EVALUATING SSA'S CURRENT PROCEDURES FOR ESTIMATING UNTAXED WAGES

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This paper presents an evaluation of the bias and precision in current methodology at the Social Security Administration (SSA) for estimating annual wages from truncated quarterly wage series. We find that SSA's methodology underestimates total wages when the truncation quarter is other than the first quarter and overestimates total wages for first quarter truncation, but that the net bias is small. We describe and summarize the error associated with individual estimates made with the current and competing methodologies. We suggest that a small modification of SSA's methodology should slightly improve performance.

NEED FOR ESTIMATES

Employers are required to report to the Social Security Administration wages and salaries paid to their employees which are subject to FICA taxes. When earnings exceed the maximum taxable by law, the employer truncates the earnings amount at that point. In 1972, there were almost 18.5 million wage reports truncated at the taxable ceiling of $9,000.

There are both program-related and non-program needs which require that these untaxed wages be estimated. Historically, the need was first felt when the Social Security Administration required a determination of the percentage of total wages that were taxed. Other program uses are the estimation of tax revenues that would accrue for different taxable maxima; and the modeling of lifetime earnings streams to test suggested revisions of the social security benefit formula[1].

In addition, the need to extrapolate for untaxed wages arises in various non-program research efforts using the Social Security Administration's files of statistical samples. Two examples are Gallaway's enquiry into the pecuniary returns to geographic migration [2], and McCall's application of Markovian stayer-mover models to income dynamics [3].

THE DATA BASE

The 1973 Exact Match project linked together survey data from the March 1973 Current Population Survey and its supplement on work experience and income of the population during the prior year with administrative records of the Social Security Administration and the Internal Revenue Service [4]. One general thrust of this endeavor was towards improvement of the quality of each agency's statistical output in the area of income distribution. A specific objective under this heading was the enabling of an evaluation of SSA's current extrapolative method to estimate untaxed wages.

Though the 1973 Exact Match was effected with the Social Security Administration's computerized Summary Earnings Record file, the level of summarization in that file rendered it unsuitable for anything more than the identification of potential cases with truncated earnings. We could determine which persons had wages reaching $9,000 but could not distinguish those who earned this amount from a single employer. Nor did we have available the quarterly earnings amounts on which the estimates are based.

Accordingly, for a 1-in-4 (approximately) subsample of candidates for our evaluation study--3,155 of them in all--a manual search of microfilmed records was undertaken. We determined that 259 persons had no truncation, having achieved the taxable maximum only from combined earnings with 2 or more employers. Also, six farmwork records were dropped, given the special nature of annual--rather than quarterly--reporting of farm employment, leaving a viable sample of 2,890 cases.

A validation study involving comparable variables y and z differs from a comparison of y and z in that we consider one of the two, say y, to be "true" or a close approximation of the "truth"; then, it may be used as a yardstick against which the accuracy of z is measured. The three-way Exact Match presented two potential y's: the higher-quality IRS Form 1040 entry for wages, based on attached Forms W-2, and the lower-quality CPS response, often based on recall and on one household member's perception of another's income. While it was our original intention to accept the CPS report when there was no usable Form 1040 amount, rather than give up the case, preliminary tabulations indicating substantial CPS understatement made us change our minds as to the suitability of the CPS to assume a role as a yardstick.

The joint filing of income tax returns, the common practice among married persons, presented some special problems to our evaluation efforts. Consider the situation from the following perspective. For a person with truncated wages who filed a nonjoint return, the Form 1040 wage entry is the sum of three amounts:

1. the wage that had been truncated--$9,000 or more;
2. wages from other covered employment, if any--which are known to us unless they, too, were truncated; and
3. wages from noncovered employment, if any--which we wish to assume are zero. An argument can be made that the likelihood of secondary jobholding in noncovered employment for someone with high earnings on his primary job is rather small.

For a joint filer, however, the Form 1040 entry is the sum of five amounts: these same three, plus the spouse's covered wages, if any, plus the spouse's noncovered wages, if any. Now numerous difficulties present themselves:

1. Did the March CPS find a spouse present (who did not file his/her own tax report)?

2. Have we secured the spouse's social security number, to use in obtaining the spouse's covered wages from the Summary Earnings Record file? We considered this a problem unless the CPS stated that the spouse had not worked at all in the prior year or was a self-employed or unpaid worker.

3. Does the Summary Earnings Record indicate that the spouse had both wages and self-employment, in which case the Summary Earnings Record figure is the combined amount?

4. Does the spouse also have a truncated wage?

5. Could the spouse perhaps have noncovered wages? We decided to be wary of noncovered wages if the spouse had no covered wages and the CPS classified the spouse in government, farm, or household employment, or in industries dominated by nonprofit organizations. (These are the four areas of employment where social security coverage is not complete.)

Table 1 details the erosion of the sample due to these various factors to an effective size of 2,470 cases. 1/

Table 1.--Number of Discarded Cases by Type

Basic Sample	2,890
Discarded Cases	420
Truncation with Two Employers	16
Form 1040 Wages Less than $9,000	36
No Form 1040 Found	38
Spouse Not Found	13
No Usuable Social Security Number for Spouse	60
Spouse Has Both Wages and Self-employment Reported to SSA	6
Spouse May Have Truncated Wages	161
Spouse May Have Noncovered Wages	90
Remaining Sample	2,470

Among the remaining cases there are, no doubt, a small fraction for which the assumptions necessary to equate the adjusted Form 1040 amount with the true truncated wage do not hold. Corrections to individual records are not feasible, but, in specifying the bias in our procedures, we will make allowance for this inaccuracy in our yardstick.

Now, what should be the products of our evaluation study? Certainly, to adjust the estimate of untaxed wages on the macro level, we need to specify the extent of bias in the SSA procedure. Also, a distribution of forecast errors by size and sign for each of several types of earnings patterns would be helpful to users in judging what confidence to place in point or interval estimates of truncated wage amounts; such a distribution is appended to the paper (as table A). In the balance of the paper, however, we would like to summarize the magnitude, type, and structure of the forecast errors and compare SSA's present method with other models.

METHOD II

Up to this point, we have not described "Method II" 2/, the technique used most often at the Social Security Administration to forecast untaxed wages. Its scheme is to determine the calendar quarter closest to the truncation quarter with wages greater than the reported truncation quarter wages; then, substitute this amount for the truncation quarter and any subsequent quarters. To illustrate: if reported wages in the first three calendar quarters of 1972 are $2,500, $3,500, and $3,000, respectively, Method II assigns $3,500 to the third and fourth calendar quarters. For reported wages of $3,200, $2,800, and $3,000, Method II passes over the second quarter's amount and substitutes $3,200 for the last two quarters.

When wages reported for the truncation quarter exceed all prior quarters' 3/-- in effect, a contradiction of the Method II premise--Method II uses these reported wages for the truncation quarter and any subsequent quarters. This is a biased procedure, because the true ceiling quarter wages are at least equal to, but probably somewhat greater than, the reported amount.

A special case occurs when the first calendar quarter is the truncation quarter. Then, there is no series to extrapolate. Method II assumes, in such cases, that wages are at least four times the taxable maximum but does not attempt to make estimates on an individual basis. Instead, it computes an average for the group from the often-used procedure [5] of fitting a Pareto curve to the open end of the income distribution. The Pareto scheme expresses the "or more" cumulative frequency distribution as a simple two-parameter exponential function of the level of the variable and, hence, is completely determined by two points on the curve. To calculate the "or more" frequencies at two high dollar levels, Method II presumes that "or more" frequencies at four times and twice the maximum can be approximated by the frequency of first quarter truncation and the frequencies of first and second quarter truncation combined, respectively.

The bias in Method II, that is, the average value of the forecast error y-z, where y is the "true" wage obtained from the Form 1040, and z is its Method II estimate, is given in table 2. Negative biases represent overestimates.

The overall understatement of $203 is 3.5 percent of the average Form 1040 untaxed wage of $5,797. The Form 1040 average, however, is, itself, biased upward, as mentioned before, so that the actual

Method II understatement bias, we conjecture, may be closer to 1 percent or 2 percent.

Table 2.--Method II Biases by Earnings Pattern

Earnings Pattern	Percent of Population	Understatement Bias (in dollars)
Total.....	100.0	203
First Quarter Truncation..	2.5	-11,292
Second Quarter Truncation:		
Ceiling Quarter Wages:		
Highest.....	2.6	3,072
Not Highest.....	11.0	179
Third Quarter Truncation:		
Ceiling Quarter Wages:		
Highest.....	2.8	1,730
Not Highest.....	34.0	319
Fourth Quarter Truncation:		
Ceiling Quarter Wages:		
Highest.....	2.6	978
Not Highest.....	44.5	444

Our very first reaction to the large overstatement for first quarter truncation was disapproval of the Pareto technique--and confusion, since we were aware of Gastwirth's short essay in the Review of Economics and Statistics criticizing the Pareto technique for producing estimates that were too low [6]. We, then, observed, however, that, for 21 of the 55 sample cases with first quarter truncation, the Form 1040 comparison amount was actually less than four times the taxable ceiling. The fault for the overstatement error lay, not with the Pareto method for estimating wages beyond four times the maximum, but, with the assumption that the employment relationship observed in the first quarter of the year continues throughout the year.

Indeed, we believe there exist two major sources of error--acting in opposite directions. One is the uncertainty of the worker's future employment status. Perhaps, he will stop working during the year or change to another employer. This error is greater for longer periods of uncertainty. The other--which we will return to later--is the failure to recognize the secular trend of rising wages over time.

We would like to digress a moment to consider Gastwirth's results. Analyzing the distribution of adjusted gross income (AGI) published in the annual IRS Statistics of Income series, Gastwirth concluded that the Pareto estimate for the open-ended interval substantially underestimates the true average AGI. Carrying out the calculations for 1972 [7], fitting the Pareto curve at $15,000 and $25,000, we obtain an estimate of average AGI in the $25,000-and-over interval of $36,633, which indeed falls 15 percent short of the actual average of $42,932.

We believe, however, that the performance of the Pareto approximation may be better for certain kinds of income than for others. For AGI, which includes interest, dividends, rents, and other unearned income, many high incomes may be very high incomes, so that the extrapolation of a Pareto curve fit at lower values could pass below the true locus for the group. Wage and salary income, on the other hand, is, for the most part, constrained to reasonable levels, so that the extrapolated Pareto curve may provide an adequate fit. In fact, tabulating our Exact Match file, we obtained $35,038, as the true average IRS wage for the $25,000-and-over group, and an estimate of $34,292--only 2 percent lower--from a Pareto fit at $15,000 and $25,000.

Except for first quarter truncation, Method II makes wage estimates on an individual basis, and we can summarize the precision of these estimates, following Theil [8] and Mincer and Zarnowitz [9], with the root mean square error (RMSE) measure, i.e., the square root of the average value of $(y-z)^2$. 4/ The root mean square error for Method II, as estimated from the sample, is $3,180; and RMSE's for various earnings patterns are given below in table 3. The RMSE is larger for third quarter truncation than for fourth quarter truncation and largest for second quarter truncation. The RMSE is about twice as large when the truncation quarter wages are highest than otherwise.

Table 3.--Root Mean Square Errors for Earnings Patterns

Ceiling Quarter	Are Ceiling Quarter Wages Highest?	
	Yes	No
Second	$10,371	$5,316
Third	5,301	2,491
Fourth	3,094	1,341

A very useful measure of the performance of Method II on the micro level is the proportion of wage amounts predicted within x percent of the true value. We obtain a proportion of 57 at x = 5% and a proportion of 77 at x = 10%.

ALTERNATIVE METHODS WHEN THE TRUNCATION QUARTER IS OTHER THAN THE FIRST CALENDAR QUARTER

Method II is, of course, only one of several extrapolative methods that could be used to estimate untaxed wages. Each carries a different theoretical model for the stochastic nature of quarterly wage earnings: Is the extrapolation of levels or changes (trends) more appropriate?

How many terms should be included? Should these terms be weighted identically or differentially? The heterogeneity in the movement of persons' earnings over time makes it difficult to decide a priori which model is best, but we can compare the empirical results, as in the top half of table 4.

The first line of results is not for an extrapolative model, but for a set of six regressions designed to obtain the best least-squares fit of the true untaxed wage as a linear function of the wage levels in quarters prior to the ceiling quarter. A separate regression was run to fit each of six earnings patterns, defined by the number of prior quarters (1, 2, or 3) and whether or not the ceiling quarter wages were highest.

The resultant bias is, of course, zero, and the root mean square error is minimized; so, the performance of the various extrapolative methods may be judged relative to this first line. It should be noted, however, that while this regression average has certain desirable properties, it does not do well with respect to the proportion of estimates correct to within 5 percent of the true value.

The second line of results is for Method II. Six other methods follow, some of which need to be elaborated on. For the "weighted average of prior levels" (line 6), we wanted more recent levels to be weighted more heavily, but the precise weights we used--2/3 and 1/3 for two prior quarters; 2/3, 2/9, and 1/9 for three prior quarters--were arbitrarily chosen. "Extrapolating prior trend" means carrying forward the most recent (line 7) or the average (line 8) signed difference between the wages of one quarter and the preceding quarter.

We would judge the extrapolation of highest prior quarter method (line 3) best, because of its smaller bias and the high proportion of wage estimates it predicts within 5 percent of the true wage. We think that it is best, not because its theory is most "correct," but because, by searching out the highest prior quarter wage, it somewhat offsets the problem identified earlier, namely, the tendency towards understatement which is characteristic of extrapolations that ignore the rising trend of wages.

It seems appropriate, therefore, to include an explicit trend component in our models, such as, for example, Milton Friedman did for his calculation of "permanent income" [10]. For this, we, first, adjusted wages downward to eliminate the presumed trend; then, recalculated the extrapolative estimates; and, finally, brought the trend component back in. A comparison of the lower and upper halves of table 4 reveals that both Method

Table 4.--Empirical Results with Different Models

Description of Model	Understatement Bias (in dollars)	Percent Correct within 5% of True Total Wage	Percent Correct within 10% of True Total Wage	Root Mean Square Error (in dollars)
NO OVERALL TREND ASSUMED				
1. Regression	0	49.5	77.8	3,022
2. "Method II"	493	56.6	76.6	3,180
3. Extrapolating Maximum Prior Level	271	59.6	77.7	3,160
4. Extrapolating Immediately Prior Level	507	55.5	75.8	3,179
5. Extrapolating Simple Average of Prior Levels	588	57.8	77.2	3,163
6. Extrapolating Weighted Average of Prior Levels*	578	56.2	76.5	3,163
7. Extrapolating Immediate Prior Trend	264	39.5	61.4	3,656
8. Extrapolating Average Prior Trend	246	44.4	65.0	3,639
OVERALL TREND OF 1% ASSUMED				
2a. "Method II"	377	57.3	76.7	3,168
3a. Extrapolating Maximum Prior Level	148	59.9	78.1	3,157
5a. Extrapolating Simple Average of Prior Levels	472	59.8	78.0	3,149
OVERALL TREND OF 2% ASSUMED				
2b. "Method II"	281	57.0	76.8	3,167
3b. Extrapolating Maximum Prior Level	22	58.6	77.6	3,162
5b. Extrapolating Simple Average of Prior Levels	354	61.0	78.2	3,143

* More recent levels are weighted more heavily.

II and a simple average of prior quarters perform better with an assumed rising secular trend of 1 percent or 2 percent per quarter. We would tentatively suggest that this type of modification be implemented.

FOOTNOTES

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1/ On top of the weights and initial raking adjustments (for survey undercoverage and failures to match to administrative records) already on the Exact Match file [11], we applied further minor adjustments to force the subsample to better reflect the known distribution of certain variables that are correlated with the performance of extrapolative technique in the population. Specifically, these adjustments were based on the assumptions that performance should depend on: (a) whether or not the recorded earnings amount for the truncation quarter is greater than in all preceding quarters; and (b) the range of, and (c) the number of quarters with prior earnings, since extrapolation error should be larger for series with greater variability and longer forecast spans.

2/ Its predecessor, Method I, could operate, at the macro level only, to produce estimates of total untaxed wages and related information, derived from curve fitting and calculus techniques [12].

3/ Our situation is different from the usual forecasting context in this respect, i.e., in that we have partial information for the forecast period.

4/ It must be noted that a small number of "outliers," i.e., large values for (y-z), can have a large effect on the magnitude of the RMSE measure.

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TABLE A.--PERCENTAGE DISTRIBUTION BY SIZE AND SIGN OF METHOD II FORECAST ERROR: DISTRIBUTION OF DIFFERENCE BETWEEN THE WAGE REPORTED TO IRS AND ITS METHOD II ESTIMATE, WHEN THE CEILING QUARTER IS OTHER THAN THE FIRST CALENDAR QUARTER

EARNINGS PATTERN BY RANGE OF 1/ OF PRIOR QUARTER WAGES	TOTAL	DOLLAR SIZE OF FORECAST ERROR																	
		ABSOLUTE						OVERESTIMATES OF 51 DOLLARS OR MORE						UNDERESTIMATES OF 51 DOLLARS OR MORE					
		LESS THAN 51	51 TO 250	251 TO 500	501 TO 1,000	1,001 TO 5,000	5,001 OR MORE	TOTAL	51 TO 250	251 TO 500	501 TO 1,000	1,001 TO 5,000	5,001 OR MORE	TOTAL	51 TO 250	251 TO 500	501 TO 1,000	1,001 TO 5,000	5,001 OR MORE
TOTAL	100.00	10.60	19.79	19.69	18.85	25.13	5.93	31.00	7.53	6.99	5.33	9.03	2.12	58.39	12.26	12.70	13.52	16.10	3.81
ONE PRIOR QUARTER, TOTAL	100.00	8.55	4.77	10.88	11.58	38.74	25.49	40.76	1.73	4.50	4.71	18.15	11.67	50.70	3.04	6.38	6.87	20.59	13.82
CEILING QUARTER HIGHEST, TOTAL	100.00	3.38	3.64	14.88	4.86	40.70	32.53	38.57	1.48	8.55	1.93	19.98	6.63	58.04	2.16	6.33	2.93	20.72	25.90
CEILING QUARTER NOT HIGHEST, TOTAL	100.00	9.77	5.04	9.92	13.19	38.26	23.82	41.28	1.79	3.53	5.38	17.71	12.87	48.95	3.25	6.39	7.81	20.55	10.95
TWO PRIOR QUARTERS, TOTAL	100.00	9.09	13.65	18.24	20.70	33.96	4.37	34.85	5.73	6.52	7.25	14.04	1.31	56.07	7.92	11.72	13.45	19.92	3.06
CEILING QUARTER HIGHEST, TOTAL	100.00	14.44	17.98	21.35	20.66	17.13	8.42	19.39	7.25	7.43	2.68	2.03	0.00	66.15	10.73	13.92	17.98	15.10	8.42
LESS THAN 100	100.00	18.61	14.29	21.53	19.29	14.81	11.44	9.37	4.17	5.20	0.00	0.00	0.00	71.99	10.12	16.33	19.29	14.81	11.44
100 TO 249	100.00	6.29	22.95	26.42	33.47	10.85	0.00	34.44	16.56	6.28	6.35	5.25	0.00	59.25	6.39	20.14	27.12	5.60	0.00
250 TO 499	100.00	7.91	42.70	16.95	23.96	8.48	0.00	29.83	13.68	8.04	8.11	0.00	0.00	62.26	29.02	8.91	15.85	8.48	0.00
500 TO 999	100.00	10.48	0.00	27.92	21.95	31.00	8.65	8.79	0.00	8.79	0.00	0.00	0.00	80.73	0.00	19.13	21.95	31.00	8.65
1,000 TO 1,999	100.00	27.36	0.00	27.73	0.00	23.52	21.39	27.73	0.00	27.73	0.00	0.00	0.00	44.91	0.00	0.00	0.00	23.52	21.39
2,000 TO 4,999	100.00	25.45	0.00	0.00	0.00	48.09	26.46	18.52	0.00	0.00	0.00	18.52	0.00	56.03	0.00	0.00	0.00	29.57	26.46
CEILING QUARTER NOT HIGHEST, TOTAL	100.00	8.65	13.29	17.98	20.69	35.35	4.04	36.12	5.60	6.45	7.62	15.03	1.42	55.23	7.69	11.53	13.07	20.32	2.62
LESS THAN 100	100.00	15.95	13.37	19.47	19.18	29.09	2.95	16.07	2.75	4.38	2.26	6.68	0.00	67.99	10.62	15.09	16.92	22.41	2.95
100 TO 249	100.00	9.76	15.40	21.04	25.48	27.11	1.21	29.27	5.75	4.50	9.12	9.40	0.50	60.97	9.65	16.54	16.36	17.71	0.71
250 TO 499	100.00	3.77	16.17	23.07	22.19	31.41	3.39	39.53	5.91	11.38	9.12	11.95	1.17	56.70	10.26	11.69	13.07	19.46	2.22
500 TO 999	100.00	5.95	15.19	16.90	21.47	36.07	4.41	52.13	9.69	9.67	11.76	20.63	0.38	41.91	5.50	7.23	9.71	15.44	4.03
1,000 TO 1,999	100.00	2.30	5.11	9.36	16.50	63.24	3.49	54.40	5.11	2.23	11.64	33.21	2.21	43.30	0.00	7.13	4.86	30.03	1.28
2,000 TO 4,999	100.00	9.56	4.47	4.76	13.68	48.41	19.12	42.93	2.41	0.00	0.00	26.18	14.34	47.51	2.06	4.76	13.68	22.23	4.78
THREE PRIOR QUARTERS, TOTAL	100.00	12.37	28.93	23.36	19.50	14.31	1.51	25.18	10.62	8.06	4.01	2.49	0.00	62.43	18.31	15.30	15.49	11.82	1.51
CEILING QUARTER HIGHEST, TOTAL	100.00	14.01	52.34	17.60	7.89	2.11	6.05	2.86	1.37	0.00	1.49	0.00	0.00	83.13	50.97	17.60	6.40	2.11	6.05
LESS THAN 100	100.00	28.91	11.58	34.08	0.00	0.00	25.43	0.00	0.00	0.00	0.00	0.00	0.00	71.09	11.58	34.08	0.00	0.00	25.43
100 TO 249	100.00	26.32	65.41	8.28	0.00	0.00	0.00	6.90	6.90	0.00	0.00	0.00	0.00	66.79	58.51	8.28	0.00	0.00	0.00
250 TO 499	100.00	0.00	88.56	0.00	11.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	88.56	0.00	11.44	0.00	0.00
500 TO 999	100.00	13.04	12.71	27.88	32.01	14.35	0.00	10.14	0.00	0.00	10.14	0.00	0.00	76.81	12.71	27.88	21.87	14.35	0.00
1,000 TO 1,999	100.00	0.00	74.65	25.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	74.65	25.35	0.00	0.00	0.00
2,000 TO 4,999	100.00	0.00	69.42	30.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	69.42	30.58	0.00	0.00	0.00
CEILING QUARTER NOT HIGHEST, TOTAL	100.00	12.28	27.56	23.70	20.19	15.03	1.25	26.50	11.17	8.54	4.16	2.63	0.00	61.23	16.39	15.16	16.03	12.40	1.25
LESS THAN 100	100.00	33.78	30.73	11.58	15.86	6.32	1.73	9.40	7.91	0.75	0.74	0.00	0.00	56.82	22.82	10.83	15.12	6.32	1.73
100 TO 249	100.00	17.08	38.04	15.82	13.81	14.69	0.56	20.05	11.88	2.94	1.62	3.61	0.00	62.87	26.16	12.88	12.19	11.08	0.56
250 TO 499	100.00	11.28	28.68	30.41	18.67	9.42	1.55	30.30	14.05	12.96	2.02	1.27	0.00	58.43	14.63	17.45	16.65	8.15	1.55
500 TO 999	100.00	5.29	22.90	30.98	24.74	15.01	1.08	30.69	10.35	13.12	5.24	1.98	0.00	64.02	12.55	17.86	19.50	13.03	1.08
1,000 TO 1,999	100.00	4.34	21.86	21.48	26.08	25.35	0.87	27.98	8.53	6.10	8.79	4.56	0.00	67.66	13.33	15.38	17.29	20.79	0.87
2,000 TO 4,999	100.00	7.90	19.57	11.36	22.22	36.66	2.29	39.64	11.37	3.83	13.99	10.45	0.00	52.46	8.20	7.53	8.23	26.21	2.29
5,000 OR MORE	100.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	100.00	0.00

Source: Derived from the 1973 CPS-IRS-SSA Exact Match Study conducted by the Census Bureau and Social Security Administration with the assistance of the Internal Revenue Service.

1/ The difference between the largest and smallest wage amounts in quarters prior to the ceiling quarter.