Potential Output Growth and the Long-Term Inflation Outlook

The rapid growth in real GNP and in domestic demand during this expansion has led to concern about a resurgence in inflation. If the economy continues to expand at a quick pace, some analysts suggest, it may soon run into a capacity constraint. Further increases in the demand for goods and services would then raise the inflation rate, with little or no increase in real output.

Historically, the effect of demand pressures on the inflation rate has been captured well by unemployment rate movements. An important factor in the inflation outlook is the rapidly closing gap between the unemployment rate and the natural rate—the unemployment rate consistent with stable inflation. This gap has proved to be a useful indicator of demand pressures since movements in the gap have had a stable and predictable impact on the rate of inflation.[1] At present, most estimates of the natural rate fall somewhere between 6 and 7 percent; thus, the current unemployment rate is somewhat above the midpoint of this range. Once the unemployment rate reaches the natural rate, if the economy can then be stabilized there, a pickup in inflation may be prevented.

To operate at the natural rate, real GNP needs to grow at what is called its potential or capacity growth rate. Growth in potential output, as discussed below, is fundamentally equal to trend growth in productivity, the labor force, and average weekly hours. As such, it represents the rate of growth in the economy's long-run ability to produce goods and services. If the economy expands at the same rate as potential, there is no systematic pressure on the unemployment rate to rise or fall. Thus, when actual output is growing in line with potential and the unemployment rate is equal to the natural rate, an important source of pressure on the inflation rate is eliminated.

This article examines the behavior of potential output over the past twenty-five years. Growth in potential output from 1974 to 1983 was found to be approximately 3.1 percent, down significantly compared to the years 1960 to 1973. An analysis of likely trends in the determinants of potential output suggests that it could continue to expand approximately three percent a year over the next decade.

Since 1974, however, the link between output growth and changes in the unemployment rate has become more variable. Consequently, deviations in output growth from its potential are no longer as reliable an indicator of movements in the unemployment rate. The inflationary consequences of an expanding economy, therefore, are more uncertain today than before 1974. This greater uncertainty, moreover, suggests caution in moving to a nominal GNP target for monetary policy that some economists have suggested in recent years.

What is potential output?

Generally speaking, potential output measures what the economy can produce at full employment. Throughout the 1960s, the Council of Economic Advisors defined potential output to equal the amount of goods and services the economy could produce with a 4 percent unemployment rate. In the late 1960s and early 1970s, however, it became increasingly clear that while it might be possible for the economy to operate with 4 percent unemployment, it would conflict with another policy goal—price stability.

For most purposes, the relevant measure of potential

[1] See A. Steven 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 Number 8303 (February 1983).

output equals the amount of goods and services the economy can produce when operating at the natural rate. Potential output is tied to the natural rate since movements in the unemployment rate away from the natural rate have proved to be an important determinant of whether the inflation rate will rise or fall. Note, however, that even if the economy is growing at its long-run potential rate, in the short run, the unemployment rate need not equal the natural rate.

Some analysts have suggested that a natural rate of capacity utilization also exists and that deviations in capacity from its natural rate serve as a reliable indicator of inflation But if there is a natural rate of capacity utilization, it, like the natural rate of unemployment, does not appear to have remained constant over the past twenty years In the mid- to late-1960s, for example, the manufacturing sector reached rates of capacity utilization in the high eighties before consumer prices accelerated. In the mid- to late-1970s, in contrast, inflation accelerated when the manufacturing sector was operating at only about 80 percent of capacity.

Perhaps more importantly, movements in capacity utilization tend to mirror movements in the unemployment rate; the two series have a correlation coefficient close to −0 9 Thus, after accounting for movements in the unemployment rate, movements in capacity may not improve our ability to track inflation. This, however, is an empirical question beyond the scope of this paper.

Measurement of potential output

A number of techniques have been used to measure growth in potential output; two of them are employed in this article. The simplest and most direct method is to ascertain the growth in real GNP that historically has been associated with a stable unemployment rate The equations estimated for this purpose are presented in Box 1 An alternative approach, which analyzes growth in productivity, average weekly hours, and the labor force, is discussed below. A third approach, not used in this paper, involves estimating a production function for the economy and determining the factor input levels consistent with full employment.[2]

Econometric or statistical approach

Based upon the statistical relationship between movements in real GNP and the unemployment rate, the rate of growth in potential output over the period 1974 to 1983 was found to be 3.1 percent. This rate of expansion, however, was less than the 3.9 percent growth in potential that characterized the period from 1960 to 1973.

The chart illustrates the reduction in capacity growth by plotting the estimated long-run relationship between real GNP growth and changes in the unemployment rate. As can be seen in the chart, the GNP growth rate consistent with a stable unemployment rate decreased beginning in 1974

The decline in potential output growth meant that after 1973 the economy could no longer expand as fast as in the previous decade and still maintain a stable inflation rate over the longer term Yet perceptions of potential growth changed slowly. As a result, the growth rates which had been built into people's expectations may have become highly inflationary

A second, and perhaps more significant new finding in this article is that beginning in the mid-1970s, the link between output growth and the unemployment rate became more uncertain.[3] This implies that the range of likely movements in the unemployment rate associated with any rate of real GNP growth became much wider. For example, the unemployment rate rise in 1975 and drop in 1983 were larger (in absolute terms) than the statistical relationship predicted. In the earlier period, on the other hand, the relationship predicted unemployment rate changes much more accurately Thus significant movements in the unemployment rate, that do not reflect the underlying strength or weakness of the economy, are now more likely to occur. Over time, these errors will tend to cancel each other out. However, over the course of six months to a year, large movements in the unemployment rate, unrelated to GNP, can occur.

Historically, compensation growth has moved in fairly close tandem with unemployment rate movements. The more tenuous link between GNP growth and the unemployment rate, then, serves to loosen the link between GNP growth and inflation. Thus the inflationary consequences of economic expansion are more uncertain today then before 1974, primarily because unemployment rate movements cannot be predicted as accurately from GNP growth

The increased variability in the GNP/unemployment rate relationship suggests that a *significant* decline or increase in inflation over the short run may occur even when the economy is expanding at the same rate as its long-run potential. Consequently, successfully implementing economic policies aimed at stabilizing the unemployment and inflation rates may be more difficult. For policy-makers, this means distinguishing what may be only "blips" in the unemployment and inflation rates from movements which truly reflect the economy's underlying strength or weakness

[2]For recent analyses along this line see, among others, Jeffrey M Perloff and Michael L Wachter, "A Production Function-Nonaccelerating Inflation Approach to Potential Output Is Measured Potential Output Too High?"; in Karl Brunner and Allan H Meltzer, eds , *Three Aspects of Policy and Policymaking Knowledge, Data, and Institutions*, Carnegie-Rochester Conference Series on Public Policy, Volume 10 (1979), pages 113-163, and John A Tatom, "Potential Output and the Recent Productivity Decline"; Federal Reserve Bank of St Louis *Review* (January 1982), pages 3-16 A number of objections, however, have been raised about this method See, for example, the comments on the Perloff and Wachter paper Estimates of potential output made by Tatom are discussed later in this article

[3]Not only did the growth rate of potential output change, but the residual standard error rose 75 percent as well

Box 1: Estimating the Unemployment/Real Output Relationship

The relationship between real GNP growth and unemployment rate changes was estimated using data from 1960-I to 1983-IV. Based upon a number of tests for structural stability, the data were consistent with real GNP having a different impact on the unemployment rate beginning in 1974.*

In light of this, the data were split into two groups—1960-I to 1974-I and 1974-II to 1983-IV. Several models were estimated for each subperiod to identify the relationship between the unemployment rate and real GNP. The best equation for each subperiod was

1960-I to 1974-I

$$(A.1)\quad \hat{DU}_t = \underset{(6.18)}{.260} - \underset{(-7.26)}{.183}\, gnp_t^* - \underset{(-2.60)}{.090}\, gnp_{t-1}^* + \underset{(3.17)}{.312}\, DU_{t-1}$$

$R^2 = .70 \qquad \hat{\sigma} = .16 \qquad \text{Durbin's-H} = -.63$

1974-II to 1983-IV

$$(A.2)\quad \hat{DU}_t = \underset{(6.44)}{.329} - \underset{(-7.05)}{.285}\, gnp_t^* - \underset{(-3.58)}{.142}\, gnp_{t-1}^*$$

$R^2 = .73 \qquad \hat{\sigma} = .28 \qquad DW = 1.71$

where DU equals the change in the unemployment rate and gnp* equals $(GNP_t - GNP_{t-1})/GNP_{t-1}$ times 100. Both equations were estimated by ordinary least-squares (t-statistics are in parentheses).

The rate of growth in potential output equals the rate of growth in real GNP associated with a stable unemployment rate. This growth rate can be calculated for the period 1974-II to 1983-IV as follows: set the left hand side of equation (A.2) to zero and find the constant rate of growth in GNP that solves the equation. The solution is .77 percent. This corresponds to 3.1 percent growth when expressed at a compound annual rate.

Growth in potential over the earlier period can be calculated in a similar manner. Besides setting the current value of DU equal to zero, however, the lagged value of the change in the unemployment rate must also be set equal to zero.

*For details, see Douglas M. Woodham, "The Changing Relationship Between Unemployment and Real GNP in the United States", Federal Reserve Bank of New York Research Paper (forthcoming), revised.

Box 2: Decomposing Growth in Potential Output

Movements in real GNP can be decomposed into movements in productivity (P), average hours worked (AHW), the proportion of people employed (1-U), and the labor force (LF) using the equation reported in the section on an alternative approach to measuring potential output. A problem arises, however, in using the conventional measures of P, AHW, (1-U), and LF in this equation since they are not measured on the same basis.* The most widely used measure of productivity equals output per hour produced by *all* employees in the nonfarm business sector while average hours worked is generally reported as the average workweek of *production* workers in the nonfarm sector.

Furthermore, the employment series used to calculate both of these variables is based upon data from the Bureau of Labor Statistics' payroll survey. The unemployment rate and labor force variables, on the other hand, are based upon employment numbers generated from the Bureau of Labor Statistics' household survey. These surveys sometimes give very different estimates of the number of jobs being created in the economy. This was particularly true in 1983.

The fact that P, AHW, (1-U), and LF are measured on different bases can be accounted for by noting that.

$$GNP = \frac{GNP}{NFGNP} \cdot \underset{\uparrow P}{\frac{NFGNP}{HOURS}} \cdot \frac{HOURS}{PRODHOURS} \cdot \underset{\uparrow AHW}{\frac{PRODHOURS}{WORKERS}} \cdot \frac{WORKERS}{EMPLOY} \cdot \underset{\uparrow (1-U)}{\frac{EMPLOY}{LF}} \cdot \underset{\uparrow LF}{LF}$$

where,

NFGNP = nonfarm private sector output,

HOURS = total hours of all employees in the nonfarm private sector,

PRODHOURS = total hours of production workers in the nonfarm private sector,

WORKERS = production workers in the nonfarm private sector

EMPLOY = total employment

LF = civilian labor force.

The first ratio compares real GNP to the value of all goods and services produced in the nonfarm business sector. The second ratio equals the conventional measure of productivity while the third ratio provides a link between productivity and the conventional measure of average hours worked. The fifth ratio links different employment variables from the household and payroll series, while the last two ratios equal, respectively, one minus the civilian unemployment rate and the civilian labor force.

This equation implies that the underlying rate of trend growth in real GNP can be decomposed into the underlying rates of trend growth in the conventional measures of P, AHW, and LF, along with growth in the various "linking" variables. Cyclically adjusted trend growth in P, AHW, and LF are reported in Table 1 along with the sum of the underlying rates of trend growth in the "linking" variables.

*The approach employed here owes much to Peter K. Clark, "A Kalman Filtering Approach to the Estimation of Potential GNP", unpublished manuscript, Yale University (November 1983).

An alternative approach to measuring potential output

The estimates of potential growth presented above were derived implicitly from statistical analysis of the relationship between unemployment rate changes and real GNP growth Another approach is to estimate the growth in potential by measuring trend growth in productivity, average weekly hours, and the labor force This method both confirms the earlier statistical analysis and provides insight into the fundamental factors that have changed potential output growth

Underlying the alternative approach is the following identity, relating real GNP growth to the sources of economic growth:

$$GNP = \frac{GNP}{\text{total hours worked}} * \frac{\text{total hours worked}}{\text{employment}} * \frac{\text{employment}}{\text{labor force}} * \text{labor force}$$

The first ratio measures labor productivity, the second average weekly hours, and the third is equal to one minus the unemployment rate

This equation implies that GNP growth in any quarter is identically equal to the sum of growth in labor productivity, average weekly hours, the proportion of workers employed, and the labor force Suppose the unemployment rate were set equal to a pre-specified value, such as the natural rate Then, the economy's underlying rate of growth—the rate of growth in potential—would equal the sum of the underlying rates of growth in labor productivity, average hours worked, and the labor force Table 1 presents these growth rates for different time periods

Calculating trend growth in these variables requires some care. The equation presented above is an identity, and, as such, the product of productivity, average hours worked, etc , has to equal real GNP This necessitates choosing the input variables carefully since the conventional measures of these variables are calculated using somewhat different bases Accordingly, compositional changes in employment and output have to be accounted for, as noted in Box 2

From 1960 to 1973, potential output was expanding at a 3 9 percent annual rate Most of this growth came from rapid advances in labor productivity Trend growth in the civilian labor force of 2 0 percent was also an important factor[4]

[4]The growth accounting framework used here provides a convenient way of summarizing how the sources of economic growth have changed over time A mistaken impression may arise, however, that an acceleration or deceleration in one source of economic growth will unequivocably lead to a change in potential growth This is not true since the behavior of each source of growth can affect the evolution of the others A rapid influx of inexperienced workers, for example, may boost labor force growth, however, it will also tend to depress productivity The trend behavior of each source of economic growth then, should not be viewed as being independent of the others

Taken together, the expansion in productivity and the labor force suggest that potential output was growing at a 4.4 percent annual rate However, average hours worked by production workers in the nonfarm private sector was falling a cyclically-adjusted 0 5 percent This lowered the rate of growth in potential output to 3 9 percent

Beginning in 1974, growth in potential output fell to 3.1 percent Two disparate factors led to this change. a rise in labor force growth and a slowdown in productivity growth

First, from 1974 to 1983, cyclically-adjusted trend growth in the civilian labor force rose to 2 5 percent from 2 0 percent The accelerated growth stemmed from a sharp rise in labor force participation From 1974 to 1983, labor force participation—the ratio of the civilian labor force to the working age population—expanded at an annual rate of 0 7 percent (adjusted for cyclical variation) This is more than three times the growth rate from 1960 to 1973 (Table 2) The pickup in participation rates was largely the result of more women entering the labor force

Second, faster growth in the labor force, which by itself would have increased growth in potential, was offset by a decline in the rate of expansion in labor productivity Several factors contributed to the productivity slowdown. Sharp increases in energy prices, a decline in capital investment relative to employment growth, and a change in the composition of the work force that accompanied the surge in the labor force are some of the more frequently cited factors A complete explanation for the slowdown, however, has eluded researchers

Taken together, the productivity slowdown that began in 1974 more than offset the rise in labor force growth over the same period The result has been a noticeable decline in the economy's capacity to produce goods and services

Comparison with other studies

The analysis presented above suggests that potential output has been growing about 3 1 percent a year since the mid-1970s, down sharply from 3.9 percent Statistical analysis also implies that the link between GNP growth and the unemployment rate became weaker after 1973 Both the large size of the estimated drop in potential growth—0.8 percent per year—and the more uncertain link of GNP growth to unemployment after 1974 are results which are new in this paper

Table 3 shows the growth rates for three potential output series constructed by the Council of Economic Advisors, by John Tatom, and by Peter Clark Over the period 1960 to 1973, only one series had potential expanding 3 9 percent a year while the other two grew a bit slower Also, from 1974 to 1983, all three series grew faster than 3 1 percent Since the three studies used different methods and time periods to calculate potential, it is not surprising that they produced somewhat different point estimates

While the point estimates may differ, the work presented

Table 1

Decomposition of Growth in Potential Output

Cyclically adjusted trend growth, in percent

Period	Productivity*	Average weekly hours†	Civilian labor force	Compositional changes‡	Rate of growth in potential output
1960-73	2 4	−0 5	2 0	0 0	3 9
1974-83	0 9	−0 5	2 5	0 2	3 1

*Output per hour in the nonfarm private sector
†Hours worked per week by production workers in the private nonfarm sector
‡Explained in Box 2

The trend growth rates were estimated by regressing the natural log of each variable on a constant and time trend. To account for cyclical variation, the current and one lagged value of the unemployment rate were added into each regression Annualized rates of growth are reported in the Table

Trend growth in average weekly hours and some of the variables that go into the "compositional change" variable are based on data beginning in 1964

The productivity, average weekly hours, and civilian labor force trend growth rates are based on *Bureau of Labor Statistics* data

in this paper, unlike the other studies, suggests that a sharp decline in the economy's capacity to produce goods and services occurred in the mid-1970s [5] A reasonable lower bound on the decline is 0 5 percentage point, while a 0 8 percentage point fall is an upper limit The actual decline, which we can never know with certainty, is probably closer to the upper limit than the lower one

A reduction of this size implies that a significant loss of output can accumulate in a short period of time For example, suppose the economy were to grow over the next five years at its earlier 3 9 percent potential growth rate, rather than at our current estimate of 3 1 percent per year Real GNP in 1988 would be $71 billion more—almost 5 percent of real GNP—a very significant difference over a short period of time

Another finding of this study that was not stressed in earlier work is the more uncertain link between output and unemployment since 1974 The 1979 Annual Report of the Council of Economic Advisors alluded to an apparent decline in the reliability of the relationship between output and employment that began in 1973 [6] The forecasting errors, however, were attributed to an incorrect estimate of growth in potential GNP The work presented here suggests that even after allowing for a shift in the rate of potential growth, the relationship between real GNP and unemployment became more uncertain

The outlook for growth in potential

An analysis of likely trends in productivity, average hours worked, and the labor force can be used to project tentatively the rate at which potential output may expand over the next 10 years Such calculations, although highly speculative, help to illuminate the likely sources of economic growth

Over the next decade, both the civilian labor force and labor productivity will probably behave very differently compared with the 1970s However, in contrast to the earlier period, the changes are likely to offset each other, leaving growth in potential output at about 3 percent

The Bureau of Labor Statistics projects that the civilian labor force will only grow by about 1 2 percent on average from 1985 to 1995, compared with 2 5 percent growth for 1974 to 1983 A decline in the growth rate of both the working age population and labor force participation are responsible for the slowdown [7]

If trend behavior in productivity and average hours worked were not to change over the next decade, slower labor force growth would push the rate of growth in potential down to approximately 2 0 percent Trend growth in productivity, however, will probably not remain at the depressed 1974-83 rate of 0 9 percent for a number of reasons

First, the entry of the baby-boom generation into the labor force and the rise in labor force participation of women increased the number of relatively inexperienced and unskilled workers seeking employment in the 1970s This change in the composition of the labor force contributed significantly to the productivity slowdown As these workers gain experience and develop new skills, productivity is likely to advance at a faster rate over the next decade than in the 1970s

Second, the sharp rebound in business fixed investment in this recovery, if continued, is likely to increase productivity growth Furthermore, expenditures on "high-tech" capital goods[8] have been growing rapidly since the mid-1970s,

[5] A revised, yet unpublished potential output series developed by John Tatom suggests that potential output growth fell about 0 7 percentage point in the mid-1970s The "middle-expansion" trend real GNP series presented in a table in Frank de Leeuw and Thomas M Holloway, "Cyclical Adjustment of the Federal Budget and Federal Debt", *Survey of Current Business*, Volume 63, Number 12 (December 1983), page 29 also supports the view that a major change in productive capacity occurred around 1974

[6] See pages 73-4 of the Council s 1979 Report

[7] These projections are based upon data discussed in Howard N Fullerton, Jr and John Tschetter, "The 1995 Labor Force A Second Look", *Monthly Labor Review* (November 1983), pages 3-10

[8] In 1976, for example, expenditures on "high-tech" capital goods—scientific and engineering instruments, photographic and communication equipment and office and store machinery—were equal to 26 5 percent of expenditures on producers' durable equipment By 1983, the share had risen 80 percent to 47 7 percent

leading to an ever larger share of total equipment expenditures going to high-tech goods This change in the composition of expenditures may also help to boost productivity growth

Finally, energy price growth—regarded by many analysts as a key factor in the productivity slowdown—is expected to be moderate in the 1980s Indeed, over the past two and a half years energy prices have generally been either declining or showing no change Thus they are not likely to act as a further drag on productivity growth, barring another round of energy price shocks

These factors, taken together, suggest that over the next ten years productivity is likely to expand faster than the 0 9 percent trend growth which occurred after the first oil shock Forecasts of long-term productivity growth of about 2 percent, for example, have been made by a number of economists [9]

Such a substantial pickup in productivity growth would largely offset the decline in labor force growth projected by the Bureau of Labor Statistics If these forecasts are correct, then, the rate of growth in potential output over the next decade would essentially remain at approximately 3 percent The labor force and productivity projections may, of course, prove to be incorrect. However, until there is evidence that these forecasts are wide of the mark, projections of three percent growth in potential seem reasonable Therefore, both this analysis and the statistical analysis presented earlier suggest that once the unemployment rate is at the natural rate, real growth of approximately 3 percent will help avoid a long-term rise in inflation

The near-term outlook for unemployment

The alternative approach confirms the potential growth estimate obtained from the statistically-based method This suggests that the statistically-based method may indeed be helpful in analyzing short-term unemployment rate movements. However, in so doing, one should recall the second implication of the statistical analysis forecasts of unemployment rate movements based on GNP growth are not as reliable today as they once were Therefore, the impact of GNP growth on the unemployment rate, and in turn the inflation rate, is much less certain

As a benchmark for our projections, we use the Blue Chip consensus forecast of June 1984, which calls for fourth quarter to fourth quarter growth of approximately 4 8 percent in 1984 and 2 8 percent in 1985 If these forecasts prove to be correct, further reductions in the unemployment rate are likely in 1984, albeit at a slower pace than in 1983, since real GNP will be growing faster than potential In 1985, however, the unemployment rate is not likely to decline very much, since the economy will be expanding at approximately the same rate as potential output

Will the decline in the unemployment rate that may occur in 1984 bring the unemployment rate down to the natural rate? The rates of real output growth needed over various time intervals to reduce the unemployment rate by one or more percentage points are shown in Table 4 Real growth at an annual rate of approximately 7 percent over two years, for example, is associated with a three percentage point decline in the unemployment rate As a rule of thumb, for every percentage point by which real GNP growth exceeds 3 percent, the unemployment rate declines about 0 4 percentage point over a year [10]

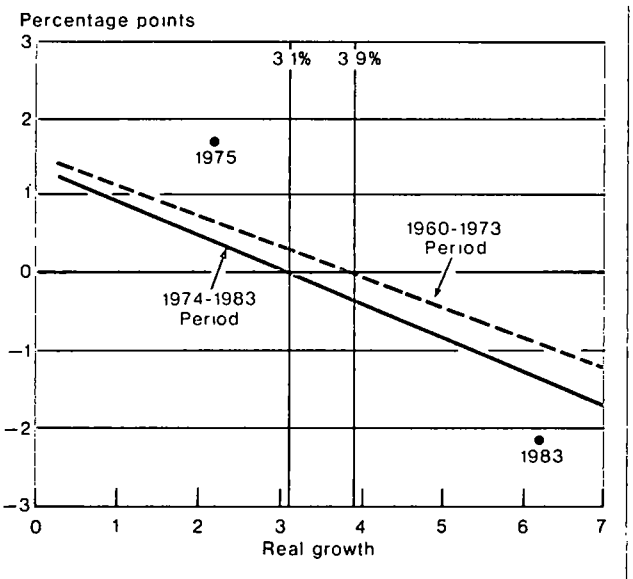
The numbers in Table 4, which are based on the historical relationship between real output and the unemployment rate, imply that the unemployment rate will probably not fall below the natural rate this year The June unemployment rate, at 7 1 percent, was about 0 6 percentage point above the midpoint of natural rate estimates Historical relations suggest that a reduction in the unemployment rate of this size

[9] See Chase Econometrics, *U S Macroeconomic Long-Term Forecasts* (October 1983), page A 4 and Data Resources, Inc , *U S Long-Term Review* (Summer 1983) page 1 9

[10] In their 1984 Report, the Council of Economic Advisors projected that real GNP would expand on average 4 2 percent from 1984 to 1989 This rate of expansion exceeds the estimate of potential growth presented in this paper by about one percentage point The Council has the unemployment rate falling on average 0 4 percentage point a year to 5 7 percent in 1989, a drop consistent with our estimate of potential output growth

Estimated Long-run Relationship Between Changes in the Unemployment Rate and Real GNP Growth

Fourth-quarter to fourth-quarter



would require real GNP growth of approximately 4 6 percent for one year. Growth of this magnitude, while possible, is stronger than most forecasts The economy, then, may well be operating somewhat above the natural rate at the year-end, although it may approach the natural rate sometime in 1985

A final note of caution is in order here. The natural rate is not known with certainty. Changes in trend productivity growth or shifts in labor bargaining relationships may alter the natural rate. Thus, it is important to monitor wage and price inflation carefully as we approach the range of estimated natural rates.

Table 2

Decomposition of Growth in the Civilian Labor Force

In percent

Demographic factors	Trend rate of growth 1960-73	1974-83
Civilian labor force	2 0	2 5
Working age population*	1 7	1 7
Labor force participation†	0 2	0 7

*All noninstitutionalized civilians 16 years old and over

†The ratio of the civilian labor force to the working age population

The data were obtained from the *Bureau of Labor Statistics* See Table 1 for an explanation of how the growth rates were calculated Since the working age population depends upon past fertility rates and life expectancy, rather than the business cycle, the unemployment rate was not included in the working age population regressions

Table 3

A Comparison of Estimates of Growth in Potential Output

In percent

Period	Council of Economic Advisors	Tatom*	Clark†	This study
1960-73	3 7‡	3 9	3 6	3 9
1974-83	3 3‡	3 4	3 4	3.1
1984-89	4 2(3 1)§	‖	‖	3 1

*See John Tatom, *op cit* The growth rates were estimated by regressing the natural log of Tatom's potential output series on a constant and time trend The growth rate for 1974 to 1983 is based on data ending in 1981-III

†Revised estimates based on Peter K Clark, *op cit* The growth rates, which are based on annual data, equal the average rate of growth over the stipulated interval The growth rate for 1974 to 1983 is based on data ending in 1982

‡1981 *Annual Report of the Council of Economic Advisors* The growth rates were estimated by regressing the natural log of the Council's potential output series on a constant and time trend The growth rate for 1974 to 1983 is based on data ending in 1980-IV

§1984 *Annual Report of the Council of Economic Advisors* The first number equals the average rate of growth in the Administration's real GNP forecast See Table 6-11, page 197 in the Council's Report The number in parentheses refers to the Council's estimate of *trend* GNP growth from 1970 to 1989

‖Not available

Conclusions and policy implications

The economy's potential growth rate—the long-run rate compatible with stable inflation—appears to be about three percent Real GNP growth above three percent would ultimately drive the unemployment rate below its natural rate, eventually reviving inflationary pressures. This rate of growth in potential is lower than the 3.9 percent rate that characterized the 1960s and early 1970s.

Particularly significant is the finding that the link between the unemployment rate and real GNP is more uncertain today Given any rate of growth in real GNP, the range of likely movements in the unemployment rate is larger now than before 1974

What does this uncertainty mean for our understanding of inflation and real growth? The relationship between inflation and unemployment has remained fairly tight over the past twenty years. But the weakened link between unemployment and real output, by extension, loosens the link between inflation and output We therefore face more uncertainty today regarding the inflationary consequences of economic growth than in the 1960s and early 1970s.

Suppose, for example, that the economy is expanding at the same rate as its long-run potential and that the unemployment rate is initially at the natural rate Shocks to the unemployment rate, unrelated to GNP growth, can cause temporary, yet significant, upticks or declines in inflation. This has been particularly true since 1974

Notwithstanding these difficulties, the rate of growth in potential GNP is a useful measure of the longer-term ability of the economy to produce goods and services. Sustained growth in excess of 3 percent is likely to induce an overheating of the economy, which would revive inflationary pressures Thus, despite the greater uncertainty in the unemployment/real output relationship in the post-1973 economy, it is important that policy aim at bringing economic growth toward its long run potential of about 3 percent

However, arguing that economic policy should be consistent with growth in potential does not imply that we should move all the way to nominal GNP targeting, as some analysts have suggested In fact, hitting nominal GNP targets presents many of the same problems as hitting monetary targets Targeting nominal income requires setting goals for both real output growth and price inflation, which add up to nominal GNP growth Our estimated three percent growth in potential provides a long-term anchor on which

to focus the real growth component But this estimate would have to be carefully monitored As we have seen, a shift in the rate of capacity growth—similar in many ways to a shift in money demand—occurred in 1974, but it took a long while before the shift was detected. Such undetected shifts would greatly reduce the benefits from nominal GNP targeting

Finally, our finding of a weakened link between output and unemployment (and therefore inflation) implies that the economy is now more prone to large, albeit possibly temporary, departures from a nominal income target over a policy-making horizon of, say, a year Consequently, even if real GNP were to expand along its potential path, a wide range of inflation rates and, thus, deviations from a nominal income target, are possible over a period of several quarters, again posing problems analogous to those associated with interpreting the monetary aggregates [11] More generally, a given rate of nominal income growth may be difficult to interpret, since its inflation and real growth components may differ greatly from those expected in setting the nominal income target Such issues raise questions about the practicality of targeting nominal GNP

Table 4

Relationship Between Unemployment Rate Movements and GNP Growth

	Real Growth (in percent) needed to reduce unemployment rate by		
Over a period of	1 point	2 points	3 points
1 year	5 5	8 0	10 5
2 years	4 3	5 5	6 8
3 years	3 9	4 7	5 5

These numbers were derived using equation (A 2) reported in Box 1 They were obtained by solving the equation for the constant rate of growth in real output that would reduce the unemployment rate by one, two, or three percentage points over the stipulated time interval The growth rates are expressed at an annual rate

[11]Suppose, for example, that the economy is proceeding along its potential path and that the nominal income target is 8 percent (composed of 3 percent real growth and 5 percent inflation) Unexpected movements in the unemployment rate (as large as plus or minus a half a percentage point in any quarter) could yield inflation rates of 4 to 6 percent over the course of a year If policymakers attempt to offset what may be essentially random movements in inflation, they run some risk of inducing unnecessary fluctuations in the economy

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