Technical Description of the Quarterly Data on Weekly Earnings from the Current Population Survey

U.S. Department of Labor
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U.S. Department of Labor
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Preface

In 1979, the Bureau of Labor Statistics, working through the Bureau of the Census, began to collect data on weekly earnings by demographic groups throughout the year rather than just once a year as had previously been the case. These data, which are now published on a quarterly basis, are collected through the Current Population Survey (CPS). This bulletin provides background information on the CPS and describes how the new quarterly earnings data are collected and processed and how they compare with the earnings data previously collected once a year. The merits and limitations of the data, particularly with regard to sampling error, also are discussed.

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The Current Population Survey (CPS)

The CPS uses a scientifically selected national sample of households, with coverage in all 50 States and the District of Columbia. The survey is conducted each month by the Bureau of the Census for the Bureau of Labor Statistics, and provides information on the labor force, the employed, and the unemployed, including such characteristics as age, sex, race and Hispanic origin, family relationship, marital status, occupation, and industry attachment. The information is collected by trained interviewers from a sample of about 60,000 households.

In addition to the basic questions on employment and unemployment, the CPS questionnaire for some specific months contains supplemental questions on other subjects. For example, during March, information on income and work experience during the previous calendar year is collected. Each May, supplemental questions are asked about multiple jobholding, union representation, receipt of premium pay for work in excess of 40 hours a week, and work schedules. Over the 1967-78 period (except 1968), a question was also asked each May regarding usual weekly earnings. Beginning in May 1973, questions pertaining to hourly earnings also were added. The data obtained each May through these questions have been published by BLS in news releases, *Monthly Labor Review* articles, and *Special Labor Force Reports*. In addition, a large amount of unpublished data has been transmitted on request to users both inside and outside the Federal Government.

Monthly collection of earnings data in the CPS

Over the 1967-78 period, the demand for demographically oriented earnings data grew considerably. Such data were needed, among other things, to keep track of the differences in earnings among the various population groups—men and women, whites and blacks, young and old, etc. In addition, there was a great demand for data on the earnings of families, particularly those with two or more workers and those in which some of the members were unemployed.

Earnings data of this type, particularly those for families, cannot be derived from the various surveys of establishments conducted by the BLS. For example, while the Current Employment Statistics survey (also known as the establishment survey) provides a large body of monthly data on employment and earnings by industry and geographic area, it yields no information on the distribution of earnings or on the characteristics of the earners in terms of their age, race, or family status. The only way to obtain demographically oriented earnings information at relatively little cost is through a household survey such as the CPS.

After conducting special tests, regular collection of current earnings data through the CPS was begun in January 1979. A question on the usual weekly earnings of all wage and salary workers and one on the hourly earnings of workers paid by the hour were incorporated into the monthly CPS questionnaire. However, in order to minimize the burden upon the respondents, these questions are asked of only one-fourth of the wage and salary workers in the monthly sample—those in the "outgoing" rotation groups. The resulting data are then averaged over a 3-month period for publication on a quarterly basis.

The CPS sample consists of households in eight subsamples or rotation groups. Each group is interviewed for 4 consecutive months, dropped from the sample for the following 8 months, and then returned to the sample for a final 4 months. The sample is so designed that 2 of the 8 rotation groups are dropped each month—one group for 8 months, the other group, permanently. The set of questions pertaining to weekly and hourly earnings is asked only of those households which are in these two outgoing rotation groups. The outgoing rotation groups were selected for the earnings queries in order to minimize the possibly negative impact of these questions on the future cooperation of respondents. Since earnings questions are sensitive in nature, it was feared that, if they were asked monthly in all households, they might jeopardize respondent cooperation in answering the basic labor force and employment questions in the surveys. The primary purpose of the CPS is to gather data on the labor force and employment status of the population, and other survey questions which might interfere with this purpose are kept to a

minimum. Also for this reason, the new questions on earnings are positioned on the questionnaire following the questions on labor force participation and employment status. The segments of the questionnaires used for the former once-a-year collection and for the current monthly collection of earnings data are shown below.

May supplement

(Old series May 1973-78)

These questions were asked of wage and salary workers, including self-employed persons whose business was incorporated. Questions refer to a worker's sole or primary job.

50. How many hours per week does . . . USUALLY work at this job?
51. How much does . . . USUALLY earn per week at this job before deductions?
52. Is . . . paid by the hour on this job? (If yes, ask 53.)
53. How much does . . . earn per hour?

Monthly basic questionnaire

(New series beginning January 1979)

These questions are asked only of wage and salary workers. *All* self-employed persons are excluded. Questions refer to a worker's sole or primary job.

25A. How many hours per week does . . . USUALLY work at this job?
25B. Is . . . paid by the hour on this job? (If yes, ask 25C; if no, skip to 25D.)
25C. How much does . . . earn per hour?
25D. How much does . . . USUALLY earn per week at this job BEFORE deductions? Include any overtime pay, commissions, or tips usually received.

Processing of the data

Range of earnings checked. The results from each interview are checked to determine if the reported earnings are within a reasonable range and if entries contain all digits. The ranges for usual weekly earnings are based both on the occupation and the hours usually worked. For full-time workers, the floor is $20 a week for private household workers and $30 for others. Ceilings are set at $999, the highest value which can be coded onto the questionnaire. (Higher values can be entered in the questionnaire, but the maximum machine-readable entry is $999.) For part-time workers, the range is $20 to $999 for workers in professional, technical, managerial, and administrative occupations, and $1 to $749 for other workers.

In-range entries for hourly workers have a floor of 50 cents and ceilings which range from $29.99 to $99.99 based on the occupation of the earners. For workers in the higher paying white-collar occupations, mentioned above, the maximum ceiling is $99.99—the amount coded by the interviewer onto the questionnaire for any worker reporting hourly earnings of $100 or more.

Entries outside these ranges and those with missing digits are treated as nonresponses. For example, the entry for a private household worker reporting an hourly wage of $30 or more or a craft worker reporting $80 or more per hour would be treated as a nonresponse.

Editing. The next processing step is a detailed editing procedure either to compute missing data or to assign a record to be allocated for nonresponse. For example: (1) If there is no response to the usual weekly earnings question (25D), but there are entries for usual hours worked (25A) and hourly earnings (25C), the product of the two is given a range check and a valid result would be entered as the usual weekly earnings. (2) If there is no entry to the question on whether the worker is paid an hourly rate (25B), but an hourly rate is entered in 25C, a yes is inserted into 25B. (3) If the worker is reported to be paid an hourly rate, but there is no value in 25C, the reported usual weekly earnings value is divided by the number of hours usually worked. The quotient is given a range check, and a valid result is entered in 25C.

Although original plans called for estimating usual weekly earnings for those workers paid hourly rates by multiplying usual weekly hours by the hourly rate, evaluation of special tabulations indicated that such a procedure would result in a slight understatement of average weekly earnings. This understatement results primarily from the omission of tips, commissions, piecework, or overtime pay at premium rates from such a calculated weekly amount. Hence, it was decided to use the reported usual weekly earnings figure for BLS tabulations on weekly earnings.

Allocation. Blank items which cannot be filled in during the editing stage and out-of-range items are allocated. Allocation is performed by matching the record of a person with no entry for an item with the record of a person of similar demographic and other characteristics who has an entry for the item in question. The value on the donor record is then inserted onto the record requiring allocation. This procedure has long been used in processing other data series from the CPS as well as in the processing of the decennial censuses. The computer program for the processing of the weekly and hourly earnings data contains four levels of allocation, with the highest level—a level-1 match—having the largest number of characteristics for matching the two records, and the lowest level—a level-4 match—having the least number of characteristics. There are 12 characteristic items used in determining a level-1 match (occupation alone has 44 categories), while a level-4 match has only 4 characteristic items,

most of which have less detail (occupation has only 4 categories).

If the characteristics of a worker whose earnings entries require allocation do not match at level 1 with those of any other worker for whom valid earnings information has been reported, an attempt is made for a match at the next level. Upon a failure to match at level 2, successive levels are tried until a match is found. During the first 30 months of processing these data, only 18 records requiring allocation could not be matched with a donor record at any level. For these cases, values approximating earnings averages for recent months were inserted for the missing items.

During 1979, 1980, and the first half of 1981, the proportion of weekly earnings items which had to be allocated for full-time workers ranged from a low of 13.5 percent in March 1980 to a high of 20.0 percent in May 1979. Over the 30-month period, the rate averaged 16.8 percent. Weekly earnings allocation rates for each quarter and annual averages are shown below:

	1979	*1980*	*1981*
I	15.9	15.2	15.8
II	19.2	16.8	16.6
III	16.9	18.0	-
IV	17.0	16.8	-
Annual	17.2	16.7	-

These rates are lower than those from the May series on weekly earnings. The proportion of workers for whom earnings data were not available averaged 20.0 percent between May 1973 and May 1978.

The proportion of hourly earnings items which had to be allocated for workers paid hourly rates ranged from a low of 10.8 percent in March 1980 to a high of 17.2 percent in May 1979. Over the 30-month period, the rate averaged 13.6 percent. Hourly earnings allocation rates for individual quarters and annual averages are:

	1979	*1980*	*1981*
I	13.3	12.0	12.4
II	16.3	13.5	13.6
III	13.6	14.1	-
IV	14.0	13.5	-
Annual	14.3	13.3	-

The not available rate for hourly earnings averaged 15.0 percent over the May 1973-78 period.

Comparability of the new and old series

As already noted, the new quarterly earnings series exclude all self-employed workers, whereas the May series did include those self-employed workers whose businesses were incorporated (from a legal standpoint, they were the paid employees of a corporation). These workers have been classified as wage and salary workers in the CPS since 1967. The change is expected to produce slightly different earnings medians than would have been produced if the incorporated self-employed were included.

Another change from the May series is that the new questions on hourly earnings are asked prior to the question on usual weekly earnings. Since the question on whether or not one is paid by the hour appears before any questions requesting amounts earned, there may be some effect on the number of workers reporting being paid hourly rates. In addition, nonresponses to this question are now being allocated. As a result, the new data show a substantially larger number of workers paid hourly rates relative to the May series.

All averages and aggregations are affected to some extent by the allocation process. (The old May series contained no allocated data.) Special tabulations indicate that allocation for nonresponses tends to raise the earnings averages. The increase in median usual weekly earnings of full-time workers resulting from allocation averged $2.66 in 1979 and $3.27 in 1980. The increase in median hourly earnings of workers paid hourly rates was about 5 cents in both 1979 and 1980.

In terms of historical continuity, it appears that the averages for the second quarter, of which May is the midmonth, are at least roughly comparable with the data previously obtained in May. However, in addition to the possible discontinuities brought about by the changes discussed above, another factor must be considered. Relative to the earnings averages for May, the averages for the second quarter might be influenced by the influx of youth into low-paying jobs in June. This may pull the value for the second quarter average below that for May alone. Special tabulations of weekly earnings data for 1979 show that the second quarter median was about $4 less than the May median for full-time workers. In 1980 and 1981, differences between the second quarter average and May were not statistically significant. Hourly earnings data also may be affected, but apparent differences of 4 cents found in each of the 3 years were not statistically significant. The net effect of all these factors is not known.

Comparability to establishment data

Data on weekly and hourly earnings have long been collected from business establishments in the Current Employment Statistics (CES) survey, and results have been published by the BLS for many years. These results, which are published for major industry groups and for detailed individual industries, differ from those available from the CPS because of differences in definition, coverage, and computation. Most of the household data tabulated on weekly earnings pertain to all wage and salary workers who usually work full time, and those on hourly earnings are limited to employees (full and part time) paid hourly rates. These earnings are generally expressed as medians. Furthermore, the weekly earnings data from the CPS refer to earnings usually received. The establishment data pertain to all production workers in mining and manufacturing, construction workers in the construction industry, and nonsupervisory workers in other industries, but only within

the private, nonagricultural economy. Both full- and part-time workers are included in the establishment data, but there are numerous exclusions, as indicated above, based on occupation. No distinction is made between workers paid hourly rates and others. Averages are expressed as means and refer to actual payroll figures for a specific reference week including paid overtime. Another difference is in the handling of workers with two or more jobs. Multiple jobholders are counted separately in each job they hold in the establishment data (provided the jobs are production or nonsupervisory), whereas they are counted only once—according to their primary job—in the household data.

The extent of earnings differences between the establishment and household surveys varies by industry. For some of the major industry groups and some of the more detailed groups for which comparisons can be made, the differences are small. They are as low as 1 or 2 percent in mining, manufacturing, and in transportation and public utilities, industry groups in which definitions and coverage of the two surveys are similar. Earnings differences are greatest in the trade, services, and construction industry groups. For example, according to the establishment data, mean weekly earnings in trade, in 1980, were $176 per week, while the CPS data showed an earnings median of $222—a difference of 21 percent. The CPS universe in this case is limited to full-time workers, thus excluding many low-paid part-time workers in trade. Also, the CPS data refer only to those employees whose primary job is in trade, while the establishment data include any multiple jobholders whose second job is in trade. Furthermore, the CPS data include more of the highly paid professional and technical workers and managerial and administrative staff. The points made here also apply to the services group, in which establishment data show mean earnings 17 percent below the CPS median.

For the construction industry, on the other hand, the mean weekly earnings from the establishment payroll data are 14 percent higher than the CPS median. This may be explained, in part, by the inclusion of only actual construction workers in the payroll data, whereas the CPS data relate also to office workers employed in the industry. The CPS is also more likely to pick up more of the lower paid workers in construction (i.e., those working for private individuals and small firms) than is the case for the establishment survey.

Because the establishment data are collected from each reporting unit in the aggregate form (total employees, total production workers, total hours paid for production workers, and total payroll for production workers), information on the characteristics of workers and their families, earning distributions, and median earnings are not available. Nevertheless, the establishment survey has its own distinct advantages relative to the CPS. Because the coverage of the Current Employment Statistics survey includes 39 percent of employees (the CPS sample includes less than one in a thousand households), the CES data have smaller sampling error; thus the degree of industry detail, much at the 4-digit SIC level, is much greater than that available from the CPS. Nonsampling error, too, should be smaller in the CES because employers maintain better records and generally can provide more accurate information than households.

Reliability of the data

In any sample survey, variations in the data can occur by chance because a sample, rather than the whole population, is surveyed. *The standard error* is a measure of variations that occur by chance because the sample may not be completely representative of the universe. The chances are about 68 out of 100 that an estimate from the sample would differ from a complete census by less than the standard error. The chances are about 95 out of 100 that it would be less than twice the standard error, and about 99 out of 100 that it would be less than 2-1/2 times the standard error. All statements of comparison appearing in the text of BLS publications with CPS earnings data are generally significant at the 90-percent level (1.6 standard errors or more).

If other factors are held constant, the relative size of the standard error is inversely related to the number of persons sampled. Since only one-quarter of the wage and salary workers in the sample are asked the earnings questions, the standard error is such that publication of the earnings data on a monthly basis was not deemed advisable. Similarly, quarterly data—and even annual average data—for very small population groups may be subject to relatively large standard errors. Thus, the user is cautioned against drawing conclusions from relatively small differences among numbers for small population groups without first comparing such differences with the standard errors associated with them.

Because of the large standard errors associated with small numbers, percentages and medians derived from a base of less than 100,000 persons for the quarterly data and less than 50,000 for the annual average data are not shown. There is little chance that summary measures based on smaller numbers would reveal any useful information. Small values in tables showing percent distributions are also subject to relatively large sampling errors and should be used with caution. Specifically, most values of less than 1.0 percent have a relative error of 25 percent or more. Such cell values are shown to permit the user to make combinations having adequate sample size.

Calculating standard errors. The Bureau of the Census has developed parameters for estimating standard errors. In order to derive standard errors that would be applicable to a large number of estimates and could be prepared at a moderate cost, a number of approxima-

tions were required. Therefore, instead of providing an individual standard error parameter for each estimate, generalized parameters are provided for various types of characteristics. As a result, the parameters and the standard errors shown in the tables give only an approximate indication of the order of magnitude of the standard error of an estimate rather than its precise value.

Standard errors of estimated numbers are obtained from the following formula:

$$\sigma_x = \sqrt{Ax^2 + Bx}$$

where x is the size of the estimate and A and B are the parameters in table 1 associated with particular demographic characteristics. Values shown in table 1 are to be used only for usual weekly and hourly earnings data, and should not be used for other data series from the Current Population Survey. For example, in the first quarter of 1981, there were an estimated 9,528,000 employed full-time wage and salary workers 25 years and over who were reported earning $500 or more per week. From table 1, the appropriate parameters are A= -0.0000300 and B = 2970. Using the formula, the approximate standard error of an estimate of 9,528,000 is:

$$\sigma_x = \sqrt{-.0000300\ (9{,}528{,}000)^2 + 2970\ (9{,}528{,}000)} = 159{,}921$$

or about 160,000. An alternative method of estimating standard errors of numbers is to use standard error tables. Tables 2 and 3 provide standard errors for major demographic groups. The figures were generated using using A and B parameters provided in table 1. The figures given in tables 2 and 3 are to be used as shown in the following example: In 1980, an estimated 8,121,000 full-time workers had weekly earnings in the $300 to $349 range. Table 3 should be used because it covers annual average data. Linear interpolation in the second column shows the standard error of an estimate of 8,121,000 is about 81,000.

Standard errors of estimated percentages, computed by using sample data for both numerator and denominator, are derived from the following formula:

$$\sigma_p = \sqrt{\frac{B(P)(1-P)}{y}}$$

in which y is the base of the percentage (the denominator), P is the percentage expressed as a decimal (e.g., 10.5 percent=0.05), and B is the parameter (found in table 1) associated with the characteristic of the numerator.

Tables 4 and 5 provide estimates of standard errors of selected percentages cross-tabulated by the size of the base of percentages. For example, if 10.0 percent of a group of workers numbering 10,000,000 were reported with quarterly average earnings of $500 or more per week, the standard error of the 10.0 percent value is 0.52 percentage point. The 95-percent confidence interval (2 standard errors) around the 10.0-percent value ranges from 9.0 to 11.0 percent. For percentages or bases (of percentages) not shown in the tables, linear interpolation of shown values should be used. The estimates in tables 4 and 5 are only for data covering all workers and full-time workers of both sexes or men only, for husband-wife families, and for families maintained by men (no spouse present). Estimates of standard errors for other groups of individuals and for families maintained by women (no spouse present) may be found by multiplying shown values by the factors listed below each table. The values in tables 4 and 5 were generated from the formula shown above by using respective B values of 2,970 and 861.

The standard error of an estimated median depends upon the shape of the distribution (particularly in the vicinity of the median value) as well as the size of its base. A method to estimate the approximate standard error of most medians is as follows: (1) Determine, using either the standard error formula or the standard error table and multiplication factors, the standard error of 50 percent. (2) Determine the percent of the total distribution contained in the published dollar interval containing the median. (3) Divide the result of step (1) by that of step (2) and multiply the result by the dollar width of the interval containing the median.

For example, in the second quarter of 1979, the median usual weekly earnings of the 43,863,000 men who usually work full time was $295. (1) The standard error of 50 percent on a base of 43,863,000 is:

$$\sqrt{\frac{2970 \times 0.50 \times 0.50}{43{,}863{,}000}} = 0.0041 \text{ or } 0.41 \text{ percent}$$

(2) The interval containing the $295 median (the $250 to $299 interval, which has an estimated 6,085,000 workers) includes 13.87 percent of all men who usually work full time.

$$\frac{6{,}085{,}000}{43{,}863{,}000} = 0.1387 \text{ or } 13.87 \text{ percent}$$

(3) Dividing the 0.41 percent by 13.87 percent, and multiplying the result by the $50 width of the interval, yields a standard error of $1.48.

In some cases, the calculated result varies according to the extent of rounding of numbers in each of the three steps. The examples of standard errors of medi-

ans appearing in table 6 were computed using more significant digits than were used in the calculations shown above.

For some items, the median may lie very close to an interval boundary. In this case, the standard error (and confidence limits) will differ depending on which side of the median a significance test is needed, if (l) the value of the median plus or minus the standard error yields a total which lies within the adjoining interval, *and* (2) the number of workers per dollar width of the adjoining interval is different from that within the interval containing the median. Otherwise the estimated standard error is the same on both sides of the median.

The standard error for a difference between two sample estimates is approximately equal to:

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2}$$

where σ_x and σ_y are the standard errors of the estimates x and y; the estimates can be of numbers, percents, or medians. This will represent the standard errors quite accurately for the difference between estimates of separate and uncorrelated characteristics. (If there is high positive correlation between the two characteristics, the formula will overestimate the actual standard error.) For example, the average 1979 median usual weekly earnings of blacks was $204 and that of Hispanics was $197, a difference of $7. Standard errors of the respective medians were $1.47 and $2.09. Using the formula, the standard error of the difference is about $2.56.

$$\sigma_{(x-y)} = \sqrt{(1.47)^2 + (2.09)^2} = \sqrt{6.529} = \$2.56$$

The $7 difference in medians is more than 2 times the value of the standard error of the difference. Hence, one can conclude with at least 95-percent confidence that the usual weekly earnings median of blacks was higher than that of Hispanics in 1979.

The standard error of a change is approximately equal to:

$$\sigma_{(x-y)} = \sqrt{\sigma_x^2 + \sigma_y^2 - 2\rho\,\sigma_x\,\sigma_y}$$

where ρ represents the correlation between the two estimates, and σ_x and σ_y are estimated standard errors of levels, percents, or medians. Values of ρ for comparing annual averages of consecutive years and identical quarters of consecutive years are:

	Persons	*Families*
Total, white, or black	0.30	0.35
Hispanic	.45	.55

In other cases, ρ is zero, resulting in a formula identical to that in the preceding paragraph. For example, median weekly earnings of black men were $229 in the first quarter of 1979 and $239 in the first quarter of 1980. The standard errors of these estimates were $3.62 and $3.56, respectively. Using the formula, the standard error of the year-to-year change is:

$$\sigma_{(x-y)} = \sqrt{(3.62)^2 + (3.56)^2 - 2(.3)\,(3.62)\,(3.56)} = \$4.25$$

The standard error of a ratio, or a percent change of numbers or medians, can be calculated from the following formula:

$$\sigma_{\left(\frac{y}{x}\right)} = \sqrt{\left(\frac{y}{x}\right)^2 \left[\left(\frac{\sigma_x}{x}\right)^2 + \left(\frac{\sigma_y}{y}\right)^2 - 2\rho\left(\frac{\sigma_x}{x}\right)\left(\frac{\sigma_y}{y}\right)\right]}$$

where x and y are the respective numbers of medians and p is the correlation coefficient (as indicated above) between x and y. For example, between the first quarters of 1979 and 1980, median weekly earnings of blacks 35 to 44 years old rose 14.1 percent—from $206 to $235. Estimated standard errors of these medians were $5.06 and $5.66, respectively. Using the formula, the standard error of the change is:

$$\sigma_{\left(\frac{y}{x}\right)} = \sqrt{\left(\frac{235}{206}\right)^2 \left[\left(\frac{5.60}{206}\right)^2 + \left(\frac{5.66}{235}\right)^2 - 2\,(.3)\left(\frac{5.60}{206}\right)\left(\frac{5.66}{235}\right)\right]}$$

$$= 0.0347$$

or 3.5 percent.

Reliability of the new and old series compared. The quarterly data, based on monthly information from one-fourth of the sample (or a total of six rotation groups), are, on the average, almost as reliable as data based on the May surveys of all eight rotation groups. Lower nonresponse rates and improved editing of the new series have resulted in estimates of standard errors similar to those for the old May data. Annual average data are about twice as reliable (i.e., have about one-half the standard error) as the quarterly figures. Estimates of standard errors for median earnings of selected population groups from the May 1978 survey, the second quarter of 1979, and the annual averages for 1980 are shown in table 6.

Because the earnings questions are limited to only one-fourth of the sample, the publication of reliable data on a monthly basis is not practical. Most month-to-month changes would be meaningless, given the standard errors associated with the data. However, the BLS may publish a limited amount of earnings data from a single month's sample for cases in which earnings are cross-tabulated with special information collected only 1 month a year—for example, data on union status, which are currently collected each May. Such data

have standard errors about twice as large as the quarterly data.

Nonsampling error. In any survey work, the results also are subject to errors of response and nonreporting in addition to sampling variability. Such nonsampling errors can be attributed to failure to represent all households with the sample or all persons within sample households (undercoverage), differences in the interpretation of questions, inability or unwillingness on the part of respondents to provide accurate information, errors made in collection such as in recording or coding the data, errors made in processing the data, and errors made in estimating values for missing data (allocation).

The standard error information provided in tables 1 through 6 relate primarily to the magnitude of the sampling error; however, they also partially measure the effect of some nonsampling errors in response and enumeration. They do not, however, measure any systematic biases in the data. An example of a systematic bias would be the reporting of after-tax, rather than gross, earnings—a systematic downward bias. The full extent of nonsampling error is unknown, and is not, of course, measurable as is sampling error.

A special test to gauge the accuracy in reporting of earnings data was conducted in January 1977. Information relating to the earnings of nearly 4,000 workers was obtained either personally from them or from other members of their households. With their permission, the same information was subsequently obtained by mail from the specific employers. Median hourly earnings for workers paid at an hourly rate was $3.53 on the basis of the household reports and $3.64 on the basis of the employer reports, for a difference of 11 cents or 3 percent. There were, however, relatively larger differences between the two sets of data in terms of the proportion of workers falling in specific earnings intervals, particularly at the low end of the earnings distribution. Median weekly earnings (excluding tips or commissions) were $170.24 on the basis of the household reports and $179.50 on the basis of the employer reports, for a difference of $9.26 or 5 percent. Also, as might be expected, the difference between the two sets of data was greater where the household information was obtained from proxy respondents (wives, husbands, mothers, etc.) than where it was obtained from the actual workers. Probably because the earnings of men are more likely to be obtained from proxy respondents, the average difference in their earnings, relative to what was reported by employers, was somewhat greater than that for women. For more information on this test, see "Comparing Earnings Data From the CPS and Employer Records," by Larry Carstensen and Henry Woltman, of the Bureau of the Census, in American Statistical Association, *Proceedings of the Social Statistics Section, 1979.*

Definitions of terms used in reports on usual weekly earnings

Family. A family is a group of two or more persons residing together who are related by blood, marriage, or adoption. The counts of persons by family status in reports on earnings refer to their position in "primary" families only; that is, all persons in the household who are related to the householder. The universe used to compare the total weekly wage and salary earnings for families excludes all families in which there is no wage or salary earner or in which the husband, wife, or other person maintaining the family is either self-employed or in the Armed Forces.

Householder. A householder is the person (or one of the persons) in whose name the housing unit is owned or rented. For purposes of presenting earnings data, the term is never applied to either husbands or wives in married-couple families. As used here, the term "householder" relates only to men or women with no spouse present who are maintaining families.

Employed persons. The universe of employed persons comprise (a) all those who during the survey reference week did any work at all as paid employees, worked in their own business, profession, or farm, or worked 15 hours or more as unpaid workers in an enterprise operated by a member of the family; and (b) all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, labor-management dispute, or personal reasons, whether or not they were paid by their employers for the time off, or whether or not they were seeking other jobs.

Each employed person is counted only once. Those who held more than one job are counted in the job at which they worked the greatest number of hours during the survey reference week.

Wage and salary workers. Wage and salary workers are employed persons who receive wages, salaries, commissions, tips, payment in kind, or piece rates. The group includes employees in both the private and public sectors but excludes self-employed persons.

Full-time workers. Full-time workers usually work 35 hours or more per week at their principal job.

Part-time workers. Part-time workers are those who usually work fewer than 35 hours per week at their principal job.

Usual weekly earnings. Data on usual weekly earnings are provided from responses to the question "How much does ... USUALLY earn per week at this job before deductions? Include any overtime pay, commissions, or

tips usually received." The response is for the worker's sole or principal job. The term "usually" is as perceived by the respondent. If the respondent asks for a definition of "usually," interviewers are instructed to define the term as more than half the weeks worked during the past 4 or 5 months. The usual weekly earnings of families is determined by aggregating the usual weekly earnings of all family members 16 years and older who were employed as wage and salary workers during the survey reference week.

Hourly earnings. Data on hourly earnings, as obtained in the CPS, relate only to employed wage and salary workers who are reported as being paid by the hour at their principal job. (Those for whom yes is entered in item 25B of the questionnaire.) The amount of earnings is determined by the response to item 25C, "How much does ... earn per hour?"

Change in constant dollars. The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) is used to convert current dollars to constant dollars.

Survey reference week. The survey reference week is the calendar week, Sunday through Saturday, which includes the 12th of the month.

Hispanic origin. This term refers to persons who are of Mexican, Puerto Rican, Cuban, Central or South American, or other Hispanic origin or descent. Persons of Hispanic origin may be of any race; hence, they are included among the numbers for both whites and blacks.

Table 1. Parameters used for the estimation of standard errors of weekly and hourly earnings data

Characteristic	For quarterly average data		For annual average data	
	A parameter	B parameter	A parameter	B parameter
PERSONS				
All races, white, black				
Both sexes:				
Part-time workers	-.0000115	2327	-.0000033	675
All workers and full-time workers:				
Total or white	-.0000232	2970	-.0000067	861
5-year age groups or teenage	-.0001905	2970	-.0000553	861
25 years and over	-.0000300	2970	-.0000087	861
Black	-.0001931	2970	-.0000560	861
5-year age groups or teenage	-.0013655	2970	-.0003961	861
25 years and over	-.0002661	2970	-.0000772	861
Men:				
Part-time workers	-.0000242	2327	-.0000070	675
All workers and full-time workers:				
Total	-.0000491	2970	-.0000143	861
5-year age groups or teenage	-.0003948	2970	-.0001145	861
20 years and over	-.0000552	2970	-.0000160	861
25 years and over	-.0000642	2970	-.0000186	861
White	-.0000554	2970	-.0000161	861
5-year age groups or teenage	-.0004537	2970	-.0001316	861
20 years and over	-.0000621	2970	-.0000180	861
25 years and over	-.0000719	2970	-.0000209	861
Black	-.0004285	2970	-.0001243	861
5-year age groups or teenage	-.0030458	2970	-.0008835	861
20 years and over	-.0005524	2970	-.0001602	861
Women:				
All workers, full- and part-time workers:				
Total or white	-.0000217	2327	-.0000063	675
5-year age groups or teenage	-.0001821	2327	-.0000528	675
Black	-.0001738	2327	-.0000504	675
5-year age groups or teenage	-.0012239	2327	-.0003550	675
Hispanic origin (levels only)[1]				
Both sexes, men, women:				
All workers, full- and part-time workers	.0010500	2401	.0003200	739
Hispanic origin (percents and medians only)[2]				
All workers, full- and part-time workers:				
Both sexes	(3)	5712	(3)	1758
Men	(3)	4081	(3)	1256
Women	(3)	3026	(3)	931
Geographic				
All characteristics for total, men only, and women only	-.0000345	4488	-.0000010	1302
FAMILIES				
All races, white, black				
All families	-.0000232	2970	-.0000067	861
Husband-wife families and families maintained by men (no spouse present)	-.0000491	2970	-.0000143	861
Families maintained by women (no spouse present)	-.0000217	2327	-.0000063	675
Hispanic origin (levels only)[1]				
All families, husband-wife families, and families maintained by either men or women (no spouse present)	.0010500	2401	.0003200	739

See footnotes at end of table.

Table 1. Continued—Parameters used for the estimation of standard errors of weekly and hourly earnings data

Characteristic	For quarterly average data		For annual average data	
	A parameter	B parameter	A parameter	B parameter
FAMILIES—Continued				
Hispanic origin (percents and medians only)[2]				
All families	(3)	4081	(3)	1256
Husband-wife families, and families maintained by men (no spouse present)	(3)	4081	(3)	1256
Families maintained by women (no spouse present)	(3)	3026	(3)	931

[1] Use these parameters for calculating standard errors of estimated levels (numbers of persons with a given characteristic) only.
[2] Use these parameters for calculating standard errors of estimated percentages and median earnings only.
[3] The A parameter is not used to calculate standard errors of percents and medians.

NOTE: Parameters in this table were used to generate the numbers in table 2-5. These parameters are valid only for weekly and hourly earnings data tabulated from the 2-rotation group sample and should not be used for other items from the Current Population Survey. In the case of a cross-tabulation involving items with different parameters, the larger parameter should be used.

SOURCE: U.S. Department of Commerce, Bureau of the Census, memoranda prepared in the Statistical Methods Division (SMD), Mar. 11, 1980, and Nov. 12, 1980. Additional B parameters for the standard errors of family earnings tabulated by labor force characteristics of family members are available in an SMD memorandum of Jan. 29, 1980.

Table 2. Standard errors of estimates of quarterly levels, by selected characteristics

(Numbers in thousands)

Estimated level	Both sexes			Men				Women	
	Part-time workers	Total or full-time workers		Part-time workers	Total or full-time workers			Total, full- or part-time workers	
		All races or white	Black		All races	White	Black	All races or white	Black
10	5	5	5	5	5	5	5	5	5
50	11	12	12	11	12	12	12	11	11
75	13	15	15	13	15	15	15	13	13
100	15	17	17	15	17	17	17	15	15
150	19	21	21	19	21	21	21	19	19
200	22	24	24	22	24	24	24	22	21
250	24	27	27	24	27	27	27	24	24
300	26	30	30	26	30	30	29	26	26
500	34	38	38	34	38	38	37	34	33
750	42	47	46	42	47	47	45	42	41
1,000	48	54	53	48	54	54	50	48	46
1,500	59	66	63	59	66	66	59	59	56
2,000	68	76	72	68	76	76	65	68	63
2,500	76	85	79	75	84	84	69	75	69
3,000	83	93	85	82	92	92	71	82	74
5,000	107	119	100	105	117	116	64	105	85
7,500	130	145	107	127	140	138	—	127	—
10,000	149	165	102	144	157	155	—	145	—
15,000	180	198	—	187	183	179	—	173	—
20,000	205	224	—	192	199	193	—	195	—
25,000	226	244	—	207	209	199	—	211	—
30,000	244	261	—	219	212	198	—	224	—
40,000	273	286	—	236	201	174	—	242	—
50,000	296	301	—	—	—	—	—	—	—
75,000	331	304	—	—	—	—	—	—	—
100,000	343	255	—	—	—	—	—	—	—

NOTE: Dashes indicate the standard error is not applicable because the number of workers having the indicated characteristic is less than that listed in the estimated level column.

Table 3. Standard errors of estimates of annual average levels, by selected characteristics

(Numbers in thousands)

Estimated level	Both sexes			Men				Women	
	Part-time workers	Total or full-time workers		Part-time workers	Total or full-time workers			Total, full- or part-time workers	
		All races or white	Black		All races	White	Black	All races or white	Black
10	3	3	3	3	3	3	3	3	3
50	6	7	7	6	7	7	7	6	6
75	7	8	8	7	8	8	8	7	7
100	8	9	9	8	9	9	9	8	8
150	10	11	11	10	11	11	11	10	10
200	12	13	13	12	13	13	13	12	12
250	13	15	15	13	15	15	14	13	13
300	14	16	16	14	16	16	16	14	14
500	18	21	20	18	21	21	20	18	18
750	22	25	25	22	25	25	24	22	22
1,000	26	29	28	26	29	29	27	26	25
1,500	32	36	34	32	35	35	32	32	30
2,000	37	41	39	36	41	41	35	36	34
2,500	41	46	42	41	45	45	37	41	37
3,000	45	50	46	44	50	49	38	44	40
5,000	57	64	54	57	63	62	35	57	46
7,500	70	78	58	68	75	75	—	69	—
10,000	80	89	55	78	85	84	—	78	—
15,000	97	107	—	92	98	96	—	93	—
20,000	110	121	—	103	107	104	—	105	—
25,000	122	132	—	112	112	107	—	114	—
30,000	131	141	—	118	114	106	—	121	—
40,000	147	154	—	126	108	93	—	130	—
50,000	160	162	—	—	—	—	—	—	—
75,000	179	164	—	—	—	—	—	—	—
100,000	186	138	—	—	—	—	—	—	—

NOTE: Dashes indicate the standard error is not applicable because the number of workers having the indicated characteristic is less than that listed in the estimated level column.

Table 4. Standard errors of estimated percentages—quarterly averages

Base of estimated percentage (thousands)	Estimated percentages										
	0.5 or 99.5	1 or 99	2 or 98	3 or 97	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	50
50	1.72	2.42	3.41	4.16	5.31	7.31	8.70	9.75	10.55	11.17	12.19
75	1.40	1.98	2.79	3.39	4.34	5.97	7.11	7.96	8.62	9.12	9.95
100	1.22	1.71	2.41	2.94	3.76	5.17	6.15	6.89	7.46	7.90	8.62
150	.99	1.40	1.97	2.40	3.07	4.22	5.02	5.63	6.09	6.45	7.04
200	.86	1.21	1.71	2.08	2.66	3.66	4.35	4.87	5.28	5.58	6.09
250	.77	1.08	1.53	1.86	2.38	3.27	3.89	4.36	4.72	4.99	5.45
300	.70	.99	1.39	1.70	2.17	2.98	3.55	3.98	4.31	4.56	4.97
500	.54	.77	1.08	1.31	1.68	2.31	2.75	3.08	3.34	3.53	3.85
750	.44	.63	.88	1.07	1.37	1.89	2.25	2.52	2.72	2.88	3.15
1,000	.38	.54	.76	.93	1.19	1.63	1.95	2.18	2.36	2.50	2.72
1,500	.31	.44	.62	.76	.97	1.33	1.59	1.78	1.93	2.04	2.22
2,000	.27	.38	.54	.66	.84	1.16	1.38	1.54	1.67	1.77	1.93
2,500	.24	.34	.48	.59	.75	1.03	1.23	1.38	1.49	1.58	1.72
3,000	.22	.31	.44	.54	.69	.94	1.12	1.26	1.36	1.44	1.57
5,000	.17	.24	.34	.42	.53	.73	.87	.97	1.06	1.12	1.22
7,500	.14	.20	.28	.34	.43	.60	.71	.80	.86	.91	.99
10,000	.12	.17	.24	.29	.38	.52	.62	.69	.75	.79	.86
15,000	.10	.14	.20	.24	.31	.42	.50	.56	.61	.64	.70
20,000	.09	.12	.17	.21	.27	.37	.44	.49	.53	.56	.61
25,000	.08	.11	.15	.19	.24	.33	.39	.44	.47	.50	.54
30,000	.07	.10	.14	.17	.22	.30	.36	.40	.43	.46	.50
50,000	.05	.08	.11	.13	.17	.23	.28	.31	.33	.35	.39
75,000	.04	.06	.09	.11	.14	.19	.22	.25	.27	.29	.31
100,000	.04	.05	.08	.09	.12	.16	.19	.22	.24	.25	.27

NOTE: For part-time workers, women, and families maintained by women, multiply the above values by 0.89. For Hispanics: Multiply by 1.39 for both sexes; by 1.17 for men, all families, husband-wife families, and families maintained by men; and by 1.01 for women and families maintained by women.

Table 5. Standard errors of estimated percentages—annual averages

Base of estimated percentage (thousands)	Estimated percentages										
	0.5 or 99.5	1 or 99	2 or 98	3 or 97	5 or 95	10 or 90	15 or 85	20 or 80	25 or 75	30 or 70	50
50	0.93	1.31	1.84	2.24	2.86	3.94	4.69	5.25	5.68	6.01	6.56
75	.76	1.07	1.50	1.83	2.34	3.21	3.83	4.29	4.64	4.91	5.36
100	.65	.92	1.30	1.58	2.02	2.78	3.31	3.71	4.02	4.25	4.64
150	.53	.75	1.06	1.29	1.65	2.27	2.71	3.03	3.28	3.47	3.79
200	.46	.65	.92	1.12	1.43	1.97	2.34	2.62	2.84	3.01	3.28
250	.41	.58	.82	1.00	1.28	1.76	2.10	2.35	2.54	2.69	2.93
300	.38	.53	.75	.91	1.17	1.61	1.91	2.14	2.32	2.45	2.68
500	.29	.41	.58	.71	.90	1.24	1.48	1.66	1.80	1.90	2.07
750	.24	.34	.47	.58	.74	1.02	1.21	1.36	1.47	1.55	1.69
1,000	.21	.29	.41	.50	.64	.88	1.05	1.17	1.27	1.34	1.47
1,500	.17	.24	.34	.41	.52	.72	.86	.96	1.04	1.10	1.20
2,000	.15	.21	.29	.35	.45	.62	.74	.83	.90	.95	1.04
2,500	.13	.18	.26	.32	.40	.56	.66	.74	.80	.85	.93
3,000	.12	.17	.24	.29	.37	.51	.60	.68	.73	.78	.85
5,000	.09	.13	.18	.22	.29	.39	.47	.52	.57	.60	.66
7,500	.08	.11	.15	.18	.23	.32	.38	.43	.46	.49	.54
10,000	.07	.09	.13	.16	.20	.28	.33	.37	.40	.43	.46
15,000	.05	.08	.11	.13	.17	.23	.27	.30	.33	.35	.38
20,000	.05	.07	.09	.11	.14	.20	.23	.26	.28	.30	.33
25,000	.04	.06	.08	.10	.13	.18	.21	.23	.25	.27	.29
30,000	.04	.05	.08	.09	.12	.16	.19	.21	.23	.25	.27
50,000	.03	.04	.06	.07	.09	.12	.15	.17	.18	.19	.21
75,000	.02	.03	.05	.06	.07	.10	.12	.14	.15	.16	.17
100,000	.02	.03	.04	.05	.06	.09	.10	.12	.13	.13	.15

NOTE: For part-time workers, women, and families maintained by women, multiply the above values by 0.89. For Hispanics: Multiply by 1.43 for both sexes; by 1.21 for men, all families, husband-wife families, and families maintained by men; and by 1.04 for women and families maintained by women.

Table 6. Standard errors of median usual weekly earnings of full-time workers and of families, by selected characteristics, May 1978, second quarter 1979, and annual average 1980

Characteristic	May 1978		Second quarter 1979		Annual average 1980	
	Median	Standard error	Median	Standard error	Median	Standard error
PERSONS						
Both sexes:						
16 years and over	$227	$0.97	$242	$0.98	$266	$0.71
16 to 24 years	162	1.11	176	1.36	191	.72
25 years and over	246	1.32	267	1.36	292	.76
White	232	1.03	247	1.05	273	.75
Black	181	3.04	205	2.95	219	1.48
Hispanic	174	4.14	193	4.11	214	4.97
Men:						
16 years and over	272	1.37	295	1.48	322	.82
16 to 24 years	185	2.27	199	2.15	214	1.22
25 years and over	294	1.44	319	1.46	346	.87
White	279	1.44	302	1.49	329	.86
Black	213	3.70	237	3.79	247	2.20
Hispanic	201	5.96	222	5.13	238	2.77
Women:						
16 years and over	166	.74	183	.87	204	.61
16 to 24 years	142	1.25	153	1.60	171	.81
25 years and over	175	1.34	193	1.03	217	.67
White	167	.79	184	.92	206	.65
Black	156	2.21	172	2.96	190	1.35
Hispanic	141	4.51	153	4.17	177	2.33
FAMILIES						
Married-couple families	n.a.	n.a.	401	2.38	437	1.33
One earner	n.a.	n.a.	294	2.85	312	1.60
Two or more earners	n.a.	n.a.	490	2.92	539	1.90
Families maintained by women (no spouse present)	n.a.	n.a.	205	3.72	227	1.80
Families maintained by men (no spouse present)	n.a.	n.a.	332	7.51	365	5.97

n.a. = not available.

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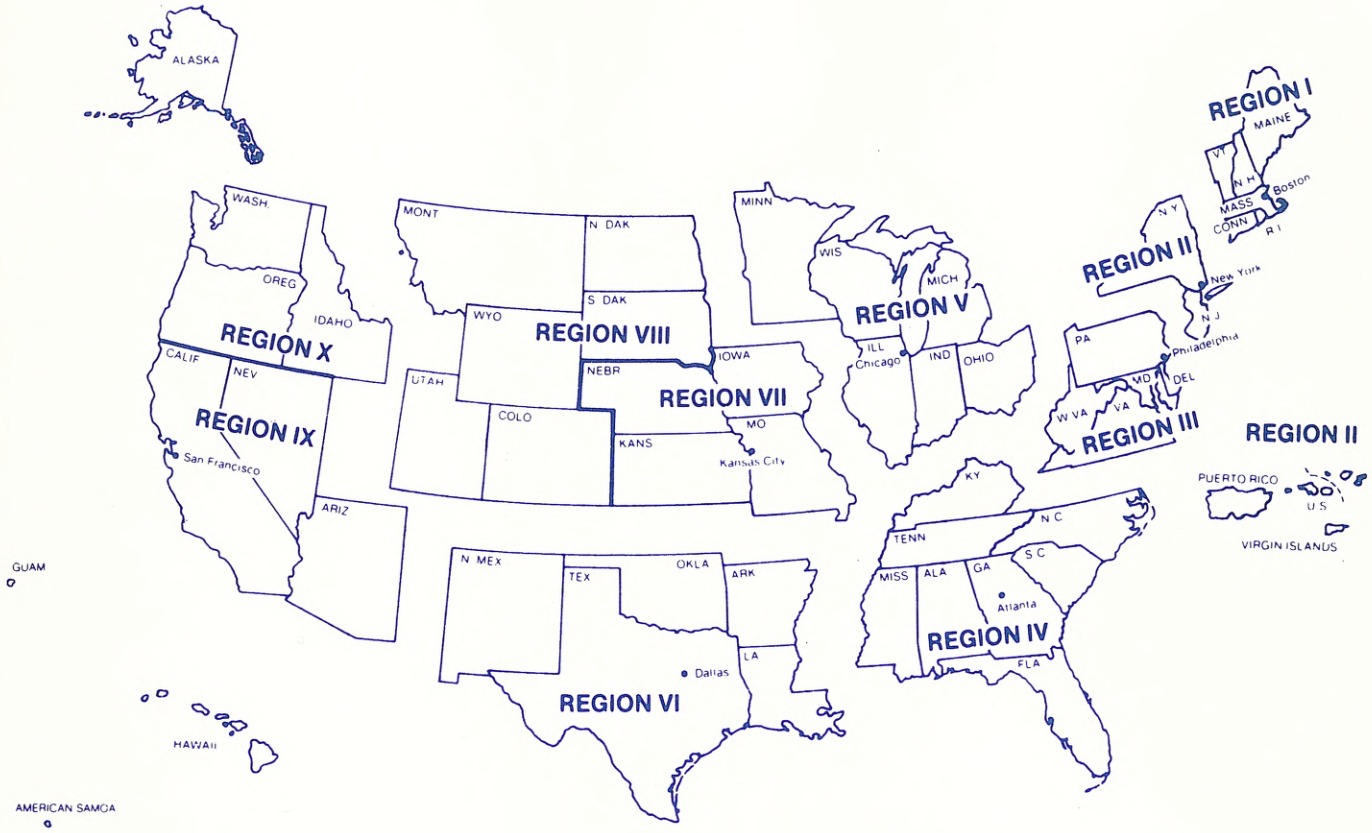

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