Chapter 8.
National Compensation Measures (Updated 07/2007)

The Office of Compensation and Working Conditions of the U.S. Bureau of Labor Statistics (BLS) produces a diverse set of employee compensation measures using data from the National Compensation Survey (NCS). The office also compiles statistics on work stoppages.

Compensation Measures

National Compensation Survey
The NCS collection of occupational wage data can be traced to the late 19th century, and benefits data can be traced to the mid-20th century. The NCS provides data on employer expenditures for wages, salaries, and benefits, as well as details of employer-provided benefits. Data are shown by sector of the economy (private industry, and State and local government), occupational groups, selected worker characteristics (such as full time and part time, and union and nonunion), and establishment characteristics (such as number of employees and geographic area).

Wage data
Wage data are published for the Nation, regions, and selected areas. These data are presented as hourly, weekly, and annual earnings and associated hours worked. Earnings are shown for detailed occupations as well as by work level (discussed later in this chapter), permitting wage comparisons across occupational groups. The wage data are computed using current weights to reflect the composition of today's labor force.

Employment Cost Index (ECI)
The *ECI* provides data on changes in labor costs and is a principal Federal economic indicator. (Principal Federal economic indicators are the major statistical series that describe the current condition of the economy. For more detail, see OMB Statistical Policy Directive No. 3 at **www.bea.gov/about/ pdf/federalregister09251985.pdf.**) The ECI shows quarterly and annual changes in employers' compensation costs, including both wages and salaries and benefits. Both seasonally adjusted and unadjusted data are presented. The ECI uses fixed weights to control for employment shifts among occupations and among industries.

Employer Costs for Employee Compensation (ECEC) series
The *ECEC* series shows employer costs per hour worked for wages and salaries and individual benefits. Cost data are presented both in dollar amounts and as percentages of compensation. The ECEC uses current weights to reflect the composition of today's labor force.

NCS benefits measures
NCS benefits measures cover the incidence and detailed provisions of selected employee benefit plans. Data are presented as the percentage of employees who have access to, or participate in, a broad selection of prevailing benefits. Provision data are available for benefits, such as leave (paid

vacations and holidays), disability insurance (short-term and long-term), and life insurance. NCS provides more extensive provision data for two major benefit areas: (1) Health insurance and (2) retirement (both defined-benefit and defined-contribution plans).

Description of the Survey

The NCS covers civilian workers in private industry establishments and in State and local governments in the 50 States and the District of Columbia. Workers in the Federal government, agriculture, and private households are excluded from coverage. Establishments with one or more workers are included, regardless of industry.

Major exclusions from the survey are the self-employed, individuals who set their own pay (for example, proprietors, owners, major stockholders, and partners in unincorporated firms), volunteers, unpaid workers, family members being paid token wages, individuals receiving long-term disability compensation, and U.S. citizens working overseas.

The following section presents a description of the sample design as well as general information on how each of the NCS measures is computed.

Sample design

Selecting areas. The NCS uses Office of Management and Budget (OMB) area definitions in selecting areas. OMB makes major revisions to the classification of areas after each decennial Census. In June 2003, OMB issued area definitions based on the 2000 census. These definitions were updated in December 2003. OMB defined 361 Metropolitan Statistical Areas and 573 Micropolitan Statistical Areas in the Nation.[1] OMB also defined a list of Combined Statistical Areas (CSAs) such that, adjacent Metropolitan and Micropolitan Statistical Areas, in various combinations, may be combined to form a CSA, if specified criteria are met. There are 1,359 counties in the Nation that are not included in either type of statistical area. Any county not included in a Metropolitan or Micropolitan Statistical Area is referred to as an Outside Core Based Statistical Area (CBSA).[2] For additional information about the process used to select areas, see Kenneth J. Hoffmann, "New Sample Areas Selected for BLS National Compensation Survey Program," Compensation and Working Conditions, spring 1997, available on the Internet at **www.bls.gov/opub/cwc/archive/spring1997art4.pdf**.

In 2004, a new area sample was selected for the NCS that contains 152 areas. Initially, the certainty areas were identified. Certainty areas are any individual areas with employment greater than 80 percent of the sampling interval. The sampling interval is the total employment across all areas

divided by the total number of areas to be selected. Data from the sample of areas can be aggregated to represent geographic divisions and the United States as a whole. Larger areas (the certainty areas) represent only themselves in these broader estimates, but smaller areas represent other areas that are not part of the sample in addition to themselves. After the certainty areas were identified, the remaining sample areas were allocated approximately proportionally to total employment across the Metropolitan Areas, Micropolitan Areas, and Outside CBSA county clusters by nine census divisions. This resulted in a sample of 57 certainty areas, 60 noncertainty Metropolitan Areas, 22 noncertainty Micropolitan Areas, and 13 noncertainty Outside CBSA county clusters.

In the past, the NCS considered any county that was outside OMB-defined areas as a single sampling unit. However, a county with particularly small employment can cause weighting, variance, and publication problems if it is selected for the NCS sample. Instead of continuing to treat these counties as single sampling units, most Outside CBSA counties are clustered to create larger sampling units. These larger sampling units help to prevent some of the problems associated with small survey areas. With some exceptions, contiguous counties within the same census division were combined to form clusters with a total employment of at least 10,000 workers and with heterogeneous wage levels. The employment minimum of 10,000 was chosen after research was conducted to measure the impact of clustering on the component of variance arising from the sampling of areas.[3] Clusters with heterogeneous wage levels were formed because clusters with wide wage distributions lead to lower between-area variances. The result is a list of 436 county clusters formed from an original list of 1,359 Outside CBSA counties.

For more information on the new area sample, see Jason Tehonica, "New Area Sample Selected for the National Compensation Survey," *Compensation and Working Conditions Online,* April 25, 2005, available on the Internet at **www.bls.gov/opub/cwc/cm20050318ar01p1.htm**.

Selecting establishments. Within each selected area, BLS selects a sample of business establishments and State and local government operations to represent the economic activity in that area. The individual business establishments and government operations to be studied are selected using a *probability-proportionate-to-size* (PPS) technique. That is, larger establishments, in terms of total nonagricultural employment, have a greater chance of selection than smaller establishments.

The NCS uses the 2002 North American Industry Classification System (NAICS) for defining industries. All new establishment samples are selected using NAICS as one of the stratification variables. The NCS began the transition from establishment samples based on the Standard Industrial Classification (SIC) to NAICS-based establishment samples in

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[1] The criteria for defining Metropolitan, Micropolitan, and Combined Statistical Areas are published in the Federal Register (65 FR 82228–82238, December 27, 2000), on the Internet at **www.census.gov/population/www/estimates/00-32997.pdf.**

[2] The criteria for defining Core Based Statistical Areas are published in the Federal Register (65 FR 82228–82238, December 27, 2000), on the Internet at **www.census.gov/population/www/estimates/00-32997.pdf**.

[3] For more information, see Izsak, Y.; Ernst, L. R.; Paben, S. P.; Ponikowski, C. H.; and Tehonica, J., "Redesign of the National Compensation Survey," 2003 Proceedings of the American Statistical Association, Section on Survey Research Methods [CD-ROM], Alexandria, VA: American Statistical Association, 2003.

2001. This transition will be completed in 2008. The private industry establishment sample is divided into five panels, with the sample being fully replaced over approximately a 5-year period. Each panel is a cross-section of the sampled industries and geographic areas. A new replacement panel is introduced every year, with the other four panels being updated.

The State and local government establishment sample is replaced approximately once every 10 years.

The selection and identification of surveyed occupations within an establishment require the following four steps:

1. Selecting jobs to survey within an establishment

2. Identifying job characteristics

3. Classifying each job to a standard occupation

4. Evaluating work level of job

Selecting jobs. Field economists use the PPS technique to select jobs in the surveyed establishment. A complete list of employees, or a list of jobs with employment totals, is used and the number of jobs selected is based on the total employment of the establishment. The number of jobs selected varies by the size of the establishment and the industry it is in. Random sampling gives those occupations with greater employment a higher probability of selection.

Identifying job duties and responsibilities. Field economist identify the duties and responsibilities of the selected jobs. The analysis is not based on job duties.

Classifying jobs. The selected jobs are classified into occupations based on job duties and responsibilities, according to an occupational classification system. (The selected occupations also are referred to as sampled occupations or quotes.) The NCS uses the 2000 Standard Occupational Classification (SOC) system, replacing the Census Bureau's Occupational Classification System (OCS). In addition, for each job, NCS records the union or nonunion status, the full-time or part-time status, and the time-based or incentive-pay status.[4]

Evaluating work level of jobs. Field economists rate the level of work for the selected job by evaluating its duties and responsibilities. This process is known as point-factor leveling because it categorizes certain aspects of a job to specific levels of work with assigned point values. The NCS system uses four distinct factors: Knowledge, job controls and complexity, personal contacts, and physical environment. Each factor consists of several levels, each with an associated description and assigned points. The knowledge factor is described separately for broad categories of occupations and contains

relevant examples as well as short definitions for the point levels. The remaining three factors use identical descriptions for all occupational categories.

Field economists choose the description within each factor that best matches the surveyed job. The full performance level of the job is used as the basis for evaluation, not the hiring criteria nor the qualifications of the current incumbents. The point levels describe thresholds of distinct levels of work, and only the stated point values are used. The job is assigned a point level when it fulfills the full requirement of that level. The points for each factor are then totaled to determine the overall level of work for the job.

There are 15 work-level classifications. The work levels reflect a hierarchy of the primary duties and responsibilities that can be used to compare dissimilar occupations. Work levels vary by occupation. Lower levels are found in occupations that require limited training, such as equipment cleaners, cashiers, and personal care workers. *Higher levels* are found in occupational groups that require extensive knowledge and independence, such as operations managers, engineers, and lawyers.

NCS also records whether an occupation has supervisory responsibilities, including the level of that responsibility. Most supervisory jobs are evaluated based on the levels of the four factors described above. A modified approach is used for professional and administrative supervisors when they direct professional work and are paid primarily for their supervisory and managerial skills: such supervisory jobs are leveled based on the duties and responsibilities of the highest reporting position. Additional information on this approach, as well as detailed information on the point-factor levels, is provided in the NCS publication "Guide for Evaluating Your Firm's Jobs and Pay," **www.bls.gov/ncs/ocs/sp/ncbr0004.pdf**.

Data collection

The collection of data from survey respondents requires detailed procedures. Field economists collect the data, while working out of regional offices and visiting the establishments to be surveyed. Other contact methods, such as mail and telephone, are used to follow up and update data. Information on detailed benefit provisions is obtained through an analysis of plan booklets.

Computations

The following section describes in detail the method used to compute each of the major NCS products.

Wage estimates

For the NCS wage products, the following estimates are calculated and published for specific areas of interest: Mean annual wages, mean weekly wages, mean hourly wages, total employment, and hourly wage percentiles. Areas of interest include geographical area by industry and by occupational group.

The formula used for calculating mean annual wages, mean weekly wages, and mean hourly wages uses the indi-

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[4] Union workers are those whose wages are determined through collective bargaining. Employees are classified as working either full time or part time based on the definitions used by each establishment. Time workers are those whose wages are based solely on an hourly rate or salary. Incentive workers are those whose wages are at least partially based on productivity payments, such as piece rates, commissions, and production bonuses.

vidual weight of the sampled occupation, the individual rates in the sampled occupations, and the number of weeks worked per year. Since 1996, the calculation of average hourly wage also has included the number of hours paid.

The following estimation formulas are used for computing mean wages, total employment, and hourly wage percentiles for the NCS.

(1) Mean annual wage

$$\frac{\sum\limits_{q\in D}\sum\limits_{l}(Y_{ql}*X_{ql}*W_q)}{\sum\limits_{q\in D}\sum\limits_{l}(X_{ql}*W_q)}$$

(2) Mean weekly wage

$$\frac{\sum\limits_{q\in D}\sum\limits_{l}(Y_{ql}*X_{ql}*W_q*A_q)}{\sum\limits_{q\in D}\sum\limits_{l}(X_{ql}*W_q*A_q)}$$

(3) Mean hourly wage

$$\frac{\sum\limits_{q\in D}\sum\limits_{l}(Y_{ql}*X_{ql}*W_q*H_q*A_q)}{\sum\limits_{q\in D}\sum\limits_{l}(X_{ql}*W_q*H_q*A_q)}$$

(4) Total Employment

$$\sum\limits_{q\in D}\sum\limits_{l}(X_{ql}*W_q)$$

(5) Hourly Wage Percentile. The p-th percentile is that hourly wage rate Y_{ql} such that the resulting weighted annual hours figure paid less than Y_{ql} is less than p percent of the total weighted annual hours paid, and the weighted annual hours paid more than Y_{ql} is less than (100 - p) percent of the total weighted annual hours paid

where

Subscript D is the domain of interest (e.g., occupation x level, occupational group x level),

Subscript q is the quote, and l is the wage record,

Y_{ql} is the annual wage rate in formula (1), the weekly wage rate in formula (2), and the hourly wage rate in formula (3) of a particular worker or group of workers in a particular quote,

X_{ql} is the number of workers for a particular wage rate,

H_q is the number of weekly hours paid for a particular worker, which is assumed to be the same for each worker in a quote,

(NOTE: Weekly hours paid is used only when computing average hourly wage.)

A_q is the number of annual weeks worked for a particular worker, which is assumed to be the same for each worker in a quote, and

W_q is the individual weight. The individual weight is calculated by dividing the final quote weight by the number of employees in the quote. The final quote weight for local area occupational wage estimates is a product of the reciprocal of the probability of selecting the establishment given the set of sample areas; a correction factor to adjust for cases in which data are collected for a different number of employees than data should be collected for; the establishment nonresponse adjustment factor; the occupational nonresponse adjustment factor; and the probability selection of occupation interval, which is the number of eligible employees divided by the number of occupational selections. For national and census division estimates, the final quote weights are a product of the same type of factors and one additional factor, the reciprocal of the probability of selecting the sample area in which the establishment is located. The benchmark factors are aggregated for geographical areas, census divisions, and national wage computations. The individual weight contains an additional factor to account for changes in the employment distribution.

Employment Cost Index
The ECI is a Laspeyres index. The basic computational framework for the ECI is the standard formula for an index number with fixed weights, as modified by the special statistical conditions that apply to the ECI. This discussion focuses on the ECI measures of wage changes, but indexes of changes in compensation and benefits are calculated in essentially the same fashion.

Method. An index for the ECI is a weighted average of the cumulative average wage changes from a specified base-period wage.

A formula for I_t, the index at quarter t, is presented. This formula assumes that the index series is based at 100 for $t = 0$. Currently, the index is based at 100 for December 2005; so I_t should be divided by the original index value for December 2005 to obtain the value of the index at quarter t with this base.

$$I_t = I_{t-1}\frac{\sum\limits_{i}W_{ti}}{\sum\limits_{i}W_{(t-1)i}}$$

where
$W_{(t-1)i}$, W_{ti} are the wage bill for cell i for quarter $t-1$ computed at quarter t and the wage bill for cell i at quarter t, computed at quarter t, respectively.

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A cell is defined by private or government sector, industry, and occupational group. The wage bill is the weighted average hourly wage of workers in the cell times the number of workers represented by the cell (the fixed employment weight). The fixed weights used in the index calculation for March 2006 to the present are based primarily on 2002 employment from the BLS Occupational Employment Survey (OES). From March 1995 through December 2005, the 1990 OES employment counts were used.

Now $\quad W_{ti} = W_{(t-1)i} * R_{ti} \qquad (1)$

where R_{ti} is the ratio of the current-quarter weighted average wage in the cell to the prior-quarter weighted average wage in the cell, both calculated in the current quarter using matched establishment/occupation wage quotations—that is, quotes with usable data in both quarters. The weights applied are the sample quote weights described in the previous section.

As for $W_{(t-1)i}$, note the wage bill for the cell for quarter t-1 was originally calculated at quarter t-1 using (1) with t and t-1 replaced by t-1 and t-2, respectively. At quarter t the wage bill for quarter t-1 remains the same, except if quarter t is the once a decade t-1 quarter in which the fixed employment weights are changed, such as March 1995 and March 2006. In this latter case, the wage bill for quarter t-1 is recomputed at quarter t as the product of the new fixed employment for the cell and the mean wage for the cell at quarter t-1 calculated from the ECI sample.

The index computation for a quarter involves five principal steps:

1. Establishment sample quote weights are applied to the average occupational hourly wage in every establishment that has both current- and prior-quarter wage information. These data are used to calculate a weight ed average wage for each cell (that is, occupational group within industry) for the current and prior survey periods.

2. The ratio of current-quarter to prior-quarter weighted average wage is then calculated for each cell.

3. This ratio for each cell is multiplied by the wage bill for the cell from the prior quarter. The product is the current-quarter wage bill.

4. Both the current-quarter and previous-quarter wage bills are then summed over all cells within the scope of the index. For example, for the manufacturing in - dex, the wage bills would be summed across all cells in manufacturing.

5. The summed current-quarter wage bill is divided by the summed previous-quarter wage bill. The result is the quarterly change in the index. This quarterly change is multiplied by the previous quarter's index value to obtain the current quarter's index value.

The computations for the occupational and industry groups 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 bills are summed across all cells that are a subset of that occupational group, with indexes for industry groups calculated analogously.

Computation procedures for the regional, union or non-union, and metropolitan or nonmetropolitan measures of change differ from those of the national indexes because the sample is not large enough to hold constant the wage bills at that level of detail. For these subseries, each quarter the prevailing distribution in the sample (for example, between union and nonunion within each ownership/industry/occupation cell) is used to apportion the prior-quarter wage bill in that cell (for example, between the union and nonunion series). The portion of the wage bill assigned to the union sector is then moved by the percentage change in the union wages in the cell, and similarly for the nonunion sector. Therefore, the relative employment of the union sector in each cell is not held constant over time. Since the weights of the region, the union, and metropolitan area subcells are allowed to vary over time, the indexes for these series are not strictly comparable to those for the aggregate, industry, and occupation series.

Seasonal adjustment. Over the course of a year, the rate of wage-and-benefit cost changes is affected by events that follow a more or less regular pattern. For example, ECI 3-month rates of change for wage-and-benefit costs in State and local governments, which include State and local education as a substantial part, show larger rates of increase in September, reflecting new contracts associated with the beginning of new school sessions.

Adjusting for these seasonal patterns makes it easier to observe the cyclical and other nonseasonal movements in the series. When evaluating changes in a seasonally adjusted series, it is important to note that seasonal adjustment is an approximation based on past experience. Seasonally adjusted estimates have a broader margin of possible error than the original data on which they are based because they are subject to errors associated with seasonal factor estimation, in addition to sampling and nonsampling errors.

Seasonal adjustment is performed using the X-12 ARIMA program developed by the time series staff in the Statistical Research Division of the Census Bureau, U.S. Department of Commerce. The X-12 ARIMA program includes enhancements to the X-11 Variant of Census Method II seasonal adjustment program, as well as the X-11 ARIMA program developed by Statistics Canada.

At the beginning of each calendar year, seasonal adjustment factors are calculated for use during the coming year. The seasonal factors for the coming year are published on the BLS Web site. Revisions of seasonally adjusted indexes and

3-month percent changes for the most recent 5 years also are published on that Web site.

ECI series are seasonally adjusted using either direct or indirect methods. In the direct method, an original or unadjusted index is divided by its seasonal factor. In the indirect method (also called composite seasonal adjustment), the seasonally adjusted index is calculated as a weighted sum of seasonally adjusted index components.

Employer Costs for Employee Compensation estimates

ECEC estimates are shown as costs per hour worked for total compensation (wages and benefits), expressed both as dollar amounts and as percentages of compensation. ECEC estimates are computed for various costs, c, including wages, individual benefits, combinations of benefits, total benefits, and total compensation (total wages plus total benefits). The formula for $\hat{\bar{Y}}_{cD}$, the mean hourly cost c for domain D, is

$$\hat{\bar{Y}}_{cD} = \frac{\sum\limits_{q \in D} W'_q Y_{cq}}{\sum\limits_{q \in D} W'_q}$$

where

D is the domain of interest,

W'_q is the final quote weight for quote q, calculated as in the description of the final quote weight in the section on the calculation of wage levels, with one additional factor to account for changes in the employment distribution, and

Y_{cq} is the mean hourly cost c for quote q.

In addition, P_{cD}, the mean hourly cost c as a percentage of total compensation, is calculated as

$$P_{cD} = \frac{\hat{\bar{Y}}_{cD}}{\hat{\bar{Y}}_{TD}} \times 100$$

where

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

Benefit Incidence and Provisions Estimates

NCS provides information on the incidence and detailed provisions of employee benefit plans.

Incidence, which refers to the number or percentage of employees that receive a benefit plan or specific benefit feature, is measured in two ways—access and participation. Employees are considered as having access to a benefit plan if it is available for their use or will be once a service requirement has been met. Access is determined on an occupational basis within an establishment; either all employees or no employees in an occupation in an establishment have the benefit available to them. *Participation* refers to the proportion of employees who are actually enrolled in the plan.

Access. The formula for A_a, the percentage of employees with access to a benefit area such as life insurance, for domain D is

$$A_D = \frac{\sum\limits_{q \in D} W'_q X_q}{\sum\limits_{q \in D} W'_q} \times 100$$

where

D is the domain of interest,

W'_q is the final quote weight for quote q, calculated as described in the previous section on the calculation of ECEC estimates, and

X_q is 1 if the quote has access to the benefit being estimated, and 0 otherwise.

Participation. The formula for I_D, the percentage of employees participating in a benefit area such as medical care, for domain D is

$$I_D = \frac{\sum\limits_{q \in D} \sum\limits_{j \in q} W'_q P_{qj}}{\sum\limits_{q \in D} W'_q} \times 100$$

where

D is the domain of interest,

W'_q is the final quote weight for quote q, calculated as described in the previous section on the calculation of ECEC estimates, and

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

Other estimates of incidence, such as the percentage of participants in a benefit area or subset of a benefit area, can be computed in a similar manner, in which the base includes only those workers who participate in the benefit. For example, to calculate the percentage of medical insurance partici-

pants in domain *D* participating in indemnity plans, a ratio is calculated such that the denominator is the same as the numerator of the previous formula, and the numerator is of the same form except that the summation is restricted to those participants in indemnity plans.

Average (Means). The formula for $\hat{\bar{Y}}_D$, the average flat monthly employee contribution for medical insurance for domain *D*, is

$$\hat{\bar{Y}}_D = \frac{\sum_{q\in D}\sum_{j\in q} W_q' Y_{qj} P_{qj}}{\sum_{q\in D}\sum_{j\in q} W_q' P_{qj}}$$

where

D is the domain of interest,

W'_q is the final quote weight for quote *q*, calculated as described in the previous section on the calculation of ECEC estimates,

Y_{qj} is the average monthly employee contribution for plan *j* in quote *q*, and

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

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

Reliability of Estimates

Errors in the estimates include both sampling errors and non-sampling errors.

Sampling errors occur because the sample makes up only a part of the population. The sample used for this survey is one of a number of possible samples that could have been selected under the sample design, each with a corresponding estimate. A measure of the variation among these sample estimates is the standard error.

The ECI, ECEC, and the NCS wage publications all use some variation of *balanced repeated replication* (BRR) to estimate the standard error. Standard errors presently are not estimated for the other benefits products (such as benefit access and participation rates). The procedure for BRR is first to partition the sample into variance strata, composed of single sampling strata or clusters of sampling strata, and then to split the sample units in each variance stratum evenly into two variance primary sampling units (PSUs). Next, half-samples

are chosen so that each half-sample contains exactly one variance PSU from each variance stratum. Choices are not random, but 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. 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. (Some of the weighting adjustments done as part of the calculation of final weights also are recalculated for each replicate.) The BRR estimate of standard error with *R* half samples is

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

where the summation is over all half-samples *r* = 1,...,R,

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

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

ECEC and NCS wage publications display the standard error as a percentage of the full-sample estimate. This is called the percent relative standard error and is given by

$$\%\text{RSE} = 100 \times \text{SE}(\hat{Y}) \,/\, \hat{Y}$$

Nonsampling errors result from not collecting data within a specified sample. The primary sources for nonsampling errors are survey nonresponse, and data collection and processing errors. Nonsampling errors are not measured, but procedures have been implemented for reducing them.

Survey nonresponse includes unit nonresponse and item nonresponse. Unit nonresponse is treated with weight adjustments that redistribute the weights of nonrespondents to similar respondents based on characterics such as industry, establishment size-class, and occupational group. Some adjustments are applied to nonrespondent establishments, and some are applied to nonrespondent jobs within partial respondent establishments.

Item nonresponse occurs when some respondent units do not provide data for all items being collected. Item nonresponse is treated by item imputation. In item imputation, missing values for an item are replaced by values derived from respondents with similar characteristics who completed the item.

Data collection and processing errors are mitigated primarily through quality assurance programs. These programs include the use of data collection reinterviews, observed interviews, computer edits of the data, and systematic professional review

of the reports in which the data are recorded. The programs also serve as a training device to provide feedback to the field economists, or data collectors, on errors. They provide information on the sources of errors that can be remedied by improved collection instructions or computer-processing edits. Extensive training of field economists also is conducted to maintain high standards in data collection.

Uses and Limitations

The compensation, wage, and benefit data developed in BLS surveys have a variety of uses. Federal, State, and local agencies use them in compensation administration and in the formulation of public policy on compensation. The data are of value to Federal and State mediation and conciliation services and to State employment compensation agencies in judging the suitability of job offers. Bureau data are also used in private industry for determining compensation. Survey data are considered by employers in selecting locations for new facilities and in cost estimating relating to contract work.

In addition, the data are used in economic analysis. Knowledge of levels, structures, and trends of pay rates and benefit practices is required in the analysis of current economic developments and in studies relating to wage dispersion and differentials. The integration of the compensation surveys allows costs to be linked to specific benefit practices because all data are based on the same survey methodology and definitions.

The ECI has been designated a principal Federal economic indicator by OMB. It is the only measure of labor costs that treats wages and salaries and total compensation consistently and provides consistent subseries by occupation and industry. The ECI is used by the Federal Reserve Board to monitor the effects of fiscal and monetary policies and to formulate those policies. It enables analysts and policymakers to assess the effects of labor cost changes on the economy, both in the aggregate and by sectors. The ECI is particularly important in studies of the relationships among prices, productivity, labor costs, and employment.

Although these measures of compensation have many uses, their limitations must be kept in mind. The data are subject to sampling errors, which may cause deviations from the results that would be obtained if the actual records of all establishments could be used. The sampling error is described in the earlier section on **Reliability of Estimates**.

Work Stoppages

The Bureau currently compiles data on work stoppages involving 1,000 or more workers for at least a full day or shift. Data for this series, major work stoppages, is uninterrupted and dates back to 1947. The information includes monthly listings of companies or governments involved in a work stoppage, along with the name of the union involved in the dispute, the location of the stoppage, the NAICS code, the beginning and ending dates of the dispute, the number of workers idled by the stoppage, days of idleness during the reference month, and days of idleness from the beginning of the work stoppage.

Definitions and methods

A *work stoppage* is a *strike* or *lockout*. Because of the complexity of most labor-management disputes, BLS makes no attempt to distinguish between strikes and lockouts in its statistics. A strike is a temporary stoppage of work by a group of employees (not necessarily members of a union) to express a grievance or enforce a demand. A lockout is a temporary withholding or denial of employment by management during a labor dispute to enforce terms of employment on a group of employees.

Workers involved include those who initiate the strike as well as others in the establishment who honor picket lines or are idled because the plant is closed down. Other branches or plants of the struck employer also may be affected.

The *number of days idle* includes all workers made idle for one shift or longer in establishments directly involved in a stoppage. This number does not account for secondary idleness, that is, the effects of a stoppage on other establishments or industries whose employees may be made idle as a result of material or service shortages. The figure does, however, include idleness at other plants or facilities of the establishment struck.

Estimated working time lost is computed by multiplying the number of workers idled during the period by the number of workdays lost based on a 5-day workweek, excluding Federal holidays.

Sources of information. Information on the actual or probable existence of a work stoppage is collected from numerous sources. They include weekly reports of the Federal Mediation and Conciliation Service, State Bureau of Employment Security reports, union newspapers and periodicals, and clippings of labor disputes obtained from a number of major daily and weekly newspapers.

Analysis and Presentation of NCS Compensation and Work Stoppage Data

Analysis and data derived from the various compensation measures also are presented in news releases, reports, summaries, bulletins, and articles in *Compensation and Working Conditions Online* and *Monthly Labor Review*. Data also are available on LABSTAT, the BLS public use database, and through the Internet. Current information about national wage and compensation programs can be accessed at **www. bls.gov/ncs/home.htm**.

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