Chapter 13
Employment Projections

The Bureau of Labor Statistics (BLS) began discussing the employment outlook soon after the end of World War II in order to offer career information to veterans reentering the civilian workforce. The first set of formal numerical projections was published in 1960. Since then, BLS has developed long-term projections of likely employment patterns in the U.S. economy. Projections cover the future size and composition of the labor force, aggregate economic growth, detailed estimates of industry production, and industry and occupational employment. The resulting data serve a variety of users who need information about expected patterns of economic growth and the effects these patterns could have on employment. Data users include individuals seeking career guidance and organizations and individuals offering career guidance resources. In addition, policymakers, community planners, and educational authorities, who need information for long-term policy planning purposes, make use of BLS employment projections, as do states in preparing state and local area projections.

Since the early 1970s, projections have been prepared on a 2-year cycle. Until 1997, BLS developed projections in which the target year always ended in a zero or a five. Projections were prepared every other year, resulting in at least two—and sometimes three—sets of projections being prepared for the same target year. As a result, projection horizons were as short as 10 years or as long as 15 years. Beginning with the 1996–2006 projections, which were published in 1997, BLS began developing projections for a 10-year period, still on a 2-year cycle.

IN THIS CHAPTER

Projection Procedures

Over the years, the BLS employment projections have undergone many changes as new data series became available and as economic and statistical tools improved. Since the late 1970s, however, the basic methodology has remained largely the same. Procedures have centered around projections of an interindustry, or input–output, model that determines job requirements associated with production needs, and the National Employment Matrix, which depicts the distribution of employment by industry and occupation. Projecting employment in industry and occupational detail requires projections of the total economy and its sectors. BLS develops its projections in a series of six steps that examine

- the size and demographic composition of the labor force
- aggregate economic growth
- commodity final demand
- input–output
- industry output and employment
- occupational employment and openings.

Each step, based on separate procedures and models and on related assumptions, goes through several iterations to ensure internal consistency as assumptions and results are reviewed and revised. Together, the six components provide the analytical framework needed to develop detailed employment projections. BLS analysts solve each component sequentially.

Labor force

Projections of the future supply of labor are calculated by applying BLS labor force participation rate projections to population projections produced by the Census Bureau. The Census Bureau carries out long-term projections of the resident

U.S. population. The projection of the resident population is based on the current size and composition of the population and includes assumptions about future fertility, mortality, and net international migration. The conversion from the resident population concept of the decennial census to the civilian noninstitutional population concept of the BLS Current Population Survey (CPS) takes place in three steps. First, the population of children under 16 years is subtracted from the total resident population. Then, the population of the Armed Forces, by age, gender, race, and ethnic categories, is also subtracted. Finally, the institutional population is subtracted from the civilian population for all the different categories.

BLS maintains a database of annual averages of labor force participation rates provided by the Current Population Survey (CPS) for various age, gender, race and ethnic groups. BLS analysts examine trends and the past behavior of participation rates for each of the categories. First, the historical participation rates for these groups are smoothed. Second, the smoothed data are transformed into logits, or the natural logarithm of the odds ratio.[1] Finally, the logits of the participation rates are extrapolated linearly by regressing them against time and then extending the fitted series to or beyond the target year. When the series are transformed back into participation rates, the projected paths are nonlinear.

In addition, projected labor force participation rates are reviewed for consistency. The time path, cross section in the target year, and cohort patterns of participation are all reviewed and, if necessary, modified. Projected labor force participation rates are then applied to the projected civilian noninstitutional population, producing labor force projections for each of the age, gender, race, and ethnic groups. Then, groups are summed to obtain the total civilian labor force, which becomes an important input into the next stage of the BLS projection process, the projections of the macro economy.

Aggregate economic growth

The second stage of the BLS projections process develops projections of the macroeconomy, including gross domestic product (GDP) for the United States and the major categories of demand and income. The results of this stage provide aggregate measures that are consistent with each other and with the various assumptions and conditions of the projections. Values generated for each demand sector are then used in the next stage: developing data on detailed commodity purchases for personal consumption, business investment, foreign trade, and government.

Recent projections are produced by using the MA/US model, licensed from Macroeconomic Advisers, LLC (MA). The 2012–2022 projections were the first to employ the new model, which was introduced in late 2012. Previously, the Bureau relied on MA's Washington University Macro Model (WUMM). MA/US has the same foundations as WUMM: consumption follows a life-cycle model and investment is based on a neoclassical model. Foreign sector estimates rely on forecasts from Oxford Economics. The MA/US model is explicitly designed to reach a full-employment solution in the target years, which is consistent with the BLS long-run view of the economy. In a full-employment economy, any unemployment is frictional and is not a consequence of deficient demand. Within MA/US, a submodel calculates an estimate of potential output from the nonfarm business sector, based upon full-employment estimates of the sector's hours worked and output per hour. Error correction models are embedded into MA/US to align the model's solution with the full-employment submodel.

Certain critical variables set the parameters for the nation's economic growth and determine, in large part, the trend that GDP will follow. In developing the macroeconomic projections, BLS elects to determine these critical variables externally through research and modeling, and then supplies them to the MA/US model as exogenous variables. The in-house labor force projections, described above, are of particular importance as they are the primary constraint on future economic growth. Other fundamental exogenous variables in the model include energy prices and assumptions about fiscal and monetary policy.

Besides being governed by general assumptions, projections usually are approached with specific goals or targets in mind. Goals used to assess the behavior of a given set of projections include the rate of growth and demand composition of real GDP, the rate of growth of labor productivity, the rate of inflation, and the unemployment rate. Many iterations may be necessary to arrive at a balanced set of assumptions that yield a defensible set of results. When the aggregate economic projection is final, the components of GDP are supplied to the commodity component of the projections process.

Commodity final demand

The macroeconomic model provides projections of final demand sectors, including personal consumption expenditures (PCE), private investment in equipment and software (PIES), residential and nonresidential structures, changes in private inventories (CIPI), exports and imports of goods and services, and consumption and investment of federal and state and local governments. The next step in the projections process is to further disaggregate these results into detailed categories and then into the types of commodities purchased within each category. The sectoring plan is chosen to be as detailed as possible only to the extent that categories and commodities are supported by the National Income and Product Accounts (NIPA)[2] and the Input Output Accounts,[3] both published by the Bureau of Economic Analysis (BEA).

The Houthakker Taylor model[4] is used to estimate consumption expenditures for 76 detailed product categories over

[1]For more information on labor force methodology, see Paul F. Velleman, "Definition and Comparison of Robust Nonlinear Data Smoothing Algorithms," Journal of the American Statistical Association, September 1980, Theory and Methods Section, pp. 609–615.

[2]For a more detailed discussion, see *Concepts and Methods of the U.S. National Income and Product Accounts* (Bureau of Economic Analysis, October 2009), chapters 1–5, **http://www.bea.gov/national/pdf/methodology/ALLchapters.pdf**.

[3]For a more detailed discussion, see *Concepts and Methods of the U.S. Input–Output Accounts* (Bureau of Economic Analysis, September 2006; updated April 2009), **http://www.bea.gov/papers/pdf/IOmanual_092906.pdf**.

[4]H. S. Houthakker and Lester D. Taylor, *Consumer Demand in the United States: Analyses and Projections* (Cambridge, MA: Harvard University Press, 1970).

the projection period. Consumption of each product type is modeled based upon its historical relationship with disposable income, prices, and a state variable capturing inventory or habit formation. Likewise, PIES is modeled for 28 asset categories using the Modified Neoclassical model wherein investment is determined by GDP, capital stock, and the rental cost of capital. Next, the PCE and PIES category estimates are chain weighted[5] to their aggregate levels and adjusted as necessary to ensure consistency with the macroeconomic model solution.

The controls for nonresidential and residential structures, exports and imports of goods and services, as well as consumption and investment within federal defense, federal nondefense, and state and local government are supplied directly from the macro model. Slight adjustments are made to the model's breakout of net exports to account for re-exports and re-imports, effectively revising the data from a NIPA-based estimate to an input–output definition.

Once the column totals for consumption, investment, government, and trade are projected, a bridge table is developed based on historical relationships within the input–output accounts. The bridge table is used to distribute the projected total for each demand category among 195 commodities.

Business inventories are extrapolated at the commodity level of detail using a two-stage least squares model where inventories are regressed on lagged values of both inventories and commodity output. Detailed projections of inventories are then aggregated and adjusted to conform to the macroeconomic model solution.

Other factors are then considered in adjusting initial distributional relationships. For example, the trade outlook may consider research such as external energy forecasts, existing and expected shares of the domestic market, expected world economic conditions, and known trade agreements. The relationship amongst commodities for government categories may factor in analysis including current trends in spending patterns and well as expectations of government policy changes.

As a last step, data are converted from purchaser value to producer value. Margin columns are projected for each component of final demand based upon distributional relationships from the historical time series. Summing across the rows of a particular component with its related margin columns (consisting of transportation costs as well as wholesale and retail markups), results in a vector of producer value data by detailed commodity. Producer value data are important to the employment projections as they separate output and therefore the job outlook in the wholesale, retail, and transportation industries apart from the remaining economy.

For a simplified example of producer value data for one commodity, see table 1. To track the purchase of a sweater, for example, an analyst would first measure the transaction as a purchaser value in column A. The customer paid $20 for the sweater which is allocated entirely to the textile row. Column B shows the retail trade markup value for the sweater. The retailer in this case marked up the sweater by $10 as captured by a negative value in the textile row and an equivalent positive value in the retail trade row. The margin column is just reallocating data and therefore sums to zero. The producer value of this same transaction is shown in column C, the row sum of columns A and B. The producer value for this purchase is $10 for textile commodity and $10 for retail trade. The summed value of the purchaser and producer value columns are equivalent.

Table 1. Example of producer value data for a sweater purchase

Commodity rows	A Purchaser value	B Margin data	C Producer value
	Consumption of clothing	Retail trade	Consumption of clothing
Textiles	$20	–$10	$10
Other goods	0	0	0
Retail trade	0	$10	$10
Services	0	0	0
Remaining commodities	0	0	0
Sum	$20	0	$20

The components of final demand and the margin columns are compiled into a final-demand matrix comprising 195 rows of commodity sectors and 191 columns of final-demand and margin categories. The resulting detailed distribution of GDP provides the demand component of an inter-industry model of the U.S. economy.

Input—output

The creation of an input–output model is the next stage in developing BLS projections. Each industry within the economy relies on other industries to supply inputs—intermediate products or services—for further processing. By definition, GDP reflects only sales to final purchasers, such as car buyers for personal use and businesses for equipment. Intermediate material inputs, such as the steel incorporated into cars, are not explicitly reflected in the GDP estimates. An input output model provides a means to derive an industry-level estimate of the output and employment needed to produce a given level of GDP.

[5]The U.S. National Income and Product Accounts (NIPA) has adopted a chain-weighted Fisher index to calculate real aggregates. Because BLS data are based on the BEA NIPA and input–output accounts, real projections data also are measured in chain-weighted dollars. Because of the mathematical properties of chain weighting, for a particular year, details do not necessarily add to their higher level aggregates for any particular year.

[6]Categories may vary from one projection study to the next, depending on the availability of data.

[7]For detailed information regarding input output analysis, see Ronald E. Miller and Peter D. Blair, *Input–Output Analysis: Foundations and Extensions* (Englewood Cliffs, NJ: Prentice-Hall, 1985), pp. 276–294.

BLS develops a historical time series of input–output tables. In the past, this has been accomplished through the use of various source data from a number of different data providers, including the Bureau of Economic Analysis (BEA), Census Bureau, Department of Agriculture, Energy Information Administration, U.S. Geological Survey, and various other ancillary information sources. These data were compiled, and, using the most current BEA benchmark input–output accounts as the basis for its system, BLS developed historic input–output tables. Starting with the 2010–2020 projections series, BLS undertook a major overhaul of the historic input–output system in order to incorporate annual input–output data provided by BEA along with the benchmark input–output data. The overhaul was in response to a BEA initiative to provide an annual input–output data series consistent with the benchmark data. BEA NIPA data, output measures from the Census Bureau, and other data sources also were used in the revised methods.

In 2009, BEA published a comprehensive revision to its input–output framework, bringing about a standardized and consistent framework between the benchmark input–output data and the annual input–output systems. Within the framework of these revisions, BLS was able to develop a comprehensive historical detailed set of input–output tables. Using both the 1997 and 2002 benchmark input–output tables as the basis, scaling the BEA benchmark tables (430 industries) to the BLS sector plan (195 industries), and making adjustments conforming to BLS assumptions and methods, BLS utilized the tables to create pattern structures that would be used to develop the detailed sector input–output tables for the nonbenchmark-year input–output tables. Under this methodology, and based on the pattern structures developed from the scaled benchmark, the BEA annual input–output tables detailing only 67 industries were expanded. The years between the two benchmarks included interpolation factors to accommodate changes to the patterns between the benchmark years. Years subsequent to the 2002 benchmark year utilized the 2002 pattern structure, while the 1993–1996 data were based on the 1997 benchmark pattern. Because no annual input–output tables were available for the 1993–1996 and 2012 periods, these tables were developed on the basis of the patterns of the nearest benchmark year and on industry and commodity outputs for the 195 BLS sector industries. After all of the tables were developed under the BLS sector plan, each table was RAS balanced (iteratively scaled) to ensure consistency and conformity.

The BLS input–output model consists of two basic matrices for each year: a "use" table and a "make" table. Once balanced, both tables are converted to coefficient form. The converted "use" table, or the direct requirements table, shows the use of commodities by each industry as inputs into its production process. Each column of this table displays the pattern of commodity inputs per dollar of industry output. The converted "make" table, or the market share table, shows the commodity output of each industry. This table allocates commodity output to the industry in which it is the primary commodity output and to those industries in which it is secondary. The "make" table also shows the industry distribution of production for each commodity. Initial estimates of the projected input-output tables are based on historical relationships and the projected final demand tables. Results are then reviewed and revised in order to take into account changing trends in the input patterns, or the way in which goods are produced or services provided by each industry.

When projected values of the "use" and "make" relationships are available, BLS uses the relationships derived by BEA to convert the projection of commodity demand developed in preceding steps into a projection of domestic industry output. The BEA relationships are summarized in the formula

$$\mathbf{g} = \mathbf{D}\,(\mathbf{I} - \mathbf{BD})^{-1}\mathbf{e},$$

where

$\mathbf{g}$ = vector of domestic industry output by sector,

$\mathbf{B}$ = "use" table in coefficient form,

$\mathbf{D}$ = "make" table in coefficient form,

$\mathbf{I}$ = identity matrix, and

$\mathbf{e}$ = vector of final demand by commodity sector.

In sum, the matrix product of the inverse of the coefficient forms of the "make" and "use" tables and a vector **e** of final-demand commodity distribution, yields industry outputs.

Industry output and employment

The detailed industry output from the previous stage is used to derive the industry employment estimate necessary to produce the given level of output. To arrive at the employment estimate, the Employment Projections (EP) program combines data from two BLS sources: (1) the Current Employment Statistics (CES) survey, an establishment survey that offers data on nonagricultural wage and salary employment and weekly hours and (2) the Current Population Survey (CPS), a household survey that provides information regarding agricultural employment, self-employed and unpaid family worker jobs and hours, and private household workers.

BLS models industry employment as a function of industry output, wages, prices, and time. The EP measures total employment as a count of jobs, not a count of individual workers. This concept is different from that used by another BLS measure familiar to many readers: CPS total employment, a count of the number of workers. The EP total-employment concept also is different from the CES total-employment measure: whereas the CES measure also is a count of jobs, it covers nonfarm payroll jobs only, while the EP measure includes all jobs. BLS then projects industry employment, using the estimated historical relationship between the variables. Industry employment is projected in both numbers of jobs and hours worked, for wage and salary workers and for self-employed and unpaid family workers. Projections are developed according to the procedure outlined next, implemented for each industry.

A system of equations projecting employment for wage and salary workers is solved independently over the projections decade for each industry. The individual industry estimates of employment must be consistent with the total level of employment derived from the solution of the macroeconomic model. The employment equations relate an industry's labor demand (total hours) to its output, its wage rate relative to its output price, and a trend variable in order to capture technological change within that industry. A separate set of equations, describing average weekly hours for each industry, is estimated as a function of time and the unemployment rate. The two sets of equations are then used to predict average weekly hours over the projections decade. An identity relating average weekly hours, total hours, and employment yields a count of wage and salary jobs by industry.

The number of self-employed and unpaid family workers is derived by first extrapolating the ratio of the self-employed to the total employment for each industry. The resulting extrapolation is a function of time and the unemployment rate. The extrapolated ratio is used to derive the number of self-employed and unpaid family workers, given the number of wage and salary jobs in each industry. Total hours for self-employed and unpaid family workers are calculated by applying the estimated number of annual average weekly hours to the employment levels for each industry. Finally, total hours for each industry are derived by summing hours for wage and salary workers and hours for self-employed and unpaid family workers.

Together with industry output projections, employment results provide a measure of labor productivity. BLS analysts examine the implied growth rates in the projected productivity numbers for consistency with historical trends. At the same time, analysts attempt to identify industries that may deviate from past behavior because of changes in technology or other factors. Where appropriate, changes to the employment estimates are made by modifying either the employment demand itself or the results from earlier steps in the projections process. The final estimates of projected employment for about 200 industries are then used as inputs to determine the occupational employment over the projections decade.

Occupational employment and job openings

To allocate projected industry employment to occupations, BLS develops a set of industry–occupation matrices. These matrices include a base-year employment matrix and a projected-year employment matrix. The matrices, referred to collectively as the National Employment Matrix, constitute a comprehensive employment database. For each occupation, the National Employment Matrix provides a detailed breakdown of employment by industry and class of worker. Similarly, for each industry and class of worker, the matrix provides a detailed breakdown of occupational employment. Base-year employment data on wage and salary workers, self-employed workers, and unpaid family workers come from a variety of sources and measure total employment as a count of jobs, not a count of individual workers. The National Employment Matrix does not include employment estimates for every industry that employs an occupation or for every occupation employed within an industry. For reasons of confidentiality or quality, some data are not released.

Base-year employment

For most industries, the Occupational Employment Statistics (OES) survey provides data on occupational staffing patterns—the distribution of wage and salary employment by occupation in each industry—and the CES survey provides data on total wage and salary employment in each nonfarm industry. Estimates of occupational employment for each industry are derived by multiplying each occupation's proportion—or ratio—of OES employment in each industry by CES industry employment.

BLS staff obtain industry and occupational employment data on workers in all agricultural industries (except logging), workers in private households, self-employed workers, and unpaid family workers. Data on all these workers come from the CPS. CPS data are coded in accordance with the Census Bureau occupation classification system. Although this system is based on the Standard Occupational Classification (SOC) system used by the OES program, it does not provide the same level of detail. CPS employment data were proportionally distributed to detailed SOC occupations on the basis of the employment distribution from the OES data.

Total base-year employment for an occupation is the sum of employment across all industries and class-of-worker categories: the combination of wage and salary workers, the self-employed, and unpaid family workers. Occupational employment within each industry, divided by total wage and salary employment in each industry, yields the occupational distribution ratios used to project occupational employment for each industry. These ratios, referred to as staffing patterns, show occupational utilization by industry.

Projected-year employment

Projected-year employment data for industries and class-of-worker categories are first developed at a higher level of aggregation and then distributed across corresponding detailed National Employment Matrix industries and by class of worker. To derive projected-year staffing patterns, BLS economists place base-year staffing patterns under an iterative process of qualitative and quantitative analyses. Examining historical staffing pattern data, they conduct research on factors that may affect occupational utilization within given industries during the projection decade. Among such factors are shifts in product mix and changes in technology or business practices. Once these factors are identified, they are used to develop numerical change factors that give the proportional change in an occupation's share of industry employment over the 10-year projection period. These change factors are applied to the base year occupational staffing patterns to derive projected staffing patterns. An occupation's projected share of an industry may increase, decrease, or remain the same, depending on the change factors and underlying rationales.

For each industry, the projected-year employment is multiplied by the projected-year occupational ratio to yield the industry's projected-year wage and salary occupational employment. Occupational employment data on the self-employed and on unpaid family workers are projected separately. Total projected-year occupational employment is the sum of the projected employment figures for wage and salary workers, the self-employed, and unpaid family workers.

Replacement needs

In addition to projecting employment change by occupation, BLS projects replacement needs—estimates of the number of openings that will result from workers who leave an occupation and need to be replaced. Replacement needs are combined with openings due to economic growth to derive total job openings over the projection decade. To calculate job openings due to replacement needs, BLS analyzes historical data from the CPS on occupational employment and calculates replacement rates by age group. These historical rates are applied to occupational age-distribution data in the base year, to estimate replacement needs for the future. The projected replacement needs assume that workers will continue to retire and otherwise exit an occupation at ages similar to those which have been observed in the recent past. The result is occupation-specific replacement needs that capture the impact of demographic, but not behavioral, changes. (For a full discussion of how replacement needs are estimated, see the technical documentation on the Employment Projections Program website.)[8]

Education and training requirements

BLS also provides information about education and training requirements for each of the occupations for which it publishes projections data.[9] This approach allows occupations to be grouped in order to create estimates of the education or training needs for the labor force as a whole and estimates of the outlook for occupations with various types of education or training needs. In addition, educational attainment data for each occupation are presented to show the level of education achieved by current workers. Definitions used in the education and training classification can be found in the Measures of Education and Training technical document.[10]

Final review

An important element of the projection system is its comprehensive structure. To ensure internal consistency and reasonableness of this large structure, the BLS projections process encompasses detailed reviews and analyses of the results at each stage. For example, the close relationship between changes in staffing patterns in the occupational model to changes in technology is an important factor in determining industry labor productivity. Specialists in many different areas from inside and outside the BLS projections group review all of the relevant results from their particular perspective. In short, final results reflect innumerable interactions among BLS analysts, who focus on particular sectors in the model. Through this review, the projection process at BLS converges into an internally consistent set of employment projections across all industries and occupations.

Assumptions

BLS employment projections are developed with a number of underlying assumptions, both explicit and implicit. Projections are developed from statistical and econometric models combined with subjective analysis. All analytical projections implicitly assume that relationships exhibited in the past will continue to hold over the projection period. Statistical and econometric models formally project historical relationships on a mathematical basis. Subjective analysis projects current and historical behavior into the future on the basis of analogous past experience. The efficacy of the projections relies both on the understanding of history and the expectation that the past can be extrapolated into the future.

The following assumptions underlie the BLS employment projections:

- Broad social and demographic trends will continue.
- New major armed conflicts will not develop.
- There will be no major natural disasters.
- The projected U.S. economy will be at approximately full employment.
- Existing laws and policies with significant impacts on economic trends are assumed to hold throughout the projection period.

In addition to these assumptions, the component processes of the projections may incorporate specific assumptions, or exogenous inputs. For example, the labor force model uses the Census Bureau population projections to derive the labor force level, by applying a projection of labor force participation rates. These assumptions are discussed in the relevant sections of this chapter.

The BLS employment projections should be understood to be a projection and not a forecast. The distinction involves an emphasis on purpose and results. Projections focus on longer term underlying trends based on a set of assumptions, whereas forecasts focus more on predicting actual outcomes in the near term. The assumptions that underlie projections are usually designed to provide a neutral backdrop that allows a focused analysis of the long-term trends. For example, BLS does not forecast business cycle activity, but rather is concerned with the long-term growth path of the aggregate economy. Because the purpose of a forecast is prediction, the forecast user will be interested in the actual forecast values. A projection, however, supplies the user with a plausible scenario in which to understand the ramifications of the long-term trends.

Finally, the unexpected will occur and have unknown influences. There will be unanticipated events, whether changes in technology, war, disaster, human understanding, or so-

[8]See Employment Projections (U.S. Bureau of Labor Statistics, Feb. 1, 2012), **http://www.bls.gov/emp/ep_replacements.htm**.

[9]For a more-detailed discussion of the education and training categories, see Measures of Education and Training (U.S. Bureau of Labor Statistics, May 4, 2012), **http://www.bls.gov/emp/ep_replacements.htm**.

[10]Ibid.

cial dynamics. In this context, BLS employment projections should be considered as likely outcomes based on specified assumptions, and not definitive outcomes.

Presentation

Projections are released online biennially in December or January and in both the *Monthly Labor Review* and the *Occupational Outlook Quarterly*. The *Review* typically includes an overview article and an article on each of the major components of the projections: the labor force, the aggregate economy, industry output and employment, and occupational employment and job openings. The *Quarterly* publishes articles related to career preparation, such as occupational profiles, jobseeking information, and understanding wage and benefits data. Part of each projection study is the release of the *Occupational Outlook Handbook (OOH)*, which contains extensive information about hundreds of occupations. In addition to presenting outlook data for each occupation, this publication includes information on the nature of the work, education and training requirements, working conditions, and wages. The *OOH* is used as a primary source of information for people choosing a career and is available in many career centers of high schools and colleges, as well as in libraries.

Accuracy

The BLS projection process does not end at publication. BLS is constantly working to improve the accuracy of its projections. To ensure that projections are reliable and of the highest quality, BLS retrospectively evaluates them when comparable data are available. Projections of the labor force, industry employment, and occupational employment are evaluated by means of metrics that provide measures of accuracy. These metrics were developed from a review of methods used by BLS and other agencies in evaluating projections.

Evaluations benefit both BLS and external users. Identifying sources of errors helps BLS improve the models used in developing the employment projections, and publishing the results allows users to gauge the accuracy of statements about future economic conditions, industry activity, and employment growth. The most recent evaluation articles include the following:

Information about the Census Bureau's U.S. Population Projections is available at **http://www.census.gov/population/projections**.

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