After completing a set of employment projections, the Office of Employment and Unemployment Statistics (OEUS) applies a factor analysis technique to projected changes in industry and occupational employment demand.1 This document details the occupational factor analysis but the industry analysis follows an analogous methodology.

Between 2014 and 2024, wage and salary employment is projected to increase by about 6.5 percent in the BLS projections. At the detailed occupational level, changes in employment demand range from a 107.9-percent increase for wind turbine service technicians and 44.8-percent increase for chiropractors to a 70.5-percent decrease for locomotive firemen and 48.0-percent decrease for telephone operators.

To assist the user of the projections in evaluating and understanding the sources of growth or decline in individual occupations, an analysis of the factors embedded in the projection process has been carried out and presented in the tables offered here. It should be noted that all production data referred to in the tables are based on 2009 chain weighted dollars.

The derivation of detailed occupational demand can be expressed with the following equation:

\[ O = C \times B \times T \times E \times S \]

The dependent variable \( O \) is a vector of occupations. The Office identifies 1097 detailed occupations, not counting summary categories, in the projections analysis.

\( C \) is a vector containing the percent distribution of total final demand by its categories, such as consumption, investment, foreign trade, or government. The BLS identifies 13 major final demand product categories in the projections analysis. This factor is identified in the tables as final demand category levels.

In addition, the \( C \) vector embodies the change in the grand total for all of final demand in the economy. In past analyses, the grand total for all of final demand was identified as a separate factor for either gross domestic product (GDP) or previously gross national product (GNP). However, GDP is no longer identified as a separate factor because of the difficulties introduced by the chain-weighted method of deflation now used to aggregate final demand components up to GDP.

\( B \) is a matrix of percent distributions showing the commodity content of each of the 13 demand product categories identified in \( C \) above. The BLS identifies 206 commodity categories. This factor is identified in the tables as final demand commodity distribution.

\( T \) is an input-output total requirements matrix, which translates a measure of final demand into each industry’s total output necessary to produce that final demand. This factor is identified in the tables as input-output coefficients, and represents changes in production technologies.

\( E \) is a vector of industry-specific employment-output relationships measured by employment/output ratios. Performing a cell-by-cell multiplication of this vector by a corresponding industry output vector yields an estimate of employment required to produce that output.

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\( S \) is a matrix of occupational staffing patterns by industry. For each of the detailed industries, this matrix contains a percent distribution of the various occupations employed in that industry to create its output.

To illustrate how these results should be interpreted, consider the first detailed occupation shown in the table, chief executives. Between 2014 and 2024, the employment in this occupation decreased by 3.5 percent. However, if only the final demand category levels changed, while all other factors in the equation above were kept at their 2014 values, the resulting demand for employees in this occupation would have increased 25.2 percent. This percent change is shown in the final demand category levels column for chief executives.

In a like manner, if the commodity makeup of the final demand categories changed while all the other factors remained the same, demand for this occupation would decrease by 0.2 percent as shown in the final demand commodity distribution column.

Allowing the production technology—the mix of goods and services required in the economy to produce a given final demand—to move to the projected 2024 levels while holding all other factors constant, leads to no change in projected demand for this occupation. This percent change is shown in the input-output coefficients column for this occupation.

Decreases in employment-output ratios over the 2014-2024 periods would lead to a decline of 14.8 percent in demand for this occupation if all other factors remained unchanged as represented in the employment output relationships column.

Changes in staffing patterns, that is, in the mix of the types of occupations used by various industries, accounts for a 9.2 percent decrease in the demand for this occupation as shown in the occupational staffing patterns column.

Finally, the interaction of all of the factors accounts for a 4.5 percent decline in demand for this occupation. The interaction affect presents a crude measure of the extent of nonlinearities in the employment relationships discussed above.

The individual percent changes add to the overall projected percent change between 2014 and 2024 and give the user the feel for what proportion of projected change in a given occupation can be attributed to each component of the analysis. It shows which factors are most important and which are least important in determining the ultimate level of an occupation in the projected period.