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## Chapter 13

# Employment, Unemployment, and the Inflation-Recession Dilemma

### SUMMARY

An alternative way of viewing the unemployment-inflation trade-off yields more sensible and more decisive results than the customary way. It uses the ratio of employment to population of working age, instead of the unemployment rate, as the variable that measures the utilization of the potential labor force. This measure avoids the problem of variation in labor force participation rates, which to some degree respond to conditions of demand. It avoids the problem of discouraged workers, who are not counted as unemployed because they are not seeking work, even though they "want" work in some sense; obviously they are not employed. It avoids such definitional problems as the degree to which persons must actively be seeking work to be considered unemployed or whether they have realistic ideas about their individual employability, wage aspirations, and so on.

The record for the postwar period shows a fairly close relationship between movements in the employment-population ratio and in the rate of wage or price inflation. This is not the case with the unemployment rate, at least in its raw form. It appears that one of the factors explaining the persistence of inflation during the 1973-1975 recession, despite the high unemployment rate, was that the percentage of persons employed held up relatively well, and this provided support for wage income and consumer demand. In this regard, the

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moderate decline in the inflation rate since 1974 was about in line with previous experience.

The implication is that policymakers and others concerned about the state of the labor market and its bearing on wage and price inflation should pay closer attention than they have to the percentage of the population employed. Wider reporting of this statistic on a current basis, along with the reporting of the unemployment rate and other labor market information, would make it easier for it to be given that closer attention.

### **EMPLOYMENT AND UNEMPLOYMENT DURING RECESSION**

One of the clichés of the times is that the 1973–1975 recession was the longest and deepest since the Great Depression of the 1930s. Such an appraisal is commonly based on the fact that the unemployment rate averaged 8.5 percent during 1975, higher than in any year since 1941. But the employment ratio, which is the percentage of the population employed, gives a contradictory verdict. In so doing, it may help solve an economic puzzle—why, in the face of this “worst recession,” wages and prices have continued to advance at near record rates.

Admittedly, history will probably continue to record the 1973–1975 recession as the worst since the 1930s, particularly since it was worldwide. Yet in several significant respects it was in the same family with the three recessions that occurred in the United States between 1948 and 1958 and not at all in a class with the Great Depression. For example, the decline in nonfarm employment lasted nine months (September 1974 to June 1975) and came to 3 percent, compared to declines of fourteen months and 4 percent in 1957–1958; sixteen months and 3 percent in 1953–1954; and thirteen months and 4 percent in 1948–1949. In 1929–1933 the drop in nonfarm employment lasted forty-three months and reached 32 percent. Industrial production fell 13 percent in 1973–1975 and 12 percent in 1957–1958, but 53 percent in 1929–1932. Real gross national product dropped nearly 7 percent in 1973–1975 and 4 percent in 1957–1958, but 33 percent in 1929–1932.<sup>1</sup>

A large part of the reduction in output in 1973–1975 was attributable to a reduction in inventory investment, which was what happened in the earlier postwar recessions but not in 1929–1932. This probably contributed to the brevity of the decline in employment, since inventory movements are usually quickly reversed and do not have the longer run implications of a decline in basic demand. The

pecuniary volume of business scarcely declined at all in 1973-1975, nor did personal income, whereas they declined slightly in the earlier postwar recessions and dramatically in 1929-1932.

The unemployment rate and the employment ratio for the low years of each of the six recessions since 1949 are given in Table 13-1. According to the unemployment rate, the latest recession was by far the worst. According to the percentage of the population that continued to be employed, it was next to the mildest. Which of these characterizations is more accurate can be a matter of argument, but there is no question that they are different.

The two measures give more nearly similar verdicts when the lows are compared with the previous highs. The rise in unemployment in the first three recessions was larger than in the next two, and the decline in the employment ratio also was larger in the first three than in the next two. Moreover, the rise in unemployment and the decline in the employment ratio both were larger in the 1975 recession than in any of the previous five. This measurement of the severity of recession depends, of course, partly on the degree to which the economy enjoyed full employment when the recession began, and not only on the amount of slack there was when the economy hit bottom. Nevertheless, even by this measure, the unemployment rate puts the 1975 recession well in front of the others, whereas the employment ratio does not. According to the decline in the employment ratio, the 1973-1975 recession barely exceeded the worst of the earlier postwar recessions; according to the rise in the unemployment rate, it was much worse.

**Table 13-1. Employment and Unemployment in Recession Years, 1949-1975 (percentages).**

<i>Business Cycle Low (1)</i>	<i>Unemployment Rate (2)</i>	<i>Employment Ratio (3)</i>
1949	5.9	54.6
1954	5.5	53.8
1958	6.8	54.2
1961	6.7	54.2
1970	4.9	56.1
1975	8.5	55.3

*Sources:* Column (1): Business cycle trough years, National Bureau of Economic Research, Inc.; column (2): Unemployment as percentage of civilian labor force, U.S. Bureau of Labor Statistics; and column (3): Civilian employment as percentage of population sixteen years old and over, U.S. Bureau of Labor Statistics.

## THE INFLATION TRADE-OFF

These alternative ways of looking at the employment situation are of more than academic concern. Not only do they tell us how people are faring in the job market, but they also have a bearing on the way we interpret the inflation that has accompanied the recession. If the percentage of the population employed is high, the total earnings of the population are likely to be higher than would otherwise be the case, and the same holds true for spending capacity. Under these circumstances, wage rates and prices are likely to remain higher than they otherwise would. If the unemployment rate is high, on the other hand, one might expect the opposite conditions: greater downward pressure on wages because of the large numbers seeking work and hence lower cost pressure on prices. Both propositions must of course be qualified, because many other factors besides employment and unemployment influence wages and prices. Moreover, the propositions do not tell what we should expect if employment and unemployment are both at relatively high levels.

In 1975, in fact, we had both a high unemployment rate and a moderately high employment ratio. The employment ratio seems more consistent with the inflationary conditions that existed than does the unemployment rate. Neither the rate nor the ratio can explain the whole situation, but the employment ratio does give a clue, which the unemployment rate alone does not, to determining why inflation persisted in 1975. Unemployment was a serious problem, but at the same time, a relatively high percentage of the population continued to be employed, and the fact that they were employed helped to sustain demand, wages, and prices. If we ignore this fact, and thereby treat employment and unemployment merely as opposite sides of the same coin, we may overlook one of the factors that can help explain the current dilemma of high unemployment and persistent inflation.

This dilemma has been growing more and more serious since World War II. Although reductions in the rate of inflation have continued to accompany recessions (sometimes with a short lag), each succeeding recession (with a partial exception in 1961) has left the rate of inflation in both prices and wages higher than it was left by the recession before. As Table 13-2 shows, the steady upward progression in the rate of increase in hourly compensation, from less than one percent at the trough of the 1949 recession to nearly 8 percent at the trough of the 1975 recession, has been matched by a similar progression in the rate of increase in consumer prices.

**Table 13-2. Prices and Wages in Recession Years, 1949-1975**  
(percentages).

<i>Business Cycle Low (1)</i>	<i>Rate of Change in:</i>	
	<i>Consumer Prices (2)</i>	<i>Hourly Compensation (3)</i>
1949	-1.8	0.6
1954	-0.5	3.1
1958	1.8	3.5
1961	0.7	4.3
1970	5.5	6.3
1975	7.0	7.7

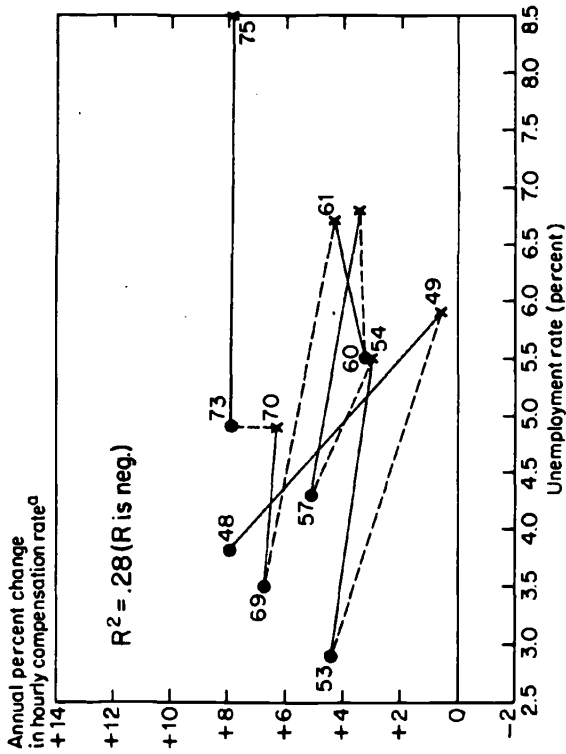
*Sources:* Column (1): Business cycle trough years, National Bureau of Economic Research, Inc.; column (2): Percentage change in consumer price index, December of preceding year to December of current year, U.S. Bureau of Labor Statistics; column (3): Percentage change in average hourly compensation, fourth quarter of preceding year to fourth quarter of current year, private non-farm sector, U.S. Bureau of Labor Statistics.

If the figures on prices and wages in Table 13-2 are compared with those on employment and unemployment in Table 13-1, one can see why it is important to look at both measures. If the unemployment rate is taken as the measure of slack in the economy at business cycle lows, one would have to say that it bears virtually no relation to the rate of increase in either prices or wages. If, on the other hand, the employment ratio is taken as the measure of the degree to which there is full employment in the economy, the figures fall more nearly into place. The high rates of price and wage inflation in 1970 and 1975 correspond with relatively high employment ratios.

Data for years other than the six recession years covered in these tables support these results (see Figures 13-1 and 13-2). The two diagrams on the left-hand side of each figure relate unemployment to wage changes (Figure 13-1) and to price changes (Figure 13-2). The two on the right relate the employment ratio to the same wage and price data. One would expect diagrams using unemployment to show a scatter of points sloping downward to the right, in accordance with the so-called Phillips curve. It takes a close look to find any trace of this, though most of the lines connecting the peaks and troughs of the business cycles do slope downward. On the other hand, the diagrams using the employment ratio show a much tighter relationship, with the scatter of points clearly sloping upward to the

Figure 13-1. Rate of Change in Hourly Compensation, Unemployment Rate, and Percentage of Population Employed, 1948-1975.

Business Cycle Peak (●) and Trough (x) Years



Business Cycle Peak (●) and Trough (x) Years

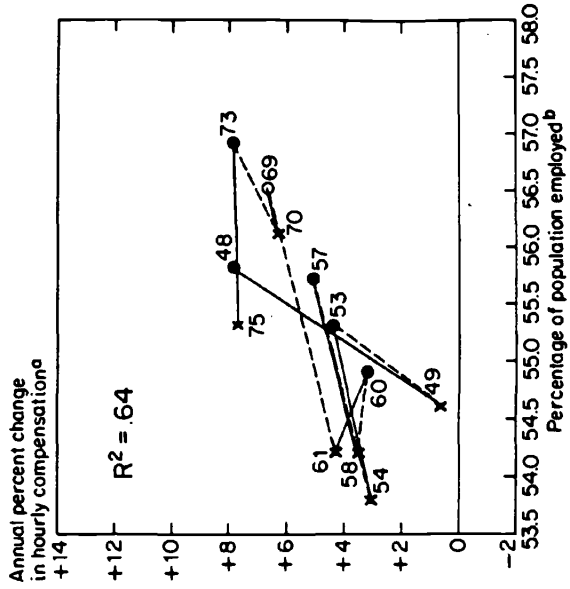
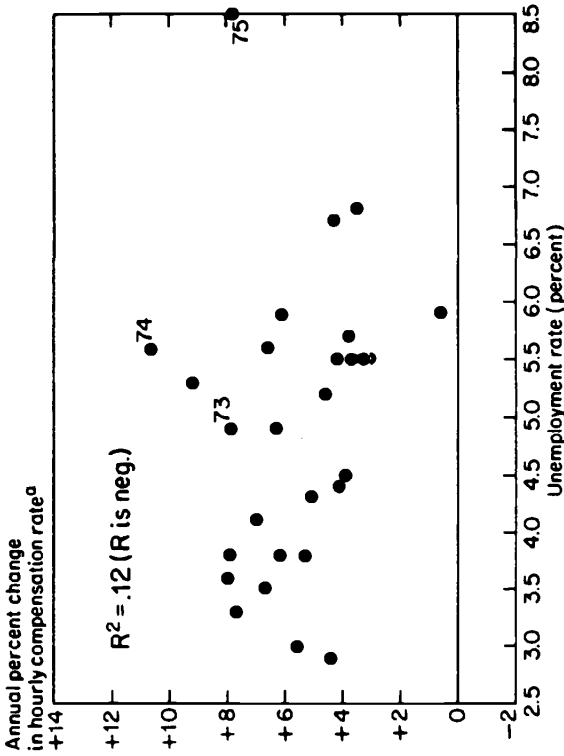
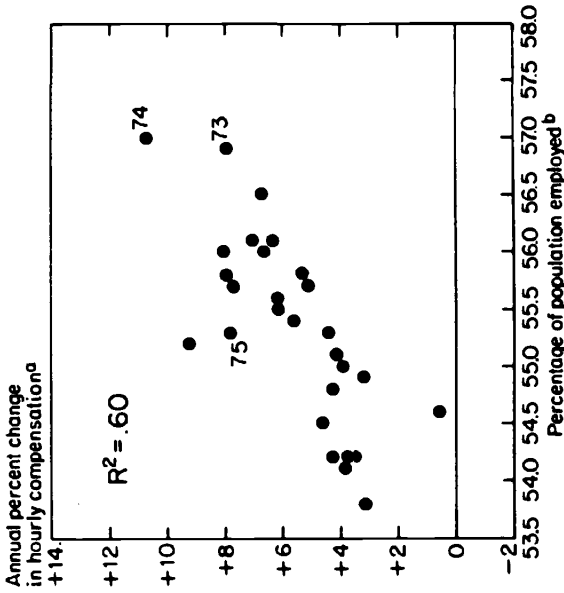


Figure 13-1. continued

All Years



All Years



Note: The correlation ( $R^2$ ) is based on data ending with 1974.

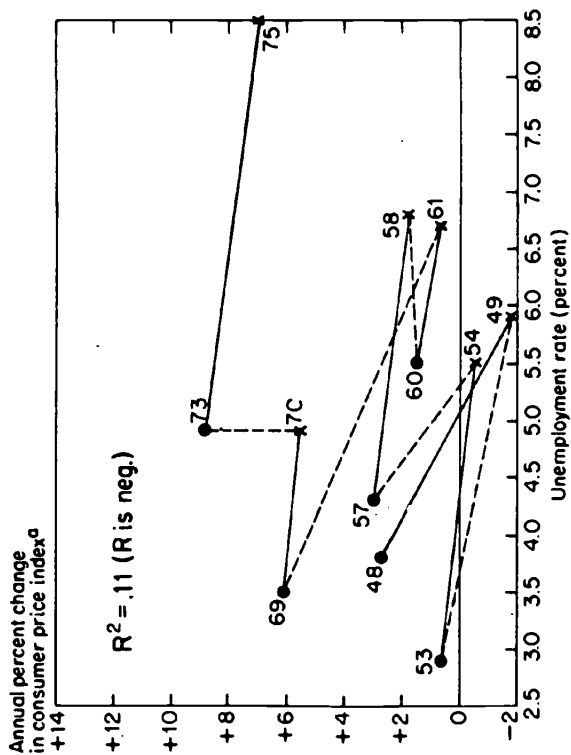
a Fourth quarter of preceding year to fourth quarter of current year, private nonfarm sector.

b Civilian employment as percent of noninstitutional population sixteen years of age and over.  
Source: Table 13-5.



Figure 13-2. Rate of Change in Consumer Price Index, Unemployment Rate, and Percentage of Population Employed, 1948-1975.

Business Cycle Peak (●) and Trough (x) Years



Business Cycle Peak (●) and Trough (x) Years

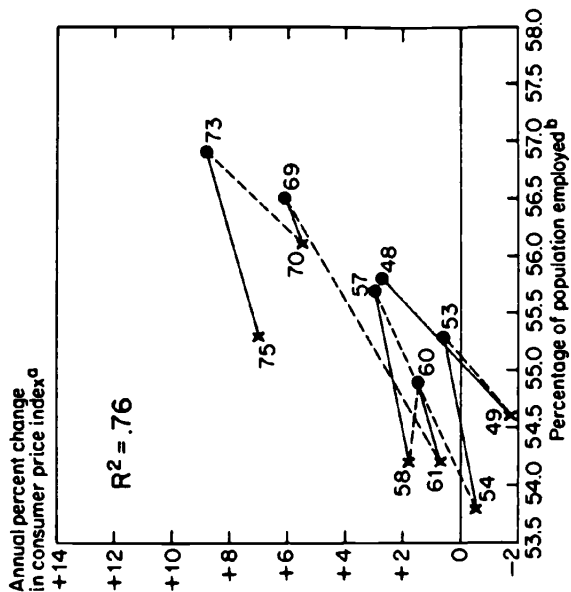
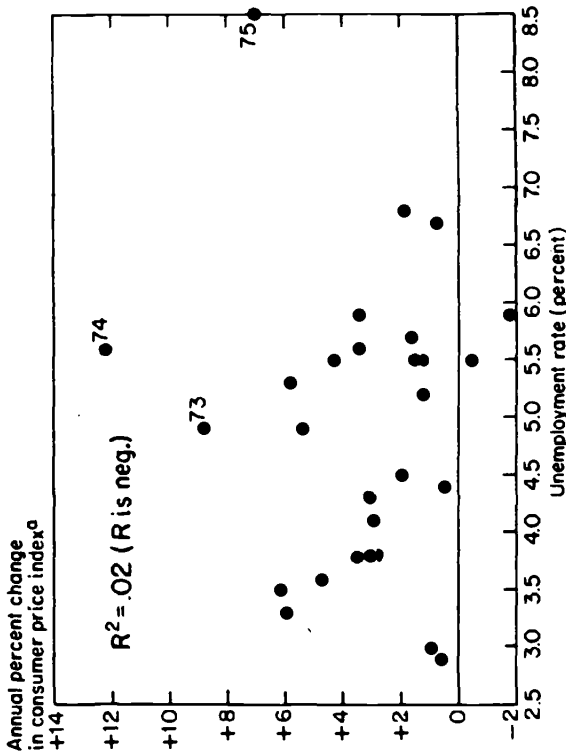
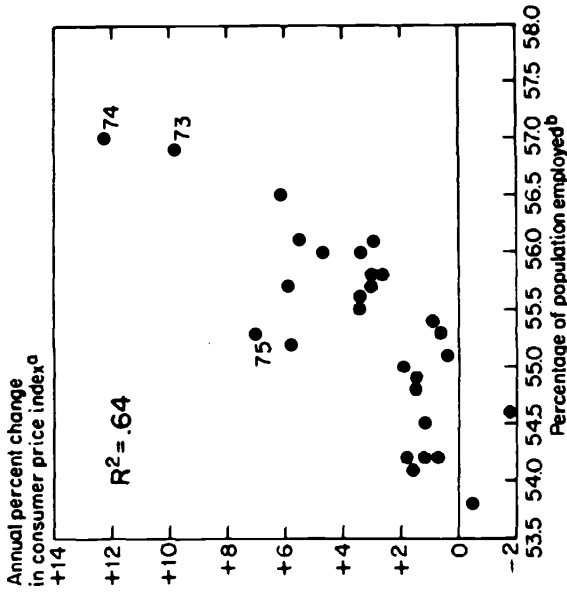


Figure 13-2. continued

All Years



All Years



Note: The correlation ( $R^2$ ) is based on data ending with 1974.

<sup>a</sup>December of preceding year to December of current year.

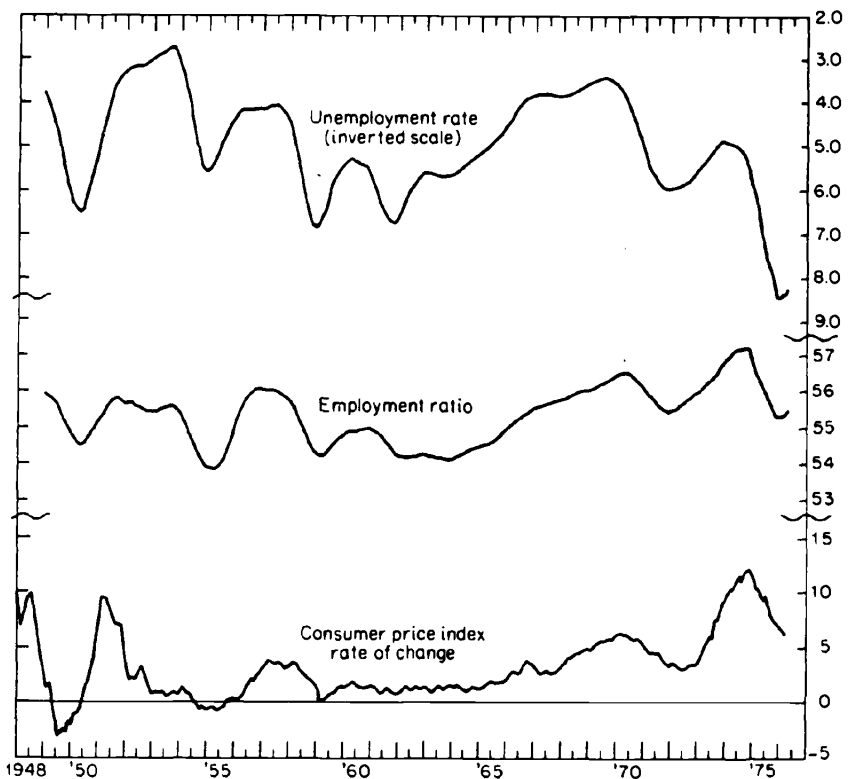
<sup>b</sup>Civilian employment as percent of noninstitutional population sixteen years of age and over.

Source: Table 13-5.

right. The correlation coefficients, which are nearly zero for unemployment but moderately high for employment, confirm this impression. (For further discussion, see Technical Note 1, below.)

Another way to depict the relation between employment, unemployment, and the rate of inflation is shown in Figure 13-3. The employment ratio and the rate of change in the consumer price index have followed nearly parallel courses. The unemployment rate (plotted on an inverted scale) has deviated from both, notably in the early 1950s and again in recent years. Especially noteworthy is the moderate decline in the employment ratio during the recent recession and

**Figure 13-3.** Unemployment Rate, Employment Ratio, and the Rate of Change in the Consumer Price Index, 1948-1976.



**Note:** The unemployment rate and employment ratio are twelve month moving averages; the rate of change in the consumer price index is the percent change over twelve months. All series are plotted at end of the twelve month period.

**Source:** U.S. Bureau of Labor Statistics. For annual data see Table 13-5.

the similarly moderate decline in the rate of inflation, in sharp contrast with what was happening to the unemployment rate.

One cannot deduce cause and effect from these or any other sets of numbers: they merely make one or another hypothesis more or less plausible. In this instance, since alternative measures of slack in the economy behave quite differently, and one (the employment ratio) bears a plausible and fairly consistent relationship to rates of price and wage inflation, while the other (the unemployment rate) does not, we would be well advised to reconsider our hypotheses about the way slack in the economy affects the rate of inflation. The employment ratio shows that sometimes there may be less slack than would meet the eye of one who looks only at the unemployment rate.

This is indeed the case during the current recovery, which at present writing (May 1976) is about one year old. The unemployment rate in April 1976 was 7.5 percent. By historical standards, such a rate suggests an enormous amount of slack in the economy, more than in any previous postwar recession year except 1975. It is more than one and a half times as high as the average unemployment rate during 1948-1974, which was 4.8 percent. The employment ratio, on the other hand, was 56.2 percent in April 1976. It is well above the average ratio for 1948-1974, which was 55.3 percent. It is also well above the level of any postwar recession year and, indeed, higher than in four of the six peak years in the business cycle (1948, 1953, 1957, and 1960). The economy, after a year of recovery, is providing employment for a relatively large fraction of the population of working age, though many are still seeking work. Under these conditions, judging from past experience, we should not find it surprising that the pace of wage and price inflation is still a worrisome problem.

## NATURE OF THE EMPLOYMENT RATIO

The employment ratio used in this chapter is not the only available measure of employment nor even the only employment ratio. It takes the total population sixteen years of age and over as the potential labor supply, ignoring the fact that there are many in the population who—because of age, illness, affluence, or preoccupation with other duties—are not likely to become employed under any circumstances. It does not count those who are in the armed forces as employed, but does count them in the population. By using “civilian employment” in the numerator, it conforms to customary usage in reports of the number employed. By using total population in the denominator, it makes a simple allowance for the trend in the popu-

lation of the country or, more specifically, the trend in the number of persons (apart from children under sixteen) who are largely supported by those who are employed. Since the size of the armed forces is subject to noneconomic considerations, the alternative treatments (either adding the armed forces to the employed or subtracting them from the population) do not seem to yield as satisfactory a ratio for economic analysis as the one adopted, though opinions may differ on this point. (For further discussion, see Technical Note 2, below.)

The employment ratio avoids some of the definitional questions that beset measures of unemployment. For example, the so-called "discouraged worker," who is not counted as unemployed because he or she is not seeking work even though he wants work, is obviously not counted as employed. Young people whose principal activity is going to school, but who are counted as unemployed if they are seeking part-time work, are not counted as employed unless they actually have a job. Unlike the unemployment rate, the employment ratio does not depend implicitly on the degree to which a person must actively seek work to be considered unemployed, nor does it depend on whether his ideas are realistic or unrealistic as to employability, earning capacity, the suitability of working conditions, and so on. If he does not have a job, he is not counted as employed. Hence it is both a more objective and a more neutral measure (as well as being, one hopes, less controversial) than the unemployment rate. For example, when the definitions of employment and unemployment were revised in 1967 in response to the recommendations of the Gordon Committee (which in turn arose out of a controversy regarding the measurement of unemployment), the revisions altered the unemployment count in 1966 by 3.4 percent but altered the employment count by only 0.06 percent.<sup>2</sup>

If the employment ratio is to receive due attention, however, it must be reported promptly and prominently, together with other statistics on the employment situation. At present, it is not so reported. The Bureau of Labor Statistics does not refer to it in its monthly press release, though it does report both the numerator and the denominator. The bureau does show an employment ratio (the ratio of civilian employment to civilian population) in its monthly *Chartbook on Prices, Wages and Productivity* and in its monthly *Employment and Earnings*. Although such notices are helpful, they are not likely to receive much public attention, because they do not appear as promptly as the figures in the monthly press releases.<sup>3</sup> (Postscript: The BLS press releases now report the employment ratio.)

## IMPLICATIONS

The principal implication of the findings described above is that in the conduct of economic policy, careful attention should be paid to the level and change in the percentage of the population employed. This is not to say that unemployment should be ignored. It is simply to say that evaluations of the labor market based upon employment data are not always consistent with those based upon unemployment data and it is therefore essential for us to analyze the difference and its implications for wage and price trends.

A high level of unemployment not accompanied by a low level of employment (relative to population) may not imply a deficiency of demand. It may, on the contrary, imply that large numbers of workers are seeking jobs, or seeking to change jobs, because employment opportunities are plentiful. The existence of numerous vacancies, satisfactory wage levels, and good working conditions induce persons to seek jobs, or to leave jobs that they have in order to search for better ones, or to take more time than they might otherwise take to find the best job they can. For example, many persons, particularly married women with small children and young people who are attending school, can accept only part-time employment. The fact that there are many more part-time jobs available today than there were twenty or thirty years ago, partly because of the growth of service industries, induces many to enter the labor force who would not otherwise have done so. Initially, they are likely to be counted as unemployed. Such changes in both supply and demand have tended to raise the unemployment rate, but they are not a symptom of inadequate demand, and they do not necessarily call for measures to stimulate demand.

More appropriate policies in such instances may be those that help to place people in jobs or to train them for jobs that are available or those that improve productivity and reduce costs, increasing incentives to employ people without at the same time putting upward pressure on prices. By means of such policies, the employment ratio may be raised and unemployment reduced without the usual inflationary consequences.

### **TECHNICAL NOTE 1: LONG-RUN CHANGES IN EMPLOYMENT, UNEMPLOYMENT, AND INFLATION RATES**

In the unemployment diagrams (left-hand panels of Figures 13-1 and 13-2), there is clear evidence that the unemployment rate asso-

ciated with a given rate of wage or price inflation has become higher in recent years than it was formerly. This is one way of accounting for the apparent lack of association between the two: the Phillips curve has shifted to the right. This means, of course, that some factor has caused the unemployment rate to drift upward relative to the rate of wage or price change. The employment ratio diagrams (right-hand panels of Figures 13-1 and 13-2) show some evidence of a similar shift, but to the left. This shift is much less pronounced than that for unemployment, but insofar as it is present it means that some factor has caused the employment ratio to drift downward relative to the rate of wage or price change.<sup>4</sup>

The employment ratio has tended to drift downward because of the declining proportion of adult men in the population and the rising proportion of adult women and teenagers. Since the adult men have much higher employment ratios than either adult women or teenagers, a decline in their relative numbers tends to reduce the overall employment ratio. For example, between 1948 and 1973 (both prosperous years in the business cycle), the proportion of adult males in the working age population fell from 45 percent to 42 percent, while adult women and teenagers rose from 55 to 58 percent (see Table 13-3). The percentage of adult males employed in 1948 was eighty-four compared to thirty-three for adult women and teenagers; by 1973 the former had dropped to seventy-six, and the latter had risen to forty-three. As a net result of these offsetting changes the overall employment ratio rose from 56 to 57 percent, but other things equal, it would have risen to 58 percent had the composition of the population remained the same. The shift in composition caused a downtrend of one percentage point in twenty-five years. This factor, incidentally, cannot bear any responsibility for the positive correlation between the employment ratio and the rate of inflation, since the latter has moved upward over the years.

The unemployment rate was affected not only by these demographic changes but also by the changing propensity of different groups to enter or leave the labor force. Adult men comprised 67 percent of the labor force in 1948, but only 56 percent in 1973; adult women and teenagers, entering the labor force in large numbers, increased from 33 to 44 percent. These were much larger shifts than those in the population, and they had a substantial effect on the overall unemployment rate, which rose from 3.8 to 4.9 percent from 1948 to 1973. Without the shift in labor force composition, the rate would have risen only half as much, to 4.4 percent. The higher unemployment rates for adult women and teenagers (4.9 percent in 1948 and 6.9 percent in 1973) than for adult men (3.2 percent in

Table 13-3. Employment and Unemployment, 1948 and 1973.

	Noninstitutional Population, 16 and Over		Civilian Employment		Unemployment	
	1948	1973	1948	1973	1948	1973
	<i>Number (in thousands)</i>					
Males, 20 and over	46,958	62,843	39,382	47,946	1,305	1,594
Females, 20 and over	48,716	69,289	14,937	29,228	564	1,485
Teenagers, 16-19	8,853	16,130	4,028	7,236	407	1,226
Total	104,527	148,263	58,344	84,409	2,276	4,304
	<i>Percent of Total</i>					
Males, 20 and over	44.9	42.4	67.5	56.8	57.3	37.0
Females, 20 and over	46.6	46.7	25.6	34.6	24.8	34.5
Teenagers, 16-19	8.5	10.9	6.9	8.6	17.9	28.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
	<i>Percent of Noninstitutional Population</i>					
Males, 20 and over	100.0	100.0	83.9	76.3	2.8	2.5
Females, 20 and over	100.0	100.0	30.7	42.2	1.2	2.1
Teenagers, 16-19	100.0	100.0	45.5	44.9	4.6	7.6
Total	100.0	100.0	55.8	56.9	2.2	2.9

(Table 13-3. continued overleaf)



Table 13-3. continued

	Civilian Labor Force		Armed Forces		Not in Labor Force	
	1948	1973	1948	1973	1948	1973
	<i>Number (in thousands)</i>					
Males, 20 and over	40,686	49,539	1,041	1,901	5,231	11,404
Females, 20 and over	15,500	30,713	16	40	33,200	38,536
Teenagers, 16-19	4,435	8,461	402	386	4,016	7,283
Total	60,621	88,714	1,459	2,326	42,447	57,223
	<i>Percent of Total</i>					
Males, 20 and over	67.1	55.8	71.3	81.7	12.3	19.9
Females, 20 and over	25.6	34.6	1.1	1.7	78.2	67.3
Teenagers, 16-19	7.3	9.5	27.6	16.6	9.5	12.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
	<i>Percent of Noninstitutional Population</i>					
Males, 20 and over	86.6	78.8	2.2	3.0	11.1	18.1
Females, 20 and over	31.8	44.3	0.0	0.1	68.2	55.6
Teenagers, 16-19	50.1	52.5	4.5	2.4	45.4	45.2
Total	58.0	59.8	1.4	1.6	40.6	38.6

Note: The unemployment rates (percent of civilian labor force), 1948 and 1973, are: total, 3.8, 4.9; males, 20 and older 3.2, 3.2; females, 20 and older, 3.6, 4.8; teenagers, 9.2, 14.5

Source: U.S. Bureau of Labor Statistics.

both years), coupled with their sharp rise in the labor force, added about half a percentage point to the unemployment rate over the twenty-five year period. This was a much bigger proportionate shift than in the employment ratio, since the unemployment rate is a much smaller figure.

This points to one of the merits of an unemployment ratio (unemployment as a percentage of population of working age) as compared with the unemployment rate (unemployment as a percentage of labor force): the population is less affected than is the labor force by changes in age-sex composition. Short-run as well as long-run changes in labor force participation affect the behavior of the unemployment rate. In the population, the long-run changes dominate; they are generally smaller than in the labor force; and some of them are predictable. Some consideration might well be given, therefore, to more extensive use of the unemployment ratio (see also Technical Note 2, below; and see Chapter 7).

#### **TECHNICAL NOTE 2: CORRELATION ANALYSIS OF EMPLOYMENT, UNEMPLOYMENT, AND INFLATION RATES**

Some of the factors underlying the fact that the employment ratio is more closely associated with inflation rates than is the unemployment rate are illuminated by a correlation analysis involving both measures.

The total population aged sixteen and over can be divided into the following groups: (1) civilian employed, (2) armed forces, (3) unemployed, and (4) not in the labor force. If we divide each of these by the population sixteen and over and multiply by 100, the four ratios, which we designate  $E/P$ ,  $A/P$ ,  $U/P$ , and  $NL/P$ , add to 100. The employment ratio,  $E/P$ , is equal to 100 minus  $(A/P + U/P + NL/P)$ . When the rate of change in prices or wages is regressed upon these variables, we can determine what each contributes to the result.

The simple correlation matrix, based upon annual data, 1948-1974, is given in Table 13-4. From this we learn that the employment ratio is more highly correlated with the rate of change in consumer prices or hourly compensation than are any of the other ratios. The armed forces ratio has a slight inverse correlation with the price and wage variables. The unemployment ratio is slightly correlated inversely with the price and wage variables.<sup>5</sup> The not in the labor force ratio has a substantial inverse correlation with the price

Table 13-4. Correlation Matrix.

	$\Delta CPI$	$\Delta HC$	$E/P$	$A/P$	$U/P$	$NL/P$
Consumer price index ( $\Delta CPI$ ) <sup>a</sup>	+1.0					
Hourly compensation ( $\Delta HC$ ) <sup>b</sup>	+0.8	+1.0				
Employment ratio ( $E/P$ )	+0.8	+0.8	+1.0			
Armed forces ratio ( $A/P$ )	-0.3	-0.2	-0.2	+1.0		
Unemployment ratio ( $U/P$ )	-0.1	-0.3	-0.4	-0.6	+1.0	
Not in labor force ratio ( $NL/P$ )	-0.7	-0.6	-0.8	0.0	0.0	+1.0

<sup>a</sup>Percent change from December to December.

<sup>b</sup>Percent change from fourth quarter to fourth quarter.

and wage variables. In terms of these simple correlations, therefore, it appears that the ratios involving the armed forces, unemployed, and those not in the labor force belong together in that each appears to be (if anything) inversely correlated with the rates of change in prices and wages.

This is confirmed by multiple regressions using the three variables simultaneously (fitted to annual data, 1948-1974):

$$\Delta HC = 88.17 - 2.28 A/P - 2.05 U/P - 1.81 NL/P$$

$$(5.04) \quad (3.59) \quad (4.04) \quad (4.11)$$

$$R^2 = 0.62 \quad (13.1)$$

$$\Delta CPI = 143.51 - 2.98 A/P - 1.66 U/P - 3.39 NL/P$$

$$(7.11) \quad (3.92) \quad (2.75) \quad (6.43)$$

$$R^2 = 0.73 \quad (13.2)$$

The regression coefficients are all negative and statistically significant. The regressions were also computed with a time trend variable, but the time trend variable was not significant. Since the regression coefficients are substantially similar in magnitude, the multiple correlations are not greatly different from those obtained from the employment ratio alone:

$$\Delta HC = -100.77 + 1.92 E/P$$

$$(5.78) \quad (6.09) \quad R^2 = 0.60 \quad (13.3)$$

$$\Delta CPI = -149.89 + 2.76 E/P$$

$$(6.45) \quad (6.58) \quad R^2 = 0.63 \quad (13.4)$$

The multiple regressions indicate that the reason the employment ratio is more highly correlated with price and wage changes than is the unemployment rate is that the employment ratio implicitly takes account of two other factors that contribute to the relationship, these being the percentage of the population not in the labor force and the percentage in the armed forces. The influence of the not in the labor force ratio is, on the whole, more powerful than that of the unemployment ratio, as the following regressions testify:

$$\Delta HC = 84.24 - 1.02 U/P - 1.92 NL/P \quad R^2 = 0.41 \quad (13.5)$$

(3.95)      (2.00)      (3.56)

$$\Delta CPI = 143.38 - 0.32 U/P - 3.52 NL/P \quad R^2 = 0.54 \quad (13.6)$$

(5.44)      (0.51)      (5.29)

The armed forces ratio contributes significantly (and inversely) to the correlation, when treated as one of the three sectors outside civilian employment, as is shown by a comparison of equations (12.5) and (12.6) with (12.1 and (12.2). On the other hand, treating the armed forces as a sector to be included with civilian employment does not significantly improve the correlation, as the following regressions show:

$$\Delta HC = -98.22 + 1.89 E/P - 0.27 A/P \quad R^2 = 0.60 \quad (13.7)$$

(5.34)      (5.76)      (0.51)

$$\Delta CPI = -140.06 + 2.63 E/P - 1.07 A/P \quad R^2 = 0.67 \quad (13.8)$$

(5.96)      (6.29)      (1.54)

The persistence of the negative sign on the armed forces ratio is puzzling, and it is not clear what the reason for it may be. But it does suggest that nothing is to be gained in interpreting price and wage behavior by using an employment ratio defined to include the armed forces, which of course would then be counted positively. Similarly, from this point of view, nothing is to be gained by using an employment ratio defined to exclude the armed forces from the population, since this also would have the opposite effect to what the regressions suggest (compare columns 3 and 4 of Table 13-5).

Table 13-5. Annual Data on Employment, Unemployment and Inflation Rates, 1948-1975 (percentages).

Year	$E/P$ (1)	$A/P$ (2)	$\frac{E+A}{P}$ (3)	$\frac{E}{P-A}$ (4)	$U/P$ (5)	$UR$ (6)	$NL/P$ (7)	$\Delta CPI$ (8)	$\Delta HC$ (9)
1948	55.8	1.4	57.2	56.6	2.2	3.8	40.6	2.7	7.9
1949	54.6	1.5	56.1	55.4	3.4	5.9	40.4	-1.8	0.6
1950	55.2	1.5	56.8	56.1	3.1	5.3	40.1	5.8	9.2
1951	55.7	2.9	58.5	57.3	1.9	3.3	39.6	5.9	7.7
1952	55.4	3.3	58.7	57.3	1.7	3.0	39.6	0.9	5.6
1953	55.3	3.2	58.5	57.1	1.7	2.9	39.8	0.6	4.4
1954	53.8	3.0	56.8	55.5	3.2	5.5	40.0	-0.5	3.1
1955	55.1	2.7	57.9	56.7	2.5	4.4	39.6	0.4	4.1
1956	56.1	2.5	58.6	57.5	2.4	4.1	39.0	2.9	7.0
1957	55.7	2.4	58.1	57.1	2.5	4.3	39.4	3.0	5.1
1958	54.2	2.3	56.4	55.4	4.0	6.8	39.6	1.8	3.5
1959	54.8	2.2	57.0	56.0	3.2	5.5	39.8	1.5	4.2
1960	54.9	2.1	57.0	56.1	3.2	5.5	39.8	1.5	3.2
1961	54.2	2.1	56.3	55.4	3.9	6.7	39.8	0.7	4.3
1962	54.2	2.3	56.5	55.5	3.2	5.5	40.3	1.2	3.7
1963	54.1	2.2	56.3	55.4	3.3	5.7	40.4	1.6	3.8
1964	54.5	2.2	56.6	55.7	3.0	5.2	40.4	1.2	4.6
1965	55.0	2.1	57.1	56.2	2.6	4.5	40.3	1.9	3.9
1966	55.6	2.4	57.9	56.9	2.2	3.8	39.9	3.4	6.2
1967	55.8	2.6	58.4	57.3	2.2	3.8	39.4	3.0	5.3
1968	56.0	2.6	58.6	57.6	2.1	3.6	39.3	4.7	8.0
1969	56.5	2.5	59.1	58.0	2.1	3.5	38.9	6.1	6.7

1970	56.1	2.3	58.4	57.4	2.9	4.9	38.7	5.5	6.3
1971	55.5	2.0	57.5	56.6	3.5	5.9	39.0	3.4	6.1
1972	56.0	1.7	57.7	57.0	3.3	5.6	39.0	3.4	6.6
1973	56.9	1.6	58.5	57.8	2.9	4.9	38.6	8.8	7.9
1974	57.0	1.5	58.5	57.8	3.4	5.6	38.2	12.2	10.6
1975	55.3	1.4	56.7	56.0	5.1	8.5	38.2	7.0	7.8
Average, 1948-									
1974	55.3	2.3	57.6	56.6	2.8	4.8	39.6	3.0	5.5

Definitions:

*P* = Noninstitutional population sixteen years of age and over;

*E* = Civilian employment;

*A* = Armed forces;

*U/P* = Unemployment ratio (percentage of population);

*UR* = Unemployment rate (percentage of civilian labor force);

*NL* = Not in labor force;

$\Delta CPI$  = Percent change in consumer price index, December of preceding year to December of current year;

$\Delta HC$  = Percent change in average hourly compensation, private nonfarm sector, from fourth quarter of preceding year to fourth quarter of current year.

Source: U.S. Bureau of Labor Statistics.

## NOTES TO CHAPTER 13

1. In general, measures of activity obtained by deflating dollar values by price indexes (such as real GNP) showed 1973–1975 declines sharper in relation to those in previous recessions than did measures of activity expressed in physical units (such as man hours, units sold, and so on). Hence it is possible that the deflation procedure, which is especially hazardous when prices are rising rapidly and forcing extensive adjustments in spending habits, contract terms, and accounting procedures, has exaggerated the recent declines in the deflated (constant dollar) aggregates of sales, output, inventories, and incomes. (For revised data on these measures, see Appendix Table A-2.)

2. See Robert L. Stein, "New Definitions for Employment and Unemployment," *Employment and Earnings and Monthly Report on the Labor Force* (U.S. Bureau of Labor Statistics), February 1967, Table 1.

3. A useful analysis of the employment ratio in comparison with the unemployment rate and related measures is Julius Shiskin (Commissioner of Labor Statistics), "Employment and Unemployment: the Doughnut or the Hole?" *Monthly Labor Review* 99, no. 2 (February 1976): 3–10. See also Chapter 7.

4. Linear regressions fitted to the annual data used in the charts, 1948–1974, show that a time trend ( $T$ ), has a significant positive influence on the relationships with the unemployment rate ( $UR$ ) and a positive but not significant influence on those with the employment ratio ( $E/P$ ):

$$\Delta HC = 1.11 - 0.52 UR + 0.11 T \quad R^2 = 0.25, \\ (0.38) \quad (-1.61) \quad (2.57)$$

$$\Delta CPI = -7.33 - 0.62 UR + 0.22 T \quad R^2 = 0.35, \\ (-1.81) \quad (-1.36) \quad (3.51)$$

$$\Delta HC = -86.57 + 1.64 E/P + 0.02 T \quad R^2 = 0.58, \\ (-4.87) \quad (4.87) \quad (0.60)$$

$$\Delta CPI = -134.35 + 2.39 E/P + 0.09 T \quad R^2 = 0.68. \\ (-5.73) \quad (5.37) \quad (1.84)$$

The unemployment rate is not significant in either equation, though it has the appropriate sign; the employment ratio is significant in both equations.

5. The unemployment ratio differs from the unemployment rate in that the latter uses labor force (employment plus unemployment) as the denominator rather than population. Nevertheless, the ratio and the rate are highly correlated because of the dominant influence of the numerator upon their fluctuations.