National Compensation Measures

The National Compensation Survey (NCS) is an establishment-based survey that provides comprehensive measures of (1) employer costs for employee compensation, including wages and salaries, and benefits, (2) compensation trends, and (3) the incidence of employer-sponsored benefits among workers. The NCS also collects data and produces estimates on the provisions of selected employer-sponsored benefit plans.

Quick Facts: National Compensation Measures	
Subject areas	Pay, Benefits
Key measures	Employment Cost Index (ECI) Incidence and provision of employee benefits Employer Costs for Employee Compensation (ECEC)
How the data are obtained	Survey of businesses and governments
Classification system	Occupation, Industry
Periodicity of data availability	Quarterly, Annual
Geographic detail	National, Census region
Scope	Private sector, State and local government
Key products	• Employment Cost Index news release • Employer Costs for Employee Compensation (ECEC) news release • Employee Benefits in the United States news release • Health and Retirement Plan Provisions in the United States
Program webpage	• www.bls.gov/ncs

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Concepts

The National Compensation Survey (NCS) produces indexes measuring change over time in labor costs through the Employment Cost Index (ECI) and the level of average costs per hour worked through the Employer Costs for Employee Compensation (ECEC). The NCS also provides estimates on the incidence of benefits by the percentage of workers with access to and participating in employer-sponsored benefit plans. The survey covers a broad range of benefits including holidays and vacations, sick leave, health and life insurance, and retirement plans. Details of employer-provided health and retirement plan provisions are also available.

Civilian workers. Those employed in private industry and state and local government. Excluded from the civilian economy are workers employed in federal government and quasi-federal agencies, military personnel, agricultural workers, volunteers, unpaid workers, individuals receiving long-term disability compensation, and those working overseas. In addition, private industry excludes workers in private households, the self-employed, workers who set their own pay (e.g., proprietors, owners, major stockholders, and partners in unincorporated firms), and family members paid token wages.

Occupational group. Workers are classified into occupations using the 2010 Standard Occupational Classification (SOC).

Industry group. Establishments are classified into industries using the 2012 North American Industry Classification System (NAICS).

Census division. Grouping of the United States into nine geographical areas: **New England** (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont); **Middle Atlantic** (New Jersey, New York, and Pennsylvania); **South Atlantic** (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia); **East South Central** (Alabama, Kentucky, Mississippi, and Tennessee); **West South Central** (Arkansas, Louisiana, Oklahoma, and Texas); **East North Central** (Illinois, Indiana, Michigan, Ohio, and Wisconsin); **West North Central** (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota); **Mountain** (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming); and **Pacific** (Alaska, California, Hawaii, Oregon, and Washington).

Census region. Grouping of Census divisions into four major geographical areas: **Northeast** (New England and Middle Atlantic); **South** (South Atlantic, East South Central, and West South Central); **Midwest** (East North Central and West North Central); and **West** (Mountain and Pacific).

Work schedule. The number of daily hours, weekly hours, and annual weeks that employees in an occupation are scheduled and do work. The work schedule is the standard schedule for the selected job where short-term fluctuations and one-time events are not considered unless the change becomes permanent. Work schedules are either fixed, flexible, rotating, or nonfixed. Data are collected on usual work schedule. For more information on work schedules, see *Work Schedules in the National Compensation Survey*.

Establishment. A single economic unit that engages in one, or predominantly one, type of economic activity. For private industry, the establishment is usually at a single physical location, such as a mine, factory, office, or store. If a sampled establishment is owned by a larger entity with many locations, only the employment and characteristics of the establishment selected for the sample are considered for the survey. For state and local governments, an establishment can include more than one physical location, such as a school district or a police department. Each establishment is assigned a six-digit code from the NAICS.

Initiation. The process of collecting data from a new sample unit.

Update. The process of collecting current information from an initiated sample unit.

Full-time and part-time work status. Employees are classified on the basis of definitions used by each establishment. The NCS does not use a specific threshold of hours to determine the work status.

Bargaining status. Workers are classified as *union workers* when these conditions are met: 1) a labor organization is recognized as the bargaining agent for all workers in the occupation, and 2) wage and salary rates are determined through collective bargaining or negotiations. Workers that do not meet these conditions are classified as *nonunion workers*.

Time-based pay. Wages and salaries that are solely based on a unit of time, such as an hourly rate or an annual salary. Straight-time (time-based) wages rates are commonly referred to as base rates or base wages.

Incentive-based pay. Wages and salaries that are at least partially based on productivity payments, such as production bonuses, commissions, piece-rates, or other types of incentives based on production, sales, or output. Nonproduction bonuses or those not tied to individual production or output are considered as part of benefits in the NCS.

Work levels. Each sampled job is evaluated to determine the work level of its duties and responsibilities. The point factor leveling process categorizes certain aspects of a job to specific levels of work with assigned point values based on

- knowledge
- job controls and complexity
- contacts (nature and purpose)
- physical environment

Total compensation. Included are employer costs for wages and salaries and for employee benefits.

Wages and salaries. Remuneration of regular payments from employer to employee as compensation for services performed during a specific period of time or based on production, sales, or specific output.

The following components are included in wages and salaries:

- Incentive-based pay, including commissions, production bonuses, and piece rates

- Cost-of-living allowances
- Hazard pay
- Payments of income deferred due to participation in a salary reduction plan
- Deadhead pay, defined as pay given to transportation workers returning in a vehicle without freight or passengers

The following forms of payments are *not* included in wages and salaries:

- Uniform and tool allowances
- Free or subsidized room and board
- Payments made by third parties (for example, tips)
- On-call pay

The following forms of payments are considered benefits and *not* included in wages and salaries:

- Shift differentials, defined as extra payment for working a schedule that varies from the norm, such as night or weekend work
- Premium pay for overtime, holidays, and weekends
- Nonproduction bonuses or those not directly tied to production (such as end-of-year and profit-sharing bonuses)

Benefits (cost). The cost to employers for providing a benefit. NCS captures the cost of benefits in five major categories: (1) paid leave—vacation, holiday, sick, and personal leave; (2) supplemental pay—overtime and premium, shift differentials, and nonproduction bonuses; (3) insurance—life, health, short-term and long-term disability; (4) retirement and savings— defined benefit and defined contribution; and (5) legally required benefits—Social Security, Medicare, federal and state unemployment insurance, and workers' compensation.

Cost per hour worked. Total employer cost of wages and salaries or benefits divided by total hours worked (includes all hours worked only or annual work schedule hours plus overtime minus leave hours).

Contributory plan. An employer-sponsored plan, which is paid for in part by the employer and in part by the employee. Employees in contributory plans are considered participating if they have paid the required plan cost and fulfilled any applicable eligibility requirements. Defined contribution plans and medical care plans are typically contributory plans.

Noncontributory plan. An employer-sponsored plan that is completely paid by the employer. Employee contributions are not needed in order to participate. Employees in noncontributory plans are considered participating if they have fulfilled any applicable eligibility requirements. Traditional defined benefit plans, life insurance, and short- and long-term disability plans are typically noncontributory.

Incidence of benefits. The percentage of all workers who are provided a particular benefit plan. The incidence can be either a rate of access to, or a rate of participation in, a benefit plan.

Access. Employees are considered to have access to a benefit plan if it is available for their use. For example, if an employee is permitted to participate in a medical plan offered by the employer, but the employee declines to do so, he or she is placed in a category with those having access to medical care benefits.

Participation in a benefit plan. Employees in contributory plans are deemed to be participating in a plan if they have paid required contributions and fulfilled any applicable service requirements. Eligible employees in noncontributory plans are considered participating in the plan.

Take-up rates. Take-up rates are the percentages of workers with access to a plan and who participate in the plan. Take-up rates are computed as the number of workers participating in a plan, divided by the number of workers with access to the plan, times 100 and rounded to the nearest whole percentage. Because the computation of take-up rates is based on the number of workers, rather than the rounded percentages, the take-up rates in published tables may differ slightly from the ratio of participation to access.

Establishments offering benefits. Employers may offer benefit plans to all workers or they may limit them to certain groups of workers. The NCS considers an establishment as offering benefits if any workers have access.

Provisions of benefit plans. The terms of employer-sponsored benefit plans. These include eligibility requirements (e.g. age, service, and combination of age and service), vesting requirements (e.g. cliff, graded, and immediate), plan type (e.g., savings and thrift, money purchase plan), additional employee costs (e.g., out-of-pocket maximum, deductible, copayment, and coinsurance), number of days granted (e.g. vacation and sick leave), and carryover provisions.

Health care benefits. Plans provide preventive and protective medical, dental, vision, or prescription drug coverage to the employee and the employee's dependents, including the spouse and children.

Medical care. Plans provide services or payments for services rendered in the hospital or by a qualified medical care provider.

Retirement benefits. Retirement plans are classified as either defined benefit or defined contribution plans. Defined benefit plans determine payments according to a fixed formula based on salary, years of service, and age. Defined contribution plans determine the value of individual accounts by the amount of money contributed and the rate of return on the money invested.

Defined benefit plans. Defined benefit pension plans provide employees with guaranteed retirement benefits based on benefit formulas. A participant's retirement age, length of service, and preretirement earnings may affect the benefits received.

Defined contribution plans. Retirement plans that specify the level of employer contributions and place those contributions into individual employee accounts.

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Data Sources

The National Compensation Survey (NCS) uses Bureau of Labor Statistics (BLS) field economists to collect compensation data from survey respondents. Field economists employ a variety of collection methods, including personal visits, mail, telephone, and email, after undergoing extensive training. Field economists do not use a paper or online questionnaire to collect these data; instead, they rely on a conversational interview and descriptive documents, such as task lists, to collect cost, coverage, and provision data from respondents. The NCS is a voluntary establishment-based survey. At the initial and subsequent contacts, field economists attempt to gather the following information from respondents:

- *Primary business activity of the establishment*. The field economist determines the correct North American Industry Classification System (NAICS) industry code for the establishment.
- *A list of employees or job titles and employee counts.* With an employee list, the field economist uses equal probability sampling to select a sampled job, for which each name on the list has an equal chance of selection. With the job titles and employee counts, the field economist is using probability proportional-to-size sampling, that is, the greater the number of employees in an occupation within the establishment the greater chance the occupation will be selected.
- *Number of employees in each sampled job.* The field economist determines the number of employees matching the sampled job based on occupational description.
- *Work attributes for the workers in the sampled job.* The field economist determines the worker attributes of the employees: bargaining status, work status, and time- or incentive-based pay.
- *Wages and salaries for sampled job.* The field economist collects data on wages and salaries from the payroll records covering the 12th of the reference month.
- *Tasks, knowledge required, the controls and complexity, the contacts, and the environmental conditions for the job.* The field economist collects this information to determine the work level of the job. For more information on work levels, see *National Compensation Survey: Guide for Evaluating Your Firm's Jobs and Pay*.
- *The number of typical hours employees work.* The field economist collects data on the usual work schedule of each sampled, matched occupation. This information helps to determine the employee's hourly, weekly, and annual earnings, as well as the employer's cost of benefits.
- *Availability of employer-sponsored benefits.* The field economists collect and analyze summary plan descriptions of the health and retirement plans offered by the employer.
- *Employer cost of benefits provided.* The field economist determines eligible employees' benefit usage. Field economists calculate the employer cost based on the type of benefit. Employer costs for hours-based (wage-related) benefits, such as paid leave, directly relate to wages and salaries. For hours-based benefits, the field economist collects information on the number of hours or days of the benefit used by workers in sampled jobs. The field economist then multiplies this number by the company contribution or compensation rate and divides by total occupational employment to calculate cost. Where employer contributions are not directly linked to hours and wages, (for example, insurance), for these benefits the field economist collects information for plan participants.
- Changes to plan provisions or costs may cause changes in benefit usage. This change in usage, induced usage, is captured by field economists during collection updates, and is separate from the usage figured captured at the time of initiation.

Collection period

A BLS field economist contacts the sampled establishment for the initial collection of data for the NCS. From each sampled establishment, the Field economist collects data on wages, the cost of benefits, and the incidence and provisions of benefits. BLS uses these data to produce ECI, ECEC, and estimates on cost, coverage, and provisions of benefits. BLS conducts ECI and ECEC updates over a 6-week period for the pay period that includes the 12th day of the month for the reference periods of March, June, September, and December.

Confidentiality agreement

All data collected in the NCS are subject to the BLS confidentiality requirements that prevent the disclosure of identifying information. Data collected from the NCS are used solely for statistical purposes. BLS has a strict confidentiality policy, which ensures that the survey sample composition, lists of reporters, and names of respondents will be kept confidential. In addition, the policy assures respondents that published figures will not reveal the identity of any specific respondent and will not allow the data of any specific respondent to be identified. Each published estimate is screened to ensure that it meets these confidentiality requirements, see Confidentiality of Data Collected by BLS for Statistical Purposes for additional information.

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Design

NCS data are collected from national probability samples selected in two stages: 1) a probability sample of establishments and 2) a probability sample of occupations within sampled establishments. Probability samples are subject to sampling and nonsampling errors, which are discussed in the Calculation section.

Selecting sample establishments (stage 1)

In stage 1, the NCS uses a probability proportional-to-size (PPS) technique to select a sample of private industry and state and local government establishments from across the nation. The larger the establishment employment, the greater its chance of being selected. Establishments from all 50 states and the District of Columbia are eligible for selection. There are five industry strata and 24 geographical subsets of the country, for a total of 120 sampling cells. The five aggregate industries comprise the 23 detailed North American Industry Classification System (NAICS) sectors. The 24 geographical subsets consist of the 15 largest metropolitan areas, based on total employment within the subset, and the remaining portions (excluding the 15 metropolitan areas) of each of the 9 Census divisions, see Geographic Terms and Concepts - Census Divisions and Census Regions.

The *sampling frame*, or *universe*, are all establishments from which the survey sample is selected. It is developed from state unemployment insurance reports available through the Quarterly Census of Employment and Wages (QCEW) program. The most recent reference period available at the time the sample is selected is used to develop sampling frames.

Industry and area classification of establishments

The NCS currently uses the 2012 NAICS to classify industries and 2003 Office of Budget and Management area definitions to classify areas.

Sample rotation

When a new replacement rotation group is introduced into the survey, field economists conduct the initial interviews of establishments in the new rotation groups while updating the establishment records of the other rotation groups. There are three sample rotation groups, one for private industry, one for state and local government, and one for aerospace establishments. State and local government establishments are rotated approximately every 10 years whereas private industry and aerospace establishments are rotated every 3 years, except during years when state and local government establishments are rotated. This practice helps reduce respondent burden and keeps the sample current.

The state and local government establishment sample differs from the private industry 3-year rotation because the data from state and local government establishments are, generally, more stable in terms of establishment births and deaths as well as in the number of employees. The NCS replaced its state and local government

sample in its entirety in December 2016, using the 2012 NAICS to stratify the sampling frame for the selection of new establishments.

Probability sampling of occupations within sampled establishments (stage 2)

The number of workers in an establishment includes workers on paid vacation or other types of leave; salaried officers, executives, and staff members of incorporated firms; employees temporarily assigned to other units; and noncontract employees for whom the reporting unit is the permanent duty station, regardless of whether that unit issues their paychecks.

In stage 2, field economists use a four-step process to select and classify jobs for which data are to be collected during the initial contact with the sampled establishment.

Step 1: Field economists obtain the establishment's complete list of employees and their job titles and apply the probability selection of occupations (PSO) technique. The field economist uses the PSO technique to randomly select the jobs for which data are to be collected. This process ensures that the probability of selecting a given job is proportional to the number of workers in the job at the establishment. The number of jobs selected for data collection is based on the establishment's employment size, according to the following criteria:

Probability selection of occupation technique			
Number of employees	1–49	50–249	250 or more
Number of jobs selected	Up to 4	6	8

Exceptions include state and local government establishments, for which up to 20 jobs may be selected and the aircraft-manufacturing industry—those matching NAICS code 336411—for which up to 32 jobs may be selected.

Step 2: Field economists match employees working in the sampled jobs with an occupation. The sampled jobs are classified into occupations based on the workers' actual job duties and responsibilities, not on their job titles or specific education. For example, an employee trained as an engineer, but working as a drafter, is reported as a drafter. An employee who performs the duties of two or more occupations is reported as working in the occupation that requires the highest level of skill or in the occupation in which the employee spends the most time if there is no measurable difference in skill requirements. Each occupation is designated by a six-digit code in the Standard Occupational Classification (SOC). This code is part of a hierarchical structure as shown in the following exhibit.

Level of detail	2010 SOC code	Occupation title
2 digit	17-0000	Engineering occupations
3 digit	17-3000	Drafters, engineering technicians, and mapping technicians
5 digit	17-3010	Drafter
6 digit	17-3011	Architectural and civil drafters

The SOC designates 23 major occupational groups. Major group codes end with 0000, minor group codes end with 000, and broad occupation codes end with 0. For example, the detailed occupation Orthodontists (code 29-1023) is under the broad occupation Dentists (code 29-1020), which is under the minor group Health Diagnosing and Treating Practitioners (code 29-1000), which is under the major group Health Care Practitioner and Technical Occupations (code 29-0000). In the NCS, occupations can fall into 22 major groups; with military specific occupations (code 55-0000) excluded.

Step 3: Identification of occupational attributes of the worker, such as full-time or part-time status, union or nonunion status, and whether the work is paid on a time or incentive basis. The field economist records specific attributes of the worker in the sampled job, for each selected occupation. Each such occupation must include only workers with the same attributes; for example, the occupation cannot include both full-time and part-time workers. For definitions of occupational attributes see the Concepts section.

Step 4: Field economists evaluate the job to determine the work level of its duties and responsibilities using a point-factor system of points based on the following factors:

- Knowledge
- Job controls and complexity
- Contacts
- Physical environment

Each factor consists of several points and a description. Economists assign points based on the duties and responsibilities of the job, the work performed, and the skills, education, and training required for the job. Points are then totaled, by the field economists, to determine the overall work level for the job. Generally, the greater the impact, complexity, or difficulty of the job, the higher the number of points assigned, and the higher the work

level. As the following exhibit shows, there are some occupations that cannot be "leveled," because points cannot be determined for all four factors, thus points are not assigned and a level cannot be determined.

Jobs that cannot be leveled	
SOC 2010 code	**Occupation title**
11-1031	Legislators
27-1013	Fine artists, including painters, sculptors, and illustrators
23-1021	Administrative law judges, adjudicators, and hearing officers
23-1022	Arbitrators, mediators, and conciliators
23-1023	Judges, magistrate judges, and magistrates
27-2011	Actors
27-2012	Producers and directors
27-2021	Athletes and sports competitors
27-2022	Coaches and scouts
27-2023	Umpires, referees, and other sports officials
27-2031	Dancers
27-2032	Choreographers
27-2041	Music directors and composers
27-2042	Musicians and singers
27-2099	Entertainers and performers, sports and related worker, all other
27-3011	Radio and television announcers
27-3012	Public address systems and other announcers
41-9012	Models

Determining supervisory responsibilities. According to the 2010 SOC, supervisors of professional and technical workers usually have a background similar to the workers they supervise, and are therefore classified with the workers they supervise. Likewise, team leaders, lead workers and supervisors of production, sales, and service workers who spend at least 20 percent of their time performing work similar to that of the workers they supervise are classified with the workers they supervise. For more information on classification of supervisors, see the *2010 SOC User Guide*.

Typically, supervisors have the authority to hire, transfer, lay off, promote, reward, and discipline other employees. Field economists record whether the occupation includes supervisory responsibilities and, if so, the level of responsibility. First-line supervisors direct their staff through face-to-face meetings and are responsible for conducting the employees' performance appraisals, whereas second-line supervisors typically direct the actions of their subordinates through first-line supervisors. The field economists also evaluate most supervisory jobs on work levels based on the four-point factors previously described. A modified approach is used for professional and administrative supervisors who direct professional workers and are paid primarily for their supervisory and managerial skills; the levels of such supervisory jobs are determined on the basis of the duties and responsibilities of the highest reporting position. For a complete description of point-factor leveling and the determination of supervisory levels, see *National Compensation Survey: Guide for Evaluating Your Firm's Jobs and Pay*.

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Calculation

The National Compensation Survey (NCS) is an establishment-based survey that collects data on employer costs for employee compensation and incidence and details of employer-sponsored benefits. The calculation details for the Employment Cost Index (ECI), Employer Costs for Employee Compensation (ECEC) and Employee Benefits are covered in this section.

Computing the Employment Cost Index (ECI)

The ECI is a measure of the change in the employer costs of labor, independent of the influence of employment shifts among occupations and industry categories. The total compensation series include changes in wages and salaries and in employer costs for employee benefits. The ECI calculates indexes of total compensation, wages and salaries, and benefits separately for all civilian workers in the United States (as defined by the NCS), for private industry workers, and for workers in state and local government. For all of these categories, the ECI calculates the same measures by occupational group, industry group, and worker and establishment characteristics. Seasonally adjusted series are calculated as well.

The ECI is a modified Laspeyres index (that is, an index reflecting the change in labor costs over time), for which the basic computational framework is the standard formula for an index number with fixed index weights, modified by special statistical conditions and accounting for sampling methodology.

An index number for the ECI is a weighted average of the cumulative average wage changes within each of the ECI basic cells, with “wage bills” serving as the fixed weights. For benefit costs, the index number is a weighted average of the cumulative average benefit costs within each of the ECI basic cells, with “benefit bills” serving as the fixed weights. A basic cell for the ECI is composed of wage (or benefit) data from a narrowly defined set of workers, sorted by ownership sector, industry, and occupational groups in which they are employed. The ECI cell structure sorts the industry codes into 1 of 3 ownership sectors: private, state government, or local government. Workers within private establishments are sorted into 1 of 59 industry categories that are defined primarily by three-digit industry codes using the 2012 North American Industry Classification System (NAICS). Workers in either state or local government are classified into 13 industry categories; the government industry categories are as broad as “all goods-producing industries” and as narrow as “hospitals.” Each of these private and government industry groups is arrayed across nine aggregate occupational groups, which are ordered numerically by their 2010 Standard Occupational Classification (SOC) codes. Altogether, there are 531 (59 × 9) private industry occupational cells and 234 (13 × 9 × 2) state and local government industry occupational cells, totaling 765 ECI basic cells.

The unweighted average wage (or benefit cost) is calculated from all workers within a sampled quote (selected job). The wage (or benefit) bill $W_{0,i}$ is the product of the weighted average wage (or benefit cost) of sampled quotes (selected jobs), $\bar{Y}_{0,i}$, within the cell at the period (0) in which the wage (or benefit) bill is calculated and the number of workers represented by the cell, E_i

$$W_{o,i} = \bar{Y}_{0,i} E_i$$

For the ECI, the number of workers represented by the cell is held fixed. For each basic cell, wage and benefit bills (W_0) are computed, and the bills are updated each quarter by observed rates of change from the ECI survey sample.

The simplified formula for a basic cell is:

$$I_t = \frac{\sum(W_{0,i} M_{t,i})}{\sum W_{o,i}} * 100$$

where

I_t is the index at period *t*,

$W_{0,i}$is the estimated wage (or benefit) bill for the *i*th cell, and

$M_{t,i}$ is the multiplicatively accumulated weighted average wage (or benefit cost) change in the *i*th cell from time 0 (the period the wage or benefit bill is calculated) to time *t* (the current quarter). $M_{t,i}$ projects the weighted average wage (or benefit cost) level for the cell forward to the current quarter.

Note that $M_{t,i}$ can be written as $M_{t,i} = M_{t-1,i} \times R_{t,i}$

where

$R_{t,i}$ is the ratio of the current-quarter weighted average wage (or average benefit costs) in the cell to the previous-quarter weighted average wage (or average benefit costs) in the cell, both calculated in the current quarter from matched-sampled quotes. Using only matched quotes in the ratio eliminates the inclusion of wage (or benefit cost) changes that might be caused by workers reassigned between jobs within establishments or changes of jobs sampled in the survey. That is, the ECI sample tracks changes in wages (or benefit cost) within establishment jobs, not by individual workers of the establishment. The sample quote weights are applied to compute the cell-weighted averages.

All wage and benefit indexes are computed from the following data:

- *Matched quotes* are average hourly wages (or benefit costs) for detailed occupations (six-digit SOC) or groups of occupations, in sample establishments for which data are available for both the current and previous quarters. In addition to being identified by the detailed occupation, a quote within an establishment is identified from quarter to quarter by its bargaining status, full-time or part-time status, method of pay (time- or incentive-based), and work level.
- *Employment levels for each of the basic cells* from December 2005 to September 2013, employment were held constant using 2002 employment estimates from the Occupational Employment Statistics (OES)

Survey. Beginning December 2013 employment levels are fixed using 2012 OES employment estimates. The relative difference for any two periods after September 2013, reflect the cost of employing the 2012 workforce. Similarly, the difference for any two periods between December 2005 and September 2013 reflect the cost in employing the 2002 workforce. Because the index was updated with employment weights after September 2013, differences between the two reweighting periods cannot be interpreted in terms of the cost of employing any fixed workforce.

- *Sample quote weights* reflect both employment in each establishment, occupation surveyed, and the probability of selection.
- *Nonresponse and other adjustments* at the establishment and occupation level account for missing data and unusual situations that may have occurred or observed during data collection, such as when reported data represents more locations than the sampled establishment.

Computation of the index for a calendar quarter involves five principal steps:

1. Calculate a weighted average for each basic cell in the current quarter. Sampled occupation (quote) weights are applied to the average occupational hourly wage (or benefit cost) for every quote in a sampled establishment that reported both current-quarter and previous-quarter wage (or benefit) data. These data are used to calculate a weighted average wage (or benefit cost) for each basic cell (that is for each occupational group within each industry) for the current and previous survey periods.
2. Calculate the multiplicatively accumulated average wage (or benefit cost) changes. The ratio of the current-quarter to the previous-quarter weighted average wage (or benefit cost) is calculated for each cell i. This ratio ($R_{t,i}$) is used as an estimate of the current-quarter (t) wage (or benefit cost) change for that basic cell and is multiplied by the previous-quarter ($t-1$) cumulative average wage (or benefit cost) change for the cell ($M_{t-1,i}$). The product $M_{t,i}$ is a measure of the cumulative percent wage (or benefit cost) change in the cell's wage bill ($W_{0,i}$) since the period in which it was calculated.
3. Generate an estimate of the current-quarter wage (or benefit) bill. The measure of cumulative percent wage (or benefit cost) change is multiplied by the wage (or benefit) bill ($W_{0,i}$) in the calculated period to generate an estimate of the current-quarter wage (or benefit) bill for the cell.
4. Calculate the ratio of summed current-quarter wage (or benefit) bill to the summed wage (or benefit) bill in the period it was calculated. The current-quarter and previous-quarter wage (or benefit) bills are then summed over all cells within the scope of the index. For example, for the manufacturing wage index, the wage bills would be summed across all cells in manufacturing. The summed current-quarter wage ($\sum W_{0,i}\, M_{t,i}$) is divided by the summed base-period wage bill ($\sum W_{0,i}$).
5. Calculate the index link relative. The result, multiplied by 100, is the current-quarter index (I_t), which is then divided by the previous-quarter index (I_{t-1}) to provide a measure of quarter-to-quarter change, referred to as an “index link relative.”

Computations for the occupational and industry group indexes follow the same procedures as those for the overall indexes, except for summation. For example, for an index for a broad occupational group, the wage (or benefit) bills are summed across all cells, which are a subset of that occupational group, with indexes for industry groups calculated analogously.

Fixed employment weights are used each quarter to calculate aggregate indexes for civilian, private, and state and local government. These fixed weights are also used to derive all of the industry and occupation series indexes, see *Introducing 2012 fixed employment weights for the ECI*.

Computation procedures for measures of change in the regional, union and nonunion, and excluding-incentive workers indexes differ from those of the national wage and benefit indexes because the sample is not large enough to hold the wage and benefit bills constant at the level of detail of the indexes for larger samples. For these indexes, the prevailing distribution in the sample in the previous quarter (for example, between union and nonunion attributes within each ownership–industry–occupation cell of the previous quarter) is used to apportion the previous-quarter wage (or benefit) bill in that cell (for example, between the union and nonunion indexes) each quarter. The portion of the wage (or benefit) bill assigned to the union index is then adjusted by the percent change in the union wages (or benefit costs) in the cell, and similarly for the nonunion index. Therefore, the relative employment of the union index in each cell is not held constant over time and will likely change each quarter as the sample changes as well as actual changes in the employment distributions across these attributes. Because the weights of the region, union, and time-paid workers indexes are allowed to vary over time, these indexes are not strictly comparable to the aggregate, industry, occupation, and metropolitan area indexes.

ECI seasonal adjustment

Over the course of a year, rates of change in the cost of wages and benefits, as measured in the ECI, reflect events that follow a more or less regular pattern. These events include expansions and contractions of economic activity that occur in specific periods of the year, such as increased work in the construction industry during warm weather or changes in education stemming from new contracts associated with the beginning of the new school year. Such regular patterns in an economic time series typically are referred to as *seasonal effects*. The process of estimating and removing these effects from an economic series is called *seasonal adjustment*. Seasonal adjustment makes it easier for analysts to observe changes in data exclusive of seasonal effects. Economists and other researchers are particularly interested in observing cyclical and long-run movements of economic series to gain a better understanding of the economic behavior of various sectors of the economy.

In evaluating changes in a seasonally adjusted series, it is important to note that seasonal adjustment is an approximation based on past experience. Seasonally adjusted data have a similar margin of error as the original data on which they are based; therefore, the standard errors of the original (not seasonally adjusted) series could be used to assess the approximate precision of the corresponding seasonally adjusted estimates.

Seasonal adjustment is performed with the X-13ARIMA-SEATS program developed by staff of the Statistical Research Division of the U.S. Census Bureau. The X-13ARIMA-SEATS program includes enhancements to both the X-11 variant of the Census Method II seasonal adjustment program and the X-11 ARIMA (Autoregressive Integrated Moving Average) program developed by Statistics Canada. For a definition and explanatory information on ARIMA, see *The X-13ARIMA-SEATS Seasonal Adjustment Program* and *The X-II-ARIMA Seasonal Adjustment Method.*

ECI series are seasonally adjusted by either a direct or an indirect method. In the direct method, an original (or unadjusted) index is divided by its seasonal factor estimated from X-13ARIMA-SEATS. In the indirect method, also called composite seasonal adjustment, the seasonally adjusted index is calculated as a weighted sum of seasonally adjusted index components, where the weights are derived from the index weights.

Indexes at comparatively low levels of aggregation, such as the construction wage index, are adjusted by the direct method; that is, dividing the index by its seasonal factor. Higher level aggregate indexes, such as civilian wages and salaries, are generally seasonally adjusted by the indirect method, a weighted sum of seasonally adjusted component indexes, where the weights sum to 1.0. Industry and occupational series that are seasonally adjusted by the indirect method are based on industry and occupational components, respectively.

At the beginning of each calendar year, seasonal adjustment factors are estimated. The seasonal factors for the directly adjusted series for the entire year are published. Seasonally adjusted estimates are revised each year, for a 5-year period, based on the latest year of data available. NCS publishes these revised seasonally adjusted series, directly and indirectly adjusted, annually. For additional information see *Employment Cost Index: Annual Seasonal Adjustment Process*.

Employer Costs for Employee Compensation (ECEC)

The ECEC measures the average costs to employers for wages and salaries, and benefits, per employee hour worked. The series provides data on employer costs per hour worked for total compensation, wages and salaries, total benefits, and the following benefits:

- paid leave—vacations, holidays, sick leave, and personal leave
- supplemental pay—premium pay (such as overtime, weekend, and holiday) for work in addition to the regular work schedule and for shift differentials, and nonproduction bonuses (such as yearend, referral, and attendance bonuses)
- insurance benefits—life, health, short-term disability, and long-term disability insurance
- retirement and savings benefits—defined benefit and defined contribution plans
- legally required benefits—Social Security (refers to Old-Age, Survivors, and Disability Insurance (OASDI) program), Medicare, federal and state unemployment insurance, and workers' compensation

Cost data are presented both in dollar amounts and as percentages of total compensation and published quarterly.

The ECEC series provides an average cost across all workers. Eligible workers with access to employer-sponsored benefits who do not participate are also included in the calculation. That is, the average cost includes workers for whom the employer incurred a compensation cost and those for whom no cost was incurred.

The ECEC uses current employment weights (as opposed to fixed employment weights used in the ECI) to reflect the changing composition of today's labor force to calculate cost levels. The employment weights are derived from two BLS programs: the Quarterly Census of Employment and Wages (QCEW) and the Current Employment Statistics (CES). Combined, these programs provide the appropriate industry coverage and currency of data needed to benchmark (post-stratify) employment weights for the ECEC series.

In most instances, private industry employment weights used in the ECEC are total employment estimates for two-digit industry groups, such as utilities (NAICS 22) or wholesale trade (NAICS 42). In a few cases, the employment weights associated with more detailed industrial categories are used. Among such categories are the four-digit NAICS categories elementary and secondary schools (6111), junior colleges (6122), colleges and universities (6133), and the six-digit NAICS category aircraft manufacturing (336411). For state and local governments, a more aggregated level reflecting the level of detail published by the Current Employment Statistics (CES) program is typically used.

The ECEC estimates of the percentage of total compensation are calculated from unrounded estimates of hourly employer costs and then the percentages are rounded to the first decimal place. This method provides the most precise estimates of the percentage of total compensation; estimates calculated from published cost estimates may differ slightly from those calculated from unpublished unrounded cost estimates.

The formula for the mean hourly cost *c* for domain D is:

$$\hat{\bar{Y}}_{cD} = \frac{\sum_{q \in D} W_q \bar{Y}_{cq}}{\sum_{q \in D} W_q}$$

where

D is the domain of interest (such as all manufacturing workers)

W_q is the final quote weight for quote q, calculated as described earlier, with one additional factor included to account for changes in the employment distribution,

and $\bar{Y}_{cq}$ is the mean hourly cost c for quote q.

The formula for the mean hourly cost *c* as a percentage of total compensation is:

$$\boldsymbol{P_{cD}} = \frac{\hat{\bar{Y}}_{cD}}{\hat{\bar{Y}}_{TD}} * \mathbf{100}$$

where

$\hat{\bar{Y}}_{cD}$ is the mean hourly cost *c* for domain D, as before, and

$\hat{\bar{Y}}_{TD}$ is the mean hourly cost for total compensation for domain D.

When respondents do not provide all the data needed, a procedure for assigning plausible values for the missing values is used. The process is explained in the section Weighting, nonresponse adjustment, imputation, and benchmarking.

Computing incidence and provisions of benefits

The NCS collects and publishes data annually on the incidence of employer-provided benefits and on the key provisions (terms) of employee benefit plans, for civilian workers, workers in private industry, and state and local government workers. The following lists the types of published benefits.

- Health care (medical, dental, vision, and prescription drug plan coverage, and employee and employer premiums for individual and family coverage) and the percentage of establishments offering health benefits
- Retirement plan coverage (defined benefit and defined contribution) and the percentage of establishments offering retirement benefits
- Life, short-term disability, and long-term disability insurance coverage
- Paid leave (for example, sick, jury duty, personal, and family), paid holidays and vacations;
- Unpaid family leave
- Health promotion benefits
- Financial benefits (for example, health savings accounts, stock options, Section 125 cafeteria plans)
- Pretax benefits
- “Quality of life” benefits, (for example, long-term care insurance, flexible-workplace, and subsidized commuting)

In addition, the NCS publishes data on detailed provisions of coverage in two major benefit areas: health insurance and retirement plans. Health data include medical plan provisions, such as deductibles, coinsurance, and out-of-pocket maximums, as well as details of dental, vision, and prescription drug benefits. Provisions of defined benefit and defined contribution retirement plans, such as eligibility requirements and benefit formulas, also are published. Detailed provision estimates are produced based on the initiation year (for example, the first year of participation in the NCS for the sampled establishment) of each sample group collected data via Summary Plan Description (SPD), plan summary sheets, and Summary of Benefits and Coverage (SBC).

Formula used to calculate access to benefits. The formula for the percentage of employees with access A to a benefit area, such as life insurance, for domain D is:

$$A_D = \frac{\sum_{q \in D} W_q X_q}{\sum_{q \in D} W_q} * 100$$

where

D is the domain of interest,

W_q is the final weight for quote q, calculated as described in the section on the calculation of ECEC estimates, and

$X_q = 1$ if the worker in quote q has access to the benefit being estimated and $X_q = 0$ otherwise.

Formula used to calculate benefit participation. The formula for the incidence I, or percentage, of employees participating in a benefit area, such as medical care, for domain D is

$$I_D = \frac{\sum_{q \in D} \sum_{j \in q} W_q P_{qj}}{\sum_{q \in D} W_q} * 100$$

where

D is the domain of interest,

W_q is the final quote weight for quote q, calculated as described in the section on the calculation of ECEC estimates, and

P_{qj} is the percentage of workers in quote q who are participating in benefit-area plan j.

Other estimates of incidence, such as the percentage of participants in a benefit area or in a subset of a benefit area, can be computed in a similar manner, such that the base includes only those workers who participate in the benefit-area plans. For example, to calculate the percentage of medical insurance participants in fee-for-service plans in domain D, a ratio is calculated such that the denominator is the same as the numerator in the previous formula and the numerator is of the same form as well, except that the summation is restricted to those participants in fee-for-service plans.

Formula used to calculate average (mean). The formula for the average flat monthly employee contribution for medical insurance for domain D is

$$Y_D = \frac{\sum_{q \in D} \sum_{j \in q} W_q Y_{qj} P_{qj}}{\sum_{q \in D} \sum_{j \in q} W_q P_{qj}}$$

where

D is the domain of interest,

W_q, is the final quote weight for quote q, calculated as described in the section on the calculation of ECEC estimates,

Y_{qj} is the average monthly employee contribution to plan j by workers in quote q, and

P_{qj} is the percentage of workers in quote q who are participating in plan j.

Other means, such as the average annual deductible for medical insurance, can be calculated by a similar formula. In all cases, the averages include only those workers with the provision in question.

The weighted count of workers participating in plans available to workers in the sampled occupation and establishment is calculated by multiplying the final benchmarked quote weight by the participation rate for only those plans in the quote that meet the specific conditions defined by the quote condition and the plan conditions.

$WPE_{iqj} = OccFW_{iq} \times X_{iq} Y_{iqj} \times Z_{iqj} \times P_{iqj}$ where

$i =$ establishment,

$q =$ occupation within establishment i,

$j =$ plan in occupation q within establishment i,

WPE_{iqj} weighted plan employment of participating workers iqj,

$OccFW_{iq} =$ final benchmarked quote weight for occupation q in establishment i,

X_{iq}, Y_{iqj}, and Z_{iqj} are dummy variables such that

$X_{iq} = 1$ if quote iq meets the condition set in the quote (row) condition

$X_{iq} = 0$ otherwise,

$Y_{iqj} = 1$ if plan iqj meets the condition set in the base (denominator) plan condition

$Y_{iqj} = 0$ otherwise,

$Z_{iqj} = 1$ if plan iqj meets the condition set in the additional (numerator) plan condition

$Z_{iqj} = 0$ otherwise, and

$P_{iqj} =$ percentage of workers in occupation q and establishment i who are participating in plan j.

Calculation of percentiles

Percentiles of benefit provisions are calculated with data only from those workers in plans that include the provision in question. Percentile data are used to describe the distribution of a numeric value, such as a median annual deductible of $400.00 and the value $600.00 at the 90th percentile. The following percentiles *p* are calculated: 10, 25, 50 (median), 75, and 90.

The *p*th percentile is the value Q_{iqj}, where the plan value of a quantity is for a specific benefit or a subset of a benefit area, such that

- the weighted plan employment (WPE_{iqj}) across plans with a value less than Q_{iqj} is less than *p* percent of the total weighted plan employment and
- the weighted plan employment (WPE_{iqj}) across plans with a value more than Q_{iqj} is less than (100 − *p*) percent of the total weighted plan employment.

It is possible that there are no specific plan records *qi* for which both of these properties hold. This occurs when there exists a plan for which the WPE_{iqj} of records whose value is less than Q_{iqj} equals *p* percent of the total weighted plan employment. In that situation, the *p*th percentile is the average of Q_{iqj} and the value on the record with the next-lowest value. The Q_{iqj} values must be sorted in ascending order.

Weighting, nonresponse adjustment, imputation, and benchmarking

Participation in the NCS is voluntary; therefore, a company official may refuse to participate in the initial survey or may be unwilling or unable to update previously provided data for one or more occupations during subsequent contact. In addition, some establishments selected from the sample frame may be out of the scope for the survey or have gone out of business. To address the problems of nonresponse and missing data, the NCS adjusts the weights of the remaining establishments and imputes missing values (for example, fills in missing values with plausible values). To ensure that published compensation estimates ultimately are representative of compensation in the civilian, private industry, and state and local government sectors.

Weight adjustments and imputation are made in accordance with the following steps:

Step 1. Unit nonresponse adjustment: An establishment is considered *responding* if it provided information on at least one usable occupation. A selected occupation is classified as usable if the following data are present: occupational attributes (full-time or part-time schedule, union or nonunion status, and time or incentive type of pay), work schedule, and wage data. Wages account for approximately 70 percent of compensation; therefore, if wage data are not available, other data from the establishment cannot be used in calculating estimates. Without the wage data, it is not possible to create benefit-cost estimates because many benefits, such as paid leave, for example, are linked to wages.

An establishment is considered *nonresponding* if it refused to participate in the survey or provided neither wages and salaries, occupational classification, worker attributes, and work schedule data for any selected occupation. Establishment nonresponse during the initial interview (referred to as initiation) is addressed by introducing

nonresponse adjustments that redistribute the weights of nonrespondents to responding sample units in the same industry and size class. For example, if the nonresponding establishment was in the manufacturing industry and had an employment of 350 workers, the NCS would adjust the weights of responding manufacturing establishments with 250–499 workers by a nonresponse factor calculated by dividing the sum of the product of establishment employment and sample weight for responding and nonresponding establishments by the sum of the product of establishment employment and sample weight for responding establishments.

Step 2. Quote nonresponse adjustment: Quote nonresponse is a situation in which an establishment refuses to provide any wage data for a given sampled occupation (quote). Quote nonresponse during the initial interview is addressed by an adjustment that redistributes the weights of nonresponding quotes to responding sample quotes in the same occupational group, ownership, industry, and size class. Quote nonresponse during update interview is addressed by imputation.

Step 3. Item nonresponse is a situation in which an establishment responds to the survey but is unable or unwilling to provide some or all of the benefits data, for a given sampled occupation. Item nonresponse is addressed through item imputation in certain situations. Item imputation replaces missing values for an item with values derived from establishments with similar characteristics.

For benefit estimates, items can be imputed for nonresponse at initial and subsequent data collection. For example, during the initial contact, an establishment reports wage and salary data for a sampled occupation but refuses or is unable to report whether those in the occupation receive paid vacation benefits; the NCS imputes the incidence of vacation benefits for the selected occupation on the basis of the incidence of vacation benefits among similar occupations in similar establishments.

For wages and salaries, cost data are not imputed for item nonresponse during the establishment's initial data collection but are imputed at subsequent data collections (update). For example, if a manufacturing establishment reported wages and salaries for its full-time nonunion assembly workers during the initial collection, but not in a subsequent collection period (update), the NCS calculates the rate of change in wages and salaries of full-time nonunion workers in similar manufacturing establishments between the two collection periods, where the rate of change in wages and salaries between two collection periods is estimated from a regression model fit to establishments who reported wage data in both periods. This rate is then multiplied by the establishment reported wages and salaries, at initiation, to impute missing wages and salaries. However, if the establishment did not provide wages and salaries for full-time nonunion assembly workers at the initial collection, the NCS would perform a quote nonresponse adjustment.

Additional adjustment factors are applied to special situations that may have occurred during data collection. For example, when a sample unit is one of two establishments owned by a given company and the respondent provides data for both locations combined instead of data for the sampled unit, the weight of the sampled unit is adjusted to reflect the employment data for the sampled unit.

Step 4 Benchmarking (poststratification). The benchmark calculation is essentially the same for all NCS data products; however, the *input* to the calculation differs by data product. The ECI uses fixed employment weights from the QCEW and OES programs, whereas the ECEC and benefits estimates use current weights from the CES

program. B*enchmarking*, is the process of adjusting the weight of each establishment in the survey to match the most current distribution of employment by industry.

The private industry sample also uses establishment employment size class in the benchmarking process. The NCS establishment sample is drawn from the Quarterly Census of Employment and Wages (QCEW). The QCEW and the railroad information provide employment data, but because these sources do not have current employment data, the CES is used to adjust employment. The benchmark process updates the initial establishment weights, assigned during sampling, by current employment. Establishment weights reflect employment at the time of sampling, not collection. Benchmarking ensures that survey estimates reflect the most current industry composition–employment counts in proportions consistent with the private industry, state government, and local government sectors (hereafter, ownership).

For example, 40 private industry, 10 local government, and 5 state government units in the service sector were selected from the sampling frame made up of establishments employing 200,000 private workers, 30,000 local government workers, and 10,000 state government workers. By the time of survey processing, the private service sector employment increased by 10,000 workers, or 5 percent, with no increase in employment in the service sectors of state and local government. In the absence of benchmarking, the sample would underrepresent current employment in the private industry service sector. In this example, the NCS adjusts the sample weights of the 40 service sector firms in private industry to ensure that the number of workers in establishments in the sampling frame rises to 210,000. The ownership employment counts for the private industry service sector would then reflect the current proportions of 84 percent for private industry, 12 percent for local government, and 4 percent for state government employment.

Calculating estimate reliability

Two types of errors are possible in an estimate based on a sample survey: sampling errors and nonsampling errors. *Sampling errors* occur because the sample makes up only a part of the population it represents. The sample used for the survey is one of a number of possible samples that could have been selected under the sample design, each producing its own estimate. A measure of the variation among sample estimates is the *standard error*. *Nonsampling errors* are data errors that stem from any source other than sampling error, such as data collection errors and data-processing errors.

Standard errors can be used to measure the precision with which an estimate from a particular sample approximates the expected result of all possible samples. The chances are about 68 out of 100 that an estimate from the survey differs from a complete population figure by less than the standard error. The chances are about 90 out of 100 that this difference is less than 1.6 times the standard error. Statements of comparison appearing in NCS publications are significant at a level of 1.6 standard errors or better. This means that, for differences cited, the estimated difference is less than 1.6 times the standard error of the difference. To assist users in ascertaining the reliability of NCS series, standard errors or relative standard errors for NCS estimates are available online.

The ECI, ECEC, and benefits publications all use some variation of *balanced repeated replication* (BRR), a methodology employed to estimate the standard error. The procedure for BRR entails first partitioning the sample into 120 variance strata composed of a single sampling stratum or clusters of sampling strata, and then splitting

the sample units in each variance stratum evenly into two variance primary sampling units (PSUs). Next, half-samples are chosen, so that each contains exactly one variance PSU from each variance stratum. Choices are not random, but are designed to yield a “balanced” collection of half-samples. For each half-sample, a “replicate” estimate is computed with the same formula for the regular, or “full-sample,” estimate, except that the final weights are adjusted. A total of 120 replicates are used in this process. If a unit is in the half-sample, its weight is multiplied by (2 – *k*); if not, its weight is multiplied by *k*. For all NCS publications, *k* = 0.5, so the multipliers are 1.5 and 0.5.

The BRR estimate of standard error with *R* half-sample replicates is

$$SE(\hat{Y}) = \sqrt{\frac{1}{R(1-k)^2}\sum_{r=1}^{R}(\hat{Y}_r - \hat{Y})^2}$$

where

the summation is over all half-sample replicates $r = 1,...,R$,

$\hat{Y}_r$ is the *r*th half-sample replicate estimate, and

$\hat{Y}$ is the full-sample estimate.

Percent relative standard error data are provided alongside estimates in NCS ECEC publications, which display the standard error as a percentage of the full-sample estimate.

The percent relative standard error is given by

$$\%\text{RSE} = 100 * SE(\hat{Y})/\hat{Y}.$$

Data collection and processing errors are mitigated primarily through quality assurance programs that include the use of data collection reinterviews, observed interviews, computer edits of the data, and a systematic professional review of the data. The programs also serve as a training device to provide feedback to field economists, or data collectors, on errors and the sources of errors that can be remedied by improved collection instructions or computer-processing edits. Extensive training of field economists is conducted to maintain high standards in data collection.

Once estimates of compensation cost changes, of wage and compensation cost levels, or of benefit provisions are produced, the estimates are verified, or validated. The focus of the verification at this stage is a comparison of the estimates with their expected values, which are based on economic conditions; recent trends in similar data; and values prevalent in the recent past as broken out by industry, occupation, bargaining status, region of the country, type of compensation, and other characteristics. Anomalies, such as wage changes outside the historical range,

are identified, reviewed, and explained. Estimates are reviewed to ensure respondent confidentiality and specified statistical reliability. Estimates that meet this criteria are designated as “fit for use” and published.

Reliability of the ECI estimates

To assist users in evaluating the reliability of indexes, standard errors for ECI estimates, excluding seasonally adjusted series, are available.

Reliability of the ECEC estimates

To assist users in evaluating the reliability of ECEC estimates, relative standard errors are available for News Release (TXT) (PDF) and Supplemental Private Industry (TXT) (PDF) tables.

Reliability of the benefits estimates

To assist users in evaluating the reliability of benefit estimates, standard errors are available for incidence estimates.

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Presentation

The National Compensation Survey (NCS) produces indexes measuring change over time in labor costs through the Employment Cost Index (ECI) and the level of average costs per hour worked through the Employer Costs for Employee Compensation (ECEC). The NCS provides benefits per incidence for the percentage of workers with access to and participating in employer-sponsored benefit plans. The survey covers a broad range of benefits including holidays and vacations, sick leave, health and life insurance, and retirement plans. Details of employer-provided health and retirement plan provisions are also available. The NCS program's webpage is available at www.bls.gov/ncs/.

Users and Uses

Data from the NCS are used for a variety of reasons by the private sector including to aid in collective bargaining negotiations, evaluate benefit packages, analyze contract settlements, guide decisions in business or plant location, assist in wage and salary administration, and adjust wages in long-term contracts. The public sector also uses the NCS to formulate and assess public policy, aid collective bargaining negotiations, evaluate benefit packages, analyze contract settlements, index Medicare payments, and formulate monetary policy. Some examples by product are listed below.

Employment Cost Index (ECI)

- *Active-duty military pay adjustments*. In 1999, with a widening gap between military and private industry pay, Congress enacted legislation that tied annual military pay increases to the annual increase in the ECI plus 0.5 percent. For more information on military pay determination, see Military Compensation.
- *Federal pay adjustments*. The ECI is used to determine white-collar pay adjustments under the Federal Employees Pay Comparability Act (FEPCA), see General Schedule Classification and Pay.
- *Adjustments to Medicare reimbursements*. The U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services, uses estimates from the ECI to determine allowable increases in reimbursements to hospitals, skilled-nursing facilities, and home maintenance organizations under Medicare's Prospective Payment Systems (PPS), see *The Employment Cost Index and the impact on Medicare Reimbursements*, 2017.
- *Escalator clauses in government contracts*. Governments use the ECI series in labor contracts. For example, the Virginia department of transportation (VDOT) uses the professional, scientific, and technical services private industry wage series to adjust billable rates, see Escalation Rate for Professional Services Contracts.
- *Adjusting labor costs*. ECI series are used in adjusting personnel costs in education. For example, Fairfax County government uses a market rate adjustment to maintain pay competiveness.

Employer Costs for Employee Compensation (ECEC)

- *Costs associated with employee compensation*. The Department of Energy uses the ECEC data to benchmark its compensation costs in the process of selecting a potential contractor, see U.S. Department of Energy *Cost Study Manual*.
- *For comparisons between costs in the public and private sector.* The National Association of State Budget Officers uses the ECEC data to assess its compensation costs and their relative costs, see *The Relative Importance of Health and Retirement Benefits in State and Local Employee Compensation*.
- *For setting minimum wages and benefit payments.* The Department of Labor's Wage and Hour Division uses the ECEC data to pay service employees' wages and offer them benefits as consistent with those prevailing in the locality, see *All Agency Memorandum*.

Benefits incidence and detailed provisions

- *Planning and improving company benefits*. NCS data commonly are used as a guide when companies choose the provisions for their benefit plans. In addition, companies may improve benefit packages to remain competitive in the labor market.
- *Lowering turnover rates*. To attract and retain workers, employers may provide additional benefits. Using NCS data, employers can evaluate benefits that are available to employees nationally by worker and establishment characteristics.
- *Aiding collective bargaining negotiations*. Collective bargaining units renegotiate their contracts at various times. The bargaining unit may want to add a new benefit, such as flexible workplace arrangements, to an agreement. The bargaining unit and the employer can use NCS benefits data to assist them in decisionmaking.
- *Assessing health care premiums*. Companies can compare the premiums it currently pays for health benefits with nationwide averages. The comparison helps the established company assess its health benefits or negotiate contracts with insurance companies.
- *Assessing and formulating public policy*. NCS benefits data were used to design defined benefit plans and savings and thrift plans for federal employees.
- *Researching current benefit issues*. Students, consultants, and researchers use benefits data frequently to investigate a particular issue pertaining to benefits or may focus on a few years of previous data to develop research on trends or other benefit issues.

Accessing data

A comprehensive set of recent NCS data is available on the BLS website.

Employment Cost Index:

News Release (Latest) (Archived)

Historical and Health Benefit Tables

Standard Errors

Seasonal Factors

Videos and Graphics

Public Database Tools

Employer Costs for Employee Compensation:

News Release (Latest) (Archived)

Historical, Supplemental, and Relative Standard Error Tables

Public Database Tools

Employee Benefits:

News Release (Latest) (Archived)

Employee Benefits in the United States (Latest) (Archived)

Health and Retirement Plan Provisions in Private Industry (Latest) (Archived)

Health and Retirement Plan Provisions in State and Local Government (Latest) (Archived)

Public Database Tools

Special tabulation requests

The NCS processes requests for special tabulations of data not available elsewhere. Requests are evaluated and processed according to resource availability and complexity of the request. The NCS is not designed to produce estimates for individual states. Requests for additional geographic detail will be denied. All special tabulations of data are reviewed for reliability and confidentiality prior to release, which may limit the data provided. If the special tabulation data are cited, the user should indicate that the data are unpublished estimates from the Bureau of Labor Statistics, National Compensation Survey and provide the associated reference period. To submit a request for special tabulation of data, complete the NCS online form, enter “special data request” in the subject line and indicate the scope of the request. BLS staff evaluating the request will respond and ask for clarification, if necessary. When making a special data request, users should provide a detailed explanation of the scope that includes ownership (civilian, private, and state and local government), industry, occupation, worker and establishment characteristics, and time period. This detailed explanation will expedite the evaluation. Users looking to conduct econometric analysis should consider submitting proposals through BLS Restricted Data Access.

Availability of micro data

The NCS micro data are available on a limited basis to researchers who want to conduct valid statistical analyses. Researchers are encouraged to apply for access as early as possible and to discuss the project with appropriate BLS contacts prior to submitting an application. For more information see BLS Restricted Data Access.

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History

The Bureau of Labor Statistics (BLS) was established in 1884. Throughout its history, it has consistently focused on collecting high-quality data for various aspects of the nation's economy including the conditions of employee compensation. Although the focus and scope of the compensation surveys has changed over time (owing to legislative direction, emerging trends, and requests from the data user community), BLS has provided information on employee compensation essentially since the beginning of BLS. The first BLS study of occupational wages was conducted in 1885.

Historical timeline

- 1885 – The first BLS study of occupational wages is conducted and published in the "First Annual Report"*, 1886, Industrial Depressions*
- 1889 –"Fifth Annual Report"*, 1889, Railroad Labor* is published and includes occupational wage statistics for 60 carriers
- 1905 –"Nineteenth Annual Report"*, 1904, Wages and Hours of Labor* is published and includes the occupational wages by industry results for 1890 through 1903. Results were published for the next 4 years in the Bureau's bimonthly bulletin
- 1908–1912 – Hiatus in the compensation program occurs due to priority of other labor statistics
- 1909 –"Twenty-third Annual Report,"*1908, Workmen's Insurance and Benefit Funds in the United States* is published
- 1911–12 – Condition of employment in the iron and steel industry is published as a Senate document
- 1912 – Studies of union wage scales and hours of work in various industries are introduced and continued for almost 80 years
- 1912 – Payroll-based series on Industrial Wages and Hours (in 12 industries) is introduced and conducted until 1933
- 1920 – Annual wage index is introduced and conducted until 1934
- 1926 – Common Laborers Entrance Wage Rates survey is introduced and discontinued in the early 1940s
- 1938–39 – Industry Wage Surveys are conducted in support of the Fair Labor Standards Act (FLSA)
- 1943 – Urban wage index is introduced and conducted until 1947
- 1945 – Industry Wage Survey (IWS) is re-introduced and conducted until 1991
- 1948 – Community Wage Survey is introduced and conducted until the mid- 1960s
- 1955 – "Digest of Selected Health and Insurance Plans" and "Digest of Selected Pension Plans" are introduced and conducted until 1979
- 1959 – Employer Expenditures for Employee Compensation is introduced and conducted until 1977
- 1960 – National Survey of Professional, Administrative, Technical and Clerical Pay (PATC) is introduced and conducted until 1991
- Mid-1960s – Area Wage Survey (AWS) is introduced and conducted until 1991. It is a direct ancestor of NCS
- 1967 – Service Contract Act Survey (SCA) is introduced and conducted until 1997
- 1975 – Employment Cost Index (ECI) is introduced
- 1977 – Level of Benefits Survey (LOB) is introduced, and in 1979, moves into production as the Employee Benefit Survey (EBS)
- 1979 – Employee Benefits Survey (EBS) is introduced

- 1986 – Employer Costs for Employee Compensation (ECEC) is introduced
- 1991 – Occupational Compensation Survey (OCS) is introduced merging the AWS, IWS, and PATC into a single survey and conducted until 1997
- 1996 – COMP2000 is introduced merging the OCS, ECI/ECEC and EBS into a single survey
- 2000 – COMP2000 is renamed the National Compensation Survey (NCS)

The NCS, introduced in 1996, collects a broad range of compensation data that formerly had been collected under three separate BLS programs. The Employment Cost Index (ECI) measures the change in labor costs over time. The Level of Benefit Survey (LOB) provided detailed information on employee benefits for survey years 1980 through 1998. The Employer Costs for Employee Compensation (ECEC) measures the level of average cost per employee hour worked. The Occupational Compensation Survey (OCS) program published national and local area wage data for survey years 1991 through 1996.

Data from the Occupational Employment Statistics (OES) survey and NCS programs are combined and provided to the President's Pay Agent to meet the requirements of the Federal Employees Pay Comparability Act of 1990 (FEPCA). FEPCA established locality pay and the President's Pay Agent designated locality pay areas based on Office of Management and Budget (OMB) statistical area definitions. The President's Pay Agent advises the President on the issues of federal pay. It is made up of the Secretary of Labor and the directors of the Office of Management and Budget (OMB) and the Office of Personnel Management (OPM), for more information see the Annual Report of the President's Pay Agent. A combination of NCS and OES data is used by the President's Pay Agent to recommend adjustments in pay levels (in a report to the Federal Salary Council) of some federal workers.

Until 2011, the NCS published data on employee compensation from a large sample of establishments providing data on about 800 detailed occupations in more than 150 local areas. With the enactment of the 2011 U.S. federal budget, the Locality Pay Survey (LPS) portion of the NCS was eliminated. Occupational estimates by locality are available through the OES program. This program produces employment and earnings estimates for over 800 occupations. These are available at the national, state, and local area level.

The OES and NCS programs have produced estimates by borrowing from each survey to provide more details on occupational wages. The Modeled Wage Estimates provide annual estimates of average hourly wages for occupations by selected job characteristics and within a geographical location. The job characteristics include bargaining status (union and nonunion), part- and full-time work status, incentive- and time-based pay, and work levels by occupation. For more information see the Modeled Wage Estimates homepage.

Major ECI milestones:

- *June 1976: ECI private industry wages and salaries are first published*
- *June 1981: Total compensation and benefits are added to the ECI along with estimates for civilian workers and state and local governments, see The Employment Cost Index in 1980 : a first look at total compensation*
- March 1990: ECI is rebased, see ECI rebased to June 1989
- March 2006: ECI introduced number of changes, see *Employment Cost Trends: Change Has Come to the ECI*

  - 1987 Standard Industrial Classification (SIC) replaced with 2002 North American Industry Classification System (NAICS)
  - 1990 Occupational Classification System Manual (OCSM) replaced with 2000 Standard Occupational Classification (SOC)
  - ECI is rebased from June 1989 = 100 to December 2005 = 100, see: *Employment Cost Index publication plans*
  - Imputation methods were updated, see *Accounting for missing data in the Employment Cost Index*
- September 2008: Localities added to ECI, see *BLS introduces new Employment Cost Indexes for 14 metropolitan areas*
- December 2013: Fixed employment weights were updated, using 2012 employment counts from the OES survey, see *Introducing 2012 fixed employment weights for the Employment Cost Index*, *Monthly Labor Review, August, 2012*

Major ECEC milestones:

- March 1986: ECEC private industry cost per hour estimates are first published
- March 1992: ECEC civilian and state and local government workers cost per hour estimates are first published
- March 2002: Quarterly releases of ECEC begin (TXT) (PDF)
- March 2004: First estimates based on North American Industry Classification System (NAICS) Standard Occupational Classification (SOC) published, see *Comparing Current and Former Industry and Occupation ECEC Series*
- March 2009: Localities added to ECEC, see *BLS Introduces New Employer Costs for Employee Compensation Data for Private Industry Workers in 15 Metropolitan Areas*
- September 2016: Benchmarking process updated to include establishment size class, see *The Weighting Process Used in the Employer Costs for Employee Compensation Series for the National Compensation Survey* and *Effect of Benchmarking by Industry and Size Class on National Compensation Survey Estimates*

Major benefits milestones:

- 1979: Pilot survey of employer-sponsored benefits in private industry conducted
- 1979–1997: Development of the Employee Benefit Survey and survey publications summary, see *An overview of the EBS and the NCS*
- 1987: First benefits publication on state and local government with 50 or more employees
- 1990: First benefits publication on small establishments in private industry released
- 2008: Estimates for civilian workers (combined private and state and local government) first published
- 2009: Improvements to imputation methodology introduced, see *Recent Modification of Imputation Methods for National Compensation Survey Benefits Data*

Archives

- April 04, 2011

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More Information

Additional information on the National Compensation Survey (NCS) is available on the NCS website: www.bls.gov/ncs.

NCS estimates are available on the BLS website:

- Time series data from the NCS database: www.bls.gov/ncs/#data
- Latest news releases: www.bls.gov/ncs/#news

For a listing of frequently asked questions, see www.bls.gov/ncs/#faq.

For more information on definitions of additional benefit concepts, see the *National Compensation Survey: Glossary of Employee Benefit Terms*.

Selected articles on National Compensation Survey methodology are referenced below.

Benchmarking (post-stratification):

- "Changes in calculations for the BLS Employer Costs for Employee Compensation Data," March 2007

Estimation:

- "BLS introduces New Employer Costs for Employee Compensation Data for Private Industry Workers in 15 Metropolitan Areas," September 2009
- "BLS introduces new Employment Cost Indexes for 14 metropolitan areas," September 2008
- "The Employment Cost Index: What is it?" September 2001
- Technical Note "Estimation procedures for the Employment Cost Index"
- "Measuring Trends in the Structure and Levels of Employer Costs for Employee Compensation," 1997

Imputation:

- "An evaluation of alternative imputation methods"
- "Alternative imputation models for wage related data collected from establishment surveys"
- "Recent modification of imputation methods for National Compensation Survey benefits data," August 2009

Reliability:

- "Analyzing year-to-year changes in Employer Costs for Employee Compensation"
- "BLS Resumes Estimation of Sample Errors for Benefits Measures," May 2008
- "Application of Fay's Method for Variance Estimation in the National Compensation Survey Benefits Products," October 2008

Reweighting:

- "Introducing 2012 weights for the Employment Cost Index," *Monthly Labor Review* August 2016

- "Introducing 2002 weights for the Employment Cost Index," April 2006
- "Introducing new weights for the Employment Cost Index," June 1985

Sample design:

- "State and local government sample design for the National Compensation Survey," October 2012
- "Update on the evaluation of sample design issues in the National Compensation Survey," August 2011
- "Evaluating sample design issues in the National Compensation Survey," October 2010

Seasonal adjustment:

- "Changes in the publication of seasonally adjusted Employment Cost Index series," March 2013
- "Transitional Employment Cost Indexes for seasonal adjustment," April 2008
- "Seasonal adjustment in the ECI and the conversion to NAICS and SOC," April 2006

The Office of Compensation Levels and Trends, Branch of Survey Information and Publications, will be glad to assist you with questions about the NCS.

Email: Contact us

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