AN ERROR PROFILE: EMPLOYMENT AS MEASURED BY THE CURRENT EMPLOYMENT STATISTICS PROGRAM

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I. Introduction

An error profile is a vector, each component of which corresponds to an aspect of the survey process that may lead to errors in the data. It is desirable to have sampling error and a measurement of overall error among the components of the error profile. The components may be overlapping or not, correlated or not. Some of the components of an error profile may be scalars, for example, estimates of variance components; others may be vectors or matrices, i.e. tables of characteristics of sample and population. The purpose of this study is to present steps towards an error profile for the national employment estimates of the Current Employment Statistics (CES) Program of the Bureau of Labor Statistics (BLS).

II. Specifications Met by the Survey

1. **Purpose.** The CES program provides monthly estimates of employment, and hours and earnings of persons on the payrolls of nonagricultural establishments including government, by detailed industry. Estimates are published for the Nation, States and local areas. This paper is concerned only with the estimates of employment for the Nation and for eight major industry divisions.

2. **Publication Dates.** Preliminary estimates for at least the Nation and for 8 industry divisions, are published in a press release issued the third Friday after the week including the 12th of the month. They are also published with more industry detail about two weeks later in the BLS monthly periodical Employment and Earnings (E&E). Estimates are published for over 400 industries, or aggregations of industries, in E&E , in each of the two following months. The three sets of estimates are often called the first, second and third closing estimates.

3. **Relative Error.** The relative error of the estimate of National month-to-month change, the ratio of the current month's estimate of employment to the preceding month's estimate of employment, is between 0.1 and 0.2 percent.

4. **Administration.** The CES is a joint Federal-State cooperative data collection and processing program. The States prepare the CES estimates for the States and local areas. BLS-Washington prepares the National estimates. The BLS Regional Offices provide guidance and technical assistance to the States.

III. Concepts: Establishment, Employment, Industry

The concepts of employment and industry are fundamental in the CES program, because estimates are produced of employment by industry.

1. **Establishment.** An establishment is defined to be an economic unit such as a farm, mine, factory, or store which produces goods or provides services; it is usually at a single physical location and engaged in one type of economic activity. If more than one type of economic activity is performed at a single location, each activity is treated as a separate establishment, provided that:

a. No one industry description, at the level of industry detail considered, includes the combined activities;

b. The employment in each such activity is significant;

c. Reports can be prepared on the number of employees, their wages and salaries, sale of receipts and other establishment type data;

d. The enterprise owning the establishment is willing to provide the reports on employment and other information for each of the establishments.

Thus, an establishment is not necessarily the same as a business or company; these may consist of several establishments.

The unit that reports information in the CES program is called a reporting unit. Often, the reporting unit is an establishment. Sometimes, a reporting unit consists of several establishments, e.g. a chain store may provide a single report for all of its establishments in a county. Sometimes, as in the transportation or public utility businesses, the concept of the establishment being at one location does not apply.

2. **Employment.** Establishments report the number of employees on their payrolls who receive pay for any part of the pay period including the 12th of each month. For most establishments, this pay period is a week but an establishment reports for whatever pay period it actually uses, bi-weekly, monthly or other. CES estimates are also prepared for women employees and for production and nonsupervisory employees, but this study only considers all employees. A person will be counted as many times as the number of payrolls on which he is listed for the reference period, whether because of holding more than one job or because of changing jobs during the specified pay period. Proprietors, the self-employed, unpaid volunteer or family workers, farm workers, and domestic workers in households are excluded according to the above definition, but employees at all levels are included, e.g. executives of corporations. Government employment covers only civilian employment; military personnel are excluded.

There is no requirement that a minimum number of hours be worked during the pay period; the only requirement is that the person be on the payroll and be paid.

3. **Industry.** Industries are classified according to the Office of Management and Budget (OMB) Standard Industrial Classification (SIC) code, with a 1,2,3, or 4-digit code -- the higher the digit, the more detailed is the classification. The higher digits are subsets of the lower digits and can be aggregated to form different levels of industry groupings. To facilitate classification by industry, establishments provide information on their principal products or activities and the percent of sales value or receipts resulting from each of these products.

IV. Estimation

1. <u>General Description.</u> CES estimates of employment are first computed for 846 <u>estimating cells</u> -- an estimating cell consists of all establishments in an industry defined by a 3 or 4-digit SIC code; some of the industries are further subdivided by region and/or size of establishment as measured by employment. Then, the estimates of total employment for the 846 estimating cells are summed to provide estimates for larger industry groupings.

For each estimating cell, the CES estimate of employment is a product of three terms:

- A <u>benchmark, B.</u> The benchmark is a relatively complete count of employment computed for March of every year, with some exceptions, but not available for about 18 months after the reference month, March;

- A product of <u>link relatives, L.</u> The link relative for a specified month is the ratio of total employment in that month to total employment in the preceding month for establishments reporting in both months. (In the actual estimation process, as discussed in Section V, the estimator may be more complex.);

- A power of an <u>adjustment factor, F.</u> The adjustment factor estimates the effects of births, deaths and other "persistent" sources of bias on employment.

2. <u>Estimators.</u> An estimator, E_{ik}, of employment for the kth month after the last benchmark available at the time the estimator is computed has the form:

$$E_{ik} = B_{io} L_{i1} \dots L_{ik} F_i^k \qquad (1)$$

where i denotes the estimating cell, B_{io} is the benchmark, L_{ij} is the link relative for month j, j = 1, ...,k, and

$$L_{ij} = \frac{Y_{i,j,j}}{Y_{i,j,j-1}} ,$$

where $Y_{i,j,h}$ is the total employment in cell i in month h (h=j, j-1), after the benchmark for establishments reporting in month j after the benchmark, and F_i is the adjustment factor. Thus, the first subscript identifies the cell, the second subscript identifies the month for which the link relative is computed and the third subscript identifies the month of the data summed.

The subscript, i, will now be omitted for convenience. Let $B_{-\alpha}$, $\alpha= 1, 2, \dots, 6$, be the last 6 benchmarks at intervals of one year prior to B_0.

In order to state how F is calculated, let us define $E'_{-\alpha}$ by

$$E'_{-\alpha} = B_{-(\alpha+1)} L_{\alpha 1} \dots L_{\alpha 12}, \alpha = 1, \dots , 5 \qquad (2)$$

where $L_{\alpha 1}, \dots , L_{\alpha 12}$ are the link relatives for the 12 months following the month of $B_{-(\alpha+1)}$. Then the adjustment factor, F, is

$$F = 1 + \frac{1}{60} \sum_{\alpha=1}^{5} \frac{B_{-\alpha} - E'_{-\alpha}}{B_{-\alpha}} \qquad (3)$$

Usually, values of F are close to 1, ranging from 1.000 to 1.004, or in a few cases a little larger, but more often, no greater than 1.002.

As expression (3) shows, any source of bias that is persistent over the 5 benchmark comparisons included in (3) will affect the value of F.

The form of the estimator given in (1) and the fact that the benchmark and link relatives use the same concepts of employment imply that current estimates of employment are extrapolations of the benchmark based on the link relatives and adjustment factor.

The relative change in employment from month k-1 to month k is estimated by

$$\frac{E_k - E_{k-1}}{E_{k-1}} = L_k F - 1 \qquad (4)$$

Thus, estimates of relative month-to-month change are independent of the last available benchmark and depend only on the current link relative and the adjustment factor, F. Since F is usually small and has no cumulative effect in a one month period, relative month-to-month change depends primarily on the current link relative.

Adjustment factors are computed by BLS with each new benchmark, for selected 2 and 3-digit industries. Thus, more than one industry may have the same adjustment factor.

In order to discuss the formulae for first, second and third closing estimators, it is desirable to define first, second and third closing dates. By <u>reference week</u> for a given month is meant the calendar week containing the 12th of that month. All three closing dates occur on a Monday. The first closing is the third Monday after the reference week. The second and third closings occur at three week intervals after the first closing.

If E_k is a first closing estimator, then L_k is computed for establishments whose data are received in BLS by the first closing date for month k, and L_{k-1} is computed for establishments whose data are received in BLS by the second closing date for month k-1. Link relatives for months 1, 2, ..., k-2 are third closing link relatives.

If E_k is a second closing estimator, then L_k is computed for establishments whose data are received in BLS by the second closing date for month k. Link relatives for earlier months are third closing link relatives.

If E_k is a third closing estimator, then all k link relatives are third closing link relatives.

As mentioned earlier, link relatives are computed for establishments providing data in both the month of the link relative and in the preceding month.

BLS computes estimates for each of the 846 estimating cells. In general, estimating cells include several of the strata used in selecting the sample. BLS does not, however, use sampling weights for responses in the different strata within an estimating cell.

Although not discussed in detail here, BLS uses several means of detecting outliers and reducing their effects on the estimators. These have the effect of smoothing month-to-month changes.

V. Steps in the Production of CES Estimates

Chart 1 shows the major steps in the production of National CES employment estimates. It provides an overview of the CES design.

One major data source of the CES estimates is the Unemployment Insurance (UI) file. Each quarter, mandatory tax reports containing monthly data on employment and quarterly data on wages are submitted to the States by over 4,000,000 reporting units subject to State UI laws. The UI data are supplemented by data from the Civil Service Commission (CSC), the Census of State and Local Governments, the Interstate Commerce Commission (ICC), and other sources.

The UI program provides:

● The ES-202 report which is a summary of the UI tax reports. Each quarter, the States edit and tabulate the UI data by industry code (in the first quarter, by industry code and size of establishment). These tabulations give the distribution of establishments and payroll employees by industry and size class. They essentially constitute the ES-202 first quarter reports, which are due at BLS-Washington 6 months after the quarter ends.

The ES-202 reports are used to compute benchmarks and to determine the size of the incremental sample.

● The Unemployment Insurance Address File (UIAF), which is a listing of establishment identification and various characteristics, including number of employees and industry code. Each State prepares this list annually from the UI tax reports. In 1978, UIAF will include over 98.5 percent of all establishments.

The UIAF provides the frame for the selection of the incremental sample selected each year to update the 790 Survey.

The other major date source is the BLS 790 Survey, a national survey, called the 790, because of the form number.

The BLS 790 Survey is a voluntary, mail, monthly survey in which approximately 160,000 establishments report each month on total employment, and the employment of women and production workers as well as the hours and payrolls of production workers.

The 790 Survey is used to calculate the link relatives.

The last major revision of the 790 Survey occurred in 1963, when an improved design was introduced. This design was a stratified random sample of establishments from each of over 400 industries, based on the then existing UIAF, supplemented by samples from industries not included in the UIAF.

Within each industry in the UIAF, the stratification was by size of establishment and effectively by State since each State used National sampling ratios to select its sample from the State UIAF.

In almost all industries, all establishments having 250 or more employees constituted the certainty stratum and were designated for the sample. In some industries, all establishments having 100 or more employees constituted the certainty stratum. The sampling ratio from each of the other strata was proportional to the average size of establishment in the stratum, as determined by the ES-202 tabulation for the first quarter in 1963.

If the coefficient of variation of size of establishment was constant for all non-certainty strata for a given industry, the stratified sampling design used optimum allocation for the non-certainty strata.

Exceptions to the stratified design occur for industries not listed in the UIAF. It may be that neither an establishment list (including establishment sizes) nor the equivalent of the ES-202 tabulation is available.

Incremental Sample. Each year, after the ES-202 listings for the first quarter become available, the States update the sample by selecting an incremental sample. They are expected to compute the desired size of sample within each stratum by multiplying the sampling ratio by the number of establishments in a size class in the ES-202 report for the State. Then the States are to select at random, or systematically, from the corresponding stratum of the State UIAF, a sample consisting of the number of establishments equal to the difference between the expected number and the current actual sample size.

The benchmark is computed annually (with some exceptions) from the ES-202, supplemented for industries not covered by UI, and modified by industry classification information from the 790 Survey.

The link relatives are computed monthly from the 790 Survey.

The adjustment factor is computed annually from benchmarks and link relatives for 5 periods preceding the last available benchmark.

VI. The Error Profile

1. An Approach. The number of possible components of an error profile of an estimate, which depends in whole or in part on a survey of respondents, is very large. It seems reasonable, therefore, to begin by identifying the major sources of error of the estimate and to relate the source to the components of error. In the development of the CES error profile, it has been convenient to organize the profile and identify the components according to the "paths" between steps in Chart 1. First, however, relevance and concepts are considered; these remain sources of error even if sampling is not used.

2. Relevance and Concepts.

   a. Relevance. The components of an error profile measuring relevance -- roughly, how much the survey information (even if "true") differs from what is desired, may well vary from user to user. Further, the means of approximating such components are rarely set down. Early in planning, judgments are made on what is reasonably practicable and from then on

discussions are in terms of the desired information. In a continuing survey, perhaps the best means of studying relevance at any given time is to consider with what objectives the analysts are transforming or adjusting the estimates, and what they say about the estimates.

b. Concepts. To what extent do the definitions of concepts inherently define random variables rather than constants? Is the schedule in agreement with the desired concept? Are the reported responses those called for by the schedule? If the same information is obtained from two or more sources, perhaps at different times, as in a ratio or regression estimator, are the concepts the same for the different sources? What are their measurement errors?

The UI tax reports and 790 survey are based on the same concepts of employment, establishments and SIC codes. More instructions are given for the 790 survey than the UI tax reports. The forms used by UI vary from State to State, although the same employment question is asked. The last reported study was by Young and Goldstein.[3] It showed that the 790 schedules were filled in almost exlusively from payroll records, and that the net effects of incorrect reporting were very small.

The 790 assignments of SIC codes are compared annually with UI assigned SIC codes. It will be found in the discussion of the benchmark below that, on the level of industry divisions, there is apparently little difference between UI and the 790 survey in the assignment of SIC codes.

Let us return to the chart and consider error components for the major steps in obtaining CES estimates with the branches leading to the three factors on which the estimates depend: benchmark, B, link relatives, L, and adjustment factor, F.

3. From UI to Benchmark.

a. Imputation of UI Tax Reports. States summarize the tax reports for each quarter, containing monthly data on employment in a report called the ES-202 report. Three months after the end of the quarter, the State Employment Security Agency (SESA), imputes for establishments whose reports have not arrived. Imputation accounts for from 2 to 10 percent of the establishment reports but no more than one percent of employment. At present, there are general guidelines for imputing.

b. Benchmark. Benchmarks are computed almost every year primarily from the ES-202 for the first quarter of the year. The computation of the benchmarks begins with ES-202 reports for the 50 States and the District of Columbia. SIC codes of establishments in the 790 survey and of UI tax reporting units are compared; the more detailed specification of establishments with different SIC codes is adopted and ES-202 data are modified by transferring employment in accordance with changes in SIC's.

Then, data on total employment for SIC's not in the ES-202 report are obtained and added to the modified ES-202 data to obtain the benchmarks.

Table A shows the steps from the ES-202 reports (after they are summarized in BLS) to the benchmark. The most important step is that of adding employment for the SIC's that do not have full UI coverage. These magnitudes are shown by industry division in Table A, and the details and sources of the estimates are given in Table B.

The small changes resulting from SIC assignments are shown in the third column of Table A. The column headed ES-202 will differ slightly from data published in the BLS quarterly periodical, Employment and Wages (E&W). The published table in E&W includes the 50 States, the District of Columbia, and Puerto Rico. The column headed ES-202 includes only the 50 States and the District of Columbia, since National CES estimates do not include Puerto Rico.

Table B shows the SIC's and the estimated employment for those industries in which the UI is supplemented. The sources from which the supplementary data were obtained are the Interstate Commerce Commission (ICC); County Business Patterns (CBP), an annual publication of the Census Bureau based on data obtained from the Social Security Administration; The American Hospital Association (AHA); the Center for Education Statistics and the Office of Education of the Department of Health, Education and Welfare (HEW).

c. Completeness of Benchmark. How "reasonably complete" a count is the CES benchmark? Some establishments may not file tax reports with the States, or may file their initial reports late. Also, the estimates of employment for the SIC's not covered by UI are not necessarily precise. One indication of the completeness of the CES is how it relates to the Current Population Survey (CPS) estimate of employment. One study by Green [4] and another by Korns [5] compared the CES estimate of jobs with the CPS estimate of employment converted to an estimate of jobs. The conversion primarily consists of adjusting for the number of jobs held by persons with more than one job and for the number of jobs held by persons not counted in the Census. The latter estimates depend on hypotheses concerning the employment characteristics of those not counted in the Census. If the effects of the Census undercount are ignored, then the CES estimate of jobs exceed the adjusted CPS estimate. If one accepts the Green and Korns estimates of undercount, the CES estimates are less than the adjusted CPS estimates by about 5 percent. If one accepts the Johnson and Wetzel [6] assumptions (in a Bureau of the Census study of employment and unemployment effects of the undercount), the CPS adjusted estimate might be one percent greater than the CES estimate of jobs. In view of the differences in concept, samples, and data collection procedures, as well as the assumptions made in the undercount studies, the conclusion seems to be that CES and adjusted CPS estimates do not differ importantly. Also, the benchmark and revised CES estimates differ by about 0.1 to 0.2 percent. The conclusion is that the benchmark is a reasonably complete count.

4. From UI to 790 Survey and the Link Relatives.

a. The Frame. Every year, each State is to use its Unemployment Insurance Address File (UIAF) as the frame from which to select incremental samples in

order to maintain the 790 sample. For industries not having UI coverage, the States select their own frames, and select and maintain their own samples. Currently in progress is a special Survey of the States in which the State agencies will report on the procedures used and the problems encountered in maintaining the 790 Survey.

The completeness of the UI portion of the total frame is best indicated by the fact that the establishments listed in the UIAF account for about 97 percent of all employment in private nonagricultural industries, all Federal employment, 80 percent of State Government employment and 15 percent of local government employment. The completeness of the frames used for most of the industries not covered by UI is not known. However, beginning with the first quarter of 1978, UI, and therefore, UIAF coverage will include about 98.5 percent of all employment in nonagricultural establishments, primarily because all State and local governments will have UI coverage.

b. Comparison of 790 Sample with Universe and Potential Sample. Table C shows a comparison of the actual sample for Marc, 1974, with the potential size of sample, the latter being obtained by applying the sampling ratios for individual industries to the tables of employment by industry and size class in the ES-202 report, with some adjustments for industries not covered. Table C is presented here to show the relationship of the employment in establishments reporting in the 790 survey to both the universe population and the potential sample size, if there is neither refusal nor no nonresponse. The table displays the large size of the 790 sample.

c. Processing the 790 Schedules. As illustrations of the numbers of schedules processed each month: in April, 1977, of the 159,843 schedules entering the editing and screening module (which includes matching), 8,468 were not used in estimation, either because the data were rejected during editing and screening or because there were no data for the establishment in the preceding month. (The latter data are required by the use of link relatives.) Thus, the estimates were based on 151,374 schedules, or 94.7 percent of those entering the editing and screening module. The corresponding data for May were 156,613, 6810, and 149,803, or 95.7 percent of those entering the editing and screening module. In both months, the number of schedules used in making estimates was about 85 percent of the National Registry of active reporters which lists about 184,000 establishments. However, the value, 85 percent, is a response rate only for the National Registry. In a voluntary continuing survey of establishments, refusals and "dropouts" occur. The National Registry includes only "active reporters". The comparison of estimates and benchmarks presented later includes the net effects of nonresponse and the selection of respondents.

During the data processing operations, including estimation, listings are prepared of establishments and estimating cells that fail various editing and screening tests including comparisons with past data for establishments or cells. It would be useful to have summary tables prepared in addition to the listings, and also to learn what would have been the estimates, if editing or screening or reviewing estimates by estimating cell were not done.

At the conclusion of the monthly data processing cycle for a given closing estimator, the link relatives have been calculated and the estimation formulae (Section V) are applied.

5. Comparisons of Estimates and Benchmarks. Benchmarks are available about 18 months after the benchmark month. At that time, the estimates for the benchmark month and the benchmark can be compared.

Four estimates for the benchmark month are computed. The first, second and third closing estimators, here denoted by E_1, E_2, and E_3, are computed using the last available benchmark at the time of computation, usually that of 24 months previous to the benchmark month. About 6 months after a specified benchmark month, the benchmark for the preceding year, 12 months prior to the specified benchmark month, usually becomes available. The fourth estimator, E_r, is computed from the newly available preceding year's benchmark, the link relatives for the following 12 months and the adjustment factor. Comparisons of E_1, E_2, E_3, E_r with B, the benchmark for the same month as the four estimates, provide one basis for evaluating CES estimates. Another basis is how useful these data are in analysis; this second basis is not discussed here.

Let us review the major sources of error to identify those whose net effect is included in the benchmark comparison.

The concepts of employment, establishment and SIC used in the CES estimates and the benchmark are the same. There may be differences in implementation, but until this question is studied, the comparisons made below of estimates and benchmark cannot now be said to include errors attributable to concepts and their implementation.

The comparison between estimate and benchmark does include the effects of both respondent selection and nonresponse, but does not reflect the previously discussed possible small undercount in the benchmark since the frame used for the 790 survey is a list of the establishments whose data are the major part of the benchmark.

Data processing to obtain the ES-202 State Reports from the UI tax reports and the first editing of 790 schedules are performed by the States using instructions prepared by BLS-Washington. Data processing is performed by BLS-Washington for the benchmark and estimates, using and supplementing the State ES-202 reports, the 790 schedules and the adjustment factors. Thus, the comparison between benchmark and estimates may reflect some differences due to data processing.

In Table D, relative differences between the estimates and benchmarks are presented as well as relative differences between first and third closing estimates for the same months.

It would be easy [7/] to compute summary statistics from Table D. However, the number of years is only three and the summary statistics might mask the essential close agreement not only for total employment but also for the 8 industry divisions.

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Detailed data are shown for only the three years since the last major increase in UI coverage. The next major increase in UI coverage will affect primarily State and local governments. The comparisions for the private sector, at least, may be expected to be stable.

The conclusions from Table D are:

a. Agreement between first and third closings is reasonably good.

b. Differences between third closing and benchmark measure the error in the level of the estimate. It is difficult to generalize concerning the current level of the mean square error, since the only comparison for a 24-month period with the present level of coverage is the 1975 comparison which shows small mean square errors, except for mining (which has relatively small employment) and government (which should improve beginning in 1978 with the increase in UI coverage).

In the formula for the relative mean square error of the third closing estimate of level, k months after the last available benchmark, one term is the product of k^2 and the relative mean square error of the adjustment factor. The factor k^2 will lead to a large relative mean square error of the estimate of level resulting from this term, if k is large enough. The data of Table D confirm this.

c. The squared relative errors, $(E_r-B)^2/B^2$, provide upper bounds for the ratios of current month estimated employment to preceding month estimated employment.

VII. Summary and Conclusions

An error profile may contribute to the achievement of several possible goals:

1. Improvement of analysis through the measurement of overall error;

2. Optimum allocation of resources among the parts of a program, e.g. for a given budget, to allocate resources among the different parts of a program to minimize overall error, or for a given overall error, to allocate resources among the different parts of a program to minimize cost;

3. Understanding the limits of possible achievement by spending more money without changing design since nonsampling biases may not tend to zero as the size of sample increases;

4. Identifying aspects of the survey on which efforts should, if practicable, be made to reduce the contributions to the mean square error arising from those aspects;

5. In continuing surveys, identifying survey aspects, where deterioration is occurring and remedial action is needed;

6. Providing to the designers of computer programs, a list of outputs that will be useful in routinely measuring error components arising in the computer process, without special studies;

7. To make possible improved analysis of relationships among the underlying "true values";

8. To study cost effectiveness.

To achieve these goals may be costly except, perhaps, for the computer requirements in item 6 (if they are developed early enough), but the benefits of achieving the goals will be great. For large and continuing surveys (and also for some smaller surveys), items, in addition to sampling and overall errors, that would justify continuing measurement efforts are:

1. Concepts;

2. Changes in the population and frame;

3. Completeness of frame;

4. Data collection procedures, including
   a. Agreement to participate;
   b. Dropouts, permanent or temporary;
   c. Current and cumulative response rates; and
   d. Response errors due to data collection;

5. Any imputation process whether explicit, e.g. substitution of another schedule, use of past data for element, adjusted or not, or implicit, e.g. weighting procedure - and whether for nonresponse, missing data or "outliers";

6. Steps in data processing, including estimation, both for
   a. Correctness of processing steps, e.g. card punching, and
   b. Detection of data errors or outliers, e.g. editing and screening;

7. Implications of analysis requirements for the accuracy of the survey estimates;

8. Cost-effectiveness of the survey.

Many possible error components have been discussed in the preceding pages, but few could be estimated from information currently available. Much of the necessary data already exists and is used in the CES system. A research program has been developed to provide improved measurement of an error profile.

Footnotes

1/ In this report, the meaning of States includes the 50 States and the District of Columbia; the CES Program is also conducted in the Commonwealth of Puerto Rico, but those estimates are not included in the U.S. National estimates.

2/ Standard Industrial Classification Manual, Office of Management and Budget, Executive Office of the President. The 1967 edition of the Manual is currently being used in the CES program. CES estimates based on the 1972 edition of the Manual are expected to be published in the Fall of 1978.

3/ Young, Dudley E. and Goldstein, Sidney, "The BLS Employment Series and Manufacturing Reporting Practices", Monthly Labor Review, November, 1957, pp. 1367-1371.

4/   Green, Gloria P., "Comparing Employment Estimates from Household and Payroll Surveys", Monthly Labor Review, December, 1969.

5/ Preliminary research by Alexander Korns, Bureau of Economic Analysis(BEA), using 1974 data.

6/ This is discussed in Brooks, C.A. and Bailar, B.A., "An Error Profile: Employment as Measured by the Current Population Survey", presented at the American Statistical Association meeting in Chicago, August 15, 1976.

7/ Summaries are included in section "Explanatory Notes" published monthly in E&E.

Chart 1. Current Employment Statistics (CES) Estimates of Employment.

Concepts
Establishment, Employment, Industry (Standard Industrial Classification (SIC))

State Unemployment Insurance (UI) Program
Tax Reports

ES-202 Report
Summary of UI Tax Reports

Unemployment Insurance Address File (UIAF)
Frame

Incremental Sample

790 Survey
Monthly Survey of Establishments

SIC Comparison

Benchmark, B	
Most recent available B	5 previous B's

Link Relative, L	
For 5 periods before most recent available B	Since date of most recent available B

Adjustment Factor, F
From B's and L's for 5 previous periods

CES Employment Estimates (not seasonally adjusted)

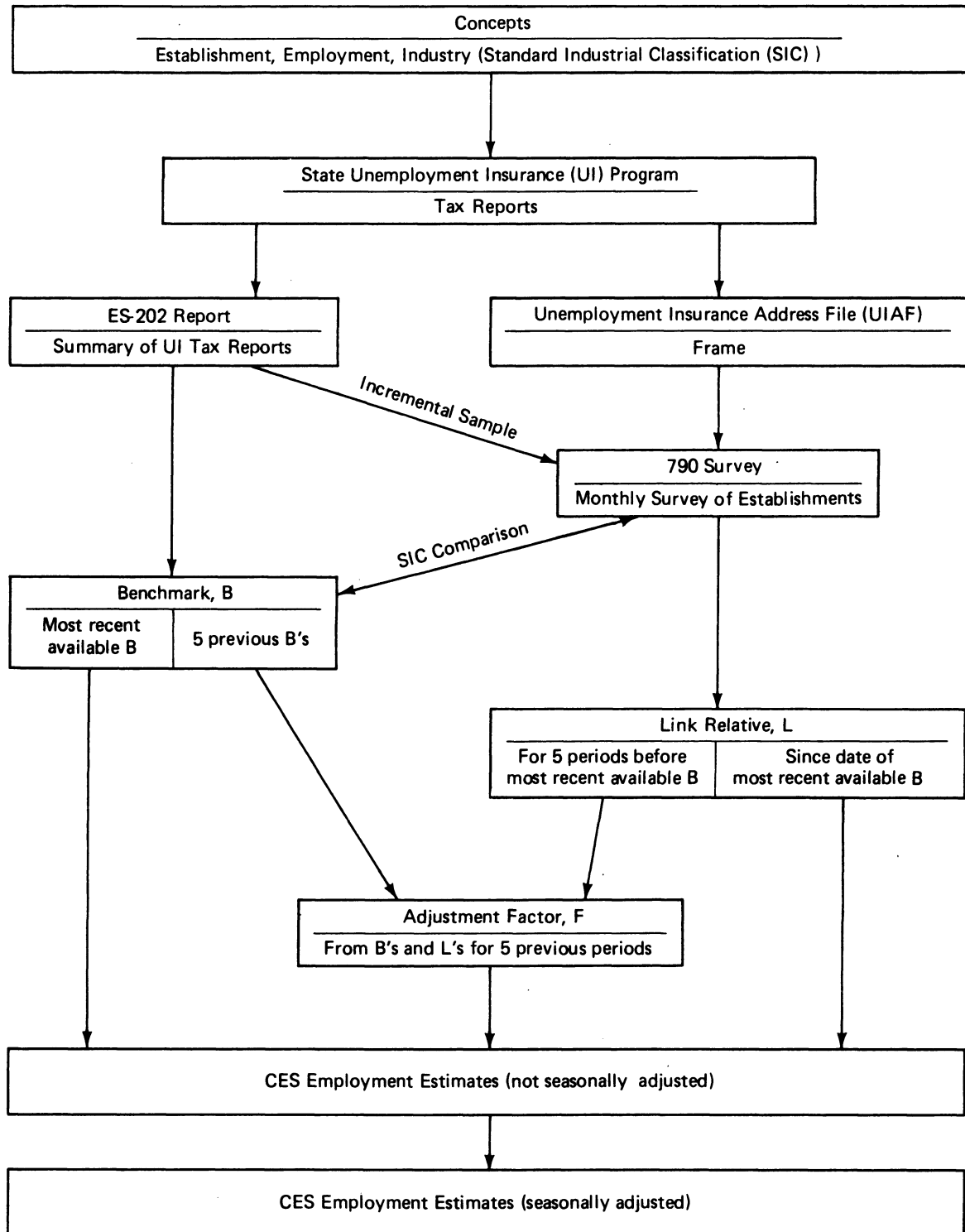| CES Employment Estimates (seasonally adjusted) |
| --- |

Table A. Employment in Nonagricultural Establishment, From ES-202
to Benchmark, by Industry Division, March, 1974.
(thousands of employees)

Industry Division	ES-202[1] summary	Changes due to changes in SIC	Other	March, 1974 Benchmark
	(1)	(2)	(3)	(4)
Total private [2]	61,144	0.0	2017.8	63,162
Mining	699	-1.1	0.0	668
Contract Construction	3,760	1.5	0.0	3,762
Manufacturing	19,973	13.9	0.0	19,987
Transportation and public utilities	4,091	-0.6	578.5[4]	4,669
Wholesale and Retail Trade	16,566	-2.1	0.0	16,564
Finance, insurance and Real Estate	4,062	1.3	103.9	4,167
Services	12,023	-12.9	1335.4	13,345

1/ There are small differences between the column headed ES-202 and the data published in
BLS Employment and Wages, (E&W) First Quarter, 1974, due primarily to the fact that
Puerto Rico is included in the tabulations published in E&W but not in the ES-202 Summary.

2/ Differs from published E&W because SIC 99 (nonclassifiable establishments) and SIC's 07-09
(Agricultural Services, Forestry and Fisheries) are included in Services in CES but are not
in Services in E&W.

3/ Differs from published E&W due to exclusion of SIC 01 (commercial farms) in this table.

4/ Includes 573.9 for SIC 40, Railroads (a complete count), for comparability with benchmark.

Table B.* Adjustments in Employment for ES-202 Coverage Exclusions, March, 1974

Category exempt from UI coverage	SIC	Benchmark March 1974	Benchmark Source
1. Trucking companies owned by RR	421,2	200	ICC
2. Railroad car loan companies	47	4,400	ICC
3. Nonoffice insurance salesmen	631	75,000	CBP
4. Nonoffice insurance salesmen	633	13,400	CBP
5. Nonoffice insurance salesmen	635,6,9	1,500	CBP
6. Religious trusts	67	14,000	CBP
7. Private hospitals	806	93,400	AHA
8. Private elementary and secondary schools	821	224,000	Various
9. Private Colleges and universities	822	155,600	HEW
10. Other schools & educational services	823,4,9	29,300	CBP
11. Religious organizations	866	825,100	BLS[1]
12. Nonprofit organizations with less than 4 employees		8,000	CBP
13. Total adjustments (Sum 1-12)		1,443,900	--
14. Railroad transportation [2]	40	573,900	ICC
15. Federal Government	91	2,691,000	CSC
16. State & Local Government [3]	92,93	11,589,000	Census
17. UI-Covered Private industries	-	61,144,200	ES-202
18. Total Benchmark (Sum of 13-17)	-	77,442,000	-

* Memorandum: Carol M. Utter to John Tucker, August 28, 1975, entitled "march 1974 Benchmark
Adjustment," Table 6.
1/ Based on Council of Churches data plus others for 1974.
2/ Covered by Railroad Retirement Board.
3/ UI-covered partially; UI will cover almost completely in January, 1978.

Table C. Actual and Potential Samples, March 1974*

Industry Division	3/74 Benchmark (1)	Actual BLS Sample[1] Employees (thousands) (2)	Actual BLS Sample[1] Percent of Benchmark (3)	Potential Sample[2] Employees (thousands) (4)	Potential Sample[2] Percent of Benchmark (5)
Total[3]	77,155	33,613	41	43,191	56
Mining	668	307	46	423	63
Contract Construction	3,762	771	20	1,544	41
Manufacturing	19,987	11,821	59	14,824	74
Railroads	574	537	94	537	94
Other transportation and utilities	4,095	2,181	53	3,576	87
Wholesale and retail trade	16,564	3,050	18	6,145	37
Finance, insurance and real estate	4,167	1,507	36	2,004	48
Serivces [3]	13,058	2,716	21	5,415	41
Government: Federal	2,691	2,691	100	2,691	100
State & Local	11,589	6,032	52	6,032	52

*Based on a letter from M.S. Raff to N. Frumkin, Nov. 2, 1976.

1/ As reported in Table H of E&W, except as modified by footnote 3.
2/ Expected number if BLS sampling ratios were fully implemented without nonresponse.
3/ Omits service employment in agriculture, forestry, fisheries, and unclassifiable
   establishments (SIC 07,08,09,99).

Table D. Relative Differences[1]: Employment Estimates and Benchmarks, March 1973, 1974, 1975.
(in percent)

Industry	First and third Closings 1973 (1)	First and third Closings 1974 (2)	First and third Closings 1975 (3)	Third Closing[2] and Benchmark 1973 (4)	Third Closing[2] and Benchmark 1974 (5)	Third Closing[2] and Benchmark 1975 (6)	Revised Estimate and Benchmark 1973[3] (7)	Revised Estimate and Benchmark 1974 (8)	Revised Estimate and Benchmark 1975 (9)
TOTAL	0.0	-0.2	0.0	-1.6	-1.7	0.1		-0.1	0.2
Mining	0.2	-0.5	0.1	-3.5	-3.9	-5.7		-3.0	-1.9
Contract Construction	-0.1	-0.4	0.1	-9.6	-9.5	0.9		0.6	0.3
Manufacturing	0.0	-0.3	0.0	-1.1	-1.3	0.1		-0.1	0.3
Transportation and Public Utilities	-0.2	-0.1	0.4	-0.7	-0.7	-0.4		0.0	-0.6
Wholesale and Retail Trade	0.1	-0.1	0.0	-2.2	-2.3	-0.3		0.1	-0.2
Finance, Insurance and Real Estate	0.2	-0.1	0.3	-0.5	-1.6	-0.2		-1.1	0.9
Services	-0.1	-0.1	0.1	-0.9	-0.5	-0.7		-0.7	-0.1
Government	-0.2	-0.2	0.0	-0.5	0.0	1.9		0.5	0.8

1/ [(earlier date - later date)/later date] · 100

2/ The third closing for March, 1973 is based on the March, 1971 benchmark, prior to the
   increase in UI coverage in 1972; The third closing for March 1974 is based on the
   March, 1971 benchmark, since there was no benchmark in March, 1972; The third closing
   for March, 1975 is based on the March, 1973 benchmark.

3/ The revised estimate is not available for 1973, since the 1972 benchmark was not computed.