

Current Labor Market Trends and Inflation

The rapid drop in the unemployment rate to 6 percent has caught almost all analysts by surprise. As recently as a year and a half ago, such a low level of unemployment seemed almost unattainable in the foreseeable future. Lawrence Summers' account of unemployment trends is representative of the expectations of that time:¹

Even forecasts that call for steady growth over the next five years do not foresee unemployment rates dipping below 6 percent....Where Kennedy-Johnson economists set 4 percent as an interim full-employment target, contemporary policy makers would regard even the temporary achievement of 6 percent unemployment as a great success.

The decline in the unemployment rate to 6 percent was unusual for two reasons. First, it coincided with much weaker GNP growth than would have been expected on the basis of past relationships. Second, it has not been accompanied by upward pressure on wages or an acceleration in inflation more generally. When the unemployment rate fell to 6 percent in the late 1970s, a rather pronounced upward spiral in wage and price inflation occurred, a sequence of events that makes the current situation quite remarkable in contrast. In this article, we will explore in more detail the circumstances that have made the current drop in the unemployment rate less inflationary than it would have

been by the standards of the late 1970s.²

The first section reviews the relationship between real GNP and the unemployment rate. This relationship is often referred to as Okun's Law—an econometric estimate of the sensitivity of the unemployment rate to changes in GNP growth. Okun's Law has also been used to calculate the growth of potential GNP consistent with maintaining a given unemployment rate. The principal findings from this section are as follows:

- The extent to which the decline in the unemployment rate over the past year might be inflationary is uncertain because the decline has occurred with considerably weaker GNP growth than past relationships would suggest.
- Nonetheless, potential GNP calculations based on Okun's Law, as well as simple scatter diagrams showing changes in the inflation rate and the potential GNP gap (the difference between potential and actual GNP), suggest that we could be approaching a point where inflationary pressures could emerge.

In the second section of this article, we compare current labor market conditions to those in the late 1970s in an effort to understand why the current drop in unemployment has not induced a significant acceleration in wage inflation. We explore this question by using the concept of the NAIRU ("nonaccelerating inflation rate of unemployment"), the level of unem-

¹Lawrence H. Summers, "Why Is the Unemployment Rate So Very High near Full Employment?" *Brookings Papers on Economic Activity*, vol. 2 (1986), pp. 339-83.

²Throughout this analysis, we have assumed that recent stock market turbulence and related developments will have only a relatively small, short effect on nonfinancial business activity.

ployment that is consistent with a stable rate of inflation. More specifically, we review the changes in the labor market over the past 10 years that could have shifted the NAIRU upward or downward at both the aggregate and disaggregated levels. At the same time, we examine whether there are any special factors at the disaggregated level that could account for the large error from Okun's Law. Our analysis in this section points to the following conclusions:

- Measures of overall labor market tightness other than the unemployment rate generally confirm that the demand for labor is stronger now than it was in 1977. Since wage inflation has not accelerated, these indicators suggest that the NAIRU may be lower than it was in 1977.
- The recent decline in the unemployment rate has been widespread across regions, industries and demographic groups, suggesting that the large error over the past year from the empirical estimates of Okun's Law cannot be easily explained by unusual developments in some segments of the labor market.
- At the disaggregated level, some factors imply that the NAIRU currently might be lower now than in 1977, while others suggest that it could be higher. Our impressionistic review of both the aggregate and disaggregated statistics suggests to us that the NAIRU is lower than in 1977, possibly as much as a full percentage point lower.

Okun's Law and unemployment

The decline in the unemployment rate to 6 percent already in 1987 appears to run counter to Okun's Law.³ Although the first formulation of this rule of thumb stated that about 4 percent real GNP growth was necessary to achieve a stable unemployment rate, most analysts have subsequently reduced the estimate of necessary GNP growth to around 2.5 percent to allow for the changes in productivity, labor force growth and work-week that have taken place. Over the past year (the second quarter of 1986 to the second quarter of 1987), however, the unemployment rate has fallen almost a full percentage point while GNP has increased at slightly less than this break-even rate of 2.5 percent. These developments raise the question whether Okun's Law—even in its revised state—has broken down in some fundamental sense.

The problem can be seen more clearly from Chart 1, which compares the Congressional Budget Office (CBO) macroeconomic forecast of August 1986 to the forecast

made in August 1987.⁴ Even with the outlook for real GNP somewhat weaker than the CBO projection of August 1986, the unemployment rate has already fallen to 6 percent, attaining that level some three to four years ahead of the schedule originally predicted by the CBO.

To quantify the amount of this unexpected decline in unemployment, we estimated a version of Okun's equation, drawing on the work of Douglas M. Woodham.⁵ The equation we used, estimated over the 1960-87 period, is shown below:

$$\Delta U = 0.401 - 0.226Y - 0.159Y(t-1) - 0.0018 \text{ time.}$$

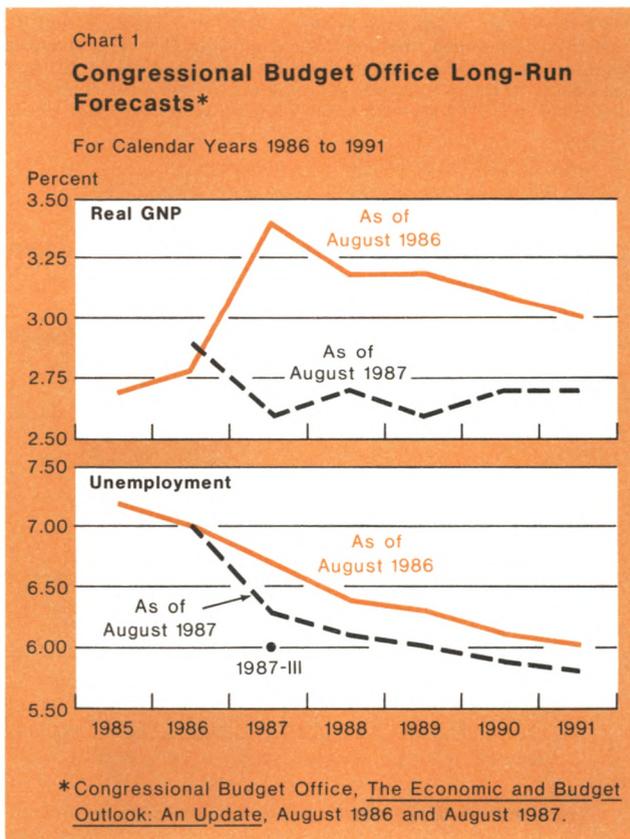
(7.8) (10.0) (7.1) (2.6)

$$R^2 = 0.65, D.W. = 1.7, S.E. = 0.23,$$

where ΔU is the change in the unemployment rate and Y is the quarterly percent change in real GNP.

⁴Congressional Budget Office, "The Economic and Budget Outlook: An Update," August 1986 and August 1987.

⁵Douglas M. Woodham, "Potential Output Growth and the Long-Term Inflation Outlook," this *Quarterly Review*, Summer 1984. The theory behind Okun's Law is quite straightforward. The growth rate of GNP



³Arthur M. Okun, "Potential GNP: Its Measurements and Significance," in Joseph Peckman, ed., *Economics Policymaking* (Cambridge: MIT Press, 1983).

Chart 2 contains the recent errors from this equation on a four-quarter moving sum basis. Over the past year, the unemployment rate has declined almost 1 percentage point more than would be expected from this equation. Although this is one of the larger errors for this equation, it is not totally unprecedented. In 1983, for example, the unemployment rate declined 2.1 per-

centage points, while the equation predicted a fall of 1.3 percentage points. In a sense, however, a negative error at this stage of the business cycle (fifth year of the expansion) should not be all that surprising if one assumes that the most productive workers are reemployed first, leaving less productive workers to be employed later in the expansion. This reasoning implies that a given GNP growth rate would be associated with larger declines in unemployment as the expansion continued. It would also suggest (as has been the case over the past year) that the more rapid decline in the unemployment rate would be associated with slower growth in productivity.

In any case, it appears that over time the errors in this equation, whether positive or negative, have become larger, thus limiting the applicability of the equation to short-run forecasts. Equations relating the unemployment rate to GNP growth can still be used, however, to make rough calculations of the long-run trend in the potential growth rate of GNP.⁶ The results of such a calculation are shown in the top panel of

Footnote 5 continued

(Y) is equal to the growth rates of the labor force (L), the workweek (W), productivity (P), and the employment rate (E). Or, in equation form: $(Y) = (L+W+P)+E$. $(L+W+P)$ is usually viewed as determining the long-run trend in GNP growth, often called potential GNP (PY). E in contrast is viewed as the cyclical component of Y, and since analysts are often interested in how sensitive the labor market is to changes in GNP growth, the equation is rewritten as: $E=Y-(L+W+P)$. If it is assumed that $L+W+P$ grows at a fairly constant rate, $L+W+P$ can be subsumed into the constant term in a regression equation. In addition, since most analysts tend to focus more on the unemployment rate ($U=1-\text{employment rate}$) than the employment rate, the change in $U(\Delta U)$ is usually substituted for E, yielding the following regression equation: $\Delta U = \text{constant term} - aY$, where the constant term is equal to $(L+W+P)$ and the coefficient "a" measures the sensitivity of ΔU to Y. If $(L+W+P)$ tends to be increasing or decreasing over time, then a time trend would also need to be included, an approach we have followed in this article. Other researchers have allowed $(L+W+P)$ to shift in value from cycle to cycle. To calculate potential GNP growth (PY), we set the cyclical component ΔU equal to zero. The regression equation is then solved for Y, which is the same as PY since the cyclical component has been set equal to zero, and we obtain: $PY = 1/a(L+W+P) + b/a$ (time trend), where "b" is the estimated coefficient on the time trend. In the equation we estimated above, a lagged value of Y was also included because the effect on ΔU from Y appeared to be spread over two quarters. In this case, the calculation of PY requires the additional step of setting $Y=Y(-1)$.

⁶Our method of obtaining potential growth rate estimates is described in footnote 5. For other approaches to estimating potential GNP, see Congressional Budget Office, "The Economic and Budget Outlook: An Update," August 1987; and Frank de Leeuw and Thomas Holloway, "The Measurement and Significance of the Cyclically-Adjusted Federal Budget and Deficit," *Journal of Money, Credit and Banking*, May 1983, pp. 232-42. For a detailed analytical description, see Peter K. Clark, "Potential GNP in the United States, 1948-80," *Review of Income and Wealth*, June 1979, pp. 141-65. For a brief international comparison that takes the same approach used

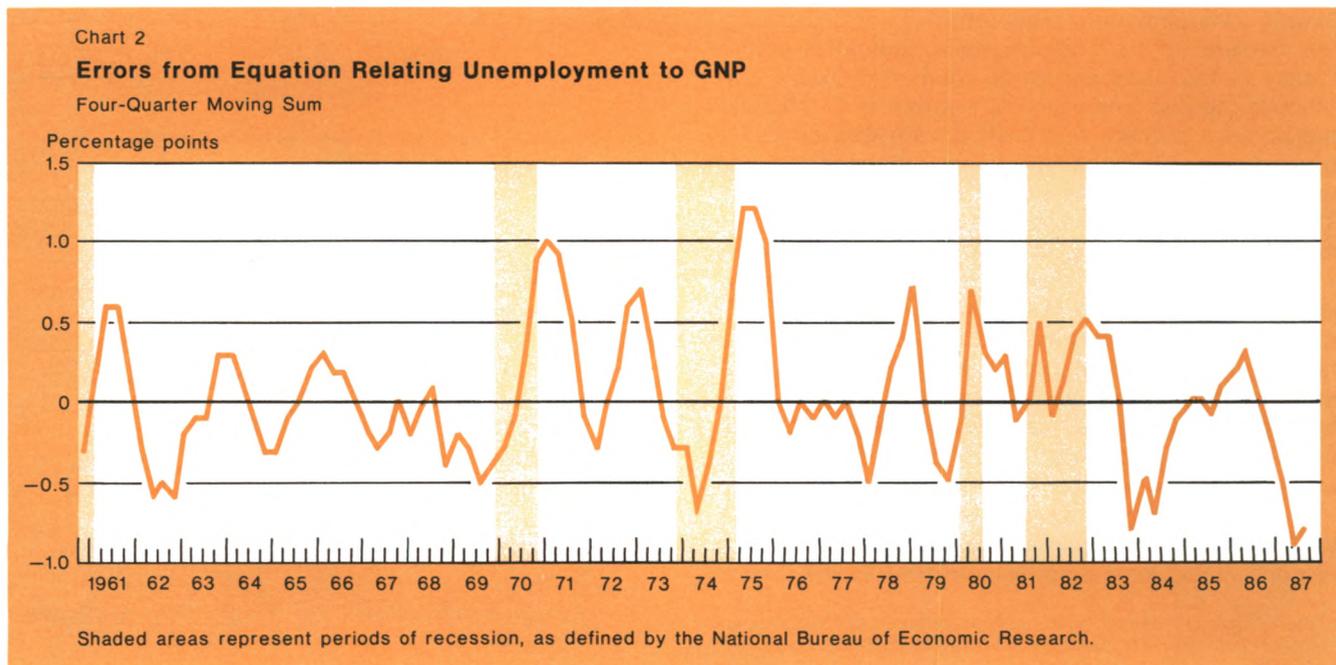


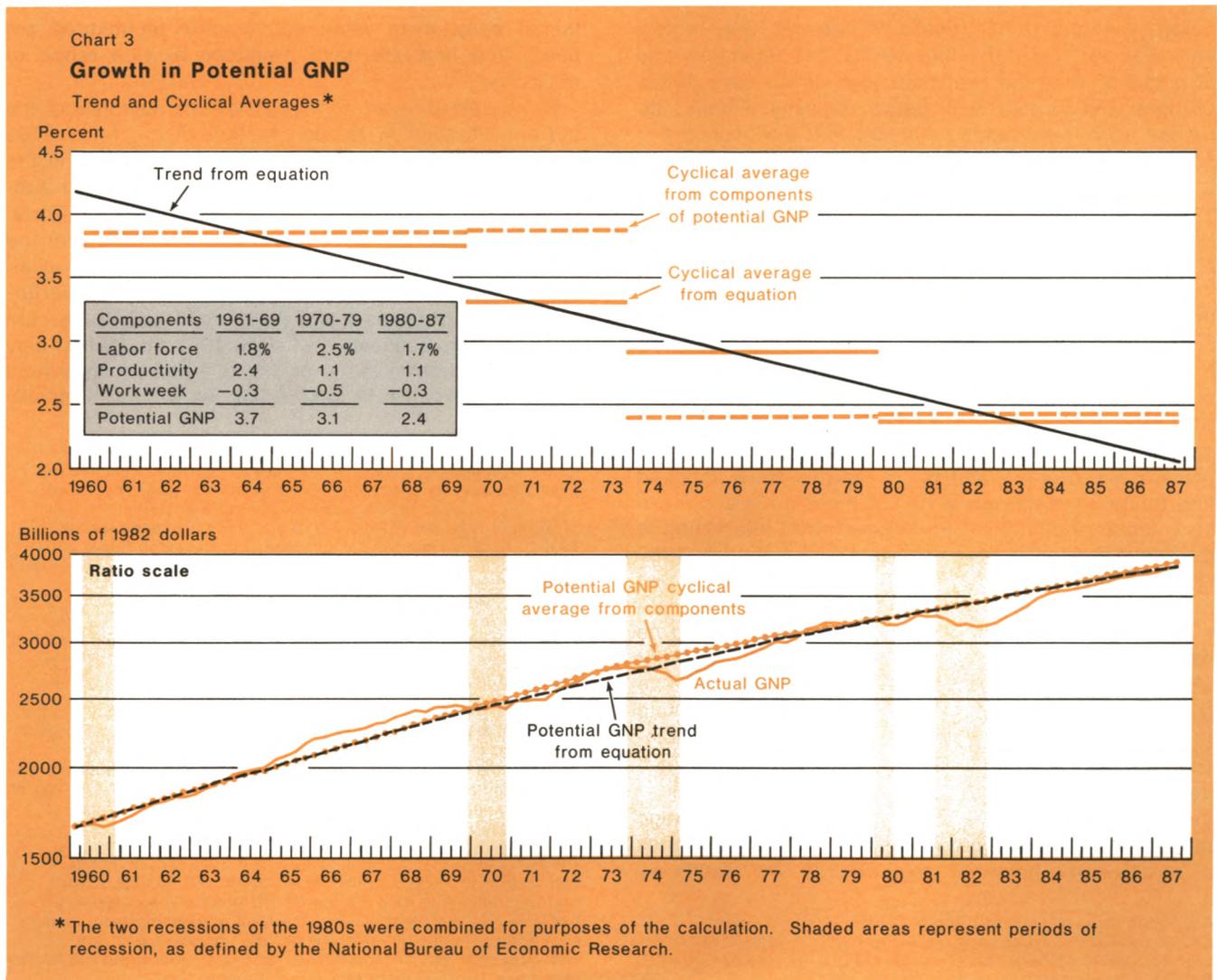
Chart 3 (see footnote 5 for more details on this calculation) both on a trend basis and a cyclical average basis. It appears from these rough estimates that potential GNP has fallen from around 4 percent in the early 1960s to around 2.5 percent in the 1980s, although the process was probably not as smooth as the trend line in the chart suggests.⁷ The table in the lower left corner of the upper part of Chart 3 shows

Footnote 6 continued here, see Robert S. Gay, "Learning to Live with 'Slow' Growth," *Economic Perspectives*, Morgan Stanley, April 12, 1987.

⁷These results are generally consistent with other estimates of potential GNP growth. The Congressional Budget Office in the January 1987 *Economic and Budget Outlook* estimates that potential

Footnote 7 continued

GNP has fallen from about 3.5 percent in the 1960s to 2.5 percent in the 1980s. Data Resources Incorporated in its Summer 1987 issue of *U.S. Long-Term Review* puts potential GNP growth at around 2.3 percent for the 1986-2012 period, down from 3.2 percent over the 1960-73 period. Robert S. Gay in "Learning to Live with 'Slow' Growth" estimates potential GNP growth at 2.4 percent in the 1980s, compared with 3.4 percent over the 1965-73 period. As noted above, however, the slowdown in the growth rate of potential GNP was probably not as uniform as the simulation in this article suggests; a significant part of it probably took place in the mid-1970s. See Woodham, "Potential Output Growth"; and Frank de Leeuw and others, "The High-Employment Budget: New Estimates, 1955 to 1980," *Survey of Current Business*, November 1980, pp. 13-43. The approach used here, which estimates the long-run trend in potential GNP from an econometric equation, is very slow to recognize shorter-run shifts in the trend, particularly any improvement in potential GNP growth. Hence, these estimates should only be viewed as a rough summary of past trends, not as a good indicator of future, longer-run developments.



another calculation of potential GNP based on the trend growth rates of the labor force, the workweek, and productivity. These calculations are roughly in line with the results from the equation, suggesting that the equation can be used to obtain some very general idea of long-run trends in potential GNP growth.⁸ Other researchers have found similar evidence. If we consider all the evidence (see footnote 7), it appears that the longer-run growth rate of GNP consistent with stable prices is about 2.5 percent at this time.

In assessing the outlook for inflation, we still need to investigate where the economy currently stands relative to potential output. The bottom panel of Chart 3 compares the actual level of GNP to the potential GNP shown in the previous chart. It shows the economy running well above capacity in the mid- to late 1960s and exceeding its potential once more around 1973, before the mid-1970s recession brought GNP below potential again. By the late 1970s, the economy was at potential; then the two recessions of the early 1980s brought GNP growth well below capacity. Finally, the results from the equation suggest that the economy is now beginning to approach capacity once again. Thus, it appears that the current situation parallels that of 1977, when the economy was also nearing its potential. However, at the present time, no acceleration in compensation is apparent.

These observations raise the question, how well has the difference between potential and actual GNP predicted the tendency for the inflation rate to accelerate or decelerate in the past? The upper part of Chart 4 shows a simple scatter diagram linking changes in the CPI inflation rate to the difference between potential and actual GNP. Although large errors have occurred, particularly when wage and price controls were imposed and removed in the early 1970s, there does appear to be a loose relationship. Somewhat more interesting is the result for 1987, which suggests not only that 1987 is turning out more or less as expected, but also that the economy is just about at the level of operation where inflation, excluding any special shocks, would be expected to hold fairly steady, neither accelerating nor slowing. The lower part of Chart 4 shows that more or less the same conclusion could be reached by using the growth of compensation in place of the CPI. (Compensation in 1987 has been increasing less rapidly than generally expected, but the current operating level of the economy is quite close to that threshold where wage pressures could emerge unless the economy operates at or below the potential rate.) Overall, the results we

⁸Any rough measure, such as potential GNP, should be used cautiously. For a detailed explanation, see William Felner, "The High-Employment Budget and Potential Output," *Survey of Current Business*, November 1982, pp. 26-33.

obtained using potential GNP suggest that further significant declines in the unemployment rate or sustained growth in real GNP considerably above the likely growth in potential GNP of about 2.5 percent could add to inflationary pressures.⁹

Unemployment and Inflation

With the economy currently operating at its highest level relative to potential since the late 1970s (Chart 3), it is also an appropriate time to compare current labor market conditions to those in the late 1970s to see whether the NAIRU has changed appreciably since then. In other words, if at this point in time, growth in the economy at about the potential rate would be consistent with stable inflation, then the current unemployment rate is probably close to the NAIRU. Establishing a precise benchmark for the NAIRU in the late 1970s, however, is not easy, even when econometric techniques are used, and analysts have produced a wide range of estimates.

Nevertheless, even an impressionistic appraisal of the current situation in relation to that of the late 1970s would suggest the NAIRU has fallen.¹⁰ Thus far in the current cycle, wage growth has not accelerated substantially since the unemployment rate fell to 6 percent. When the unemployment rate fell to 6 percent over the 1977-78 period, nonfarm compensation growth accelerated sharply (from a cyclical low on a fourth-quarter-to-fourth-quarter basis of 7.75 in 1977 to 8.75 percent in 1978). This suggests that since 1977 the NAIRU may have fallen from a range of 6.5 to 7 percent to around 6 percent.¹¹ Hence, in this section we will try to identify

⁹When we checked this result against the simulations from more formal econometric models of the trade-off between inflation and unemployment, we reached similar conclusions. The models we used can be found in A. Stephen Englander and Cornelis A. Los, "The Stability of the Phillips Curve and Its Implications for the 1980s," Federal Reserve Bank of New York Research Paper 8303, February 1983; and Flint Brayton and Eileen Mausekopf, "The Federal Reserve Board MPS Quarterly Model of the U.S. Economy," in *Economic Modelling* (Butterworth and Co., July 1985). For an extensive review of econometric "Phillips Curve" equations, see Robert J. Gordon, "Inflation, Flexible Exchange Rates, and the Natural Rate of Unemployment," in Martin Neil Baily, ed., *Workers, Jobs, and Inflation* (Washington, DC: Brookings Institute, 1982).

¹⁰Economists have studied the relationship between inflation and the amount of slack in the labor market for many years without general agreement on what the exact relationship is or what level of unemployment is consistent with price stability. For a general introduction to this issue, see Stuart E. Weiner, "The Natural Rate of Unemployment: Concepts and Issues," Federal Reserve Bank of Kansas City Review, January 1986, pp. 11-24.

¹¹The rapid drop in the unemployment rate from 7.5 percent in the first quarter of 1977 to 6 percent in the second quarter of 1978 makes it difficult to estimate the NAIRU precisely during that period because it is likely that not only the level of unemployment matters for wage pressures but also whether the unemployment rate is changing gradually or rapidly. Most empirical studies put the NAIRU in the late 1970s in the 6 to 7 percent range. Similar conclusions

those factors responsible for the apparent decline in the NAIRU.

Footnote 11 continued

about the NAIRU in the late 1970s were reached in the 1983 *Economic Report of the President* (pp. 37-38):

While it is not easy to pinpoint the threshold unemployment rate precisely, it probably lies between 6 and 7 percent. Econometric studies of historical data suggest that when unemployment is close to 6 percent the rate of inflation tends to accelerate. For example, during 1978 when the unemployment rate was 6.1 percent, inflation as measured by percent change in the gross national product (GNP) deflator rose to 7.4 percent from 5.8 percent in 1977. An even larger increase occurred in 1979 when the unemployment rate averaged 5.8 percent.

For an empirical study that argues NAIRU could have been 7 percent or even somewhat higher in the late 1970s, see Steven Braun, "Productivity and the NAIRU (And Other Phillips Curve Issues)," Working Paper Number 34, Board of Governors of Federal Reserve System, February 1984.

Before we consider the labor market changes that may have contributed to such a decline, however, we review some measures of labor market tightness at the aggregate level to see how their current values compare with those in 1977. Besides the unemployment rate (which is about a percentage point lower), the four other commonly used indicators of labor market tightness (initial claims for unemployment insurance, discouraged workers, help wanted advertising, and the length of the workweek in manufacturing) suggest that the labor market now is somewhat tighter than it was in 1977.

Nevertheless, one less commonly used indicator—involuntary part-time workers as a percent of the labor force—does suggest some additional slack in the labor market in 1987 as compared to 1977 (top panel of

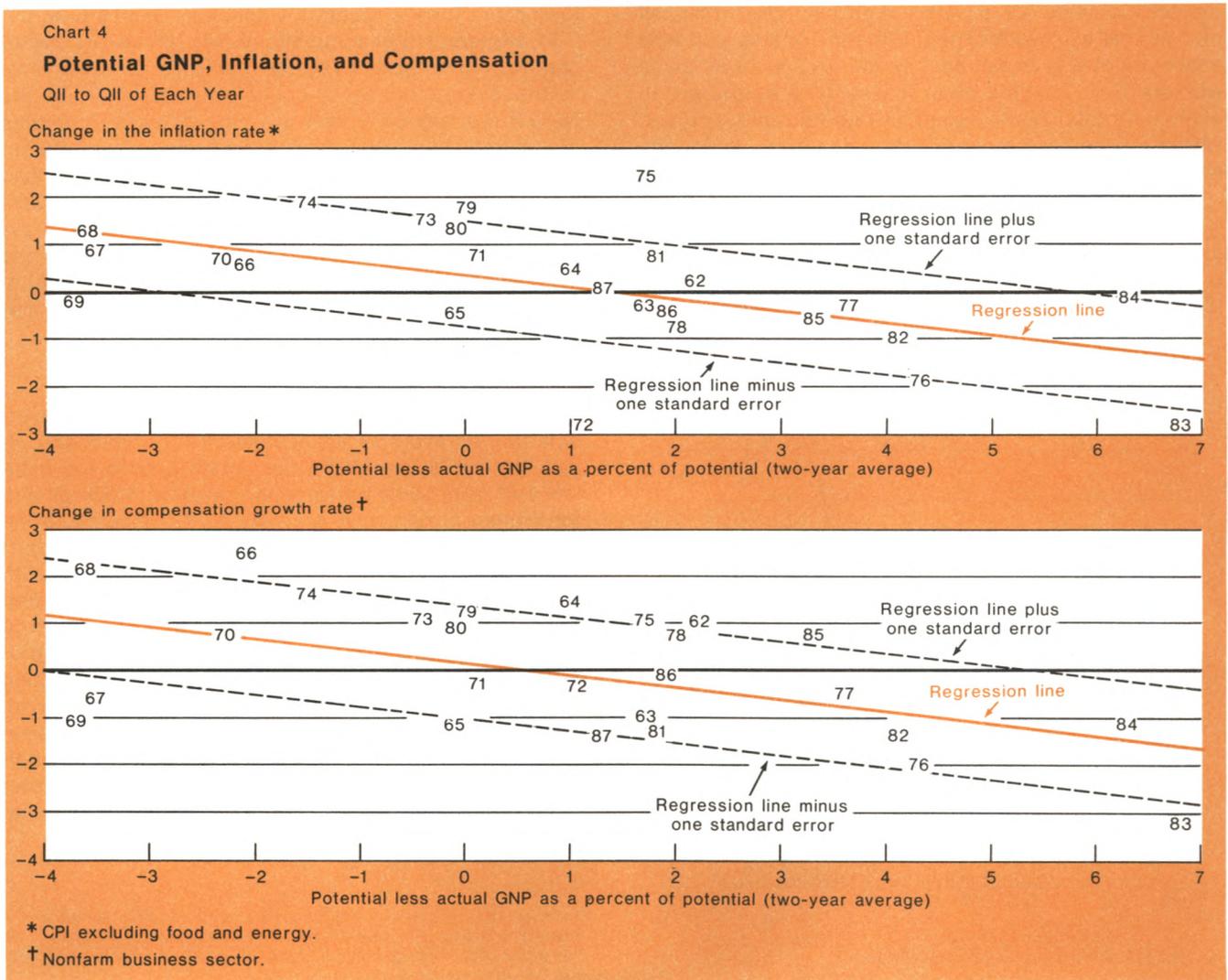


Chart 5). It is not possible to know, however, how much slack this high level of involuntary part-time workers represents because the category includes any worker working less than 35 hours who would like any additional employment. Many of the part-time employment opportunities exist in the service industry, and as the bottom panel of Chart 5 indicates, average weekly hours in the service sector have been declining, reflecting an increased use of part-time workers in that sector. This suggests that the service sector may have the capacity to grow if weekly working hours are expanded, even if demographic forces limit the growth of the labor force groups (women and young people) who traditionally have been employed in this sector.

A rough measure of the importance of this relatively high level of involuntary part-time employment can be calculated by assuming that these additional involuntary part-time workers are currently employed about one-half of a normal workweek. Then, if the involuntary part-time employment was to fall back to its 1977 level as these workers took full-time jobs, it would be equivalent to expanding total hours by about one-half of 1 percent. Hence, effective employment and output could rise without lowering the unemployment rate or creating

inflationary pressures. The assumptions behind this calculation are, of course, quite tenuous, and require that the involuntary part-time employed workers would in fact work more hours at the current wage rates.

Overall, the aggregate labor market statistics suggest that the demand for labor is stronger than in 1977. These statistics also appear to indicate that the NAIRU has shifted down, because wages have not accelerated significantly as they did when the unemployment rate fell to 6 percent in the late 1970s.

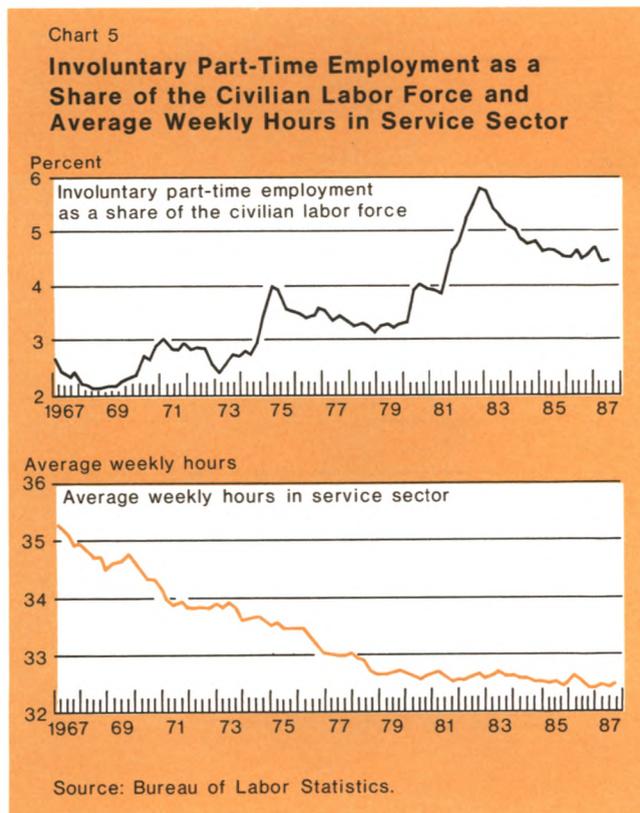
In the remainder of this section we make various comparisons of 1977 and 1987 at the disaggregated level to see if we can identify the reasons for the apparent downward shift in the NAIRU from a range of 6.5 to 7 percent in the late 1970s to around 6 percent currently. We also investigate whether special developments in any segment of the labor market may help to account for the recent instability in Okun's Law.

In exploring these questions, we focus on demographic, industrial and regional statistics. Developments in these labor markets could potentially affect the NAIRU in many different ways. For example, members of different age and sex cohorts experience different frictional unemployment rates because they differ in their turnover frequencies and in their average unemployment durations. Or, from another perspective, changes in the composition of aggregate demand, and hence in the sources of the demand for labor, can affect the level of structural unemployment if workers have relatively limited mobility across industries and regions.¹²

Demographic trends

Changes in demographics since 1977 have both favorable and unfavorable implications for the inflation outlook. Unemployment rates for young people are quite low and labor force participation rates both overall and for women in particular are very high compared to the situation prevailing in 1977. Both developments suggest possible wage pressures, especially at the entry level and in the service sector. On the other hand, the labor force is growing older, suggesting that the average worker is experiencing less turnover and higher productivity. Moreover, prime-age males are experiencing relatively high unemployment for this stage of the cycle. These factors could help contain inflationary pressures, particularly if employment growth becomes more balanced over time as the manufacturing sector grows more rapidly and service-sector growth slows. In what

¹²For a general overview of the theoretical and empirical evidence relating to the NAIRU, see David Laidler and J. Michael Parkin, "Inflation: A Survey," *Economic Journal*, vol. 85 (December 1975), pp. 741-809.



follows, we briefly review these trends and determine how pervasive the recent decline in unemployment has been across demographic categories.

The breakdown of unemployment rates by age in Table 1 reveals that, for almost all age cohorts, unemployment rates have declined over the past year and are now below their 1977 levels. Because the decline in unemployment over the past year is widespread across all groups, we cannot point to any specific developments in age categories that would account for the unexpected sharpness of the drop in the aggregate unemployment rate. This conclusion also holds when the unemployment rate is disaggregated by sex.

The disaggregation by gender also shows that the burden of unemployment is today more evenly distributed across gender. The aggregate unemployment rate for men is only slightly below the level prevailing in 1977, and the unemployment rate for prime-age men remains above its 1977 level. The unemployment rates for females in every age category are considerably lower than in 1977. The first development may reflect the slow growth of manufacturing jobs—jobs which men have traditionally held; the second reflects the increasing strength of the service sector, which employs many women. In addition, the teenage labor market has become increasingly tight, with unemployment rates dropping to cyclical lows, the teenage labor force growing slowly, and teenage workers constituting an increasingly smaller portion of the labor force as a whole (Tables 1 and 2). These developments, combined with the lower unemployment rates for women, suggest that wage pressures could emerge for workers at the

Table 2

Labor Force Trends**Percent of Labor Force by Age and Sex**

Age	1970	1977	1987*
Both sexes, 16 to 19	8.8	9.5	6.7
Both sexes, 20 to 24	12.8	15.0	12.6
Men, 25 and over	50.2	45.7	45.2
Women, 25 and over	28.3	29.8	35.5

Civilian Labor-Force Participation Rates

	1970	1977	1987*
Both sexes	60.4	62.3	65.3
Men	79.7	77.6	76.3
Women	43.4	48.4	55.9

Civilian Labor Force by Age and Sex

(Average Annual Rate of Change)

	1970-75	1975-80	1980-86
Both sexes, 16 and over	2.5	2.7	1.6
Men	1.9	1.8	1.1
16 to 24	4.9	1.9	-1.7
25 to 54	1.7	2.0	2.3
55 and over	-0.8	0.4	-0.7
Women	3.5	4.0	2.4
16 to 24	4.8	2.7	-0.8
25 to 54	3.7	5.0	3.9
55 and over	0.6	1.9	0.7

*January-September average

Source: Bureau of Labor Statistics

Table 1

Unemployment Rates by Age and Sex

(In Percent)

	1977	1982-IV	1986-II	1987-III	Change since 1982-IV	Change since 1986-II
Both sexes, 16 and over	7.1	10.7	7.1	6.0	-4.7	-1.2
Men, 16 and over	6.3	11.1	7.0	5.9	-5.2	-1.1
16 to 19	17.3	25.4	20.2	16.9	-8.5	-3.3
20 to 24	10.8	17.8	11.3	9.5	-8.4	-1.8
25 to 54	4.3	9.2	5.6	4.8	-4.4	-0.8
55 and over	3.9	5.9	4.0	3.3	-2.5	-0.7
Women, 16 and over	8.2	10.1	7.2	6.1	-4.1	-1.2
16 to 19	18.3	22.3	18.3	14.9	-7.4	-3.3
20 to 24	10.9	14.2	10.5	9.3	-4.9	-1.2
25 to 54	6.4	8.5	6.0	5.0	-3.6	-1.0
55 and over	4.6	5.0	3.5	3.1	-2.0	-0.5

Source: Bureau of Labor Statistics

entry level and in the service sector.

Other demographic trends that might put upward pressure on wages are evident in Table 2. The center panel shows that the total labor force participation rate and the participation rate for women are at very high levels by historical standards. Hence, labor force growth generally is not expected to be nearly as rapid as in the 1970s when a large number of people entered the labor market. As a result, further increases in labor supply, particularly in the service sector, are likely to occur only if higher wages are offered.

Currently, young people who entered the labor force in the 1970s are moving into their most productive years (top panel of Table 2). Over 80 percent of the labor force is currently over age 25, as compared to around 75 percent in 1977. Their higher productivity potential and lower turnover rates could offset at least in part the inflationary consequences of the slower labor force growth cited above. In addition, one potentially high-productivity cohort—prime-age men—still has a relatively high unemployment rate (Table 1). If future labor demand is concentrated in manufacturing and other sectors that employ this cohort, wage inflation will be less severe than if those sectors that primarily employ women and young people grow more rapidly.

The unemployment rate for prime-age men (currently 4.8 percent) could perhaps fall to around its 1977 level (4.3 percent) without creating additional wage pressure. Since this cohort constitutes two-fifths of the total labor force, such a decline in this group's unemployment might reduce the aggregate unemployment rate by 0.2 percentage point without additional inflationary pressures.

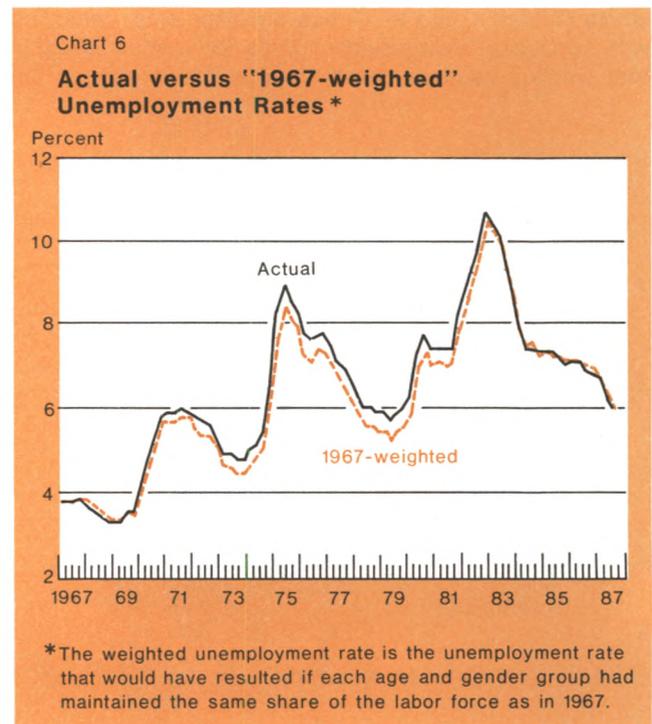
In general, the implications of many of these demographic factors for the NAIRU cannot be precisely calculated. In the past, economists have tried to control for a limited number of demographic influences on the unemployment rate by constructing the hypothetical unemployment rates that would have been observed if the relative labor force shares of different population subgroups (with different frictional unemployment rates) had remained constant at some given point in time.¹³ In Chart 6, we constructed a weighted unemployment rate using the labor market shares as of 1967.¹⁴

The actual rate rose above the weighted rate during the 1970s. This increase was due to the rising teenage

and female shares of the labor force at a time when these cohorts experienced relatively high unemployment rates. In the 1980s, the actual rate and the weighted rate have been about the same because of the reduced numbers of young workers and the lower unemployment rate for women. The recent convergence of the female and male unemployment rates implies that further increases in the female labor force share should no longer necessarily raise the actual unemployment rate relative to the weighted rate. In the 1970s, the observation that the measured unemployment rate had risen above the weighted rate formed the basis of the argument that the NAIRU was higher than what it was in the 1960s. The same logic today would suggest that, all other things equal, the NAIRU has returned to the same level as in the 1960s.¹⁵ By our calculations, it appears that demographic factors could have reduced the NAIRU from its 1977 level by as much as 0.5 percentage point.¹⁶

¹⁵For more detail along these demographic lines, see Congressional Budget Office, "Economic and Budget Outlook"; see also Lawrence H. Summers, "Why is the Unemployment Rate So Very High?" for estimates of the impacts other attributes of the labor force might have on the unemployment rate.

¹⁶Using a similar approach, the Congressional Budget Office estimates that the NAIRU has fallen 0.3 percentage point since 1977. For more detail, see "The Economic and Budget Outlook: An Update," August 1987.



¹³This notion was first introduced by George L. Perry, "Changing Labor Markets and Inflation," *Brookings Papers on Economic Activity*, vol. 3 (1970), pp. 411-41. For recent estimates that are based on the same approach as the one used in this article, see Mark Zandi, "Wage Inflation: Myth or Reality," *U.S. Economic Outlook*, Wharton Econometric Forecasting Services, November 1987.

¹⁴The labor force was separated by sex and by the following age groups: 16-19, 20-24, 25-54, and 55 and over.

Industry trends

Recent unemployment rates disaggregated by industry are shown in Table 3. As was the case with the demographic breakdowns, the recent decline in the unemployment rate has been widespread across industries, again ruling out unusual sectoral reasons for the decline in the aggregate unemployment rate.¹⁷ This breakdown of the labor market statistics also shows that all industries have unemployment rates less than their 1977 levels. The rates for finance, insurance and real estate (FIRE) and services, government, and nondurable manufacturing have even gone below their cyclical lows, attained in 1978.

The low unemployment in FIRE and services reflects in part the rapid growth in jobs in those sectors. Since 1979, employment in FIRE and services has increased at an average rate of 4.5 percent. In contrast, employment in durable and nondurable manufacturing has declined at average rates of 1.6 and 0.6 percent, respectively. These variations suggest that the ability of the economy to expand further without inflation now depends in part upon the industrial composition of future growth. Imbalanced employment growth across industries will raise structural unemployment because workers have only limited ability to move from one industry to another. Although most of the job creation during the current expansion has been in the service sector, manufacturing employment has been quite strong thus far this year. Moreover, many analysts predict that the weaker dollar will further stimulate manufacturing

exports. If the manufacturing sector should expand more rapidly while the service sector slows, the more balanced growth could be a factor contributing to a lower NAIRU. Up to this point in the expansion, however, the imbalanced growth across sectors has probably raised the NAIRU.¹⁸

The NAIRU could also be affected by the pattern of real wages in recent years. Since 1977 real wages have fallen in all industries except FIRE and services, where they rose on average 0.4 percent per year. Real wages in manufacturing have fallen 6.7 percent since 1977, after rising 8.2 percent over the 1970-78 period. Similarly, the real minimum wage has fallen 22 percent since 1979, and the differential between manufacturing and service sector wages has narrowed 24 percent since 1978.

These trends in wages could put both upward and downward pressure on the NAIRU, but we suspect that the net effect has been downward. The decline in real wages in manufacturing should lower the NAIRU, all other things equal, because it should increase the number of workers that can be employed without raising product prices. At the same time, a long period of losses in real wages could make manufacturing workers more militant if they try to recover previous wage losses as the labor market tightens. However, awareness of increased foreign competition and concern about job

¹⁸The empirical relationship between structural unemployment and the dispersion of employment growth across industries has been explored by David Lillien, "Sectoral Shifts and Structural Unemployment," *Journal of Political Economy*, August 1982, pp. 777-93; and by Katherine Abraham and Lawrence Katz, "Cyclical Unemployment: Sectoral Shifts or Aggregate Disturbances," *Journal of Political Economy*, June 1986, pp. 507-22.

¹⁷An unemployed worker's "industry" refers to the industry in which the worker was most recently employed, even if that worker had been employed in a different industry for a longer period of time.

Table 3

Unemployment Rates by Industry

(In Percent)

	1977	1982-IV	1986-II	1987-III	Change since 1982-IV	Change since 1986-II
Construction	12.5	21.9	12.6	11.3	-10.6	-1.2
Manufacturing	6.7	14.2	7.2	5.7	-8.5	-1.4
Durables	6.2	16.1	7.1	5.7	-10.4	-1.3
Nondurables	7.4	11.4	7.3	5.8	-5.6	-1.5
Transportation and public utilities	4.7	7.9	5.4	4.2	-3.7	-1.2
Wholesale and retail	8.0	10.6	7.8	6.7	-3.9	-1.1
FIRE* and services	6.0	7.6	5.6	4.9	-2.7	-0.7
Government	4.2	5.1	3.6	3.6	-1.5	0.0
Agriculture	11.2	4.8	14.0	10.1	-4.9	-3.8

*Finance, Insurance, and Real Estate
Source: Bureau of Labor Statistics

security may reduce the wage demands of workers even in a tight labor market. The decline in union representation since 1977 (from 23.5 percent of the labor force to 16.5 percent) might also play a moderating role. The fall in the real minimum wage should help lower the NAIRU because it gives employers more flexibility in hiring marginal workers. Finally, the narrowing of the spread between manufacturing and service sector wages should also reduce the NAIRU because it is likely to increase labor mobility across industries.

Some implications of these changes in real wages for the NAIRU can be roughly measured. The decline in the real minimum wage could have reduced the NAIRU by about 0.2 percentage point, while the decline in unionization could have reduced it by roughly 1 percentage point.¹⁹ But we were unable to find previous

Footnote 19 continued

minimum wage is based on estimates of how much teenage unemployment would be affected by changes in minimum wage. The effect on the total NAIRU is small, of course, because teenagers are a small fraction of the labor force. For more detail, see Howard Wachtel, *Labor and the Economy* (Orlando, Florida: Academic Press, 1984), p. 470. We are not aware of any empirical studies of the impact of unionization on the total unemployment rate or on the NAIRU. Workers in the relatively high-paying union sector are more likely to remain unemployed longer because they hope to be recalled to their former jobs or because they search longer for other union jobs—such behavior would raise the NAIRU as unionization increases. We based our estimates on results derived from interstate comparisons. For more detail, see Summers, "Why is the Unemployment Rate So Very High?"; and Robert T. McGee, "State Unemployment Rates: What Explains the Differences," this *Quarterly Review*, Spring 1985, pp. 28-35. There are some difficulties in using interstate estimates to calculate what the effects might be at the aggregate level, and these results should be interpreted cautiously. For example, interstate estimates are likely to capture not only the effects of unionization on the NAIRU mentioned above but also the effects of unionization on the location decisions of employers. At the aggregate level, of course, the effects of location decisions on unemployment would cancel out. Hence, the 1 percentage point estimate presented here should be viewed as an upper limit.

¹⁹The estimated effect on the total NAIRU for the decline in the

Table 4

Unemployment Rates by Region

(In Percent)

	CLF*	1977	1982-IV	1986-II	1987-III	Change since 1982-IV	Change since 1986-II
New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	5.7	7.7	7.2	4.2	2.9	-4.3	-1.3
Middle Atlantic (New Jersey, New York, Pennsylvania)	15.2	8.7	9.9	6.5	4.7	-5.2	-1.8
East North Central (Illinois, Indiana, Michigan, Ohio, Wisconsin)	17.4	6.5	13.5	8.0	6.6	-6.9	-1.4
West North Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota)	7.5	4.8	8.1	5.6	4.9	-3.2	-0.7
South Atlantic (Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia, District of Columbia)	17.0	7.0	9.2	5.7	5.7	-3.5	0.0
East South Central (Alabama, Kentucky, Mississippi, Tennessee)	6.0	6.4	13.0	9.4	7.6	-5.4	-1.8
West South Central (Arkansas, Louisiana, Oklahoma, Texas)	10.9	5.7	8.5	9.9	8.5	0.0	-1.4
Mountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming)	5.4	6.7	9.3	7.7	6.5	-2.7	-1.2
Pacific (Alaska, California, Hawaii, Oregon, Washington)	15.0	8.2	10.9	6.8	5.7	-5.2	-1.1
National unemployment rate		7.1	10.7	7.1	5.9	-4.8	-1.2

*Percent of U.S. Civilian Labor Force.
Source: Bureau of Labor Statistics

studies that would provide a basis for estimating how much the fall in real manufacturing wages might affect the NAIRU or how much shrinking wage differentials across sectors might increase labor mobility.

Regional trends

Like the demographic and industrial unemployment rates, the regional unemployment rates (Table 4) suggest that the decline in unemployment over the past year at the national level has been widespread. Therefore, none of the disaggregated data can help to explain the large error that emerges in tracking the total unemployment rate with a conventional econometric estimate of Okun's Law. In other words, the recent decline in the unemployment rate has not been concentrated in one or two specific components.

Over the longer run, the regional data also capture the imbalanced nature of the current recovery that we noted earlier for industries. The New England, Middle Atlantic and Pacific regions are experiencing unemployment rates below the 6 percent national average. These regions have almost half the U.S. labor force. In 1977, all the regional unemployment rates were contained in a spread from 4.8 to 8.7 percent. Currently, the range is about one-third larger, from 2.9 to 8.5 percent.

This disparity could have some implications for the NAIRU. The level of structural unemployment is likely to increase with the amount of regional imbalance because workers cannot readily move from one geographic area to another.²⁰ Examining the highest and lowest rates—the procedure we followed earlier—is clearly not an entirely adequate way of judging the overall regional imbalance in unemployment. A more comprehensive measure of imbalance is shown in Chart 7. This variable is the weighted standard deviation of annual state unemployment rates, in which each unemployment rate is weighted by each state's annual share of the U.S. labor force. It appears from this measure that the current recovery has been quite imbalanced, and regional imbalance could, therefore, be a factor increasing the NAIRU.²¹ The effect relative to 1977 could be fairly large because the current level of

²⁰For a discussion of the theoretical relationship between regional unemployment and aggregate unemployment, supplemented with empirical evidence for the United Kingdom, see G. C. Archibald, "The Phillips Curve and the Distribution of Unemployment," *American Economic Review*, May 1969 (Papers and Proceedings of the 1968 Annual Meeting of the American Economic Association), pp. 124-34.

²¹Katherine Abraham suggests that the upward drift in regional unemployment dispersion between 1960 and 1985 may explain the increase over that period in the ratio of job vacancies to unemployment. For more detail see Katherine Abraham, "Help Wanted Advertising, Job Vacancies, and Unemployment," *Brookings Papers on Economic Activity*, vol. 1 (1987), pp. 207-43.

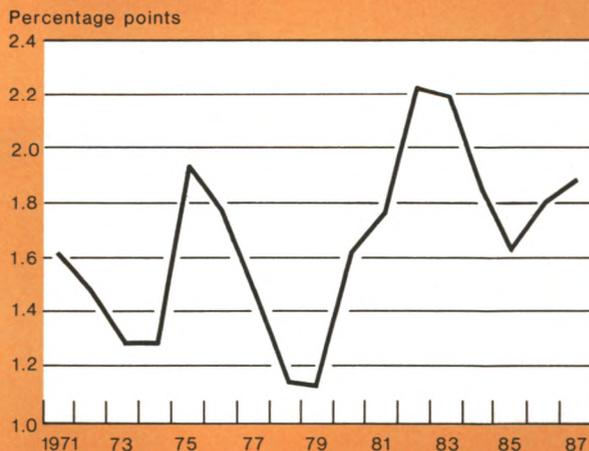
unemployment rate dispersion is about 25 percent above the 1977 level and has been increasing over the last two years.

Conclusion

We have reviewed several factors that could be affecting the trade-off between unemployment and inflation. Most of our comparisons have been relative to 1977, a year when compensation growth reached a cyclical low and began to accelerate. It appears that since 1977 some developments have taken place that could have raised the NAIRU—the unemployment rate at which inflation tends to remain stable—as well as some that could have lowered the NAIRU. We were able to quantify certain factors that could have lowered the NAIRU by as much as 2 percentage points (demographics, minimum wage, and unionization). However, it was not possible to quantify the impacts of some other factors that could have raised the NAIRU, such as regional and industrial imbalance in the current expansion. Overall, our findings suggest that the NAIRU has shifted downward from the 6.5 to 7.0 percent range in the late 1970s to about 6 percent at present, although we will not know with confidence what the NAIRU is in the current cycle until we actually see firm evidence of upward movements in

Chart 7

Unemployment Rate Dispersion across States*



*The dispersion measure is the weighted standard deviation of annual state unemployment rates, in which each unemployment rate is weighted by each state's annual share of the U.S. labor force.

wages.²² The various factors affecting the NAIRU that we have analyzed here will, of course, continue to change over time, and NAIRU will also change as a result.

Interpreting the NAIRU in the current environment is also complicated by the consideration that wage pressures are likely to develop differently than in the past.

²²In looking at this question, some analysts have reached more optimistic conclusions; others, more pessimistic conclusions. For a more optimistic point of view, see "Economic Watch: A Shift Towards Strength?" *Morgan Economic Quarterly*, September 1987. A more pessimistic outlook is presented in Richard Berner and Jerry Pedgen, "Inflation Prospects for 1987-88," Salomon Brothers, July 29, 1987.

Historically, wage pressures emerged first in the manufacturing sector and subsequently spread throughout the economy. Now, however, with the demand for labor in the manufacturing sector remaining quite low until recently, wages are more likely to begin moving gradually upward in response to very tight labor markets in some regions and in many service-producing industries. Such a process will most likely make it more difficult to detect emerging inflationary pressures.

Richard Cantor
John Weninger