Explaining the Differential Growth Rates of the ECI and the ECEC

*One of the Bureau's principal compensation surveys—the **Employment Cost Index**—has been increasing much more rapidly than its counterpart, **Employer Costs for Employee Compensation**. The difference stems largely from the fact that the ECI and the ECEC are designed to measure different things.*

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Executive Summary

In recent years, the ECI has been growing at a faster rate than the ECEC. Specifically, from March 1987 to March 1996, growth in the ECI wage index exceeded that in the ECEC by 0.6 percentage point per year, while growth in the ECI benefits index exceeded that in the ECEC by 1.5 percentage points per year.

There are two steps in the calculation of both the ECI and the ECEC. The first involves combining job quotes within an industry/occupation cell to obtain a cell average. The second involves combining the cell averages to obtain the final index. Because the ECI is designed to measure how compensation paid by employers would have changed over time if the industry/occupation composition of employment had not changed from a base period, while the ECEC is designed to measure the current cost for employee compensation, the ECI and the ECEC do each step differently.

This study calculates two alternative indexes, which are hybrids of the ECI and ECEC. These alternative indexes indicate that differences in both steps of the calculation of the ECI and the ECEC are important causes of the ECI's higher growth rate. They therefore imply that employment has shifted toward industry/occupation cells where wages and benefits are lower, and employment within cells is becoming more concentrated in jobs that offer lower compensation.

The BLS has suggested that, while the ECEC provides information about average compensation in the economy at a point in time, the ECI should be used for examining changes in compensation over time. However, even though changes in the ECEC have a different interpretation than changes in the ECI, users may still be interested in them. By comparing the ECEC at different points in time, one can obtain a measure of the change in average compensation in the labor market. For example, a shift in employment towards lower paying jobs will be picked up by the ECEC.

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The Employment Cost Index, or ECI, measures changes in employers' cost of compensating workers, controlling for changes in the industrial-occupational composition of jobs. The ECI is a quarterly index that is computed from survey information on a sample of establishments and jobs weighted to represent the universe of establishments and occupations in the economy. BLS also uses data from the ECI survey to calculate a measure of the average cost of employee compensation. This measure, which is called the Employer Costs for Employee Compensation, or ECEC, is published every March. In recent years, the ECEC has been growing at a slower rate than the ECI. This study posits a couple of explanations for the divergent behavior of the two series.

The next section describes the processes by which individual job quotes are aggregated to obtain the ECI and the ECEC. The following sections then analyze the divergent behavior of the two series. The differing growth rates stem largely from the fact that the ECI and the ECEC are designed to measure different things.

Procedures used to calculate the ECI

There are two distinct steps in calculating the ECI. The first is to estimate the average (mean) compensation for each of approximately 700 categories of labor defined by approximately 70 2-digit SIC industries and 10 major occupations. The second step is to aggregate the cell means for the different types of labor to obtain a single index number. It is easier to start with a discussion of the second step in the process.

The ECI is intended to indicate how the average compensation paid by employers would have changed over time if the industrial-occupational composition of employment had not changed from the base period. Consequently, the ECI is calculated as a fixed weight, or *Laspeyres*, index that controls for employment shifts across 2-digit industries and major occupations. This index can be interpreted as the weighted sum of the changes in compensation costs for the various categories of labor, where the weighting factor for each category is its share of total labor compensation in the base period. From March 1986 to December 1994, the employment numbers used in the construction of the weights for the ECI were obtained from the 1980 Census of Population. From March 1995 on, the employment numbers are from the 1990 Occupational Employment Statistics survey.

Now consider the first step in the calculation of the ECI, namely, the estimation of mean compensation for each of the various categories of labor. At first glance, it seems as though this step should be straightforward. Without a costly census, however, one cannot observe the compensation received by all workers of a given type. Thus, calculating mean compensation of the various categories of labor is at least in part a problem of statistical estimation. This estimation problem is complicated by the fact that one must estimate mean wages over a number of periods and not just at a point in time. This causes problems because the ECI sample changes over time. After a job is initially surveyed, it is included in the ECI sample for about 16 to 20 quarters. At the end of this period, the job is deleted from the sample and replaced by an incoming job. Some jobs drop out of the sample even sooner due to nonresponse.

The simplest way to estimate the mean change in compensation for a category of labor between period 0 (the base period) and period t (the reference period) would be to compare the average compensation for that category in the reference period with the average compensation for that category in the base period. However, because the ECI sample changes over time, this would involve comparing averages across jobs that may be dissimilar. The ECI thus takes a different approach. To start, the change in compensation for a category of labor between the base period 0 and period 1 is estimated as the ratio of the average compensation for that category's jobs in period 1 to the average compensation for that category's jobs in period 0.[1] To ensure that this estimate is not affected by a change in the composition of jobs, only jobs that are in the sample in both period 0 and period 1 are used in the calculation. A similar procedure is then used to calculate the mean change in compensation between period 1 and period 2, between period 2 and period 3, and so on. The proportionate change in mean compensation from time 0 to t is then calculated as the product of the individual per period changes.[2]

Procedures used to calculate the ECEC

As noted above, the ECEC is designed to measure the average cost of employee compensation. Accordingly, the ECEC is calculated by multiplying each job quote by its sample weight and then summing across job quotes to estimate mean compensation for each of the categories of labor. The cell means are then averaged using current employment weights from the Current Employment Survey (CES), rather than the fixed employment weights used by the ECI.[3]

What matters for present purposes is not so much what the ECEC tells about the level of average compensation, but what it tells about the changes in average compensation over time. Like the ECI, the calculation of the change in the ECEC between the base period 0 and a reference period t involves two steps. The first step estimates the proportionate change in mean compensation for each category of labor as the ratio of the average

compensation for that category's jobs in period t to the average compensation for that category's jobs in period 0. It is important to note that this differs from the analogous step in the ECI because it does not control for the effect of a change in the composition of jobs within a cell. Step two involves taking a weighted sum of the changes in compensation costs for the various categories of labor. Similar to step one, this step differs from that in the ECI by not controlling for employment shifts across the different categories of labor.

Comparing the ECI and the ECEC

The published ECI and ECEC estimates for wages, benefits, and total compensation among private industry workers are shown in table 1. The base quarter for the ECI indexes is June 1989. From March 1987 to March 1996, the ECI wage and benefit indexes increased by 35.2 and 54.9 percent, respectively. In contrast, the ECEC estimates for wages and benefits rose by 28.0 and 36.4 percent. In annual terms, the ECI wage and benefit indexes grew at average rates of 3.4 and 5.0 percent, while the ECEC estimates for wages and benefits grew at average rates of 2.8 and 3.5 percent. Thus, the ECEC estimates have been growing at a slower rate than the ECI indexes, with the differential growth rate being especially high for benefits. Interestingly, while the ECI wage and benefit indexes grew at a faster rate than the corresponding ECEC estimates throughout the entire period, the difference in growth rates is especially large from March 1994 to March 1995. From March 1994 to March 1995, the ECI wage and benefit indexes both grew by 2.9 percent. In contrast, the ECEC for wages rose by 0.9 percent while the ECEC for benefits actually fell by 1.8 percent. As discussed above, the two steps in the calculation of the ECI and the ECEC involve first combining all of the jobs within a given cell to obtain a cell average, and second, aggregating across the cell averages to obtain the final index. Both steps are done differently for the ECEC and the ECI. To what extent is the divergent behavior of the two indexes due to the different ways of *combining the job quotes to obtain cell averages* and to what extent is it due to the different ways of *aggregating the cell averages*?

This question can be answered by constructing a new index that is a mixture of the ECI and the ECEC. The first step in this construction is to calculate cell means directly from the current sample. This is identical to the first step in the construction of the ECEC. In contrast, the ECI obtains mean compensation for each cell by chaining together the estimated proportionate quarter-to-quarter changes in compensation from the base period through the current period. The second step involves taking the weighted sum of the compensation relatives for the various categories of labor, where the (Laspeyres) weight for each labor category is the category's share of total labor compensation in the base period. This calculation is identical to the second step in the construction of the ECI. In contrast, an index equal to the change in the ECEC implicitly uses a different weighting scheme because it does not control for employment shifts across the different categories of labor.

For convenience, the new index will be referred to as a Laspeyres level index. Using this new index, the ECI-ECEC differential can be decomposed into two parts:

$$(1)\quad ECI_t - ECEC_t/ECEC_0 = (ECI_t - L_t) + (L_t - ECEC_t/ECEC_0)$$

where ECI_t denotes the value of the ECI index in a reference period t, $ECEC_t/ECEC_0$ denotes the proportionate change in the ECEC between the base period (period 0) and the reference period t, and L_t denotes the value of our new Laspeyres level index in period t.

In interpreting (1), note that the term $ECI_t - L_t$ denotes that portion of the ECI-ECEC differential stemming from the different procedures to obtain cell means. The term $L_t - ECEC_t/ECEC_0$ is that part of the differential stemming from the different ways of aggregating cell means to obtain the final index.

The replicated ECI and ECEC indexes from March 1986 through March 1996 are shown in table 2. Note that the rates of growth over time in these indexes are quite similar to the published indexes in Table 1.[4] Note also that, although an ECEC is published only for March, an ECEC index has been calculated for all quarters.

Laspeyres level wage, benefit, and total compensation indexes are shown in table 3. To reiterate, the first step in the creation of each Laspeyres level index is to calculate cell means directly from the current sample, as is done with the ECEC index. The second step is to use the Laspeyres formula to aggregate the estimated proportionate changes in mean cell compensation.

Comparing columns 1 and 2 in table 3 with columns and 1 and 2 in table 2, one sees that the Laspeyres level wage and benefit indexes have both grown more slowly than the corresponding ECI components. Furthermore, a comparison of columns 1 and 2 in table 3 with columns and 4 and 5 in table 2 reveals that the Laspeyres level wage and benefit indexes have both grown at a faster rate than the corresponding ECEC indexes. Specifically, while the replicated ECI and ECEC wage indexes increase by 39.7 and 30.9 percent, respectively, from March 1986 to March 1996, the Laspeyres level wage index increases by 36.2 percent. Over this period, the increases in the ECI, ECEC, and Laspeyres level benefit indexes are 59.3, 36.0, and 49.2 percent, respectively.

The results above indicate that about 40 percent of the difference between the ECI and ECEC wage

Table 1. Published ECI and ECEC indexes by quarter, 1986-96 (June 1989 = 100)

Quarter	Published ECI			Published ECEC		
	Wage	Benefit	Total compensation	Wage	Benefit	Total compensation
1986 I	89.2	85.8	88.2			
II	89.9	86.1	88.9			
III	90.6	87.0	89.5			
IV	91.1	87.5	90.1			
1987 I	92.0	88.2	91.0	$9.83	$3.60	$13.42
II	92.6	89.0	91.6			
III	93.5	89.6	92.5			
IV	94.1	90.5	93.1			
1988 I	95.0	93.4	94.5	10.02	3.77	13.79
II	96.1	94.7	95.7			
III	97.0	95.7	96.6			
IV	98.0	96.7	97.6			
1989 I	99.0	98.4	98.8	10.38	3.90	14.28
II	100.0	100.0	100.0			
III	101.2	101.4	101.2			
IV	102.0	102.6	102.3			
1990 I	103.2	105.5	103.9	10.84	4.13	14.96
II	104.5	106.9	105.2			
III	105.4	108.3	106.2			
IV	106.1	109.4	107.0			
1991 I	107.3	111.6	108.5	11.14	4.27	15.40
II	108.4	113.5	109.8			
III	109.3	115.2	111.0			
IV	110.0	116.2	111.7			
1992 I	110.9	118.6	113.1	11.58	4.55	16.14
II	111.6	119.7	113.9			
III	112.2	121.2	114.8			
IV	112.9	122.2	115.6			
1993 I	113.9	125.2	117.1	11.90	4.80	16.70
II	114.6	126.7	118.0			
III	115.7	127.7	119.1			
IV	116.4	128.3	119.8			
1994 I	117.2	130.7	121.0	12.14	4.94	17.08
II	118.1	131.7	122.0			
III	119.1	132.8	123.0			
IV	119.7	133.0	123.5			
1995 I	120.6	134.5	124.5	12.25	4.85	17.10
II	121.5	135.1	125.4			
III	122.4	135.6	126.2			
IV	123.1	135.9	126.7			
1996 I	124.4	136.6	127.9	12.58	4.91	17.49

indexes is due to their different procedures for aggregating individual job quotes to obtain cell means while about 60 percent is due to their different ways of aggregating over cell means. Similarly, about 43 percent of the difference between the ECI and ECEC benefit indexes is due to their different procedures for aggregating individual job quotes to obtain cell means while about 57 percent is due to their different ways of aggregating over cell means. Note, however, that these proportions have not been constant over time. For example, as can be seen in charts 1 and 2, the Laspeyres level wage and benefit indexes track the replicated ECI wage and benefit indexes fairly closely until 1994. This indicates that the different ways of aggregating cell means account for most of the ECI-ECEC differential until 1994, with the different ways of aggregating individual job quotes to obtain cell means playing an important role only after March 1994.

As an additional check on these results, consider an alternative decomposition. Recall that the Laspeyres level index calculates cell means in the same manner as the ECEC index, but aggregates across cell means in the same manner as the ECI. An index is now constructed that reverses this procedure. Like the ECI, the first step in the creation of our new alternative index involves calculating current period compensation for each cell by chaining together the estimated proportionate quarter-to-quarter changes in compensation from the base period through the current period. The second step is to take the weighted sum of the changes in compensation costs for the various categories of labor using the implicit ECEC weights that do not control for employment shifts across the different categories of labor. Using this new index, our decomposition of the ECI-ECEC differential takes the form:

Table 2. ECI and ECEC replicated indexes by quarter, 1986-96 (March 1986 = 100)

Quarter	ECI			ECEC		
	Wage	Benefit	Total compen-satiion	Wage	Benefit	Total compen-sation
1986 I	100.0	100.0	100.0	100.0	100.0	100.0
II	100.9	100.5	100.8	100.9	100.5	100.8
III	101.6	101.4	101.6	102.6	102.7	102.6
IV	102.2	102.0	102.2	102.5	102.6	102.5
1987 I	103.3	102.9	103.2	103.0	102.4	102.8
II	103.9	103.8	103.9	102.8	101.8	102.5
III	105.0	104.6	104.9	103.9	103.2	103.7
IV	105.7	105.6	105.7	104.6	103.5	104.3
1988 I	106.7	108.9	107.3	103.1	103.9	103.3
II	107.9	110.5	108.6	104.0	104.4	104.1
III	108.9	111.6	109.6	104.9	104.9	104.9
IV	109.9	112.8	110.7	105.8	105.8	105.8
1989 I	111.2	114.8	112.1	106.8	108.0	107.1
II	112.2	116.6	113.4	107.0	108.6	107.4
III	113.5	118.3	114.8	108.5	110.7	109.1
IV	114.5	119.8	116.0	109.9	111.5	110.4
1990 I	115.9	123.1	117.8	111.2	114.2	112.0
II	117.2	124.7	119.3	111.9	115.2	112.8
III	118.3	126.3	120.5	112.9	116.8	113.9
IV	119.0	127.6	121.3	113.4	117.5	114.5
1991 I	120.4	130.2	123.0	114.8	118.6	115.8
II	121.6	132.3	124.5	115.4	119.9	116.6
III	122.6	134.2	125.7	117.0	122.3	118.4
IV	123.4	135.4	126.6	117.7	123.0	119.1
1992 I	124.4	138.2	128.1	118.6	125.4	120.5
II	125.2	139.4	129.0	118.8	125.7	120.7
III	125.9	141.3	130.1	119.0	126.8	121.1
IV	126.7	142.5	130.9	120.4	128.2	122.5
1993 I	127.8	145.9	132.7	121.8	131.7	124.5
II	128.7	147.7	133.8	122.0	132.4	124.8
III	129.8	148.9	135.0	122.6	133.3	125.5
IV	130.7	149.6	135.8	123.8	133.7	126.5
1994 I	131.5	152.2	137.1	124.6	135.6	127.6
II	132.6	153.4	138.1	123.7	131.9	125.9
III	133.7	154.8	139.3	124.8	132.7	127.0
IV	134.3	155.0	139.9	125.2	131.9	127.0
1995 I	135.4	156.8	141.1	126.2	133.2	128.1
II	136.6	157.4	142.2	126.2	134.2	128.4
III	137.5	158.0	143.0	128.2	134.5	129.9
IV	138.3	158.4	143.7	129.5	136.0	131.3
1996 I	139.7	159.3	145.0	130.9	136.0	132.3

(2) $ECI_t - ECEC_t/ECEC_0 = (ECI_t - I_t) + (I_t - ECEC_t/ECEC_0)$,

where I_t denotes the value of the new index in the reference period t. The new index, which will be referred to as the chained mean ECEC, is presented in table 4. The first column in table 4 shows that the chained mean ECEC wage index increased by 36.5 percent between March 1986 and March 1996. As noted above, the ECI and ECEC wage indexes increased by 39.7 and 30.9 percent, respectively. Thus, according to the new decomposition, about 65 percent of the difference in the ECI and ECEC wage growth rates is due to differences in the way that job quotes are aggregated to the cell means. The remaining 35 percent is due to differences in the way that cell means are aggregated. The chained mean ECEC benefit cost index increased by 51.6 percent between March 1986 and March 1996, so the new decomposition indicates that about 33 percent of the difference in the ECI and ECEC benefit growth rates is due to differences in the way that cell means are aggregated. About 67 percent is due to differences in the way that job quotes are aggregated to cell means.

To summarize, the two decompositions yield differing estimates of the proportion of the ECI-ECEC differential accounted for by the two different stages in the aggregation process. Furthermore, as can be seen from charts 1 and 2, these proportions vary significantly over time. Consequently, while it is difficult to pin down the exact proportion of the ECI-ECEC differential that is due to each stage, the two decompositions demonstrate that differences in both stages of the aggregation process are at times important causes of the differential between the ECI and ECEC growth rates. Each accounts for at least one-third of the ECI-ECEC growth

Chart 1. ECI-ECEC decomposition for wage and salaries by quarters, 1986-96

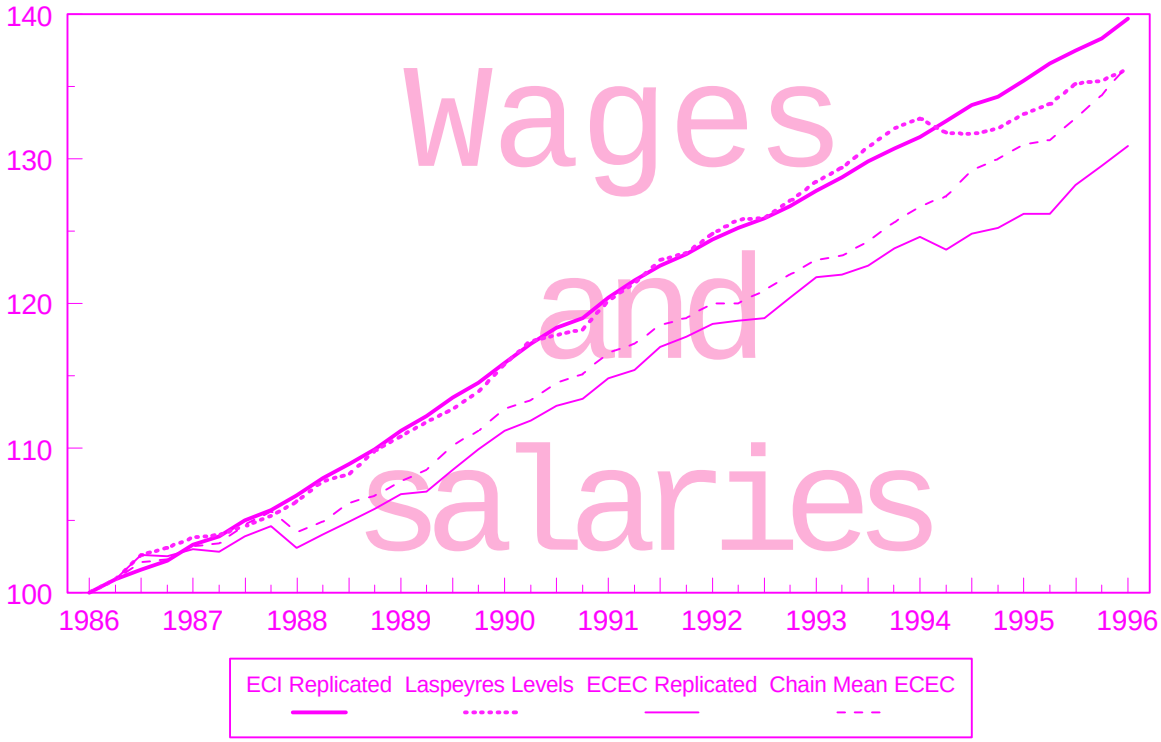

Chart 2. ECI-ECEC decomposition for total benefits by quarter, 1986-96

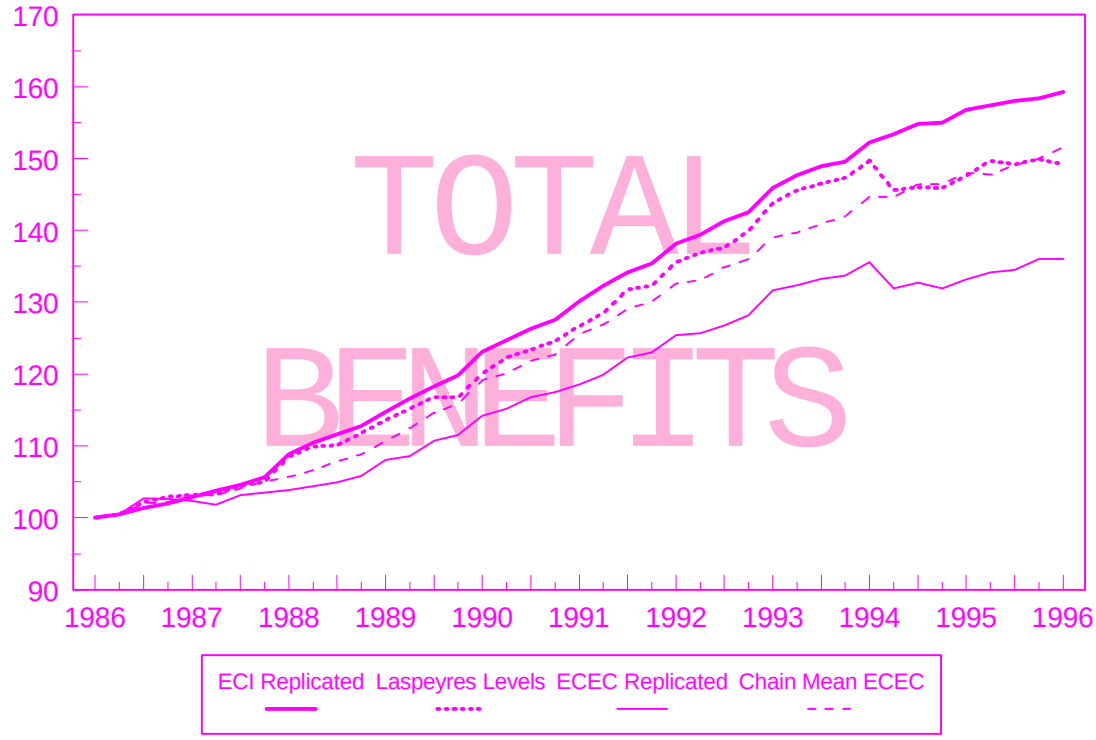

Table 3. Laspeyres levels indexes by quarter, 1986-96 (March 1986 = 100)

Quarter	Wage	Benefit	Total compensation
1986 I	100.0	100.0	100.0
II	100.9	100.5	100.8
III	102.6	102.2	102.6
IV	103.1	102.9	103.0
1987 I	103.8	103.2	103.6
II	104.0	103.3	103.8
III	104.6	104.5	104.6
IV	105.3	105.0	105.2
1988 I	106.3	108.5	106.9
II	107.7	109.9	108.4
III	108.2	110.1	108.8
IV	109.8	111.8	110.3
1989 I	110.8	113.6	111.6
II	111.8	115.2	112.7
III	112.7	116.8	113.9
IV	113.9	116.8	114.7
1990 I	115.8	120.1	117.0
II	117.4	122.3	118.7
III	117.8	123.4	119.3
IV	118.2	124.6	119.9
1991 I	120.2	126.7	121.9
II	121.4	128.5	123.4
III	123.0	131.8	125.4
IV	123.5	132.3	125.9
1992 I	124.8	135.6	127.7
II	125.8	136.9	128.9
III	125.9	137.6	129.2
IV	127.1	139.9	130.6
1993 I	128.4	143.8	132.7
II	129.4	145.6	134.0
III	130.8	146.5	135.3
IV	132.1	147.3	136.3
1994 I	132.8	149.7	137.5
II	131.8	145.6	135.6
III	131.7	146.0	135.7
IV	132.1	145.9	135.9
1995 I	133.1	147.6	137.2
II	133.8	149.7	138.2
III	135.2	149.2	139.2
IV	135.4	149.9	139.6
1996 I	136.2	149.2	140.0

differential between March 1986 and March 1996.

Shifts toward lower paying jobs among cells and within cells

The decompositions above indicate that a substantial part of the difference between the ECI and ECEC growth rates is due to the differences in the second stage of aggregation, that is, in the aggregation over the cell averages to obtain the final index. How can one interpret this finding?

The fact that the Laspeyres level wage and benefit indexes in table 3 have grown faster than the replicated ECEC indexes in table 2 indicates that employment has shifted toward those industry/major occupation cells where wages and, especially, benefits are lower. Additional evidence for this is provided by the fact that the ECI wage and benefit indexes have grown faster than the chained mean ECEC indexes in table 4.

A similar pattern persists when the distribution of employment within the industry/major occupation cells is examined. Specifically, the finding that the ECI wage and benefit indexes have been growing faster than the Laspeyres level wage and benefit indexes indicates that, on average, employment within the ECI cells is becoming more concentrated in jobs that offer lower compensation. Further evidence of this is provided by the fact that the chained mean ECEC indexes have been growing faster than the replicated ECEC indexes. The effect of this shift toward lower paying jobs is chained out of the ECI wage and benefit indexes but not the ECEC indexes. Interestingly, the decomposition using the chained mean ECEC yields a higher estimate of the share of the ECI-ECEC differential that is due to differences in the way that job quotes are aggregated to the cell means than does the decomposition using the Laspeyres levels index. This suggests that the within-cell shift toward lower paying jobs is most important for those cells with the greatest employment growth. This appears to mirror the shifts that are occurring across cells.

It is important to realize that the

Table 4. Chained mean ECEC by quarter, 1986-96 (March 1986 = 100)

Quarter	Wage	Benefit	Total Compensation
1986 I	100.0	100.0	100.0
II	100.9	100.5	100.8
III	102.1	102.0	102.0
IV	102.3	102.2	102.3
1987 I	103.2	103.2	103.2
II	103.4	103.2	103.3
III	104.7	104.1	104.5
IV	105.6	105.1	105.5
1988 I	104.2	105.7	104.6
II	104.9	106.6	105.3
III	106.2	107.9	106.7
IV	106.7	108.8	107.3
1989 I	107.7	110.7	108.5
II	108.5	112.5	109.6
III	110.2	114.6	111.3
IV	111.2	115.9	112.4
1990 I	112.7	119.2	114.4
II	113.3	120.1	115.0
III	114.5	121.9	116.4
IV	115.1	122.7	117.1
1991 I	116.6	125.6	118.9
II	117.2	126.9	119.8
III	118.5	129.1	121.3
IV	119.0	130.1	121.9
1992 I	120.0	132.6	123.2
II	120.0	133.1	123.4
III	120.9	134.9	124.5
IV	122.0	136.0	125.6
1993 I	123.0	139.0	127.1
II	123.3	139.7	127.5
III	124.3	140.9	128.6
IV	125.6	142.0	129.9
1994 I	126.7	144.7	131.4
II	127.4	144.7	131.9
III	129.2	146.4	133.6
IV	130.0	146.5	134.3
1995 I	131.0	148.0	135.4
II	131.3	147.8	135.6
III	132.8	149.1	137.0
IV	134.4	150.0	138.4
1996 I	136.5	151.6	140.4

ECI and ECEC have different interpretations. The ECI is a Laspeyres index that is intended to indicate the average percentage change in compensation, controlling for shifts in the distribution of employment across cells. Similarly, the ECI's procedure for measuring changes in the mean compensation for an individual cell has the effect of controlling for shifts in the distribution of employment across jobs within a cell. The ECEC, on the other hand, does not control for shifts in the distribution of employment across cells. Nor does it control for shifts in the distribution of employment across jobs within a cell.

The foregoing does not mean that it is inappropriate to use the ECEC to measure changes in compensation over time. Rather it means that a change in the ECEC conveys different information than does a change in the ECI. The change in the ECEC from one year to the next indicates the change in workers' average compensation. Average compensation will change for one of two reasons. First, it will change if compensation in the "representative" job is changing. Second, it will change if shifts in the distribution of employment lead to changes in the representative job.

Sample replacement in the ECI

A recent study examines the shift toward lower paying jobs in more detail.[5] The ECI sample changes gradually over time, with approximately 5 percent of the job quotes being replaced each quarter. The study compares the wages and benefits associated with incoming jobs with the wages and benefits associated with the jobs they replace. The results indicate that controlling for 2-digit industry and major occupation, the wages and benefits

associated with incoming ECI jobs are lower on average than the wages and benefits associated with outgoing jobs. Specifically, the wage associated with an incoming ECI job is, on average, about 3.1 percent lower than the wage associated with an outgoing job. And the benefit cost associated with an incoming ECI job is, on average, about 7.4 percent lower than the benefit cost associated with an outgoing job. A significant portion of this differential can be explained by observed differences in such characteristics as establishment size, union status, and part-time status. After controlling for these characteristics, the average differential between the wages associated with outgoing and incoming jobs falls to 1.3 percent and the average differential between the benefits associated with outgoing and incoming jobs falls to 3.7 percent.

As discussed above, the lower compensation in incoming jobs in good part appears to reflect the evolution of the labor market. However, nonrandom attrition could conceivably also be a factor contributing to the lower compensation in incoming jobs. The paper, "Sample Replacement in the ECI," shows that attrition is higher for nonunion jobs and jobs from smaller establishments. It is well known that such establishments tend to offer lower wages. Indeed, jobs that drop out of the ECI sample prematurely offer lower benefits than jobs that do not. Surprisingly, however, jobs that drop out prematurely do not seem to offer lower wages. Furthermore, adjusting the sample weights for incoming job quotes in an attempt to age them artificially to the average age of outgoing job quotes eliminates only a small portion of the difference in expected compensation between incoming and outgoing jobs. This suggests that the nonrandom attrition in the ECI sample does not have much of an effect on the ECEC level estimates. Of course, even if nonrandom attrition has a relatively minor effect on the ECEC level estimates, it may still affect the ECI if compensation growth for jobs that drop out prematurely differs from that for jobs that do not. However, this does not seem very likely.

Finally, even if nonrandom sample attrition does not affect growth rates in the ECI and ECEC, there is still an important sampling issue that should be addressed. If the evolution of the labor market is in fact the primary cause of the lower compensation in incoming jobs, then there arises the concern that the ECI-ECEC sample is being replenished too slowly to represent the current labor market adequately. Since incoming jobs tend to offer lower wages than outgoing jobs and since slow replacement of the ECI-ECEC sample means that outgoing jobs are over represented at any point in time, the ECEC will overstate average compensation in the labor market. The effect of slow replacements on the ECI will depend on whether compensation growth is higher or lower in incoming jobs. This is something we plan to investigate in the future.

—ENDNOTES—

[1] The ECI sample weights indicate exactly how much weight should be given to each job quote. Once a job is surveyed, its sample weight is held fixed during the entire time that it remains in the sample. As a consequence, the sample weights in period t will not strictly reflect current employment in period t. However, the importance of this consideration is limited by the fact that somewhere between 20 and 25 percent of the sample is replaced every year.

[2] See Wood, G. Donald, "Estimation Procedures for the Employment Cost Index," *Monthly Labor Review*, May 1982, pp. 40-42.

[3] For a more precise (mathematical) statement of the difference between the ECI and the change in the ECEC, see Lettau, Michael K., Mark A. Loewenstein, and Aaron T. Cushner, "Explaining the Differential Growth Rates of the ECI and the ECEC," Compensation Research and Program Development Group Working Paper, 1996. One practical complication in computing the ECEC should be noted. Unlike the ECI with fixed weights, calculating the ECEC requires employment counts for every category of labor in every period t. While quarterly industry employment counts can be obtained from the CES, occupational employment counts cannot. Consequently, employment counts for the various ECI-ECEC cells are obtained by combining the quarterly industry employment counts with the sample weights. (We plan to study further the effect of using the occupational distribution within industries from the ECI sample to calculate the current employment counts.) For a more detailed description of this process, see Lettau, Michael K., Mark A. Loewenstein, and Aaron T. Cushner, "Is the ECI Sensitive to the Method of Aggregation?", Compensation Research and Program Development Group Working Paper, 1996. We are thankful to Albert E. Schwenk for deriving the employment estimates.

[4] The reproduced indexes differ slightly from the official indexes for three reasons. First, the ECI cell definitions have undergone some minor changes over time, so a few cells were aggregated when necessary to obtain consistency over time. Second, the official ECI procedure for imputing averages for cells with a small number of job quotes differs slightly from the official ECEC procedure. The official ECI procedure is used for the replication of both the ECEC and the ECI. Finally, for the initial quarter, March 1986, the replicated indexes use the sample of job quotes that are matched to quotes in June 1986 rather than December 1985.

[5] See Lettau, Michael K. and Mark A. Loewenstein, "Sample Replacement in the ECI," Compensation Research and Program Development Group Working Paper, 1996.