Short-Term Occupational Forecasts Methodology

Data supporting industry and occupational forecasts were derived from the Occupational Employment Statistics (OES), Current Employment Statistics (CES), and Quarterly Census of Employment & Wages (QCEW) programs, which are cooperative efforts between the Pennsylvania Department of Labor & Industry and the U.S. Bureau of Labor Statistics.

OES Surveys

OES mail surveys – with telephone follow-ups to key respondents - are conducted every six months on a three-year cycle. This allows for distribution of the intensive efforts involved in collecting, summarizing, analyzing and accumulating data for all industries and occupations.

Samples of employers are chosen from the QCEW files of employers covered by the state unemployment compensation law. Employers are classified using the North American Industrial Classification System (NAICS) Manual of the U.S. Department of Labor. Occupations are grouped into 23 major groups, based on the U.S. Department of Labor's Standard Occupational Classification (SOC) coding structure.

Industry Forecasts

The first step in the industry projections process is the assembly of a historical series of annual average employment figures from the CES survey for total nonagricultural wage and salary employment at the four-digit NAICS code level. County level data are then summed together into substate regions such as Metropolitan Statistical Areas (MSA) and Workforce Investment Areas (WIA). For each four-digit NAICS, industry projections were produced statewide and for each MSA and WIA.

Industry employment trends were obtained through multiple regression analysis, with consideration of several economic and demographic factors. This method measures the relationship between employment and one or more variables, such as population, labor force participation rate, unemployment rate and CES-based industry employment trends. Time (years) and national employment were the independent variables.

Occupational Forecasts

Industries and occupations are merged using the industry-occupational matrix, which shows the occupational pattern of each industry. Occupational estimates resulting from the three year OES survey cycle were used to generate the industry-occupational matrix for the base year. Occupational patterns for industries outside the scope of the surveys (including agriculture, federal government, postal, private household, religious organizations, self-employed and unpaid family workers) were developed using national OES statistics, Census data, Current Population Survey data and state staffing patterns for federal government and postal workers.

Occupational ratios for each industry (three-digit NAICS) were applied to the base and projected year industry employment totals. The projected year data has been adjusted for occupational changes over the projected period based on national change factors, which show whether the current trend in a particular occupation has its share of an industry growing or declining.

Job Openings

Job openings result when new positions are created by industrial expansion (growth) or when existing positions are vacated because of death, retirement, disability or withdrawal for personal reasons (replacements). Vacancies created by promotion or transfers are not included in total job openings since there is no overall aggregate change in job availability. Total job openings equal the sum of growth needs and replacement needs, except for cases when negative growth is greater than replacement needs, where total openings are expressed as zero.

Openings due to growth needs are the annual average change in employment for the projected period. Openings due to replacement needs are based on separation rates by occupation, which are derived from employment data gathered from the U.S. Department of Labor's Current Population Survey (CPS). The resulting separation rate is applied to the base-year employment in that occupation to produce average annual separations. Statewide rates are also used in estimating replacement needs for substate areas.

Data Limitations

This information is best used as an indicator of employment levels and trends, not as an exact count or prediction. These labor market projections should be used in conjunction with the users' knowledge of the state and local economy, and current events that may have an impact on the projections.

No distinction is made between full-time and part-time jobs. Since these estimates reflect the number of jobs rather than persons, the secondary jobs of multiple jobholders are included.

In preparing these projections, the following assumptions were made:

- The historical industry employment data are correct, i.e., industries are properly classified, counted in the correct geographical area, etc.
- No dramatic changes will occur in any specific industry in the given time frame.
- The industry staffing patterns obtained by the OES survey are accurate and projected changes are reasonable.
- The staffing patterns, change factors and separation rates applied to the data are valid for Pennsylvania.
- The Pennsylvania economy and population will continue to grow, reflecting past trends, without major external factors.
- The effect of current technology and scientific trends on industrial employment will continue.

Every effort was made to ensure the reasonableness of the data. Accuracy of the data is subject to both sampling and nonsampling errors. Nonsampling errors – despite efforts to minimize them – may occur from nonresponse, errors in response such as a misunderstanding of instructions or occupational definitions, and errors in survey editing, coding, or tabulation. Sampling errors, usually measurable as relative errors or estimates, are inherent in surveys that do not include entire populations.

For questions or more information on this methodology, please e-mail us at workforceinfo@pa.gov.