

The Relationship Between Labor Costs and Inflation: A Cyclical Viewpoint

by [Anirvan Banerji](#)

Economic Cycle Research Institute

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This study examines how well various BLS measures of labor cost inflation have anticipated cyclical ups and downs in consumer price inflation.

Conventional Wisdom

It is commonly believed that labor costs are a key predictor of inflation, because they represent roughly two-thirds of the total costs to private U.S. businesses.¹ This view implies a cost-push model of inflation, which is based on the idea that the primary determinant of higher prices is higher costs. An alternative view is that firms will charge whatever the market will bear, regardless of their actual costs. If the market's acceptance of higher prices is the dominant determinant of inflation, the cost-push model would have less validity.

One way to test the cost-push model's validity is to examine the historical record to see how well traditional measures of labor cost inflation have anticipated the cyclical ups and downs in general inflation. This article compares various BLS measures of labor costs with the [Consumer Price Index \(CPI\)](#)--a standard measure of inflation--for the 1982-2004 period. The record turns out to be mixed on this issue.

Inflation Cycles

Inflation has always had an important cyclical aspect. The late Geoffrey H. Moore, who served as Commissioner of Labor Statistics from 1969 to 1973, and later founded the Economic Cycle Research Institute (ECRI), held the view that market-oriented economies exhibit inflation cycles, made up of alternating periods of rising and falling inflation. ECRI maintains a historical chronology of U.S. inflation cycles, which are determined using the kinds of rules that are used to date business cycles, such as those used in the Bry-Boschan "peak-trough" procedure for determining cyclical turning points.² The Bry-Boschan procedure is an objective algorithmic formulation of the National Bureau of Economic Research (NBER) rules for identifying cyclical turns, and it remains the standard for turning-point determination procedures.

While inflation is cyclical, inflation downturns do not always follow slowdowns in economic growth. A quarter of the time, inflation starts easing *before* a slowdown in growth.³ In addition, there are episodes--like the stagflation of the late 1970s and the noninflationary growth of the late 1990s--when there appears to be no connection between economic growth and inflation. Thus, inflation cycles are distinct from cycles in economic growth--one reason it is important to specifically assess the ability of economic indicators to predict turns in the inflation cycle.

Labor cost inflation--as measured by the growth rates of various measures of labor costs--is also cyclical in nature. While there is obviously some rough correspondence between labor cost inflation and consumer price inflation, the question is whether, empirically, cyclical turns in the former systematically anticipate cyclical turns in the latter. If so, labor cost inflation would be an important predictor of consumer price inflation, validating the cost-push model of inflation.

The critical test for any predictor of inflation is whether it can systematically anticipate the cyclical peaks and troughs in the inflation cycle. In other words, is it a leading indicator of inflation? In this article, the cyclical analysis is conducted in three steps. First, the cyclical turning points of each time series are determined using the Bry-Boschan procedure. Second, the data are charted against inflation cycles. Third, the lead and lag characteristics are established.

This article examines three popular measures of labor cost inflation to see how well they predict peaks and troughs in consumer price inflation. Specifically, it compares the *growth rates* of the [Employment Cost Index \(ECI\)](#), [Average Hourly Earnings \(AHE\)](#), and [Unit Labor Costs \(ULC\)](#) with the growth rate of the CPI-U (See chart.) The shaded areas of the chart

represent U.S. inflation cycle downturns, which correspond roughly to cyclical declines in CPI growth. Where there is any ambiguity about the best choice of the peaks and troughs in the inflation cycle based on the growth rate of the CPI-U, evidence from alternative coincident measures of inflation is also considered, such as the personal consumption deflator or the GDP implicit price deflator. This procedure is analogous to that used by the NBER for business cycle dating, which is based on the consensus of multiple coincident indicators of economic activity. The asterisks represent the cyclical peaks and troughs in each of the labor cost inflation measures, as determined by the Bry-Boschan procedure.

Over the 1982-2004 period, there were five periods of inflation cycle downturns, with four peaks and five troughs in the growth rate of the CPI-U that can be included in this study. The reason for only four peaks is because the initial peak in the CPI-U growth rate occurs at the very beginning of the study period. Of the three comparisons, only the ULC comparison includes four peaks and five troughs. With the ECI and AHE growth rate series, only three peaks and four troughs can be included in the analysis. In the case of the ECI, the first trough in the CPI-U growth rate is not in the analysis because the ECI series does not start until the second quarter of 1981.⁴ In addition, there is one CPI-U peak that the ECI missed. In the case of the AHE growth rate series, there simply is no corresponding trough and peak for the first trough and peak in price inflation.

Growth Rate Methodology

The 6-month smoothed annualized rate (SMSAR) of growth is used throughout this analysis, because it has key advantages over the more common year-over-year growth rate (YOYGR) measure. The main advantages of the YOYGR method are that it is relatively simple and straightforward, and that it automatically performs a kind of seasonal adjustment on any time series to which it is applied. On the other hand, sophisticated seasonal adjustment procedures have been available for many decades, so there is no need for indirect seasonal adjustment using the YOYGR. More importantly, the YOYGR measure is subject to the vagaries of the base effect, in which whatever happened a year earlier can substantially affect the growth rate, either positively or negatively.⁵

In cyclical terms, the SMSAR method has the additional advantage that it compares the latest data point to a 1-year moving average centered 6½ months before the current month, or 2½ quarters before the current quarter. In other words, it is focused on the percent change over a 6½-month span or over a 2½-quarter span, in contrast to the YOYGR, which focuses on the percent change over a 1-year time span. Therefore, when there is a cyclical turn in an indicator, its SMSAR tends to turn up or down more quickly than the YOYGR does, without adding more statistical noise or volatility. It is therefore particularly suitable for cyclical analysis.⁶

For the monthly case, the actual formulas for the two types of growth rates are as follows:

$$\text{YOYGR} = 100 * [(X_t / X_{t-12}) - 1]$$

$$\text{SMSAR} = 100 * [(X_t / \{X_{t-1} + X_{t-2} + \dots + X_{t-12}\} / 12)^{(12/6.5)} - 1]$$

For the quarterly case, the formulas are as follows:

$$\text{YOYGR} = 100 * [(X_t / X_{t-4}) - 1]$$

$$\text{SMSAR} = 100 * [(X_t / \{X_{t-1} + X_{t-2} + \dots + X_{t-4}\} / 4)^{(4/2.5)} - 1]$$

Although the SMSAR method appears to be more complicated, it is really quite simple to use. Given its relative freedom from distortions engendered by idiosyncratic movements that occurred a year earlier, analysts may want to consider using it more frequently.

The Employment Cost Index

The BLS [Employment Cost Index \(ECI\)](#) measures changes in the cost of labor compensation (absent the influence of employment shifts among occupations and industries), including wages, benefits, and payroll taxes. The ECI covers managers as well as production or nonsupervisory workers. A potential drawback of the ECI is that it is a quarterly series, unlike the Average Hourly Earnings (AHE) series used in this article, and it generally is released almost a month after the end of the relevant quarter.

A cyclical analysis shows that the growth rate of the ECI has a median *lead* of 5 months at inflation cycle peaks, and a median *lag* of 11 months at inflation cycle troughs. In fact, downturns in ECI growth anticipate two-thirds of the downturns in consumer price inflation, but upturns in ECI growth actually lag 100 percent of the upturns in CPI inflation. This is because ECI growth peaked before CPI-U growth in 2 of 3 cases, but ECI growth reached a trough after CPI-U growth in 4 of 4 cases. Therefore, ECI growth is a leading indicator of inflation peaks but a lagging indicator of inflation troughs. In other words, analysts cannot rule out an upcoming cyclical upturn in the inflation rate just because the ECI growth rate has not yet turned up.

Average Hourly Earnings

The BLS Average Hourly Earnings (AHE) series, from the [Current Employment Statistics \(CES\)](#) program, is a popular indicator of labor costs, because it is published monthly and is generally released on the first Friday of each month as part of the employment report. Thus, the figures are usually available less than a week after the end of the relevant month. On the other hand, AHE is a narrower gauge of labor costs than is the ECI, because it measures wage rates including overtime and does not include benefit costs and payroll taxes. In addition, unlike the ECI, only the earnings of production or nonsupervisory workers are included in the AHE series--it does not include managers' earnings.

A cyclical analysis shows that the growth rate of the AHE series has a median *lead* of 3 months at inflation cycle peaks, but a median *lag* of 3½ months at inflation cycle troughs. In fact, downturns in AHE growth anticipate some two-thirds of the downturns in consumer price inflation, but upturns in AHE growth actually lag upturns in CPI inflation growth three-quarters of the time. This is because AHE growth peaked before CPI-U growth in 2 of 3 cases, while AHE growth reached a trough after CPI-U growth in 3 of 4 cases. Therefore, AHE growth is a leading indicator of inflation peaks but a lagging indicator of inflation troughs. As with the ECI, an upcoming cyclical upturn in the rate of inflation cannot be ruled out just because the AHE growth rate has not turned up.

Unit Labor Costs

Many economists prefer to examine growth in the BLS [Unit Labor Costs \(ULC\)](#) series as a predictor of inflation because this series, a product of the productivity and costs program, measures the cost of labor *per unit* of production (rather than per hour), which allows analysts to determine how much the labor cost of an employer increases with each additional unit produced. In other words, the ULC measure takes into account variations in productivity growth in determining how much employer costs are rising. Like the ECI, the ULC series is published quarterly, and it generally is released about 5 weeks after the end of the relevant quarter.⁷

A cyclical analysis shows that ULC growth has a median *lead* of 5 months at inflation cycle peaks, but a median *lag* of 2 months at inflation cycle troughs. In fact, downturns in ULC growth anticipate about half of the downturns in consumer price inflation, but upturns in ULC growth actually lag upturns in CPI inflation 80 percent of the time. This is because ULC growth peaked before CPI-U growth in 2 of 4 cases, but ULC growth reached a trough after CPI-U growth in 4 of 5 cases. Therefore, ULC growth often is a leading indicator of inflation peaks, but it is a lagging indicator of inflation troughs. Regardless of its conceptual advantages, then, the ULC series, like the ECI and AHE series, cannot be relied upon as an accurate predictor of cyclical upturns in inflation.

Cyclical Asymmetry Of Leads

No matter what standard econometric models might suggest, the empirical cyclical evidence indicates that labor cost inflation is not a consistent predictor of cyclical upturns in inflation. In fact, a fair amount of asymmetry exists in the cyclical behavior of the growth rates of the ECI, AHE, and ULC when compared with inflation cycles. All three series lead consumer price inflation at peaks, and lag it at troughs.

Specifically, the three labor cost measures lead about half to two-thirds of the cyclical downturns in general inflation, and their median lead varies between 3 and 5 months. In other words, labor cost inflation is a somewhat inconsistent leading indicator of downturns in the general rate of inflation. Moreover, the three measures lag between 75 percent and 100 percent of the cyclical upturns in general inflation, and their median lag varies between 2 and 11 months. Therefore, labor cost inflation is a fairly consistent lagging indicator of upturns in general inflation.

These comparisons suggest that labor cost inflation is not a consistent predictor of cyclical upswings and downswings in general consumer price inflation. As a result, analysts should use caution when interpreting cyclical swings in labor costs growth rates--as recent history shows, price inflation may enter a cyclical upturn before labor cost inflation does.

Anirvan Banerji
Director of Research, Economic Cycle Research Institute.

The views expressed in this article are those of the author and do not necessarily reflect the policies or positions of the Bureau of Labor Statistics.

Notes

¹ According to data from the BLS multifactor productivity (MFP) program, for example, the labor share in costs for the private business sector (excluding government enterprises) averaged 67 percent over the 20-year period from 1982 to 2001. For more information on this series, see "[Private Business and Private Nonfarm Business MFP Tables](http://www.bls.gov/web/prod3.suppl.toc.htm)," on the Multifactor Productivity Trends page of the BLS website at <http://www.bls.gov/web/prod3.suppl.toc.htm>.

² Gerhard Bry and Charlotte Boschan, *Cyclical Analysis of Time Series: Selected Procedures and Computer Programs* (New York, National Bureau of Economic Research, 1971).

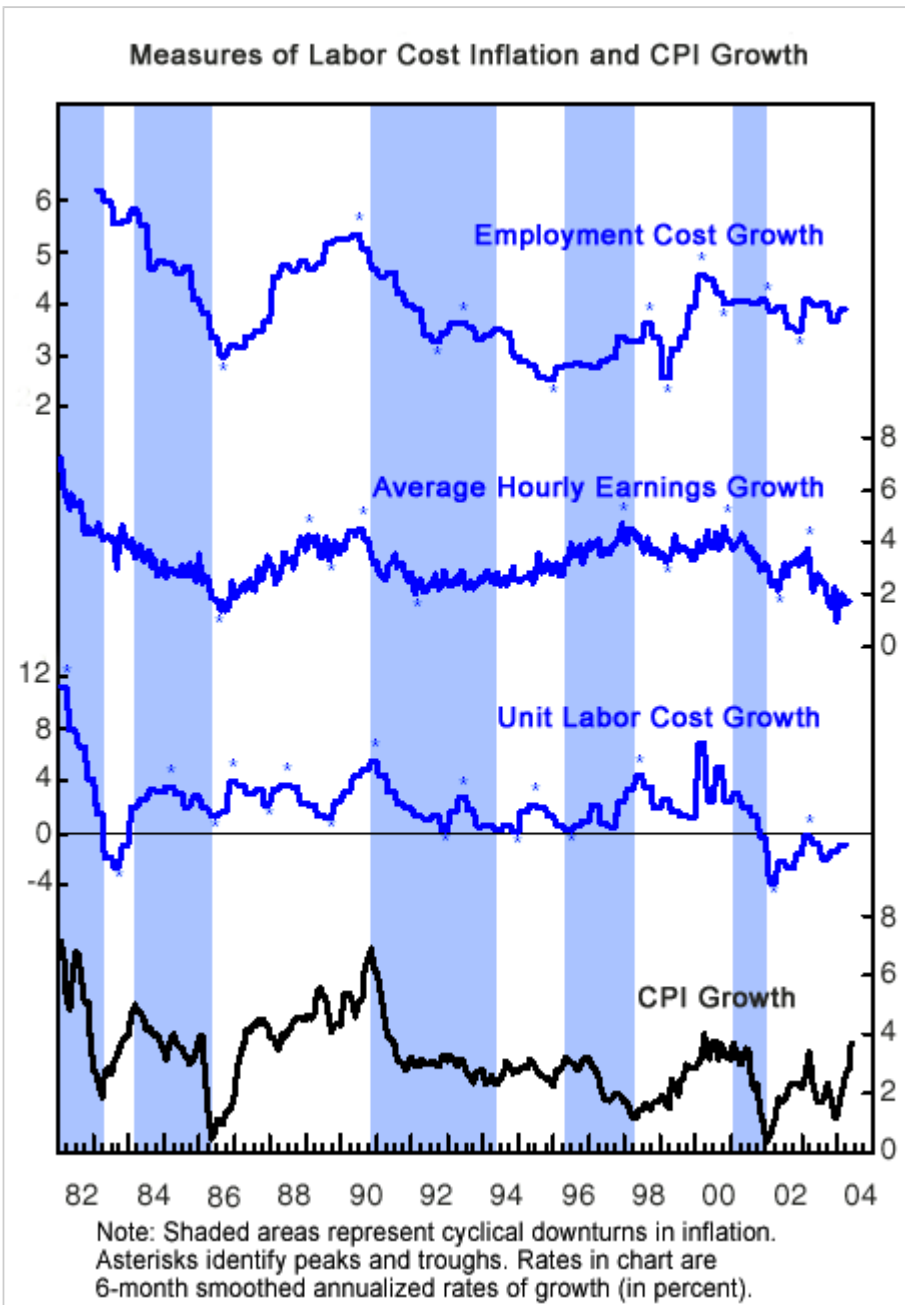
³ Dimitra Visviki, "Growth and Inflation: Insights into a Troubled Relationship," presented at the Eastern Economic Association Annual Conference, New York City, March 4-6, 2005.

⁴ The growth rate methodology used in this study requires a year of data prior to the year being considered; hence, because 1982 is the first full year for which ECI data are available, the ECI portion of the analysis begins in 1983.

⁵ This is why analysts so frequently talk about favorable and unfavorable comparisons when interpreting the YOYGR, because idiosyncrasies in the data from a year earlier can distort the YOYGR measure of growth. This is a moot issue with the SMSAR, which is based on a comparison of the latest month's data to the average over the previous year, which smoothes out the idiosyncratic month-to-month fluctuations.

⁶ For more information on the SMSAR method's advantages in cyclical analysis, see Anirvan Banerji, "The Three Ps: Simple Tools for Monitoring Economic Cycles," *Business Economics*, October 1999, pp. 72-76.

⁷ Although both the Employment Cost Index (ECI) and the Unit Labor Costs (ULC) series are published quarterly, the ULC series generally is published 5 to 7 days later than the ECI.



Data for Chart. Measures of Labor Cost Inflation and CPI Growth

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Jan-81			7.2		70.4		87.2	
Feb-81			7.2		70.4		88.0	
Mar-81			7.3		70.4		88.6	
Apr-81			7.3		72.6		89.1	
May-81			7.4		72.6		89.7	

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Jun-81			7.4		72.6		90.5	
Jul-81			7.4		73.6		91.5	
Aug-81			7.5		73.6		92.2	
Sep-81			7.5		73.6		93.1	
Oct-81			7.6		75.6		93.4	
Nov-81			7.6		75.6		93.8	
Dec-81			7.6		75.6		94.1	
Jan-82	71.7		7.7	7.2	78.1	11.3	94.4	7.2
Feb-82	71.7		7.7	6.0	78.1	11.3	94.7	6.5
Mar-82	71.7		7.7	5.7	78.1	11.3	94.7	5.3
Apr-82	72.8		7.8	5.3	78.6	7.8	95.0	4.8
May-82	72.8		7.8	5.9	78.6	7.8	95.9	5.6
Jun-82	72.8		7.8	5.5	78.6	7.8	97.0	6.8
Jul-82	74.2		7.9	5.5	79.6	6.6	97.5	6.7
Aug-82	74.2		7.9	5.6	79.6	6.6	97.7	6.0
Sep-82	74.2		7.9	4.3	79.6	6.6	97.7	5.1
Oct-82	75.3		8.0	4.6	80.0	4.2	98.1	5.1
Nov-82	75.3		8.0	4.3	80.0	4.2	98.0	4.1
Dec-82	75.3		8.0	4.3	80.0	4.2	97.7	2.8
Jan-83	76.3	6.2	8.1	4.6	79.8	1.5	97.9	2.6
Feb-83	76.3	6.2	8.1	4.7	79.8	1.5	98.0	2.3
Mar-83	76.3	6.2	8.1	4.1	79.8	1.5	98.1	1.9
Apr-83	77.4	6.0	8.1	4.2	78.6	-1.8	98.8	2.7
May-83	77.4	6.0	8.2	4.3	78.6	-1.8	99.2	2.9
Jun-83	77.4	6.0	8.2	4.1	78.6	-1.8	99.4	2.7
Jul-83	78.4	5.5	8.2	4.2	78.2	-2.6	99.8	3.1
Aug-83	78.4	5.5	8.2	3.0	78.2	-2.6	100.1	3.3
Sep-83	78.4	5.5	8.3	4.0	78.2	-2.6	100.4	3.5
Oct-83	79.5	5.6	8.3	4.7	78.7	-0.9	100.8	3.8
Nov-83	79.5	5.6	8.3	3.9	78.7	-0.9	101.1	3.9
Dec-83	79.5	5.6	8.3	3.8	78.7	-0.9	101.4	4.0
Jan-84	80.7	5.8	8.4	4.1	79.8	2.0	102.1	4.7
Feb-84	80.7	5.8	8.4	3.4	79.8	2.0	102.6	5.0
Mar-84	80.7	5.8	8.4	3.5	79.8	2.0	102.9	4.8
Apr-84	81.7	5.5	8.4	3.9	80.1	2.6	103.3	4.8
May-84	81.7	5.5	8.4	3.3	80.1	2.6	103.5	4.4
Jun-84	81.7	5.5	8.5	3.5	80.1	2.6	103.7	4.1
Jul-84	82.4	4.7	8.5	3.7	80.8	3.3	104.1	4.2
Aug-84	82.4	4.7	8.5	3.1	80.8	3.3	104.4	4.1
Sep-84	82.4	4.7	8.5	3.3	80.8	3.3	104.7	4.0
Oct-84	83.5	4.8	8.5	2.8	81.4	3.1	105.1	4.0
Nov-84	83.5	4.8	8.6	2.9	81.4	3.1	105.3	3.7

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Dec-84	83.5	4.8	8.6	3.3	81.4	3.1	105.5	3.4
Jan-85	84.5	4.8	8.6	2.6	82.3	3.6	105.7	3.2
Feb-85	84.5	4.8	8.6	3.0	82.3	3.6	106.3	3.7
Mar-85	84.5	4.8	8.7	2.9	82.3	3.6	106.8	4.0
Apr-85	85.4	4.6	8.7	3.0	82.7	3.1	107.0	3.8
May-85	85.4	4.6	8.7	2.7	82.7	3.1	107.2	3.6
Jun-85	85.4	4.6	8.7	3.1	82.7	3.1	107.5	3.6
Jul-85	86.4	4.7	8.7	2.8	82.8	2.0	107.7	3.3
Aug-85	86.4	4.7	8.7	2.7	82.8	2.0	107.9	3.2
Sep-85	86.4	4.7	8.8	3.2	82.8	2.0	108.1	3.0
Oct-85	87.1	4.1	8.8	2.7	83.8	2.9	108.5	3.2
Nov-85	87.1	4.1	8.8	2.5	83.8	2.9	109.0	3.6
Dec-85	87.1	4.1	8.9	3.5	83.8	2.9	109.5	3.9
Jan-86	87.9	3.8	8.8	2.4	83.9	1.9	109.9	4.0
Feb-86	87.9	3.8	8.9	2.8	83.9	1.9	109.7	3.0
Mar-86	87.9	3.8	8.9	2.6	83.9	1.9	109.1	1.5
Apr-86	88.5	3.3	8.9	1.9	84.0	1.3	108.7	0.5
May-86	88.5	3.3	8.9	1.8	84.0	1.3	109.0	0.7
Jun-86	88.5	3.3	8.9	1.8	84.0	1.3	109.4	1.2
Jul-86	89.1	3.0	8.9	1.4	84.5	1.7	109.5	1.1
Aug-86	89.1	3.0	8.9	1.8	84.5	1.7	109.6	1.0
Sep-86	89.1	3.0	8.9	1.4	84.5	1.7	110.0	1.4
Oct-86	89.9	3.2	9.0	1.7	86.1	3.9	110.2	1.5
Nov-86	89.9	3.2	9.0	2.5	86.1	3.9	110.4	1.6
Dec-86	89.9	3.2	9.0	1.9	86.1	3.9	110.8	2.1
Jan-87	90.6	3.2	9.0	2.0	86.6	3.8	111.4	2.9
Feb-87	90.6	3.2	9.0	2.2	86.6	3.8	111.8	3.4
Mar-87	90.6	3.2	9.1	2.4	86.6	3.8	112.2	3.7
Apr-87	91.4	3.4	9.1	2.1	86.9	3.0	112.7	4.1
May-87	91.4	3.4	9.1	2.6	86.9	3.0	113.0	4.1
Jun-87	91.4	3.4	9.1	2.2	86.9	3.0	113.5	4.3
Jul-87	92.2	3.5	9.1	2.2	87.8	3.3	113.8	4.3
Aug-87	92.2	3.5	9.2	3.1	87.8	3.3	114.3	4.5
Sep-87	92.2	3.5	9.2	2.6	87.8	3.3	114.7	4.5
Oct-87	93.1	3.7	9.2	2.9	88.0	2.1	115.0	4.3
Nov-87	93.1	3.7	9.3	3.5	88.0	2.1	115.4	4.3
Dec-87	93.1	3.7	9.3	3.2	88.0	2.1	115.6	3.9
Jan-88	94.4	4.5	9.3	3.1	89.2	3.5	116.0	3.9
Feb-88	94.4	4.5	9.3	2.4	89.2	3.5	116.2	3.6
Mar-88	94.4	4.5	9.3	2.7	89.2	3.5	116.5	3.5
Apr-88	95.5	4.7	9.3	3.2	90.0	3.7	117.2	4.0
May-88	95.5	4.7	9.4	3.7	90.0	3.7	117.5	3.9

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Jun-88	95.5	4.7	9.4	3.3	90.0	3.7	118.0	4.1
Jul-88	96.5	4.6	9.4	3.4	90.7	3.5	118.5	4.3
Aug-88	96.5	4.6	9.4	3.0	90.7	3.5	119.0	4.4
Sep-88	96.5	4.6	9.5	3.6	90.7	3.5	119.5	4.6
Oct-88	97.7	4.8	9.6	4.2	90.8	2.4	119.9	4.6
Nov-88	97.7	4.8	9.6	4.1	90.8	2.4	120.3	4.5
Dec-88	97.7	4.8	9.6	3.7	90.8	2.4	120.7	4.5
Jan-89	98.8	4.7	9.6	4.3	91.4	2.2	121.2	4.6
Feb-89	98.8	4.7	9.7	4.2	91.4	2.2	121.6	4.5
Mar-89	98.8	4.7	9.7	3.9	91.4	2.2	122.2	4.8
Apr-89	100.0	4.8	9.7	4.2	91.5	1.4	123.1	5.4
May-89	100.0	4.8	9.7	3.4	91.5	1.4	123.7	5.6
Jun-89	100.0	4.8	9.8	3.4	91.5	1.4	124.1	5.4
Jul-89	101.4	5.2	9.8	4.2	91.8	1.2	124.5	5.2
Aug-89	101.4	5.2	9.8	3.4	91.8	1.2	124.5	4.4
Sep-89	101.4	5.2	9.9	3.7	91.8	1.2	124.8	4.1
Oct-89	102.7	5.2	9.9	4.0	92.8	2.5	125.4	4.3
Nov-89	102.7	5.2	9.9	3.6	92.8	2.5	125.9	4.4
Dec-89	102.7	5.2	10.0	3.9	92.8	2.5	126.3	4.3
Jan-90	104.0	5.3	10.0	3.7	93.7	3.2	127.5	5.4
Feb-90	104.0	5.3	10.0	4.3	93.7	3.2	128.0	5.3
Mar-90	104.0	5.3	10.1	4.5	93.7	3.2	128.6	5.4
Apr-90	105.4	5.3	10.1	4.4	95.0	4.4	128.9	5.0
May-90	105.4	5.3	10.1	4.2	95.0	4.4	129.1	4.6
Jun-90	105.4	5.3	10.2	4.5	95.0	4.4	129.9	5.1
Jul-90	106.6	5.0	10.2	4.5	96.1	4.8	130.5	5.2
Aug-90	106.6	5.0	10.2	4.1	96.1	4.8	131.6	6.1
Sep-90	106.6	5.0	10.3	4.1	96.1	4.8	132.5	6.5
Oct-90	107.7	4.7	10.3	3.5	97.6	5.5	133.4	6.9
Nov-90	107.7	4.7	10.3	3.2	97.6	5.5	133.7	6.3
Dec-90	107.7	4.7	10.3	3.3	97.6	5.5	134.2	6.0
Jan-91	108.9	4.5	10.3	2.9	98.2	4.4	134.7	5.8
Feb-91	108.9	4.5	10.4	2.7	98.2	4.4	134.8	5.0
Mar-91	108.9	4.5	10.4	2.6	98.2	4.4	134.8	4.2
Apr-91	110.2	4.6	10.4	3.1	98.6	3.1	135.1	3.9
May-91	110.2	4.6	10.5	3.2	98.6	3.1	135.6	3.8
Jun-91	110.2	4.6	10.5	3.6	98.6	3.1	136.0	3.6
Jul-91	111.2	4.2	10.5	3.1	99.0	2.3	136.2	3.2
Aug-91	111.2	4.2	10.6	3.2	99.0	2.3	136.6	3.1
Sep-91	111.2	4.2	10.6	3.2	99.0	2.3	137.0	3.0
Oct-91	112.2	4.0	10.6	2.6	99.5	1.9	137.2	2.8
Nov-91	112.2	4.0	10.6	2.5	99.5	1.9	137.8	3.2

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Dec-91	112.2	4.0	10.6	2.9	99.5	1.9	138.2	3.2
Jan-92	113.3	3.9	10.6	2.0	99.7	1.4	138.3	2.9
Feb-92	113.3	3.9	10.7	2.5	99.7	1.4	138.6	2.9
Mar-92	113.3	3.9	10.7	2.6	99.7	1.4	139.1	3.1
Apr-92	114.1	3.4	10.7	2.1	99.9	1.1	139.4	3.1
May-92	114.1	3.4	10.7	2.2	99.9	1.1	139.7	3.0
Jun-92	114.1	3.4	10.8	2.5	99.9	1.1	140.1	3.0
Jul-92	115.0	3.3	10.8	2.3	100.4	1.4	140.5	3.1
Aug-92	115.0	3.3	10.8	2.8	100.4	1.4	140.8	3.0
Sep-92	115.0	3.3	10.8	2.2	100.4	1.4	141.1	3.0
Oct-92	116.1	3.5	10.8	2.4	100.0	0.2	141.7	3.3
Nov-92	116.1	3.5	10.9	2.9	100.0	0.2	142.1	3.3
Dec-92	116.1	3.5	10.9	2.4	100.0	0.2	142.3	3.1
Jan-93	117.2	3.6	10.9	2.5	101.0	1.6	142.8	3.3
Feb-93	117.2	3.6	10.9	2.4	101.0	1.6	143.1	3.2
Mar-93	117.2	3.6	11.0	2.7	101.0	1.6	143.3	3.0
Apr-93	118.2	3.6	11.0	2.5	102.0	2.7	143.8	3.1
May-93	118.2	3.6	11.0	2.9	102.0	2.7	144.2	3.2
Jun-93	118.2	3.6	11.0	2.2	102.0	2.7	144.3	2.8
Jul-93	119.2	3.6	11.0	2.3	102.0	1.8	144.5	2.6
Aug-93	119.2	3.6	11.1	2.5	102.0	1.8	144.8	2.6
Sep-93	119.2	3.6	11.1	2.3	102.0	1.8	145.0	2.4
Oct-93	120.1	3.3	11.1	2.4	101.6	0.6	145.6	2.7
Nov-93	120.1	3.3	11.1	2.6	101.6	0.6	146.0	2.8
Dec-93	120.1	3.3	11.2	2.5	101.6	0.6	146.3	2.8
Jan-94	121.2	3.4	11.2	2.8	102.1	0.7	146.3	2.3
Feb-94	121.2	3.4	11.2	2.9	102.1	0.7	146.7	2.5
Mar-94	121.2	3.4	11.2	2.5	102.1	0.7	147.1	2.6
Apr-94	122.3	3.5	11.3	2.5	102.1	0.3	147.2	2.3
May-94	122.3	3.5	11.3	2.8	102.1	0.3	147.5	2.3
Jun-94	122.3	3.5	11.3	2.4	102.1	0.3	147.9	2.5
Jul-94	123.3	3.5	11.3	2.6	102.4	0.7	148.4	2.7
Aug-94	123.3	3.5	11.3	2.4	102.4	0.7	149.0	3.1
Sep-94	123.3	3.5	11.4	2.6	102.4	0.7	149.3	3.0
Oct-94	124.0	3.0	11.4	3.0	102.1	0.1	149.4	2.7
Nov-94	124.0	3.0	11.4	2.6	102.1	0.1	149.8	2.8
Dec-94	124.0	3.0	11.5	2.6	102.1	0.1	150.1	2.8
Jan-95	124.9	2.9	11.5	2.5	103.2	1.6	150.5	2.9
Feb-95	124.9	2.9	11.5	2.6	103.2	1.6	150.9	2.9
Mar-95	124.9	2.9	11.5	2.6	103.2	1.6	151.2	2.8
Apr-95	125.8	2.8	11.6	2.9	103.8	2.1	151.8	3.2
May-95	125.8	2.8	11.6	2.5	103.8	2.1	152.1	3.0

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Jun-95	125.8	2.8	11.6	2.6	103.8	2.1	152.4	2.9
Jul-95	126.5	2.6	11.7	3.6	104.1	1.9	152.6	2.7
Aug-95	126.5	2.6	11.7	2.8	104.1	1.9	152.9	2.6
Sep-95	126.5	2.6	11.7	3.0	104.1	1.9	153.1	2.5
Oct-95	127.3	2.6	11.8	3.3	104.2	1.4	153.5	2.6
Nov-95	127.3	2.6	11.8	2.8	104.2	1.4	153.7	2.4
Dec-95	127.3	2.6	11.8	2.9	104.2	1.4	153.9	2.2
Jan-96	128.3	2.8	11.8	3.2	104.2	0.6	154.7	2.8
Feb-96	128.3	2.8	11.8	2.8	104.2	0.6	155.0	2.8
Mar-96	128.3	2.8	11.9	2.7	104.2	0.6	155.5	2.9
Apr-96	129.2	2.8	11.9	3.4	104.2	0.2	156.1	3.2
May-96	129.2	2.8	12.0	3.2	104.2	0.2	156.4	3.2
Jun-96	129.2	2.8	12.0	4.0	104.2	0.2	156.7	3.1
Jul-96	130.1	2.9	12.0	3.5	104.6	0.7	157.0	3.0
Aug-96	130.1	2.9	12.1	3.5	104.6	0.7	157.2	2.8
Sep-96	130.1	2.9	12.1	3.9	104.6	0.7	157.7	3.0
Oct-96	131.0	2.8	12.1	3.2	104.9	0.9	158.2	3.1
Nov-96	131.0	2.8	12.2	3.6	104.9	0.9	158.7	3.2
Dec-96	131.0	2.8	12.2	4.1	104.9	0.9	159.1	3.2
Jan-97	131.9	2.8	12.3	3.7	105.9	2.2	159.4	3.0
Feb-97	131.9	2.8	12.3	3.9	105.9	2.2	159.7	2.9
Mar-97	131.9	2.8	12.4	4.1	105.9	2.2	159.8	2.5
Apr-97	132.9	2.9	12.4	3.5	105.4	0.8	159.9	2.2
May-97	132.9	2.9	12.4	3.6	105.4	0.8	159.9	1.9
Jun-97	132.9	2.9	12.5	3.7	105.4	0.8	160.2	1.9
Jul-97	133.9	3.0	12.5	3.5	105.5	0.5	160.4	1.7
Aug-97	133.9	3.0	12.5	3.9	105.5	0.5	160.8	1.9
Sep-97	133.9	3.0	12.6	3.9	105.5	0.5	161.2	2.0
Oct-97	135.2	3.4	12.6	4.2	107.0	2.4	161.5	2.0
Nov-97	135.2	3.4	12.7	4.8	107.0	2.4	161.7	1.9
Dec-97	135.2	3.4	12.7	4.1	107.0	2.4	161.8	1.7
Jan-98	136.2	3.3	12.8	4.0	108.2	3.4	162.0	1.7
Feb-98	136.2	3.3	12.8	4.5	108.2	3.4	162.0	1.5
Mar-98	136.2	3.3	12.9	4.5	108.2	3.4	162.0	1.2
Apr-98	137.3	3.3	12.9	4.1	109.4	4.4	162.2	1.2
May-98	137.3	3.3	13.0	4.3	109.4	4.4	162.6	1.5
Jun-98	137.3	3.3	13.0	3.8	109.4	4.4	162.8	1.5
Jul-98	138.7	3.6	13.0	3.6	109.9	3.6	163.2	1.7
Aug-98	138.7	3.6	13.1	4.2	109.9	3.6	163.4	1.6
Sep-98	138.7	3.6	13.1	3.6	109.9	3.6	163.5	1.5
Oct-98	139.7	3.4	13.1	3.5	109.9	1.9	163.9	1.7
Nov-98	139.7	3.4	13.2	3.8	109.9	1.9	164.1	1.7

Date	Employment Cost Index (ECI)	ECI Smoothed Growth Rate (ECIGR)	Average Hourly Earnings (AHE)	AHE Smoothed Growth Rate (AHEGR)	Unit Labor Cost (ULC)	ULC Smoothed Growth Rate (ULC_MGR)	Consumer Price Index (CPI)	CPI Smoothed Growth Rate (CPIGR)
Dec-98	139.7	3.4	13.2	3.4	109.9	1.9	164.4	1.8
Jan-99	140.2	2.6	13.2	3.6	111.1	2.6	164.7	1.9
Feb-99	140.2	2.6	13.3	3.3	111.1	2.6	164.7	1.7
Mar-99	140.2	2.6	13.3	3.3	111.1	2.6	164.8	1.5
Apr-99	141.7	3.2	13.4	3.6	111.2	1.6	165.9	2.5
May-99	141.7	3.2	13.4	4.2	111.2	1.6	166.0	2.3
Jun-99	141.7	3.2	13.4	3.7	111.2	1.6	166.0	1.9
Jul-99	143.0	3.4	13.5	3.8	111.4	1.3	166.7	2.4
Aug-99	143.0	3.4	13.5	3.8	111.4	1.3	167.1	2.5
Sep-99	143.0	3.4	13.6	3.7	111.4	1.3	167.8	3.0
Oct-99	144.6	3.9	13.6	3.7	111.7	1.2	168.1	2.9
Nov-99	144.6	3.9	13.6	3.3	111.7	1.2	168.4	2.8
Dec-99	144.6	3.9	13.7	3.3	111.7	1.2	168.8	2.9
Jan-00	146.4	4.6	13.8	4.1	116.1	6.9	169.3	3.0
Feb-00	146.4	4.6	13.8	3.7	116.1	6.9	169.9	3.3
Mar-00	146.4	4.6	13.8	3.7	116.1	6.9	171.0	4.0
Apr-00	147.9	4.5	13.9	4.4	114.3	2.4	170.9	3.3
May-00	147.9	4.5	13.9	3.8	114.3	2.4	171.2	3.2
Jun-00	147.9	4.5	14.0	3.8	114.3	2.4	172.2	3.8
Jul-00	149.3	4.2	14.0	4.4	116.9	5.0	172.7	3.8
Aug-00	149.3	4.2	14.0	3.7	116.9	5.0	172.7	3.2
Sep-00	149.3	4.2	14.1	3.9	116.9	5.0	173.6	3.7
Oct-00	150.7	4.0	14.2	4.6	116.5	2.5	173.9	3.5
Nov-00	150.7	4.0	14.2	4.1	116.5	2.5	174.2	3.2
Dec-00	150.7	4.0	14.2	4.0	116.5	2.5	174.6	3.1
Jan-01	152.3	4.0	14.3	3.7	118.1	3.0	175.6	3.7
Feb-01	152.3	4.0	14.3	3.9	118.1	3.0	175.9	3.4
Mar-01	152.3	4.0	14.4	4.1	118.1	3.0	176.0	3.0
Apr-01	153.8	4.0	14.5	4.3	117.9	2.0	176.5	3.1
May-01	153.8	4.0	14.5	4.0	117.9	2.0	177.4	3.5
Jun-01	153.8	4.0	14.5	3.6	117.9	2.0	177.8	3.4
Jul-01	155.3	4.0	14.6	3.8	118.3	1.3	177.4	2.5
Aug-01	155.3	4.0	14.6	3.3	118.3	1.3	177.5	2.1
Sep-01	155.3	4.0	14.6	3.5	118.3	1.3	178.1	2.4
Oct-01	156.9	4.1	14.6	2.9	117.5	-0.3	177.6	1.4
Nov-01	156.9	4.1	14.7	3.2	117.5	-0.3	177.5	1.0
Dec-01	156.9	4.1	14.7	3.2	117.5	-0.3	177.2	0.4
Jan-02	158.3	3.9	14.8	2.9	115.1	-3.8	177.6	0.6
Feb-02	158.3	3.9	14.8	2.4	115.1	-3.8	177.9	0.7
Mar-02	158.3	3.9	14.8	2.5	115.1	-3.8	178.5	1.2
Apr-02	159.9	3.9	14.8	2.2	115.6	-2.2	179.4	1.9
May-02	159.9	3.9	14.9	2.5	115.6	-2.2	179.5	1.7

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Jun-02	159.9	3.9	14.9	3.2	115.6	-2.2	179.7	1.8
Jul-02	161.1	3.6	14.9	2.8	114.6	-2.8	180.1	2.0
Aug-02	161.1	3.6	15.0	3.1	114.6	-2.8	180.6	2.3
Sep-02	161.1	3.6	15.1	3.2	114.6	-2.8	180.9	2.3
Oct-02	162.5	3.5	15.1	3.3	114.6	-1.5	181.2	2.4
Nov-02	162.5	3.5	15.1	3.1	114.6	-1.5	181.4	2.3
Dec-02	162.5	3.5	15.2	3.5	114.6	-1.5	181.6	2.2
Jan-03	164.5	4.1	15.2	3.2	114.8	-0.2	182.2	2.4
Feb-03	164.5	4.1	15.3	3.8	114.8	-0.2	183.2	3.0
Mar-03	164.5	4.1	15.3	3.4	114.8	-0.2	184.0	3.4
Apr-03	166.0	4.0	15.2	2.2	114.4	-0.7	183.4	2.3
May-03	166.0	4.0	15.3	2.6	114.4	-0.7	183.3	1.9
Jun-03	166.0	4.0	15.4	2.8	114.4	-0.7	183.5	1.7
Jul-03	167.6	4.0	15.4	2.5	113.2	-1.9	183.8	1.7
Aug-03	167.6	4.0	15.4	2.4	113.2	-1.9	184.5	2.1
Sep-03	167.6	4.0	15.4	1.8	113.2	-1.9	185.1	2.4
Oct-03	168.9	3.7	15.4	1.5	113.2	-1.5	184.9	1.8
Nov-03	168.9	3.7	15.5	2.3	113.2	-1.5	184.6	1.2
Dec-03	168.9	3.7	15.4	1.0	113.2	-1.5	184.9	1.2
Jan-04	170.8	3.9	15.5	1.9	113.3	-0.8	185.8	1.9
Feb-04	170.8	3.9	15.5	2.0	113.3	-0.8	186.3	2.1
Mar-04	170.8	3.9	15.5	1.7	113.3	-0.8	187.2	2.7
Apr-04			15.6	1.8			187.6	2.8
May-04							188.8	3.7