

## THE BLS EMPLOYMENT COST INDEX: A CONCEPTUAL OVERVIEW

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A meaningful statistical series can be developed only if its intended uses are kept clearly in mind. The Employment Cost Index (ECI) which was released by the Bureau of Labor Statistics in its initial form in June 1976, has been designed to overcome the inadequacies of existing measures for analyses of changes in rates of pay. Most available series are limited in the types of compensation, industries, and classes of workers covered; published detail may be limited; and of primary importance, key existing series are often difficult to interpret as measures of change since they are influenced, not only by rates of pay, but also by overtime and other premium paid work, the industrial and occupational composition of the work force, and the level of output where incentive pay plans are in effect.

The ECI has been developed to meet the need for a timely, unambiguous, and comprehensive measure of changes in the price of labor, which is a key determinant of changes in production costs, in product prices, and in the demand for labor. Its survey design and conceptual framework have been developed primarily with various analyses concerning pay changes and other economic variables in mind. In particular, the new series should be valuable in studies of wage-price-employment-productivity relationships.

### The ECI Framework 1/

The ECI presents changes in the price of a standardized mix of purchased labor services, much as the Bureau's Consumer Price Index (CPI) presents changes in the price of a standardized market basket of consumer goods and services.

Establishments of all sizes and in all civilian industries are within the scope of the series, which covers all levels of workers, supervisory and nonsupervisory. It excludes only the self-employed, proprietors, unpaid family workers, and owner-managers. (At present, the survey is limited to the private nonfarm economy, excluding households. Plans call for expansion over the years to cover government, agriculture, and households.)

The working definition given to the price of labor is also comprehensive--employer expenditures per hour worked for obligations incurred in employing labor; in short, the compensation package. Outlays for fringe benefits are included along with those for wages and salaries.

Basically, the Employment Cost Index provides an overall measure of compensation change in which the behavior of individual components--hourly employer expenditures to or on behalf of workers in specified occupations within individual establishments--are incorporated in accordance with their relative employment weights. The Index expresses the average price of labor in a given period in relation to a base period price of 100. To minimize the effect of shifts in employment, fixed (base period) weights are used in combining individual observations.

In essence, the ECI measures changes in the transactions price in the labor market, using standardized occupational units of observation. To

maintain or expand the size of its labor force, a firm must offer a package of wage rates and supplementary ("fringe") benefits at a level high enough to attract qualified workers for specific jobs. When workers are hired, an employer incurs an obligation to meet the cost of the compensation package. The price of labor may be viewed as the cost to the employer of that package per hour worked. Changes in the price of labor, then, are period-to-period shifts in the cost of the compensation items--that is, the hourly employer obligations. The standardization issue in index number construction is to hold constant the set of items studied and their weights so that measured cost changes reflect price changes alone, and not shifts in the relative importance of the units of observation.

Such a statistical series reflects an important input into employer hiring and pricing policies; however, it does not directly reflect changes in unit production costs. An increase in compensation rates may result in a decision to contract out work or in the substitution of a different type of labor or of machinery for labor, all of which affect production costs per unit of output. The new series is a measure of price change in the sense that the CPI measures changes in prices of specified goods and services, rather than the cost of living.

The issues in developing the ECI fall into two categories: (1) defining the price of labor concept and specifying in measurable terms the idea of changes in that price and (2) establishing statistical methodology for implementing the conceptual design. These are discussed below, with emphasis on the first category.

It should be emphasized that although the categories are logically distinct, in practice they must be considered jointly; at times they conflict and compromises are then required, i.e., what is conceptually desirable may not be collectable.

### Measuring Wage and Salary Changes

Although superficially a simple idea, a host of conceptual and data collection problems are inherent in the overall measurement of changes in the price of a unit of labor services. Since the issues differ somewhat for wages and salaries and for supplementary benefits, these components of employee compensation are considered separately.

The basic approach to measuring wage and salary changes is straightforward. The unit of observation is an occupation in a specific establishment. Since pay rates are generally set for the jobs performed rather than for the people filling them, the occupation level seems most appropriate for observing rate changes. The ECI, therefore, measures changes in pay rates for specific jobs and not changes in earnings of individual workers.

For the most part, the Employment Cost Index uses the census occupational classification system's three-digit code level of detail (accountants, carpenters, and so forth); this classification system encompasses all specific jobs in the economy

within 441 occupations. These occupations, though broader in scope than those studied in other BLS occupational wage surveys, can be defined within specific establishments. Moreover, use of this classification system yields the necessary weights for index computation since occupational employment totals are available by industry group from the Census of Population.

For each surveyed occupation within an establishment, average straight-time hourly earnings are obtained for the pay periods encompassing or closest to the 12th of the survey months of March, June, September, and December. Straight-time earnings, which serve as proxies for rates of pay, are defined as total earnings before deductions, excluding premium payments for overtime, weekend, holiday, and late-shift work. They include production bonuses, commissions, and cost-of-living allowances. Earnings of salaried employees and those paid under incentive wage systems are converted to an hourly basis. Perquisites and payments in kind currently are excluded.

Earnings data are collected regularly from a fixed sample of establishments, and cover a sample of occupations constant over time but varying among the establishments studied. To eliminate the influence of employment shifts among occupations, establishments, and industries, the reported occupational earnings data are averaged using constant (base period) weights for each occupational unit. This process provides a comprehensive measure of wage change which, for many purposes, is far more satisfactory than those currently available. Furthermore, since the occupations studied are not limited to production and nonsupervisory workers, the Index is more comprehensive than most other available series.

ECI data are now computed from over 9,600 occupational wage and salary observations collected quarterly from approximately 2,100 respondents. An observation may cover from 1 to several thousand workers. In the aggregate, data are collected covering nearly a half million workers.

As already indicated, this approach reflects a compromise between theoretical ideals and the state of the art in data collection. Although we have talked about the price of labor, we have not considered the meaning of changes in that price. For example, pay increases associated with greater proficiency in a job should be distinguished from increases in pay unrelated to job performance. We are, of course, raising here the perennial problem of coping with quality changes in compiling price indexes.

Ideally, the Employment Cost Index should reflect only increases unrelated to improved performance. It should measure changes in rates of pay for specific jobs, not the individuals filling those jobs. But how in a mass survey operation does one identify those in-grade wage adjustments for individuals--regardless of whether they are labeled longevity or merit increases--which are pay adjustments in the desired sense?

Similarly, how can one account for pay changes associated with turnover of personnel in a job? Are they simply a function of varying worker

quality? Finally, the concept of a pay increase may be influenced by the breadth of the definition of a specific job. One conclusion seems inevitable. Despite conceptual problems, the ECI must, as a practical matter, be a measure of change in occupational averages of straight-time hourly earnings and, therefore, influenced by turnover of workers in specific occupations, all length of service or merit pay increases, and shifts in the relative importance of individual company jobs falling in a survey occupation.

The ECI, therefore, is not an index of pure wage-rate change. Nevertheless, the absence of adjustment for the impact of quality changes within a unit of observation should not be overemphasized. Long-run improvements in the quality of labor are of undoubted importance; however, such quality increases would appear to be associated more with movements among occupations (which are accounted for) than with increased proficiency in the same occupation.

A separate issue concerns workers paid on an incentive basis. Here, either the piece rates or the resulting hourly earnings can be viewed as the "real" wage rate. It can be shown that conceptual difficulties exist with either approach. Consequently, since neither alternative is ideal, the decision has been made to measure hourly earnings of incentive workers, rather than piece rates, because the former approach is simpler to implement in data collection.

Despite these limitations, the prime mover of the Employment Cost Index will undoubtedly be changes in pay rates, and for most purposes movements in the Index can be regarded as indicating movements in wage and salary rates. Moreover, efforts are being made to enhance the homogeneity of units of observation. At present, where both part- and full-time workers are found in an occupation, only the larger group is studied. A similar approach is followed where both time and incentive workers are found in a single occupation within an establishment.

Work is also in progress to narrow the occupational groupings currently being studied. Techniques are being developed for subsampling specific company job titles from broad preselected occupational categories and then confining data collection to these narrower groupings, each of which becomes a unit of observation. In addition to increasing the homogeneity of data collection units, this approach, by starting with broader occupational categories than now used, lessens the possibility of non-matches in establishments and thus enhances the cost-effectiveness of the sampling techniques.

#### Measuring Benefit Changes

At present, published ECI data are limited to changes in average straight-time hourly earnings. Work is now under way to expand the Index into a measure of change in total compensation by adding data on costs incurred by employers for supplementary benefits. Benefit expenditure information is being collected from the establishments reporting wage and salary data. After the expanded series becomes available, data on changes in wages and salaries will continue to be reported

as a component of the compensation series.

The importance of including supplementary benefits in the ECI becomes apparent when we recognize that these items represent about a fourth of total compensation expenditures and, furthermore, have been growing in recent decades at a faster rate than wages and salaries.

Nevertheless, probably the most difficult aspects of ECI development have concerned specification of procedures for incorporating benefits consistent with the price-of-labor concept underlying the Index and the meaning of change in that price. In addition, as in other areas, techniques have had to be evaluated in terms of suitability with respect to ease of data collection and processing.

Inclusion of benefits within the ECI framework is affected by the many facets of employee compensation. Some elements of remuneration, such as wage and salary rates, are normally expressed as time payments; others, such as paid leave, commonly are quoted in days off with regular salary continued; while employer pension obligations may be a percent of employee pay. The critical problem in combining the individual benefit practices with wage and salary rates is to find an appropriate common denominator. Hourly employer expenditures have been chosen for this purpose because employer records are normally kept in money terms and also because this approach is consistent with ECI objectives, that is, measurement of changes in rates of pay in a cost-of-production context.

Another question involves whether employer payments should be expressed in terms of hours worked or hours paid for. With vacations, holidays, sick leave, and similar benefits, not all paid hours are in fact worked. Moreover, because the importance of paid time not worked has been growing, relating a constant volume of pay to fewer working hours yields a higher hourly rate. Considering that the new series defines the price of labor as total employer payments per unit of time made available by workers, it follows that these outlays should be expressed in terms of hours worked.

Identification and measurement of changes in the price of labor must take into consideration that employer outlays for fringe benefits may fluctuate even if the underlying practices do not--for example, vacation expenditures normally will increase with the average length of service of a company's work force. Benefit costs vary with changes in practices, composition of the work force, wage level, cost of providing services, actuarial assumptions, and use of overtime. Clearly, not all of these can be viewed as changes in the price of labor and thus covered by the Employment Cost Index. It is necessary, therefore, to define precisely those expenditure changes which are to be reflected in the Index.

Since the price of labor, for ECI purposes, is defined as employer expenditures for obligations incurred in employing labor, the relevant criterion is whether each particular change in employer expenditures reflects a modification of the rate of labor cost obligation. Changes in hourly expenditures caused by fluctuations in the volume of overtime worked at premium rates should not affect the Index because the transactions price

is not changed. Similarly, the Index should not reflect year-to-year fluctuations in employer payments for private pension programs which are independent of actuarial factors, that is, funding changes influenced by the size of annual profits. Although these changes represent reallocations of payments over time, they cannot be considered as alterations in obligations incurred in hiring because they do not modify total longrun commitments.

In addition to changes in benefit practices, a number of changes can be considered as altering the transactions price and, therefore, properly reflected in the Employment Cost Index. For example, in the pension area, changes in contribution rates dictated by actuarial considerations should be included. In a world of perfect foresight, there would never be errors of predicting employee turnover, earnings of trust fund investments, or other factors considered by actuaries. However, given the imperfect knowledge of the real world, it seems reasonable to treat corrections of previous longrun overfunding or underfunding as changes in the price of labor.

At times, external forces may cause changes in hourly expenditures for existing benefit plans. For example, rising costs of health care may lead to increased medical insurance premium rates, and because these increases are beyond employers' control, they should influence the ECI. The same is true for changes in social security tax rates, adjustments in life insurance premiums, and changes in contributions to supplemental unemployment benefit funds determined by the level of the funds.

The procedures developed to implement this design in several respects break new ground in approaches to data collection. Collection procedures involve five steps: (1) identifying benefit practices in a base period; (2) determining hourly expenditure rates for each benefit in that period; (3) determining when appropriate changes have occurred; (4) redetermining expenditure rates when such changes are found; and (5) periodically rebasing the data to reflect existing conditions. These steps cannot be described in detail here; a full explanation is provided in the January 1978 Monthly Labor Review article cited in footnote 1. However, several comments are required.

As noted earlier, the ECI unit of observation is an occupation within an establishment because wage and salary rates--the primary elements in compensation--are generally set for the jobs performed rather than the people filling them. Unlike wage and salary data, benefit expenditure data are not always available by occupation. Employers commonly do not maintain the needed records and, in reality, benefit costs are not necessarily occupationally determined.

Thus, where data are available, as may be the case for premium pay, expenditure rates are obtained by occupation. Where occupational data are not available for items such as pensions and insurance programs, data are collected only for broader occupational groups. The precise groupings vary among establishments--in accordance with pay-setting practices--but are consistent over time within an establishment. For example, the classification may be for office-nonoffice, union-

non-union, or exempt-nonexempt workers, with executives, in some instances, in a separate category.

Benefit costs obtained for these broad occupational groups are used to impute to specific occupations hourly benefit expenditures which can be combined with straight-time hourly earnings to measure total hourly compensation. Imputation techniques cannot be described here, but it should be noted that they reflect whether expenditures for individual benefits vary with the level of wages and salaries. For example, costs of benefits such as overtime, holidays, and vacations ordinarily are wage related. By contrast, costs of employer-financed hospital-surgical-medical plans typically are independent of wage levels.

The techniques adopted, it should be noted, are designed to insure, to the extent possible, a pure measure of price change. If there is no reported change in an individual benefit (consistent with the concept of price-of-labor change appropriate for that benefit), the expenditure rate determined for the preceding reporting period ordinarily is used as the current period rate. Thus, fluctuations in cash payments extraneous to Index concepts are effectively excluded.

Furthermore, when an appropriate change in a benefit is reported, it is priced in a manner consistent with ECI objectives. For example, suppose a vacation plan is improved. A key element in pricing the new plan is determination of what the new average length of vacation would be if the current seniority distribution of affected employees was the same as in the base period. In effect, a Laspeyres index approach is used in pricing benefit changes to exclude the effects of shifting usage weights. Thus, the value carried on the data base as the current hourly expenditure rate for a given benefit for an occupation within an establishment does not necessarily coincide with--and probably differs from--actual current employer hourly outlays.

Despite what has been stated, a measure of change in total compensation must take into account the impact of wage-rate changes on the cost of wage-related benefit practices. The ECI accounts for such "creep" or "roll-up" by redetermining the cost of each wage-related benefit in each survey period on the basis of regularly collected occupational average straight-time hourly earnings. Such redetermination is an automatic computer operation and does not add to data reporting requirements.

Changes in the standard workweek and in the amount of paid leave, through their effects on annual working hours, similarly have secondary impacts on compensation per hour worked. These impacts are taken into account automatically. But, in keeping with conceptual objectives, the ECI ignores the effect of fluctuations in hours worked caused by variations in overtime due to changing business conditions.

This approach yields a measure of change in benefit costs largely independent of shifts in the composition of the workforce. Because it holds calculated expenditure rates constant until identification of specified developments, and then isolates the impact of those occurrences, extraneous factors influencing expenditures

appropriately are ignored.

Nevertheless, these procedures do have limitations. Although they are appropriate for developments that can clearly be defined and identified when they occur, they cannot readily detect changes in the price of labor which occur gradually and in almost imperceptible amounts (such as vacation cost changes associated with changes in worker seniority).

Other developments that influence employer obligations, but are difficult to separate out, include changes in other demographic characteristics of the work force, alterations in employee selection of benefit options (for example, alternative health insurance plans), fluctuations in amounts employees set aside for savings and thrift plans calling for matching company contributions, and alterations in sick leave use.

Conceivably, these occurrences could be studied, but the massive increase in data collection complexity would not be justified by the relatively limited increase in accuracy. Moreover, any attempt to include the effect of appropriate changes in the demographic characteristics of the occupational workforce would undoubtedly be accompanied by the inclusion of many workforce adjustments the ECI seeks to hold constant.

Because the reliability of survey results depends upon the accuracy of the data reported, it is important to recognize ECI benefit procedures to a degree depart from the normal BLS approach to data collection--reliance on payroll or strict after-the-fact accounting records. In this instance, emphasis is partly placed on the ability to derive meaningful cost information from benefit practice data and standardized cost-estimating formulas. In addition, respondents are expected to identify and report appropriate benefit changes.

Nevertheless, the Bureau believes the techniques can be implemented successfully; they are used extensively by employers, unions, and BLS in pricing collective bargaining settlements. Furthermore, the approach to pricing changes in individual benefit provisions was incorporated in Pay Board reporting forms during the 1971-73 Economic Stabilization Program.

#### Publication Plans

The longrun publication goal for the Employment Cost Index is to produce a monthly series, covering changes in total compensation throughout the civilian economy, with data released 2 months after the reference payroll period. This goal will be reached in stages. As already indicated, data currently published are limited to quarterly changes in wage and salary rates in the private nonfarm economy, excluding households. Collection of supplementary benefit data is under way in the same industrial sector, and publication of data on changes in total compensation will begin early in 1980. Subsequently, currently excluded industries will be added to the program, and the collection cycle will be shortened. At present, data are reported as percentage changes. After expansion of coverage of the series, these percentage changes will be linked to form index numbers.

In addition to an overall measure of wage and

salary change, the Bureau now releases data for 9 major occupational groups, 5 major industry divisions, and 4 broad geographic regions. Separate measures are also produced for union and nonunion occupations and for metropolitan and nonmetropolitan areas. The survey design permits additional detail; at present, resources generally do not permit a sample size sufficient for extra output.

Publication of subindexes reflects the complex wage structure and wage-determination mechanisms in the economy. The subindexes help to explain the behavior of the overall measure and, in addition, provide information on important individual sectors of the economy. Moreover, they are valuable in a variety of analyses such as those concerning the transmission of wage influences from one labor market to another and the role of wages in allocating labor.

Nevertheless, even the subindexes are the result of aggregating individual observations. For some purposes, variations among reporting units are important. Measures of such variations are under consideration.

ECI data are initially published in press releases, which are then reprinted in the Bureau's monthly periodical, Current Wage Developments. Analytical articles have appeared in the Monthly Labor Review. In addition, the Bureau plans to publish a handbook of ECI concepts and methodology, giving detailed coverage to topics treated here only briefly.

#### Uses and Limitations

The Employment Cost Index has been designed to measure changes in the basic transactions price in the labor market, defined in a manner appropriate to economic analyses of changes in compensation, employment, productivity, and prices. Although this specific need guided the development of the Index, its conceptual framework is appropriate for a variety of other uses. Together with associated subindexes, the new series should also be valuable in studies of labor market behavior, such as investigations of labor mobility, and may aid in reviewing pay trends in individual wage-determination units.

The new Index may replace existing wage series in many econometric models. Existing series are not as complete, timely, or accurate as the Employment Cost Index, and they may be conceptually inappropriate. Approximations of the new series are already being used in some models with significant improvements in the results. To the extent that the relationships among pay changes and other economic variables are better explained by the new Index, it will replace existing measures, thereby improving our understanding of the way economic variables interact.

The ECI also may be used as background information in formulating wage decisions (in collective bargaining and elsewhere), in developing national manpower policies, in company planning (such as where to locate or expand operations), and in other circumstances where less satisfactory measures are now employed. Employment cost subindexes for industrial, regional, and occupational groupings will be especially valuable for such uses. Of course, unforeseen uses will

doubtless develop.

Experience with other measures is suggestive. For example, indexes are often used as escalators--the CPI is used to escalate wages, rents, and pensions, and other indexes to escalate costs, particularly in long-term contracts. Indexes are also used to move or update measures for which timely data are not available. Because of the time lag between data collections, for example, data from the BLS Industry Wage Surveys are not always current; certain types of wage data might be updated with the Employment Cost Index.

The new Index should not, however, be regarded as an all-purpose tool. As a close approximation of changes in the price of a standard unit of labor services, it does not directly measure changes in working income or wage and salary flows in the economy. For such purposes, existing measures such as average weekly and hourly earnings, which are affected by fluctuations in the workweek, premium-paid hours, and employment shifts are clearly appropriate.

The Employment Cost Index will not measure levels of compensation. Although computed from data on pay levels, the statistical design yields meaningful information only on changes in compensation. This is true because of the limited size of the sample and, also, the use of fixed employment weights in averaging pay data. Furthermore, the ECI does not cover the total cost of employing labor. Hiring and training costs and retroactive payments, among others, are excluded; the Index also controls for the types and amounts of labor inputs, which naturally affect total employment costs. Finally, the Index by itself would be an unsatisfactory measure of worker well-being, since it does not take account of changes in the price level and employment conditions. In addition, as already described, the Index considers compensation from a cost-of-production standpoint; a measure of worker well-being should define compensation in terms of workers receipts. (The distinction between compensation from employer and worker viewpoints stems from the fact that deferred payments through company-financed pension and welfare funds do not pass directly from employer to employee. Employer outlays in a given time period do not necessarily equal worker receipts.)

Mention has been made of the possibility of extrapolating existing series by use of the Employment Cost Index. Such action would be appropriate for updating data on rates of pay, but not for data on money flows. An earnings series would be a more satisfactory mover of data on income levels. Moreover, great care and analysis must be exercised before assuming that ECI changes are roughly synonymous with wage-rate changes in narrowly defined occupations or situations.

#### Conclusion

Development of the Employment Cost Index undoubtedly is a major achievement. Nevertheless, although the new series will fill a major gap in existing statistical intelligence, it does not provide a basis for complacency. There is a type of Malthusian principle in our field far less controversial than the theory of population

growth: The demand for statistical data grows more rapidly than the ability to satisfy that demand. Despite advances in sampling techniques, computer technology, etc., basically, skills of data producers lag behind the ingenuity of data users.

I can in part explain this by formulating a version of an equally controversial economic doctrine--one, interestingly, strongly criticized by Malthus--J.B. Say's Law of Markets. In my version: The supply of statistical data creates its own demand.

Generation of new statistical series stimulates new analytic endeavors and this, in turn, raises questions requiring still further data for their resolution. Today's demands for new data are partly a response to the series produced yesterday.

To an extent, the Employment Cost Index has already provided an example. The limited data thus far released have stimulated demands for additional material, particularly in disaggregated form. It is entirely likely that publication of changes in the price of labor, viewed as employer costs, will lead to requests for similar

data from the employee viewpoint. Consideration of measuring pay changes in a fixed sample of occupational units has led to a proposal for studying a fixed sample of workers, with data on pay rates, job classification, and demographic characteristics being obtained.

#### FOOTNOTE

1/ In this brief presentation, it is not possible fully to describe the conceptual foundation of the ECI, to discuss the forces leading to it, or to elaborate on potential uses flowing from the survey concepts. What follows is a summary of more detailed analyses I have presented in the following articles: "Employment Cost Index: a measure of change in the 'price of labor'," Monthly Labor Review, July 1975, pp. 3-12; "The BLS Employment Cost Index," Statistical Reporter, January 1977, pp. 101-114; and "How benefits will be incorporated into the Employment Cost Index," Monthly Labor Review, January 1978, pp. 18-26. See also BLS Handbook of Methods for Surveys and Studies, Bulletin 1910 (Bureau of Labor Statistics, 1976), pp. 184-191.