dollars)

Income type	SIPP estimate	Independent estimate	SIPP as a percent of independent estimate
Wage or Salary	143,199	151,507	95.5
Self-employment income	17,079	(NA)	(X)
Federal Supplement Security income	785	791	99.2
Social Security income	13,461	13,247	101.6
Aid to Families with Dependent Children	945	1,200	78.8
Unemployment compensation	978	969	100.9
Food stamp allotment	749	896	83.6
Veterans' compensation or pensions	827	1,037	79.7

NA not available X Not applicable

Source: U. S. Bureau of the Census (1985), "Economic Characteristics of Households in the United States," Current Population Reports, Series P-70, Report Number 6, Appendix D, Washington, D. C., U. S. Government.

C. Future Plans

An experiment designed to test whether providing previous responses could reduce response error and improve data quality was conducted in Wave 7 of the 1984 panel. The experiment provided responses collected in Wave 4 for the Asset and Liability topical module to a select group of respondents in Wave 7 when this topical module was asked again. Analysis of results has begun.

Analysis of gross flows (transitions) and length of spells in SIPP data is also in progress to improve the understanding of the data. The possibility of more validation studies for various federal programs is being explored to evaluate gross flow estimates at the macro level.

Weidman suggested the use of either multivariate normal or polytomous logit models to improve gross flows estimates. These models use available information, such as the amount of time that has elapsed between the month of interest and the month of interview, interview status, and length of time a person has been in sample. Some technical difficulties accompany use of either of the models. (See Weidman, 1986.)

A proposal to expand the reinterview program to measure response variance is being considered; one or two sections of the questionnaire would be selected for this program.

When sufficient data are available for these items, they would be replaced with other sections of the questionnaire. This approach would provide valuable information while keeping the respondent burden low.

Administrative records studies currently underway include matching individual records on recipiency with nine government transfer programs in four states, and developing a model of SIPP response and imputation errors in measure of program participation and amounts received. (See Singh, Weidman, and Shapiro, 1986.) Such studies may assist in the improvement of gross flow estimates.

IX. DATA PREPARATION

A. Background

A completed questionnaire is sent to a regional office (RO) where a series of checks is performed to insure that important information was collected before the questionnaire is keyed and the data transmitted to Census headquarters. At headquarters, a series of edits and imputations is performed to insure consistency and to assign responses to unanswered items when deemed necessary.

The following procedures prepare the data for weighting and estimation.

- A clerical edit is performed by RO staff on a sample of questionnaires from each interviewer before the questionnaires are keyed. This check detects omissions, errors, or misunderstandings. (See the SIPP Office Manual.)

- For the 1984 panel, codes were assigned to identify Census geographic areas in which each sample household is located. These codes link the data to a file which contains more detailed Census geography (state, county, MSA/nonMSA, etc.). For 1985 and later panels, the codes are assigned only to those households which move after

the first interview. (See Bowie, 1984, and Kobilarcik, 1985.)

- As the data from the questionnaires and control cards are being keyed at the RO, an edit is performed. This edit ensures that a) the data are keyed in the proper sequence; b) certain data are present (e.g., control number, name, relationship to householder); and c) a limited set of numeric items, mostly on the control card, are within a specified range. Data failing edit are rekeyed after investigation and correction.

The keying of data is under strict quality control at the ROs. The quality control procedures used for SIPP are similar to those used for other bureau surveys such as the Current Expenditures Survey. A sample of keyer's work is verified. As each batch of keyer's work is verified, errors are detected and corrected. If the keyer's error rate is above an acceptable limit, his/her work is checked 100 percent until the rate is 0.43 percent or less. (New keyers also receive 100 percent verification until their average error rate is also 0.43 percent or less.) For the month of March 1987, 0.11 percent of the data transmitted to Bureau headquarters was flawed. This estimate is about average for SIPP and is well below the limit of acceptance of 0.4 percent error. (See Burnett, 1983.)

- When keyed data are transmitted to headquarters, a pre-edit is done to ensure that all expected cases (both interviews and noninterviews) are received. Errors identified in this edit are described on a reject listing for ROs. The RO staffs resolve the problems by reviewing the documents or contacting the interviewers; the corrections are then keyed.

- Written descriptions of occupation and industry are assigned appropriate codes by clerks at the Census facility in Jeffersonville, Indiana. Imputed data are assigned for noninterviewed persons in interviewed households. (See Chapter VII.)

- A further edit is performed to ensure the consistency of responses recorded for persons, families, and households. Consistency is examined 1) within and between sections of the questionnaire, and 2) between sections of the questionnaire and control card.

- Edits and imputations are carried out for each section of the questionnaire to ensure that responses appear when they should and to impute values when required.

- Following the edits, various data are recoded, and codes to identify Census geographical areas are corrected if needed.

- A special imputation is done for households that have moved and can not be located. The imputed items are household size (the number of adults and children in the household), number of adults in the household, and number of additions to the household since the last wave. The donor universe is the interviewed mover households. These three items are used in the calculation of movers weights. (See Chapter X and Riccini, 1984.)

The core data are now ready for cross-sectional weighting and estimation as described in Chapter X.

Data from topical modules receive special clerical edits at the RO as the questionnaires are received. The data are then keyed (as with core data) and transmitted. Then, for each module, a unique set of consistency edits and imputations are done. (See Gates, 1983.)

Longitudinal data are cross-sectionally processed data which have been longitudinally edited. Longitudinal edits are currently done to make data consistent over time for a select group of data items. (Some of the inconsistencies result from cross-sectional processing.) This editing includes labor force activity, earnings, health insurance coverage, demographic characteristics and household composi-

tion. (See Fink, 1985, and Coder et. al., 1987.) These longitudinal edits are still under evaluation and may be changed in the future.

B. Summary of Knowledge

Cross-sectional checks and edits are intended to reduce bias introduced by the mistakes of interviewers, keyers, and/or respondents. Cross-sectional imputation is also intended to reduce bias and hence improve the accuracy of socioeconomic characteristics. When imputing for items with high item nonresponse rates, it is more likely that nonrespondents differ from respondents. In such cases, imputation will not be as effective in decreasing bias.

Error may occur at any point in data preparation. For example, early in the 1984 panel estimates of U.S. metro population appeared reasonable, but the central city estimates of persons were 10,000,000 larger than expected based on the 1980 census. SIPP estimates seemed to indicate that growth in central cities was greater than in the "suburbs," which was not supported by independent sources. Coding problems were suspected, and an investigation found: (1) instructions for interviewers were not clear as to the information needed to assign accurate codes for Census geographic areas; and (2) inadequate coding instructions for

the clerks were compounding the problem. Better coding instructions reduced the error dramatically (see Bowie, 1984 and Kobilarcik, 1985.) For cases in the 1985 and later panels, these codes are assigned to households only if they move, since their original sample housing units were a part of the 1980-based design and have updated 1980 Census geography. Assignment errors that still occur for mover households are considered negligible.

Another error was detected in the imputation of characteristics for noninterviewed mover households. These characteristics are used later in estimation for calculating movers weights. Two of the matching variables were incorrectly defined, resulting in the imputation of inappropriate characteristics. This error affects all the data for the 1984 panel but not the later panels. The magnitude of this error is unknown but is expected to be trivial. (See King, 1986(b), and Riccini, 1984.)

X. ESTIMATION

A. Background

Procedures for weighting cross-sectional and longitudinal SIPP data are outlined below.

Cross - Sectional Weighting: The final monthly weight for each case in Wave 1 has four components:

1. Base weight. This weight is the inverse probability of selection and would provide unbiased estimates of levels and proportions if there were no nonresponse.

2. Noninterview Adjustment Factor. This factor adjusts interviewed households to account for household nonresponse. For interviewed and noninterviewed households, census region, residence status, race of reference person, tenure (own or rent), and household size are used to obtain this adjustment factor. For the 1985 panel only, a new construction noninterview adjustment factor was also applied to the weight of each new construction segment to account for segments which were unavailable for interviewing because of operational difficulties.

3. First Stage Ratio Estimate Factor. This factor is intended to reduce the between PSU variance and is applied to sample cases in nonself-representing (NSR) areas. Factors are the ratios of estimates of total persons in a cell based on sample PSUs to the corresponding census counts. These cells are defined by race, central city, urban balance, etc., within a census region.

4. Second Stage Factor. This factor is intended to reduce the mean square error of most important estimates and partially corrects for survey undercoverage of persons by age, race, Spanish origin, and sex. (Spanish origin controls were not used in the 1984 Panel.) Independent current demographic estimates of population by age, race, Spanish origin, and sex are based on the 1980 Census updated to account for births, deaths, immigration, and emigration since then. In addition, monthly estimates of type of household (marital and family status of householders by race and sex) from the Current Population Survey (CPS) are used as control totals to increase the accuracy of estimates related to these characteristics. To satisfy these objectives while keeping the number of husbands equal to the number of wives and the number of householders equal to the number of households, an iterative raking procedure was

used. (See Dorsch, 1983; Dorsch, 1984(a); Dorsch 1984(b); Hubble, 1984; King, 1985; King, 1986(a); and Nelson et. al., 1985.)

For subsequent waves, each Wave 1 sample person receives an initial weight, which is the product of the Wave 1 base weight, noninterview adjustment factor, and first stage ratio estimate factor. This initial weight is decreased for persons in housing units containing adult members (excluding persons returning from institutions, overseas, or the armed forces) who were not part of the original sample. The adjusted weights are called mover's weights. Then, initial or mover's weights are adjusted to account for household nonresponse after the first interview. Information from the most recent wave--race of reference person, household type, education level of the reference person, household income sources, household assets, tenure (own or rent), public housing or rent subsidy, and household size--are used to calculate the subsequent wave household noninterview adjustment factor. (For the 1984 panel, information from Wave 1 was used except for persons interviewed for the first time in a later wave.) Lastly, these adjusted weights go through the same second stage adjustment procedure described for Wave 1 weighting.

Longitudinal Weighting: So far, only longitudinal weights for persons have been developed for the first three interview file. The final weight for each longitudinal case begins with the product of the baseweight, noninterview adjustment factor, and the first stage ratio estimate factor from the cross-sectional weighting of the first wave. An additional noninterview adjustment factor is applied to compensate for person noninterviews occurring in subsequent waves. Variables used for this adjustment include Wave 1 average monthly household income, employment status, type of income, assets, educational level, race and Spanish origin, and labor force status. A second stage adjustment similar to the cross-sectional second stage adjustment is done using an iterative raking procedure. However, the longitudinal procedure does not force husband and wife weights to be equal. (See Kobilarcik, 1986.)

As a by-product of these longitudinal person weights, two factors were developed to perform exploratory analysis of household and family type estimates. One factor is simply the weight of the household reference person. The other factor is the average of the husband and wife weights for married couple households and the weight of the reference person for all other households. (See Hernandez, 1986.)

B. Summary of Knowledge

Weighting procedures used by SIPP are similar to those used by other large scale surveys such as CPS. Thus, SIPP weights are expected to have similar kinds and degrees of bias as experienced by other surveys. Potential sources of bias in the SIPP weights are listed below. Magnitudes of bias for each of these sources are difficult to determine; but, the net effect of all sources is expected to be small, especially for estimates based on large subgroups of the population.

- Noninterview Adjustment Procedure: Complex techniques are used to adjust the weights for nonresponse. The success of these techniques in avoiding bias due to differences in characteristics of responders and nonresponders is unknown.

- Second Stage Procedure: The process is intended to correct for bias due to survey undercoverage which results from missing units or missing persons within sample households. Bias remains in the estimates to the extent that persons missed may have different characteristics than interviewed persons in the same age, race, and sex group. (See Chapters IV and V and the table XV-7 of chapter XV for further information on survey undercoverage.)

- Husband - Wife Equalization: This part of the cross-sectional second stage adjustment procedure forces the number of husbands to equal the number of wives and affects the weights of all males. The extent of bias to male estimates from this adjustment is unknown.

- Census Controls: These controls, used in the second stage process, are based on the 1980 census which was not adjusted for undercoverage. Thus, these controls are biased. We do not know the extent to which Census undercoverage biases our estimates.

- CPS Controls: Since CPS sample size is larger, SIPP's data are controlled to CPS estimates of households by type in the second stage to reduce SIPP's variance for related estimates. By doing this, however, SIPP estimate are affected by bias in CPS estimates.

- Hispanic Controls: These controls were added to the second stage adjustment for the 1985 and later panels to improve the reliability of Hispanic estimates. These estimates were showing a significant decline over the first few waves of the 1984 panel. (See Hubble, 1986.) The controls have increased the consistency of the Hispanic estimates. In addition, the effect of these controls on the estimates of other large demographic groups is expected to be negligible.

In addition errors in the calculation of base weight, first stage factor, or second stage factor may occur. These errors are usually detected when estimates are compared with independent estimates or as part of the weighting review. It is believed that most of these errors are detected and corrected.

C. Future Plans

The SIPP research and evaluation program includes the following study plans.

Research is planned on the best method for combining data from more than one panel, and on the integration of estimates from SIPP and the Current Population Survey (CPS).

Administrative data, such as IRS records, are being investigated as possible sources for controls in the second stage of the weighting, to reduce mean square error of income and related estimates.

Work is just starting on the evaluation of longitudinal household and family definitions and associated estimates. Problems associated with these estimates will be explored so that a sound longitudinal household and family weighting procedure may be developed.

The variables presently used for noninterview adjustment were based on experiences with household surveys and evaluation of data available from the 1980 population census and related surveys. An evaluation of the noninterview adjustment method will be done in the near future.

XI. SAMPLING ERROR ESTIMATES

A. Background

Sampling error is the result of collecting data from a sample of the population for purposes of calculating population estimates instead of doing a complete census. Standard error is a measure of the extent to which the results of the sample differ from the value being estimated. This measure is the square root of the variance.

The Census Bureau calculated direct estimates of variance for a selected set of 442 SIPP estimates for the third quarter of 1983 using a variation of the half-sample variance estimation method. The resulting variances were used to obtain generalized variance parameters which are used to produce estimates of the magnitude of variances for other SIPP estimates. Data users may calculate direct estimates of variance by using Public Use Data files. (See Roebuck, 1984, Roebuck, 1985(a), and Roebuck, 1985(b).)

B. Summary of Knowledge.

It would be difficult, if not impossible, to develop an exact variance estimator that would fit SIPP's sample design. Thus a replicate variance estimator was used to approximate direct variances for the selected 1983 third

quarter SIPP estimates. This method is simple, easy to implement, and ensures that the mean square error is small enough to provide reliable estimates. Sources contributing to the mean square error follow:

- In the 1984 panel sample design, all strata contained only one selected PSU. Thus, strata were collapsed before half-sample replicates were created. Such collapsing results in positively biased estimates of variance.

- The variance method used fifty replicate samples which were not balanced. This increases the variance of SIPP's variance estimates. (See Wolter, 1985)

- Because of the complexity and expense of reweighting fifty replicate samples, they were not reweighted after they were created. Thus, replicates did not benefit, as the original sample benefited, from the variance reduction achieved in the second stage of the weighting procedure where estimates are adjusted to population totals. This also causes SIPP variance estimates to be positively biased. (See Section X for more information about the second stage of weighting.)

The overall effect of this mean square error on variance parameters can not be quantified. However, the SIPP parameters seem reasonable compared to those from other sources, such as the Current Population Survey.

C. Future Plans

A new variance estimation program using one hundred balanced replicates will be used to estimate direct variances for the 1985 panel. Current plans includes reweighting of replicate samples using a greatly simplified version of SIPP weighting procedures. In addition, for the 1985 and later panels, most strata have two PSUs selected per nonself-representing strata. These changes should produce variance estimates which have less mean square error than the previous variance estimates. (See King, 1986 (c), Roebuck, 1986.)

XII. DATA DISSEMINATION

A. Background

SIPP data are released in the form of Public Use Data Files or published reports after a review by subject matter specialists at the Census Bureau. This review involves comparing SIPP estimates with independent estimates usually derived from various administrative sources.

Public Use Data Files are released for a particular wave as soon as each data set is processed and approved by subject matter specialists. These microdata files provide suitable information for analysis by data users as rapidly as possible.

Subject matter reports are published intermittently to highlight particular topics of interest and disseminate relevant data. The review of draft reports includes a thorough, although not 100 percent, statistical verification. Authors of these reports follow standard guidelines for data release. (Harley and Shapiro [1985]; and Shapiro et. al. [1985]) For example, conclusions in the test that are based on data comparisons must be statistically significant (at a 5% significance level) unless stated otherwise. Statistical verification includes identification of all potential comparisons in the text, whether the appropriate type of test

was used to test the comparisons, whether the test was properly executed and whether the appropriate interpretation of the results was made. Unsupported or misleading statements can thus be revised before publication.

B. Summary of Knowledge

It is believed that most errors are detected by the standard checks. Preliminary reviews by subject matter specialists have resulted in the successful detection and resolution of problems in the processing and weighting of the data. Report reviews have identified further comparisons requiring testing and errors in conclusions and data tables, and have resulted in corrections to the reports. If data files are adversely affected by errors detected after their release, they are reissued.

XIII. USER ANALYSIS

User analysis runs the gamut from simple interpretation of printed numbers to complex longitudinal analysis. Users should familiarize themselves with the concepts, limitations of the data, universe, time frames, interviewing techniques, and other survey differences from year to year, to avoid erroneous conclusions. Here are some examples of such hazards for SIPP data users.

- Caution is especially appropriate when comparing data from one report with data from earlier SIPP publications, or with data from other surveys. Such comparisons are influenced by seasonal patterns for many characteristics, different nonsampling errors, and different definitions of items such as unemployment, income and earnings.

- Some data are recoded for confidentiality reasons on the Public Use Data Files, and may therefore produce estimates which differ from published estimates. Recodes affect the identification of the state of residence for a case residing in a sparsely populated state and of the metro/nonmetro status for cases in sparsely populated areas. Some of the income, asset, and liability amounts for cases with such amounts larger than a certain limit are "topcoded" so that no individual amounts above a specified level are revealed. (See

Users Guide for SIPP Public Use Data Files.) Documentation of these recodes is given in the materials released with the Public Use Data Files. (See Hubble, 1985.)

- Year-to-year comparisons for the same panel should take into consideration the large correlation between the estimates, which tends to obscure real year-to-year change. This large correlation results from sample households being visited repeatedly over two and a half years with many responses varying little over time.

- The comparison of characteristics between subpopulations by using a simple random sample approximation to obtain an estimate of variance could result in standard errors that are far too small. This is because the SIPP design uses housing unit clustering which reduces cost significantly, but tends to increase variance. (See Chapters V and VI for further information.)

- Of course, analysts should, in any case, consider the standard errors involved in reaching conclusions about differing estimates. For this purpose, generalized parameters for calculating variances are provided in all SIPP material released to the public. Public Use data file users may calculate their own variance estimates using the pseudo half-sample codes and pseudostratum codes on the file.

- Using unweighted data in comparisons can lead to erroneous conclusions. Using weighted data is extremely important for 1985 and later panels since these panels are not equal probability samples. (See Chapter V) Weighted estimates are used in publications and in the estimation of generalized variance parameters that are necessary to do comparisons.

All data users are encouraged to become familiar with the limitations of the data, nonsampling errors and their effects on estimates of interest, and the analytic importance of using weighted data and standard errors. The SIPP User's Guide and appendices in the Bureau's published reports provide extensive information on these topics.

XIV. LIMITATIONS DUE TO SAMPLE SIZE

A. Background

SIPP was designed to provide longitudinal and cross-sectional estimates of population and subpopulation characteristics. To obtain the above with a reasonable degree of reliability, the sample sizes of the 1984 and subsequent panels were set at roughly 20,000 interviewed households. Due to budget cuts, these sample sizes were reduced. In March 1985, the 1984 panel sample size was reduced to approximately 17,500 households. In February 1985, the 1985 panel was cut to 14,300 interviewed households. Then in early 1986, the 1985 and subsequent panels were reduced to around 12,300 interviewed sample households. (See Moore, 1987.)

B. Summary of Knowledge

Because of the reduction in the size of a panel from 20,000 households in October 1983 to 12,300 households in February 1986, variances are expected to increase by roughly 70% and standard errors and coefficients of variation by about 30%. These are rough estimates because the between PSU component of variance probably increased at a somewhat different rate and the variance estimates are based on generalized models. (See Chapter XI.)

Statistics based on total population remain relatively reliable. On the other hand, much policy analysis will focus on small subgroups such as households receiving food stamps. The effect of the sample size reductions is more severe for these groups even though the relative increase in variance is the same. The sampling errors are large at this level of detail. Deeper analysis, within racial groups or within the elderly population, for example, becomes increasingly difficult. The same holds true for other types of estimates, such as income amounts, year-to-year change, etc., for population subgroups. (See Moore, 1987.)

Tables XIV-1 and XIV-2 illustrate the ability of SIPP to detect year to year changes for some income and poverty characteristics. The tables show the number of differences a two panel (each of about 12,300 interviewed households when introduced) estimate from SIPP would have been able to detect had SIPP given the same estimate as CPS for the panel covering 1974 through 1984. (See Gbur, 1987.)

Of the 31 characteristics examined, SIPP would have detected some year-to-year differences for 16, while CPS would have detected some differences for 28. Of the additional twelve differences detectable by CPS, ten would be detected only once or twice. For ratio of earnings of black families to white families, percent of men age 65+ in poverty, and per-

cent of households receiving AFDC, both CPS and SIPP would detect no differences.

C. Tables

Table XIV-1. Number of Significant Differences Between Consecutive Years for SIPP and CPS by Various Income Characteristics

Characteristic	Median[3] (1984 CPS)	Number of Significant Differences[1] Out of Five Pairs of Consecutive Years[2]: SIPP (Two Panel Cross-Sectional)[4]	CPS[5]
Families' Income			
Total	$26,430	6*	8*
White	$27,690	3	5
Black	$15,430	0	1
Spanish . . .	$18,830	0	2
Ratio Black to White	0.56	0	0
Female householder, no husband present . .	$12,803	0	3
Married couple	$29,612	2	5
Persons' Earnings			
Men, year-round full-time . . .	$23,220	1	4
Women, year-round full-time . . .	$14,780	3	5
Ratio women to men	0.64	1	2

[1] Significance is based on $\alpha = .05$

[2] The five pairs of consecutive years are based on 1979 thru 1984 annual estimates.

[3] Annual estimates from the Current Population Reports series P-60: "Money Income of Families and Persons in the United states: 1984."

[4] A SIPP cross-sectional estimate is based on an average of monthly estimates over twelve months.

[5] The CPS estimate is an annual estimate.

* These values are out of ten pairs of consecutive years based on 1974 through 1984 annual estimates.

Table XIV-2. Number of Significant Differences Between Consecutive Years for SIPP and CPS by Various Poverty Status and Program Participation Characteristics

Characteristic	Percent (1984 CPS)	Level[3] (1984 CPS in thousands)	Number of Significant Differences[1] Out of Five Pairs of Consecutive Years[2]: SIPP (Two Panel Cross-Sectional)[4]	CPS[5]
Persons (in poverty)				
Total	14.4	33,700	4*	6*
White	11.5	22,955	3	4
Black	33.8	9,490	0	2
Spanish	28.4	4,806	1	2
Children less than 18	21.0	13,274	1	3
In female householder families	54.0	6,772	0	1
Persons 65 and over	12.4	3,330	0	1
Men	8.7	959	0	0
Women	15.0	2,370	0	1
Families (in poverty)				
Total	11.6	7,277	4*	5*
White	9.1	4,925	1	4
Black	30.9	2,094	0	2
Spanish	25.2	991	0	2
Female householder, no husband present	34.5	3,498	0	4
Households receiving food stamps	72.5	5,119	2	3
Households (participation)				
Receiving AFDC	4.8	4,195	0	0
Receiving UNEMP. COMP.	8.0	6,981	4	4
Receiving FOOD STAMPS	8.1	7,061	1	3
Residing in public housing	4.1	3,588	0	2
Covered by employer or union provided health plan	57.1	49,607	1	3
Covered by Medicaid	9.6	8,323	0	1

[1] Significance is based on $\alpha = .05$

[2] The five pairs of consecutive years are based on 1979 thru 1984 annual estimates.

[3] Annual estimates from the Current Population Reports series P-60: "Money Income and Poverty Status of Families and Persons in the United States: 1984" and "Characteristics of Households and Persons Receiving Selected Noncash Benefits: 1984"

[4] A SIPP cross-sectional estimate is based on an average of monthly estimates over twelve months. Note that a monthly poverty concept would have to be defined before these estimates could be calculated.

[5] The CPS estimate is an annual estimate.

* These values are out of ten pairs of consecutive years based on 1974 through 1984 annual estimates.

D. Future Plans

SIPP provides a wealth of data for analytical uses. To further increase its utility, the Bureau has attempted to obtain more funding to increase the SIPP sample. The request for fiscal year 1988 and later years to increase the sample for 1988 and later panels was denied. The request has been submitted again for fiscal year 1989 and later years to increase the sample for 1989 and later panels.

In addition, the following research projects are planned which if implemented could increase the accuracy of SIPP estimates. (See Singh, 1986.) These may also allow SIPP to detect differences better among subgroups and between year-to-year estimates with the current sample size.

The first project would explore the use of administrative data in ratio estimation as a way to reduce mean square error. Research on this project is in its early stages.

The second project would integrate estimates from SIPP and the Current Population Survey. Research in this area is in its early stage.

XV. SUMMARY

A. Overview

This document discusses sampling and nonsampling errors associated with SIPP estimates. The magnitude of sampling errors can be estimated (See table XV-1), but quantification of the various sources of nonsampling error and their impact on estimates is difficult, if not impossible.
A sense of the overall effect of nonsampling errors can be obtained by comparing SIPP estimates to those from independent sources. Tables XV-2 through XV-4 provide estimates from SIPP and other sources which, with tables XV-5 through XV-10 and other information in this document, can be used by analysts to determine the quality of SIPP estimates. The acceptable quality will differ according to the particular use to be made of the data.

Table XV-2 compares SIPP and CPS income estimates with independently derived estimates for a selected group of income types. These comparisons have been made based on the aggregate income received by the population and indicate some variation in the ratios within a year between different income surveys. Typically the estimates of income from the two surveys fall short of those derived from independent sources. The shortfalls in the SIPP estimates for monthly figures are, in most cases, less than the CPS shortfalls for

annual amounts. Tables XV-3 and XV-4 present a few selected characteristics derived from the SIPP longitudinal research file and compare them to 1983 and 1984 CPS estimates. Table XV-5 compares percentages of first interview respondents (proxy or self) for whom data was collected in the second through fifth interviews for the panel Survey of Income Dynamics (PSID), the National Medical Care Utilization and Expenditure Survey (NMCUES), and the 1984 SIPP panel. The data are not directly comparable since the content and designs of the surveys differ. For example, the time periods covered by the surveys differ, as well as the frequency of interviews. (For further details about the designs see Becketti, Gould, Lillard, and Welch, 1983 and Cox and Cohen, 1985.)

SIPP sampling and nonsampling errors can be reduced by additional expenditures. Sampling errors for SIPP can be improved by increasing sample size and/or by combining the sample from two panels. Nonsampling errors can be reduced by improving various aspect of the survey.

Described below are areas in which improvement may have an important impact on meeting SIPP objectives:

- Estimates of Gross Flows: One of the major goals of SIPP is to provide longitudinal estimates of gross flow (transition from one state of economic or labor condition to another state) and the length of time in a particular

state (i.e. income or recipiency). These estimates can be very useful in explaining social-economic events that are relevant to existing or new government policies. Preliminary analysis of unweighted data from SIPP suggests that the gross flows for pairs of two consecutive months reported in the same interview are considerably lower than those reported from two consecutive interviews. (See table XV-6.) (See Burkhead and Coder, 1985; Kalton, McMillen and Kasprzyk, 1986; and Moore with Kasprzyk, 1984 and Chapter VIII on Measurement Error.) However, a study on food stamp transitions by Judkins (1986) was encouraging. It showed that transitions based on the combination of months within a reference period and months between reference periods are very close to those derived from administrative sources. (See table XV-7). These analyses show that the microlevel estimates may be seriously affected by nonsampling errors and that, at least for food stamps, macrolevel estimates may not be.

- Coverage Within the Unit: Evaluation of SIPP coverage shows, like other surveys, a differential coverage by age, race and sex. (Coverage is the ratio of the SIPP estimate to an independent estimate.) This coverage is worst for black males of 22-24 years of age (see table XV-8). Longitudinal and cross-sectional estimates which are highly correlated with poor coverage groups may be seriously biased. For example, for households with black males aged 22-24, estimate of income may be biased because of the low

coverage of such persons

- Nonresponse: In addition to unit (household) and persons in unit nonresponse, item nonresponse is also present in SIPP. The item nonresponse varies by item (see tables VII-3 and VII-4). For some items, such as market value of stocks and mutual funds, the item nonresponse rate is as high as 41%. For other items, such as Aid to Families with Dependent Children in the fourth quarter of 1984, the item nonresponse rate is only 5.5%. After accounting for unit and person nonresponse in addition to item nonresponse, the overall nonresponse rate is higher. For example, for value of rental property and debt of stocks and mutual funds, for Wave 4 of the 1984 panel this rate is over 50%. For wage or salary income for calendar year 1985 based on two panels, the overall response rate is 76%. (See table XV-9).

Wave nonresponse creates a gap in the longitudinal data and causes problems for analysts. During the first five waves, about 5% of those who responded in Waves 1 and 5 of the 1984 panel, did not respond in one or more of the remaining three waves (See table XV-10 and Short and McArthur, 1986). Using imputation to fill the gap for these cases affects gross flow estimates, while dropping these cases increases variances.

- Combining Panels: Because more than one SIPP panel covers a given reference period, comparable data from two panels may be combined to produce more reliable estimates than can be obtained from one panel. With current sample sizes of roughly 12,000 households, coefficients of variation for estimates based on two panels are expected to be 23% smaller than those based on one panel.

B. Tables

Table XV- 1. Coefficients of Variation for Mean Monthly Household Income for Persons and Households for the Fourth Quarter, 1984

Characteristic	Estimate	Coefficient of Variation
Persons		
Both Sexes		
Total	2615	.011
Male	2730	.016
Female	2507	.016
Race and Spanish Origin		
White	2743	.012
Black	1660	.013
Spanish Origin	1939	.058
Household Relationship		
Spouse in Married-Couple Families	2920	.016
Family Householder, No Spouse Present	1635	.043
Other Family Members	2722	.016
Not a Family Member	1685	.046
Households		
Total	2327	.012
Family Households	2668	.012
Married-Couple Families	2920	.013
Female Householder, No Husband Present With Own Children Under 18 Years	1205	.039
All Other Family Households	2078	.031
Nonfamily Households	1446	.037
Single-Person Household	1306	.044
Male	1644	.040
Female	1080	.080
Multiple-person Household	2509	.041
Male Householder	2618	.053
Female Householder	2334	.062

Source: U.S. Bureau of the Census, "Economic Characteristics of Households in the United States," Current Population Reports, Series P-70, Report Number 6, Appendix D, Washington, D.C., U.S. Government.

	SIPP as a Percent of the Independent Estimates of Monthly Average Recipients for Selected Income Types by Quarter	SIPP as a Percent of the Independent Estimates of Aggregate Income Amounts Received for Selected Income Types by Quarter	CPS (1983) as a Percent of the Independent Estimate Aggregate Income Amounts Received
Wage and Salary			
3rd Quarter 1983	(x)	95.0	99.0
4th Quarter 1983	---	94.3	
1st Quarter 1984	---	93.2	
2nd Quarter 1984	---	94.4	
3rd Quarter 1984	---	95.2	
4th Quarter 1984	---	94.5	
Federal Supplemental Security			
3rd Quarter 1983	92.0	89.8	84.9
4th Quarter 1983	91.3	93.5	
1st Quarter 1984	94.8	96.4	
2nd Quarter 1984	98.2	97.4	
3rd Quarter 1984	98.3	98.6	
4th Quarter 1984	98.1	99.2	
Social Security			
3rd Quarter 1983	99.2	99.6	91.7
4th Quarter 1983	96.3	100.6	
1st Quarter 1984	97.3	100.5	
2nd Quarter 1984	97.7	101.1	
3rd Quarter 1984	97.5	101.3	
4th Quarter 1984	97.5	101.6	
Aid to Families with Dependent Children 1/			
3rd Quarter 1983	78.5	76.2	76.0
4th Quarter 1983	79.2	78.5	
1st Quarter 1984	84.5	85.3	
2nd Quarter 1984	86.0	86.0	
3rd Quarter 1984	82.0	80.2	
4th Quarter 1984	80.7	78.8	
Unemployment Compensation			
3rd Quarter 1983	102.6	100.9	75.5
4th Quarter 1983	103.4	105.8	
1st Quarter 1984	82.6	85.2	
2nd Quarter 1984	82.5	83.1	
3rd Quarter 1984	78.5	80.3	
4th Quarter 1984	95.1	100.9	
Food Stamps			
3rd Quarter 1983	89.5	90.1	71.2
4th Quarter 1983	91.1	83.1	
1st Quarter 1984	90.8	85.2	
2nd Quarter 1984	90.5	86.2	
3rd Quarter 1984	90.3	84.6	
4th Quarter 1984	91.7	83.6	
Veterans' Compensation or Pension			
3rd Quarter 1983	89.2	78.9	63.3
4th Quarter 1983	89.7	79.9	
1st Quarter 1984	90.6	78.0	
2nd Quarter 1984	90.8	74.5	
3rd Quarter 1984	89.8	76.3	
4th Quarter 1984	93.3	79.7	

1/ The amount excludes dependents covered by payments.

(x) Not Applicable

Source: U.S. Bureau of the Census, "Economic Characteristics of Households in the United States", Current Population Reports, Series P-70, Report Numbers 1, 2, 3, 4, and 5, Appendix D, Washington, D.C., U.S. Government.

Table XV-3. Comparison of SIPP and March CPS Estimates of Persons Ever Receiving Benefits from Selected Programs

Selected Income Sources	SIPP 1983-1984	CPS 1984	CPS 1983
Social Security	34,122	32,182	31,731
Federal SSI	3,941	3,568	3,442
State Unemployment Compensation[1]	9,082	7,693	10,103
Veterans' Payments[2]	3,790	2,865	3,156
AFDC	3,987	3,561	3,468
Worker's Compensation	2,329	2,478	2,382
Private Pensions	8,499	7,951	7,618
Federal Pensions	1,937	1,555	1,603
Military Pensions	1,237	1,493	1,337
Interest Income	123,135	99,045	98,005
Dividends	26,807	19,858	18,630
Rents and Royalties[3]	14,040	12,461	11,836
Estates and Trusts	521	1,384	1,239

[1] CPS estimates may include a small number of persons receiving other types of "unemployment" benefits but no State unemployment compensation.

[2] CPS estimates include G.I./VEAP beneficiaries who do not receive cash veterans payments. The SIPP figure excludes this group.

[3] The SIPP estimate excludes persons receiving royalties but not rental income.

Source: Coder, J., "Some Weighted Estimates from the 1983-84 SIPP Longitudinal Research File", Internal Census Bureau Memorandum from Coder to Green, October 8, 1986.

Table XV-4. Comparison of Mean Annual Income Amounts from the March CPS and SIPP 1983-1984 Longitudinal Research File

Income Source	SIPP 1983-1984	March CPS 1984	March CPS 1983
Social Security	$ 4,512	$ 4,583	$ 4,358
Railroad Retirement	6,448	6,190	6,098
Federal SSI	2,248	2,366	2,221
AFDC	2,980	3,072	3,034
Federal Pensions	10,115	11,032	11,013
Military Pensions	11,586	10,267	10,538
Dividends	1,427	1,543	1,459
Estates and Trusts	9,709	5,660	5,379
Food Stamps	954	1,070	1,042

Note: This limited list of income types includes only those for which directly comparable mean income could be derived given the data available at the time of preparation.

Source: Coder, J., "Some Weighted Estimates from the 1983-84 SIPP Longitudinal Research File", Internal Census Bureau Memorandum from Coder to Green, October 8, 1986.

Table XV-5. Responses for Interviews Two Through Five as a Percentage of Initially Responding Persons for 1984 SIPP Panel, NMCUES[1], and PSID.

INTERVIEW	% of Response		
	NMCUES	SIPP	PSID
(Base)	(16902)	(25138)	(18387)
Second	99.5	94.4	86.6
Third	97.9	89.7	83.5
Fourth	97.1	85.9	81.5
Fifth	96.5	83.2	79.3

[1] Percentages for NMCUES include ineligible individuals, and are based on all persons in initially responding, reporting units.

Sources:

1) Cox, B. and S. Cohen, "Methodological Issues for Health Care Surveys." Published by Marcel Dekker, INC., 1985.

2) Short, K. and E. McArthur (1986), "Life Events and Sample Attrition in the Survey of Income and Program Participation," to be published in the Proceedings of the Section on Social Statistics, American Statistical Association.

3) Becketti, S., W. Gould, L. Lillard, and F. Welch, "Attrition From the PSID", Unicom Research Corp., Santa Monica, Ca. November 11, 1983.

Table XV-6. Month-to-Month Changes in Recipiency and Accounts of Food Stamps for Fully-Interviewed Persons Age 15 Years and Older

TYPE OF CHANGE	Month - to - Month Changes[1]										
	1st to 2nd	2nd to 3rd	3rd to 4th	4th to 5th	5th to 6th	6th to 7th	7th to 8th	8th to 9th	9th to 10th	10th to 11th	11th to 12th
TOTAL WITH INCOME IN AT LEAST ONE MONTH	1927	1927	1927	1927	1927	1927	1927	1927	1927	1927	1927
RECEIVED INCOME IN BOTH MONTHS	1287	1306	1325	1211	1334	1341	1351	1224	1327	1326	1329
AMOUNT DECREASED BY 75.0 TO 99.9 PERCENT.	4	3	7	12	0	3	6	6	2	4	4
AMOUNT DECREASED BY 50.0 TO 74.9 PERCENT.	6	7	10	31	5	9	10	36	1	7	12
AMOUNT DECREASED BY 25.0 TO 49.9 PERCENT.	12	24	17	56	10	21	22	68	12	13	10
AMOUNT DECREASED BY 10.0 TO 24.9 PERCENT.	12	22	22	89	15	22	24	123	16	20	21
AMOUNT DECREASED BY 5.0 TO 9.9 PERCENT. .	12	9	14	50	5	7	13	69	8	7	16
AMOUNT DECREASED BY LESS THAN 5.0 PERCENT	9	9	9	103	9	13	18	90	2	6	6
AMOUNT DID NOT CHANGE	1166	1131	1108	444	1241	1194	1176	505	1262	1207	1190
AMOUNT INCREASED BY LESS THAN 5.0 PERCENT	8	34	38	149	7	18	16	84	4	11	7
AMOUNT INCREASED BY 5.0 TO 9.9 PERCENT. .	6	16	23	64	7	11	8	34	2	7	10
AMOUNT INCREASED BY 10.0 TO 24.9 PERCENT.	17	11	28	76	9	7	20	63	5	19	14
AMOUNT INCREASED BY 25.0 TO 49.9 PERCENT.	6	12	16	49	11	16	16	46	6	10	13
AMOUNT INCREASED BY 50.0 TO 74.9 PERCENT.	11	9	6	31	5	8	8	35	1	6	9
AMOUNT INCREASED BY 75.0 TO 99.9 PERCENT.	5	6	5	10	3	2	5	20	0	3	1
AMOUNT INCREASED BY 100.0 PERCENT OR MORE	13	13	22	47	7	10	9	45	6	6	16
FROM POSITIVE AMOUNT TO LOSS.	0	0	0	0	0	0	0	0	0	0	0
FROM LOSS TO POSITIVE AMOUNT.	0	0	0	0	0	0	0	0	0	0	0
LOSS BOTH MONTHS.	0	0	0	0	0	0	0	0	0	0	0
FROM RECEIVING TO NOT RECEIVING INCOME. . .	44	48	43	177	25	42	45	180	36	39	33
FROM NOT RECEIVING TO RECEIVING INCOME. . .	67	62	63	148	49	55	53	139	38	36	45
DID NOT RECEIVE INCOME BOTH MONTHS.	529	511	496	391	519	489	478	384	526	526	520

[1] Months 1 through 4 correspond to the first interview, months 5 through 8 to the second, and months 9 through 12 to the third.

Source: Coder, J., " Monthly Transition from the SIPP Longitudinal Research File," Internal Census Bureau Memorandum from Coder to Schneider, May 20, 1986.

Table XV-7. Start-Up and Exit Rates (Percentages) for Food Stamp Participation

SIPP 84 Panel-Reference Month i to i+1 Across All Four Rotations[1]

	1 to 2	2 to 3	3 to 4	4 to 5	Avg
Start-Up Rate	4.9	4.7	4.5	10.9	6.2
Standard Error*	0.8	0.8	0.7	1.1	0.5
Exit Rate	3.3	3.5	3.1	12.8	5.7
Standard Error*	0.7	0.7	0.6	1.2	0.5

Urban Institute-Calendar Month i to i+1 in 1983[a]

	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	Avg
Start-Up Rate	6.7	6.9	6.1	6.2	6.7	5.0	6.3
Standard Error**	0.6	0.6	0.5	0.5	0.6	0.5	0.3
Exit Rate	7.3	5.8	6.7	7.0	6.1	5.1	6.3
Standard Error**	0.6	0.5	0.6	0.6	0.5	0.5	0.3

[1] Source: Memorandum for Schneider from Coder, "Monthly Transitions from the SIPP Longitudinal Research File," (Population Division), May 20, 1986.

[a] Source: The Urban Institute, The Effects of Legislative Changes in 1981 and 1982 on the Food Stamp Program, Volume II (Washington, DC, May 1985), Appendix E.

* For individual pairs of months, a design effect of 1.8 is assumed. For the average, a design effect of 2.6 is assumed to reflect the correlation between the individual pairs induced by being in the same set of PSUs. The monthly sample sizes were around 1350. For the average, the sample size is quadrupled.

**For individual pairs of months, a design effect of 1.3 is assumed. The documentation does not suggest one, but given that there were systematic samples within only 60 offices, this seems reasonable. For the average, a design effect of 2.0 was assumed. The monthly sample sizes were around 2600. For the average, the sample size is to be sextupled.

Source: Judkins, D. R., "SIPP Gross Flows: Validation of Food Stamp Turnover", Internal Census Bureau Memorandum from Judkins to Singh, October 16, 1986.

Table XV-8. COVERAGE RATIOS FOR MARCH 1984 FOR SIPP AND CPS SAMPLES*

AGE GROUPS	MALE				FEMALE			
	CPS		SIPP		CPS		SIPP	
	Black	Nonblack	Black	Nonblack	Black	Nonblack	Black	Nonblack
16-17	.9485	.9390	.9650	.9504	.8672	.9674	1.0374	.9557
18-19	.9133	.8955	.9302	.9667	.8763	.9094	.9021	.8825
20-21	.7465	.8865	.8862	.9214	.8190	.9139	.8698	.9664
22-24	.6561	.8615	.6433	.8144	.8483	.8845	.7929	.8838
25-29	.8029	.9065	.7419	.8461	.9069	.9278	.9205	.9283
30-34	.7054	.9079	.8701	.8957	.8487	.9499	.9335	.8855
35-39	.7677	.9109	.7294	.8711	.8441	.9465	.8489	.9022
40-44	.9043	.9286	.8770	.8868	.9793	.9376	.8652	.9446
45-49	.8630	.9215	.7576	1.0039	.9500	.9678	1.1315	.9930
50-54	.8418	.9595	.9355	.9378	.9048	.9791	.7172	.9718
55-59	.8302	.9604	.9864	.9267	.8943	.9476	.8494	.9361
60-61	1.0034	.9622	.9265	.9637	.9675	.9133	1.0557	.9801
62-64	.8591	.9261		.9352	.9329	.9500	1.0363	.9345
65-69	1.0990	.9335	.9589	.9400	1.0704	.9506		.9839
70-74	.8942	.9289		.9457	1.0186	.9450	1.0492	.9178
75-79				.9206				.9184
80-84	1.0135	.9266	.9733	1.0358	.9804	.9384	.9380	.9517
85+				.7831				.9759
ALL	.8350	.9193	.8460	.9095	.9012	.9407	.9172	.9330

*Coverage ratios for other months are similar.

Source: SIPP 1984 Weighting Output for Processing Cycle 3 and CPS Weighting Output for March 1984.

Table XV-9. Overall Item Response Rate for SIPP and CPS
1985 Calendar Year Estimates[1]

Income Types	SIPP	CPS
Wage or Salary	76.1%	78.8%
Self-Employment Income	68.9%	73.7%
Federal Supplemental Security Income	75.5%	78.8%
Social Security Income	72.7%	76.2%
Aid to Families with Dependent Children	77.1%	80.8%
Unemployment Compensation	72.6%	76.8%
Company or Union Pensions	70.8%	74.6%
Food Stamp Allotment	77.1%	83.9%
Veterans Compensation or Pensions	72.4%	76.7%

[1] Calendar Year item response rates are for estimates based on monthly averages.

Source: Maher, S., "SIPP: Overall Item Response Rates for 1985 Calendar Year Estimates.", Internal Census Bureau Memorandum from Maher for Documentation, July 1987.

Table XV-10. INTERVIEW PATTERNS THROUGH FIVE INTERVIEWS FOR SIPP ORIGINAL SAMPLE PERSONS

		Number	Percent
Total		25138	100.00
1. Response every Interview (5 interviews)			
Pattern:	XXXXX	19878	79.08
2. Apparent attrition cases		3459	13.76
Patterns:	XXXX0	964	3.83
	XXX00	768	3.06
	XX000	811	3.23
	X0000	916	3.64
3. First and fifth interviews but one intervening interview missing		863	3.43
Patterns:	XXX0X	413	1.64
	X0XXX	148	0.59
	XX0XX	302	1.20
4. First and fifth interviews, two or more intervening interviews missing		165	0.66
Patterns:	X000X	30	0.12
	X0X0X	18	0.07
	XX00X	75	0.30
	X00XX	42	0.17
5. Fifth interview missing and one or more intervening interviews missing		196	0.78
Patterns:	X0XX0	29	0.12
	X0X00	61	0.24
	X00X0	22	0.09
	XX0X0	84	0.33
6. Left the universe (deceased, institutionalized, living in armed forces barracks, moved overseas)		577	2.29

Note: The universe for the table consists of all persons in rotation groups 1, 2, and 3 who were 15 years or over at the time of the first interview and for whom a personal interview was conducted (either self or proxy interviews) during the first wave of the 1984 SIPP Panel, and who were designated for interview for all five interviews. The symbol "X" represents a successful interview and the symbol "0" represents no interview (either no household interview or no personal interview).

Source: McArthur, E. and K. Short, "Measurement of Attrition from SIPP through the Fifth Wave of the 1984 Panel," Interna Census Bureau Memorandum from McArthur and Short to Distribution List, April 10, 1986.

C. Conclusion

SIPP provides a wealth of data which could be used to serve various important goals of the data users. While much research remains to be done, the information in this quality profile will allow data users to judge the quality of the SIPP data for their analytical purposes.

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