
Assumptions and Methods Used in Preparing Employment Projections

Occupational statements in the *Handbook* use 1 of 6 phrases to describe the projected change in employment between 2002 and 2012. (See page 20.) These phrases are based on numerical projections developed using the Bureau of Labor Statistics (BLS) employment projections model system. Projections of occupational employment are the sixth and final step in the system; the six steps are listed in the discussion of methods below. A full description, including numerical projections of employment, appears in the February 2004 *Monthly Labor Review* and in the BLS *Handbook of Methods*. The winter 2003-04 *Occupational Outlook Quarterly* presents the projections in a series of charts.

The projections reflect the knowledge and judgment of staff in the BLS Office of Occupational Statistics and Employment Projections and of knowledgeable people from other BLS offices, other government agencies, colleges and universities, industries, unions, professional societies, and trade associations, who furnished data and information, prepared reports, or reviewed the projections. BLS takes full responsibility, however, for the projections.

Assumptions. The information in the *Handbook* is based on an economic projection, which is characterized by labor force growth at the same rate (1.1-percent average annual growth) posted over the past 10-year period (1992-2002), strong productivity growth (2.1-percent average annual growth), a continued low unemployment rate (5.2-percent average annual rate), and increasing trade deficits. A Federal budget deficit is assumed, with modest growth in Federal defense and non-defense expenditures. Other assumptions include consumer spending on durable goods that grows faster than consumer spending on services and nondurable goods. Within nondurable goods, a large source of consumer spending is drugs and medicines, and is assumed to grow much faster than spending on other categories. Within services, consumer spending on medical care is expected to drive growth. Investment spending for production equipment—including communication equipment and computer software—will grow rapidly. Expenditures for construction of residential structures will grow at an average annual rate of 2.1 percent, significantly slower than during the 1992-2002 period. Spending on nonresidential construction will grow at an average annual rate of 6.6 percent, almost the same as during the 1992-2002 period.

Although BLS considers these assumptions reasonable, the economy may follow a different course, resulting in a different pattern of occupational growth. Real growth also could be different because most occupations are sensitive to a much wider variety of factors than those considered in the various projections models. Unforeseen changes in consumer, business, or government spending patterns and in the ways

in which goods and services are produced could greatly alter the growth of individual occupations.

Methods. This section summarizes the steps involved in BLS projections of employment by occupation. BLS uses U.S. Census Bureau projections of the population by age, gender, and race, combined with projections of labor force participation rates—the percent of the specified group of the population working or seeking work—to arrive at estimates of the civilian labor force for the projected year.

BLS projections are developed in a series of six steps, each of which is based on separate projections procedures and models and various related assumptions. These six steps, or system components, deal with:

- Size and demographic composition of the labor force
- Growth of the aggregate economy
- Final demand or gross domestic product (GDP)
- Interindustry relationships (input-output)
- Industry output and employment
- Occupational employment

These components provide the overall analytical framework needed to develop detailed employment projections. Each component is developed in order, with the results of each used as input for successive components and with some results feeding back into earlier steps. Each step is repeated a number of times to ensure internal consistency as assumptions and results are reviewed and revised.

The projections of the labor force and assumptions about other demographic variables, fiscal policy, foreign economic activity, and energy prices and availability form the input to the macroeconomic model. This model projects GDP (sales to all final consuming sectors in the economy) and the distribution of GDP by its major demand components (consumer expenditures, investment, government purchases, and net exports). Estimating the intermediate flows of goods and services—for example, the steel incorporated into automobiles—is the next step in the projections process. The resulting estimates of demand for goods and services are used to project industry output of final products as well as total output by industry.

Industry output of goods and services is then converted to industry employment. Studies of trends in productivity and technology are used to estimate future output per worker hour, and regression analysis is used to estimate worker hours. These estimates, along with output projections, are used to develop the final industry employment projections.

An industry-occupation matrix is used to project employment for wage and salary workers. The matrix shows occupational staffing patterns—each occupation as a percent of

employment in every industry. The matrix covering the 2002-12 period includes 284 detailed industries and 725 detailed occupations. Data for current staffing patterns in the matrix come from the BLS Occupational Employment Statistics surveys, which collect data from employers on a 3-year cycle.

The occupational staffing patterns for each industry were projected based on anticipated changes in the ways in which goods and services are produced, and were then applied to projected industry employment. The resulting employment was summed across industries to derive total wage and salary employment by occupation. Using this method, rapid employment growth is projected for healthcare workers while employment of rail transportation workers is expected to decline, reflecting the projected changes in the healthcare and railroad transportation industries, respectively.

Employment in an occupation also may grow or decline as a result of many other factors. For example, faster-than-average growth also is expected among computer support specialists as technology advances and organizations place more emphasis on network applications and maximizing the

efficiency of their computer systems. On the other hand, automation, the expanding use of computers, and developments in computer software will result in declining employment among procurement clerks, order clerks, and word processors and typists. The projected-year matrix incorporates these expected changes.

Data on self-employed workers in each occupation come from the Current Population Survey. Numbers of self-employed workers were projected separately.

Replacement needs. In most occupations, replacement needs provide more job openings than growth. Replacement openings occur as people leave occupations. Some individuals transfer to other occupations as a step up the career ladder or to change careers; some stop working temporarily, perhaps to return to school or care for a family; other workers—retirees for example—leave the labor force permanently. A discussion of replacements and the methodology used to prepare estimates is presented in *Occupational Projections and Training Data, 2004-05 Edition*, BLS Bulletin 2572.