

Chapter 3.

Occupational Employment Statistics

The Occupational Employment Statistics (OES) survey is a periodic mail survey of nonfarm establishments that collects occupational employment data on workers by industry. The OES program surveys approximately 725,000 establishments in 400 detailed industries. The overall response rate is 79 percent. BLS provides the procedures and technical assistance for the survey; State employment security agencies collect the data. These data are used to estimate total employment by occupation for the Nation, each State, and selected areas.

Background

In 1971, questionnaires were sent to 50,000 manufacturing establishments throughout the United States, marking the beginning of the OES survey. This survey was conducted in cooperation with the Employment and Training Administration and 15 State employment security agencies. It was designed to obtain national, State, and area occupational estimates for the cooperating States. Following the completion of the manufacturing survey, similar surveys were developed for nonmanufacturing industries and State and local governments.

The OES survey follows a 3 year cycle. Three surveys are conducted alternately for manufacturing, non-manufacturing, and the balance of nonmanufacturing industries. The manufacturing survey covers manufacturing industries, agricultural services, and hospitals. The nonmanufacturing survey covers mining; construction; finance, insurance, and real estate; and services. The third survey covers the balance of the nonmanufacturing industries: Wholesale and retail trade; transportation; communications; public utilities; State and local government; and educational services. Hospitals were added to the manufacturing survey in 1980 and educational services were added to the third survey in 1985. Agricultural services were surveyed for the first time at the national level with the 1992 manufacturing survey. The 50 States, the District of Columbia, Puerto Rico, Guam, and American Samoa cooperate in this effort.

Concepts

An *establishment* is an economic unit which processes goods or provides services, such as a factory, mine, or store. It is generally at a single physical location and is engaged

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primarily in one type of economic activity. Single physical locations that encompass two or more distinct economic activities are treated as two or more establishments, provided that separate payroll records are available and certain other criteria are met.

Unit total employment is the number of workers who can be classified as full time or part time, workers on paid vacations or other types of leave, workers on unpaid or short-term absences (i.e., illness, bad weather, temporary layoff, jury duty), salaried officers, executives, staff members of incorporated firms, employees temporarily assigned to other units, and employees for whom this unit is their permanent (home) duty station regardless of whether this unit prepares their paycheck. Unit total employment excludes proprietors (owners and partners) of unincorporated firms, unpaid family workers, workers on extended leave (i.e., pensioners and members of the Armed Forces), and workers on long-term layoff.

Employees are reported in the occupation in which they are working, even if they have been trained for a different occupation. For example, an employee trained as an engineer but working as a drafter is reported as a drafter.

Working supervisors, those spending 20 percent or more of their time at work similar to that performed by workers under their supervision, are reported in the occupations which are most closely related to their work.

Part-time workers, learners, and apprentices are reported in the occupation in which they ordinarily work.

Industrial classification

The industrial classification system currently used for compiling and publishing OES survey data is defined in the 1987 *Standard Industrial Classification Manual*. (See appendix B for a detailed description of this system.)

Under the Standard Industrial Classification (SIC) system, reporting establishments are classified on the basis of major product or activity.

Occupational classification

The OES classification system emphasizes occupations of special interest to many data users, such as technology-related occupations and those which require substantial training. In addition, the system is concise and compatible with the 1980 Standard Occupational Classification (SOC) system. The titles and descriptions of occupations are principally derived from the *Dictionary of Occupation Titles* (DOT). The classification of occupations, with some exceptions, follows the SOC principles which group occupations by function, industry, and skill.

A “crosswalk,” which relates OES occupations to the SOC, the 1990 census classification system, and the DOT, has been developed so that users can use OES data in conjunction with these other sources. With crosswalks, each classification system can be used as a common denominator.

Data Sources and Collection Methods

Employers are the source of occupational data. Within establishments, the main source of occupational data reported by respondents is personnel records. In addition, there are cases, especially for the small reporting units, where personal knowledge of persons completing the reports is also used.

Employment benchmarks for this survey are derived from employment data tabulated from the reports of the Unemployment Insurance program. In some nonmanufacturing industries, supplemental sources are used to obtain lists of establishments that are not covered by unemployment insurance laws. For example, the unemployment insurance file is supplemented by the Federal Railroad Administration’s list of railroad establishments when railroad transportation is sampled.

Employment information is currently being collected for approximately 750 occupations in 7 major divisions. A list of occupations has been designed for each industry or for each group of industries having a similar occupational structure.

Two types of survey questionnaires, long and short, are used. Both forms include specific occupational titles and definitions, establishment identification information, and several questions concerning the exact economic activity

of the business. In addition, the questionnaire provides descriptions of 3-digit SIC industries to reduce industry misclassifications.

The long form specifies an extensive list of occupations selected for each industry grouped under broad headings such as clerical occupations, professional and technical occupations, and service occupations. The long form includes supplemental sheets for respondents to report significant occupations that could not be reported in a detailed occupation, and were therefore reported in an “all other” residual category. Experience with previous surveys has shown that the supplemental sheets can be a valuable tool in improving the occupational lists and definitions for future surveys, as well as clarifying and correcting reported data.

The short form includes abbreviated occupational lists with accompanying definitions. Broad groups are not specified. Respondents are asked to identify and briefly describe jobs that cannot be matched to the occupations listed on the forms. When the questionnaires are returned, these additional occupations are coded according to the corresponding long-form occupational content. The short form was developed to reduce the reporting burden in smaller establishments by including more industry specific occupations and fewer general occupations.

Data are collected from respondents primarily by mail. Occasionally, visits are made to large employers and to other respondents who indicate particular difficulty in completing the questionnaires. Ordinarily, two mailings follow the initial mailing. After the third mailing, a subsample of the remaining nonrespondents is drawn and contacted by telephone.

Occupational employment data are requested for the pay period including the 12th day of April, May, or June, depending upon the industry surveyed.

Sampling Procedure

The OES sample is designed to yield reliable occupational employment estimates by industry for all States and selected substate areas. The sample is selected primarily from the list of business establishments reporting to the state unemployment insurance program.

Within each State, the OES sample design initially stratifies the universe of establishments by three-digit industry code and size class code. Establishments employing 250 employees or more are sampled with certainty. Establishments employing fewer than 250 employees but more than 4 employees are sampled with probability proportional to the *size class* employment within each three-digit industry. Establishments employing four or fewer employees (i.e., size class 1 establishments) are not sampled. Instead, the employment for these establishments are accounted for by assigning a larger sampling weight to establishments employing five to nine employees (i.e., size class 2 establishments). Within each three-digit industry/size class cell,

establishments are systematically selected into the sample through a single random start.

Estimating Procedure

Occupational employment estimates

During the sample selection process, each sampled establishment is assigned a sampling weight that is equal to the reciprocal of its probability of selection. For example, if an establishment on the sampling frame had a 1 in 10 chance of being selected into the sample, then its sampling weight is 10.

For establishments that did not respond to the survey, a nonresponse adjustment factor (NRAF) is calculated and applied against the sampling weights of the responding establishments within each State (Nation)/3-digit industry/size class cell. Multiplying NRAFs by sampling weights increases the weight of the responding establishments so they can account for the missing employment data of the *nonresponding* establishments.

A ratio estimator is used to calculate estimates of occupational employment at the State (Nation)/3-digit industry/size class cell level. For each size class within an industry and State (Nation), the occupational distribution is estimated by calculating a ratio for each occupation. This ratio is the sum of the total weighted employment of an occupation to the sum of the total weighted employment of all responding establishments. These ratios are then multiplied by a known total employment figure (i.e., a benchmark value) for that size class. Higher level estimates of occupational employment are obtained by summing these lower level employment estimates. For example, occupational employment estimates at the three-digit industry level are obtained by summing up size class employment estimates.

Variance estimates of the occupational employment estimates

The OES survey uses a subsample replication technique called the “jackknife random group” to estimate the variance of occupational employment at the 3-digit industry/size class level. In this technique, R subsamples are formed from the parent sample. Next, R estimates of total employment are calculated for each occupation, one employment estimate per subsample. The variability of the R employment estimates for each occupation is calculated and used as an estimate of the variance for each occupation.

Higher level variance estimates of occupational employment are obtained by summing these lower level variance estimates.

Quality control measures

A major goal of a cooperative program like the OES survey is to accommodate State-specific publication needs with limited resources yet standardize the survey procedures across all 50 States and the District of Columbia,

while at the same time producing quality employment estimates. Controlling sources of nonsampling error in this decentralized environment can be particularly difficult. Two important quality control tools employed by the OES survey are the Survey Processing and Management (SPAM) system and the Estimates Delivery System (EDS). Both systems were developed to provide a consistent and automated framework for survey processing and to reduce the workload at the State, regional, and national levels.

By standardizing data processing activities such as validating the sample frame, allocating and selecting the sample, refining mailing addresses, addressing envelopes and mailers, editing and updating questionnaires, producing management reports, and calculating employment estimates, across all States, the SPAM system and the EDS have also standardized survey methodology. This has reduced the number of errors on the data files as well as the time needed to review them.

Presentation

A report on the results of each OES survey is published by the cooperating States. BLS published national occupational employment estimates for the survey years 1971 and 1977 to the present. Each report consists of an analytical interpretation of the findings supported by statistical tables showing estimates of occupational employment and measurements of the sampling error associated with the estimates.

Uses and Limitations

Occupational employment data obtained by the OES survey are used to develop information regarding current and projected employment needs and job opportunities. Such information is used in the development of State vocational education plans. These data also enable the analysis of the occupational composition of different industries, of different establishments in the same industry, and changes in industry employment and staffing patterns over time. OES employment estimates also are used as job replacement aids by helping to identify industries that employ the skills gained by enrollees in vocational training programs. OES survey data also serve as the primary ingredients in the development of occupational information systems designed for use by those who are exploring career opportunities or those assisting others in career decision making.

All surveys are subject to response and processing errors. Errors are reduced through reviewing, editing, and screening procedures and, if necessary, through contact with respondents whose data are internally inconsistent or appear to involve misinterpretation of definitions or other instructions. In addition, estimates derived from sample surveys are subject to sampling error. Sampling errors for occupational employment estimates are calculated and published with the estimates.

Technical References

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U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Employment Statistics, 1994*, Bulletin 2468, February, 1996.

Presents occupational employment data collected in 1994 for the transportation, communications, utilities, trade, educational services, and State and local government industries.

U.S. Department of Labor, Employment and Training Administration. *Dictionary of Occupational Titles*, Revised fourth edition, vols. 1 and 2, 1991.

Comprehensive descriptions of more than 13,000 jobs coded by work requirements and duties performed.