# Employment Cost Index publication plans

*The Employment Cost Index has gone through changes that affected publication series; some series were unchanged, some new series were introduced, while others have a break in continuity or are being discontinued*

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The Employment Cost Index (ECI) has undergone several changes since its introduction 30 years ago. Initially, in December 1975, the series measured private industry wage changes. In March 1980, the series was expanded to include both wages and employer costs for employee benefits. The scope of the ECI was broadened again in September 1981 to cover State and local governments. The 1980s and 1990s brought additional industry and occupational details, while, in March 2006, BLS changed the ECI again to reflect a switch to new industry and occupational classification systems used throughout the Federal statistical community. In the future, additional geographic, industry, and occupational series may be phased into the program. This article describes the impact of the new industry and occupational classification systems on publication series, as well as notes other related developments that will occur simultaneously.

The March 2006 ECI, released in April 2006, reflected a variety of changes that marked a departure from previous publications. These changes stemmed from several different sources, including a transition from the 1987 Standard Industrial Classification (SIC) system to the 2002 North American Industry Classification System (NAICS) and from the Occupational Classification System (OCS) developed for use in the 1990 decennial census to the 2000 Standard Occupational Classification (SOC) system. Other modifications reflected an evaluation of the quality of various series, as well as a slight change in the ECI compensation costs definition, which includes wages, salaries, and employer costs for employee benefits. This article discusses the following simultaneous actions that impacted the ECI series for the first quarter 2006:

1. Transition from SIC–OCS to NAICS–SOC
2. Assessment of the statistical reliability of existing series
3. New series: excluding workers with volatile pay
4. Change in the composition of compensation

## Transition from SIC–OCS to NAICS–SOC

The United States adopted NAICS and SOC as the standard industry and occupational classification systems to be used by all Federal statistical agencies to provide a means of comparing data across agencies. The U.S. Office of Management and Budget (OMB) mandated that all statistical agencies switch to NAICS and SOC.

The potential loss of historical comparability because of breaks in time series associated with the conversion to NAICS was recognized early in the process of developing the NAICS taxonomy. OMB established the Economic Classification Policy Committee (ECPC) and charged it to use a "fresh slate" when examining the economic classification of industries for statistical purposes. ECPC favored the benefits of a one-time break in historical continuity over time series data with questionable value and concluded that "…it is unproductive to collect and maintain time series data that have a questionable value. Thus, it may be preferable to accept a onetime break in historical continuity if the benefits of conversion to a new classification structure are apparent and accepted by users."[1]

Along with breaks in continuity, the new industry and occupational systems caused other changes in the old ECI structure, such as new series being introduced and others being discontinued. This was not the result of a change in what the establishment or the employees have been doing but instead stemmed from a reclassification based on the new hierarchical scheme.

*NAICS.* The ECI continues to cover civilian workers in private industry and State and local governments, excluding agriculture, but there is a change in the classification of establishments in the industry. Some establishments that were in scope under SIC are now out of scope under NAICS; similarly, some that were out of scope prior to the reclassification are now in scope. For example, the logging industry has been reclassified from the manufacturing sector into the agriculture, forestry, fishing, and hunting group, which is not included in the ECI. At the same time, landscaping has moved out of agriculture to a new professional and business services sector, which is included in the ECI. As a result, the scope/composition of establishments in the index of the civilian labor force, excluding agriculture, has changed; however, the magnitude of the shift is insignificant.[2]

The NAICS structure is based on *how* products and services are produced, while SIC focused on *what* is produced. The SIC durable and nondurable series within manufacturing were based on what is produced, but do not coincide with the NAICS taxonomy of the production process. Thus, the durable/nondurable structure within manufacturing will be dropped because the NAICS structure does not support it. However, to help data users, the series will be maintained for a year.

*SOC.* SOC covers all occupations in which work is performed for pay or profit and reflects the current occupational structure in the United States. It contains many new occupations, especially in the service and information fields. The number of occupations increased from more than 400 used in OCS to around 800 in SOC.

Occupational series are presented by the aggregate groups specified in the 2000 SOC system. The white-collar and blue-collar series that appeared in previous index publications will be dropped in 2007. The white-collar group consists of occupations (such as accountants and cashiers) with disparate wage and compensation rates. For example, as shown in the "Employer Cost for Employee Compensation—September 2005" release, the hourly total compensation costs for civilian workers in management, professional, and related occupations was more than double those in sales and office occupations, ($42.84 and $20.04, respectively); however, all these workers are classified as white-collar. The white-collar and blue-collar series will be maintained for a year for the users during the transition.

*Defining continuous series.* Two criteria were applied to determine if the new and old series were continuous. The first test looked at employment overlaps, and the second test analyzed index changes. These tests were conducted for both the industry and occupation comparisons.

The first criterion was based on the overlap of employment between the two series. A NAICS series was deemed comparable to the corresponding SIC series if at least 90 percent of the employment in the NAICS classification was also in the SIC classification, *and* at least 90 percent of the employment in the SIC classification was also in the NAICS classification. In situations where the requirement was satisfied in one way but not the other way, the series were not considered continuous. For example, if the overlap of NAICS to SIC was 95 percent, but the overlap of SIC to NAICS was 80 percent, the series were not considered continuous. The same comparison was made between OCS and SOC series.

If a series passed the first test, then old and new indexes were compared. Both indexes used December 1994=100 base. A set of research indexes based on NAICS–SOC was calculated through December 2005. These indexes were compared with the previously published (SIC–OCS) indexes at the end of 2004. The new series was considered continuous if the NAICS–SOC indexes were within 1.5 index points of the published SIC–OCS series.[3]

Some series published in the ECI have the same name as in the old publication; however, these series were not considered continuous if the composition of an industry/occupation under NAICS–SOC was different than under SIC–OCS. For example, "Retail Trade" under NAICS does not include eating and drinking places that used to be a part of this industry under SIC.

This analysis of continuity showed that every industry and occupational series that passed the first test of employment overlap also passed the second test comparing index changes. Exhibit 1 identifies the industry series that are published under NAICS and summarizes the results of the continuity tests. Exhibit 2 provides similar analysis by occupational group.

These results paralleled the findings of the tests for the series on the Employer Costs for Employee Compensation (ECEC).[4] The ECEC analysis was also a two-part test. The first mirrored the ECI test of employment overlap, while the second examined the wage and compensation rates of the old and new series.[5]

**Exhibit 1. Continuity of Employment Cost Index (ECI) industry series between the 2002 North American Industry Classification System (NAICS) and the 1987 Standard Industrial Classification (SIC) system**

| NAICS | Industry | Series meet definition of continuity | Break in series or new series |
|---|---|---|---|
| 21–92 | All civilian workers | X | |
| 21, 23, 31–33 | Goods-producing industries | X | |
| 23 | Construction[1] | X | |
| 31–33 | Manufacturing | X | |
| 336411 | Aircraft manufacturing[1] | X | |
| 22, 42–92 | Service-providing industries[2] | X | |
| 51 | Information[1] | | X |
| 42, 44, 45, 48, 49, 22 | Trade, transportation, and utilities[1] | | X |
| 42 | Wholesale trade[1] | | X |
| 44, 45 | Retail trade[1] | | X |
| 48, 49 | Transportation and warehousing[3] | | X |
| 22 | Utilities[3] | | X |
| 52, 53 | Financial activities[1,4] | X | |
| 52 | Finance and insurance[1] | | X |
| 522 | Credit intermediation and related activities[1] | | X |
| 524 | Insurance carriers and related activities | | X |
| 53 | Real estate and rental and leasing[1] | | X |
| 54, 55, 56 | Professional and business services[1] | | X |
| 54 | Professional, scientific, and technical services[1] | | X |
| 56 | Administrative and support and waste management and remediation services | | X |
| 61, 62 | Education and health services | | X |
| 61 | Educational services | X | |
| 611110 | Elementary and secondary schools[5] | X | |
| 611210, 611310 | Junior colleges and colleges, universities, and professional schools[6] | X | |
| 62 | Healthcare and social assistance | | X |
| 622 | Hospitals | X | |
| 623 | Nursing and residential care facilities | | X |
| 71, 72 | Leisure and hospitality[1] | | X |
| 72 | Accommodation and food services[1] | | X |
| 81 | Other services (except public administration)[1] | | X |
| 92 | Public administration | X | |

[1] Private industry only.
[2] Previously titled service-producing industries.
[3] Continuous for private industry. An aggregate series for all civilian workers will be introduced later.
[4] Previously titled finance, insurance, and real estate.
[5] Previously titled elementary and secondary education.
[6] Previously titled higher education.

*Transition aids.* To help data users compare the series based on NAICS–SOC with those based on SIC–OCS, BLS is publishing two historical listings that overlap for the March 2001 through December 2005 period. Both historical listings have the base December 2005=100 and are available on the Internet.[6]

The historical listing based on SIC–OCS covers the 1975–2005 period. It is the official series for that time period because it contains the estimates as originally published. (As noted above, the data have been rebased to December 2005=100, but that does not affect percent changes except for rounding.)

The historical listing based on NAICS–SOC initially covers the March 2001 through March 2006 period and will be updated each quarter. The 2001–05 data on this listing are not official; they are presented only to aid the users in interpreting NAICS–SOC data. Note that the 2001–05 estimates in this historical listing differ from those in the SIC–OCS listing because of the new industry and occupational classification systems and the new fixed weights as discussed in Stephanie Costo's article in this issue.[7] These 2001–05 measures also utilized old imputation procedures to estimate values for missing data.[8]

With two historical listings, the user may want to know whether to construct a longer historical series. For that reason, BLS has provided recommendations regarding which series may be viewed as continuous. However, it is up to the users to decide whether a series is sufficiently continuous for their purposes.

**Exhibit 2. Continuity of Employment Cost Index (ECI) occupational series between the 2000 Standard Occupational Classification (SOC) and 1990 Occupational Classification System (OCS)**

| SOC | Occupation | Series meet definition of continuity | Break in series or new series |
|---|---|---|---|
| 11–53 | All civilian workers | X | |
| 11–29, 41–43 | White-collar occupations | X | |
| 11–29 | Management, professional, and related | | X |
| 11–13 | Management, business, and financial[1] | X | |
| 15–29 | Professional and related[2] | X | |
| 41–43 | Sales and office | | X |
| 41 | Sales and related | X | |
| 43 | Office and administrative support[3] | X | |
| 45–53 | Blue-collar occupations | X | |
| 45–49 | Natural resources, construction, and maintenance | | X |
| 45–47 | Construction and extraction | | X |
| 49 | Installation, maintenance, and repair | | X |
| 51–53 | Production, transportation, and material moving | | X |
| 51 | Production | | X |
| 53 | Transportation and material moving | | X |
| 31–39 | Service occupations | X | |

[1] Previously titled executive, administrative, and managerial.
[2] Previously titled professional specialty and technical.
[3] Previously titled administrative support, including clerical.

*Impact on other series.* In addition to series by industry, occupation, and occupation by industry, the ECI presents indexes by union status and geographic area. The aggregate series (for example, private industry) of union status and geographic area did not change with the switch to NAICS–SOC. However, some of the disaggregated series (for example, West region) exhibited larger differences in rates of wage and compensation change between NAICS–SOC and SIC–OCS than was the case for the national estimates. The reason for this is that the disaggregated series have fewer observations and thus are more sensitive to values that are reclassified by industry or occupation.

The ECI publishes both seasonally adjusted and unadjusted series.[9] As a result of the change in industry and occupational classifications, new seasonally adjusted series were introduced, some are being dropped, and others were continued. The March 2006 ECI shows seasonally adjusted and unadjusted series based on NAICS. However, seasonally adjusted indexes for the new SOC aggregations will not be introduced until March 2007. Additional seasonally adjusted series may be phased in over time.

## Assessment of the statistical reliability of series

Two criteria were used to evaluate the eligibility of series for publication: (1) the standard error (SE) and (2) the number of occupational observations. The SE criterion required that a series must have a 5-year-moving-average SE of 0.3 or less on 3-month changes and 0.6 or less on 12-month changes.[10] The occupational criterion required a minimum of 600 observations in the series. However, if a series contained more than 1,000 observations, it was deemed publishable regardless of the SE on the grounds that such a series is regarded as "inherently variable."

As a result of these evaluations, many series were continued because of the large number of observations, even though they failed the SE test. However, the following five series failed the evaluation tests and have been dropped from the ECI publication:

Within State and local government:
- Executive, administrative, managerial
- Blue collar[11]

Within private industry:
- Wholesale and retail trade excluding sales
- General merchandise stores
- Food stores

New industry and occupational series that were created by the switch to NAICS and SOC in March 2006 do not have sufficient historical experience to evaluate their variances. For these new series, the publication criterion was limited to the number of observations in the series. Subsequently, the series will be evaluated based on SE tests.

## New series: excluding workers with volatile pay

Pay for most workers varies little from quarter to quarter except, perhaps, for an annual pay increase. For some workers, however, there is wide quarter-to-quarter variability that is related to the way workers are paid rather than to seasonality. Removing that variability allows users to better understand underlying trends in much the same way as seasonal adjustment.

Many of the workers with variable pay are in sales occupations that pay commissions. Because of the way the ECI is constructed—one of the occupational categories defined for the index is sales workers—it is relatively easy to produce measures of wage and compensation change excluding sales workers; this was done in the mid-1980s and has continued. For example, the ECI has been publishing private industry workers excluding sales and private industry white-collar workers excluding sales.

It has become evident, however, that even the series excluding sales workers are sometimes volatile. This led Anthony Barkume and Thomas Moehrle, using occupational records collected from the National Compensation Survey for the ECI, to examine another possible source of the volatility.[12] They found that there are important groups of workers outside sales whose pay is volatile, primarily finance sector managers who are paid commissions. Barkume and Moehrle prepared and evaluated series that exclude incentive workers. They concluded that these new series are a better measure of underlying trends in the economy than ones excluding sales workers.

Beginning in March 2006, the ECI is now publishing series excluding incentive workers. Because series excluding incentive workers are a better measure than those excluding sales workers, beginning in March 2007, the "excluding sales" series will be discontinued.

## Change in the composition of compensation

The switch in industry and occupational classifications and other changes provided an opportune time to implement definitional changes aimed to reduce respondent burden. Thus, beginning with the March 2006 ECI, severance pay and supplemental unemployment benefits (SUB) are no longer included as a component of compensation in the index. These two benefits together accounted for about one-tenth of 1 percent of total compensation or about $0.04 per hour worked. Dropping these two benefits had virtually no impact on the index. At the same time, however, while various items (such as severance and SUB) alone contributed little to respondent burden, in the aggregate, their elimination provided some relief.

*Severance pay* is a monetary allowance employers pay to displaced employees, generally upon permanent termination of employment with no chance of recall, but often upon indefinite layoff with recall rights intact. About one-fifth of private industry workers are covered by severance plans. The cost of this benefit is very small (averaging $0.03 per hour worked in private industry).

BLS collected severance pay costs when the data were first obtained from establishments, and the updated costs were limited to a reflection of wage changes unless there was a change in the severance pay plan. Furthermore, one-time payments, extended severance benefits, or buy-out packages offered to employees in response to downsizing and/or restructuring were out-of-scope and excluded from the survey. Thus, the changes to the cost of severance pay did not reflect changes in the business cycle. The elimination of severance pay from the index had virtually no impact except for the benefit series for white-collar workers in aircraft manufacturing.

*Supplemental unemployment benefits* were introduced in an agreement between the Ford Motor Co. and the United Auto Workers in 1955 and subsequently adopted in other unionized manufacturing industries (which have faced declining employment since the 1980s). SUB plans provide regular weekly payments to employees laid off from their jobs. They differ from severance pay because workers have not been permanently discharged from the company. SUB plans covered less than 2 percent of all private industry index observations in March 2004. The cost of SUB plans for all private industry workers averaged $0.01 per hour worked. Tabulations of the ECI changes excluding SUB plans were virtually unchanged.

SUB and severance pay data were dropped in such a way as to have virtually no impact on the ECI. In the estimation of compensation cost change from September to December 2005, SUB and severance were included in the cost for both the current quarter and the prior quarter. In the estimation of the compensation cost change from December 2005 to March 2006, the two benefits were excluded from both the current quarter and the prior quarter and will be excluded from all subsequent quarters. Thus, under no circumstance was a comparison made between the costs where one quarter included the SUB and severance benefits and the other excluded them.

THE ECI SERIES has gone through many changes. Some were the result of a transition from the old SIC–OCS system to the new NAICS–SOC system. Along with this transition came the changes in the scope of industry and occupations because of reclassification. Other changes were the result of reevaluation of the series and adaptation of certain measures by the Bureau of Labor Statistics to make the series more reliable and valuable for the users.

The March 2006 ECI marked the first phase of transition to the new NAICS–SOC classification. Series with additional details, as well as other employer and employee characteristics, may be phased in pending an assessment of the quality of measures. □

## Notes

[1] U.S. Economic Policy Classification Committee, "The Impact of Classification Revisions on Time Series," Paper number 5, July 1993.

[2] For a detailed description of the employment shifts resulting from the change in industry classification system, see David R.H. Hiles, "A first look at employment and wages using NAICS," *Monthly Labor Review*, December 2001, pp. 22–31, on the Internet at **http://www.bls.gov/opub/mlr/2001/12/art3full.pdf**.

[3] For a detailed discussion, see E. Raphael Branch and Lowell Mason, "Seasonal adjustment in the ECI and the conversion to NAICS and SOC," pp. 12–21 in this issue of the *Monthly Labor Review*.

[4] The ECEC and the ECI are based on the same dataset but are different in industry and occupational details.

[5] For a detailed discussion, see Harriet G. Weinstein and Mark A. Lowenstein, "Comparing Current and Former Industry and Occupation ECEC Series," *Compensation and Working Conditions*, August 2004, on the Internet at **http://www.bls.gov/opub/cwc/cm20040823ar01p1.htm**.

[6] For more information, see **http://www.bls.gov/ncs/ect/home.htm**.

[7] For a detailed discussion, see Stephanie L. Costo, "Introducing 2002 weights for the Employment Cost Index," pp. 28–32 in this issue of the *Monthly Labor Review*.

[8] For a detailed discussion, see Song Yi, "Accounting for Missing Data in the Employment Cost Index," pp. 22–27 in this issue of the *Monthly Labor Review*.

[9] For additional information on seasonal adjustment, see Branch and Mason, "Seasonal adjusment," pp. 12–21.

[10] Because the ECI compensation change measures are estimates for a probability sample, they are likely to differ from results that would be obtained from a complete census of the employees within the scope of the survey (the survey population). The difference between an estimate calculated from a specific sample and an average for all samples that could be drawn from the survey population using the same methodology for the same statistic is the standard error.

[11] As discussed earlier, the blue-collar series will be dropped in 2007.

[12] See Anthony J. Barkume and Thomas G. Moehrle, "The Role of Incentive Pay in the Volatility of the Employment Cost Index," *Compensation and Working Conditions*, Summer 2001, pp. 13–18, on the Internet at **http://www.bls.gov/opub/cwc/archive/summer2001art2.pdf**. They found that only about 6 percent of all workers in private industry receive some form of incentive pay, and that about 40 percent of incentive workers are in sales.