

Recovery without Accelerating Inflation?

On both the wage and price side, inflation over the past year was at its lowest level since 1967. The Employment Cost Index increased only 6.4 percent in 1982, down from 9.8 percent in 1981 (Chart 1). And consumer prices rose by only 3.9 percent in 1982, down from 8.9 percent in the previous year. Moreover, consumer prices have increased at only a 3 percent annual rate thus far this year.

The dramatic price and wage slowdowns undoubtedly reflect the recession at least to some degree, and many analysts expect some reacceleration of prices in late 1983 and 1984 as the economy recovers. The Blue Chip consensus, for example, foresees 1984 consumer price inflation at about 5 percent. But an examination of the 1961-82 period suggests that there may be more ground for optimism:

- Both casual observation and more rigorous statistical analysis imply that the paths of real economic growth and unemployment rates projected by most analysts are unlikely to generate an inflationary resurgence in the near term, 1983 or 1984.
- The immediate outlook in oil and crop markets is for continued weakness and price moderation, although a major crop failure or oil shock could rapidly push up inflation.

While the high level of unemployment is likely to sustain slow growth of wages and prices in the near term, the medium- to long-term outlook (1985-88) is less

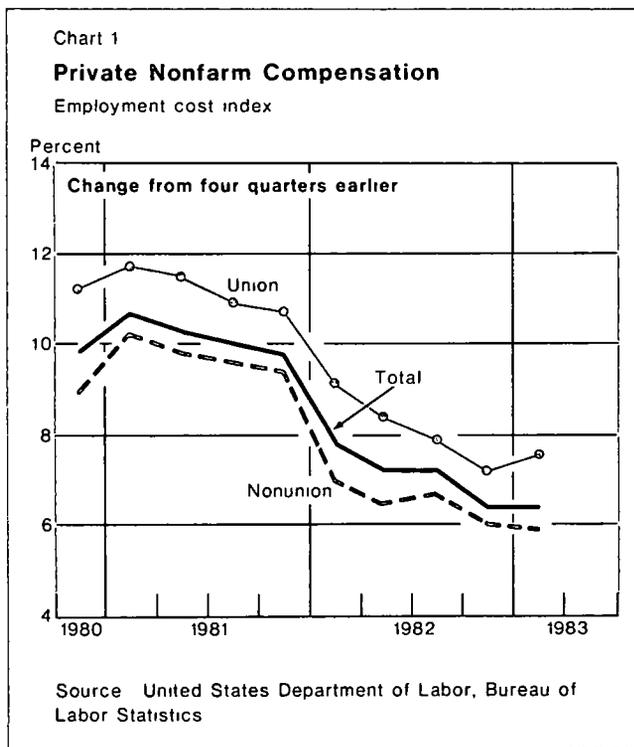
certain. Nevertheless, economic relationships, found to hold true in the past, suggest that wages in the mid-1980s might not accelerate until the unemployment rate falls below 6 percent. This would represent a more favorable scenario than we have had recently when unemployment rates of 7 percent or so seem to have been associated with a speedup in inflation.

Near-term inflation prospects

Many forecasters expect the recovery to be accompanied by a rise in inflation in 1984. For example, growth of the GNP deflator, the broadest measure of price inflation, is expected by many observers to accelerate in 1984 by about 0.4-0.6 percentage point (Table 1). Assumptions underlying these forecasts generally include somewhat stronger commodities prices and profit margins, a gradual tightening in labor markets, and a declining dollar. Such forecasts may be overly pessimistic about the resurgence in inflation, however.

In the first few years of other recoveries inflation has generally stayed flat or fallen (Table 2). Moreover, as of this spring, most forecasters predicted a slower than normal recovery for the next year or so. For example, the Office of Management and Budget (OMB) projected 4.3 percent growth of GNP and the Blue Chip consensus projected 4.6 percent for the first two years of the expansion.¹ Yet, GNP growth averaged 5 percent per year in the first two years of every postwar re-

¹ Sources: OMB, April Update of the 1984 Budget, Blue Chip, *Economic Indicators* (May 1983)



covery, except for the short recovery from the 1980 recession, and the inflation rate generally declined. Thus, casual observation of history suggests the possibility that disinflation will continue during the next few years.

Recent wage bargains also bode well for the near term. In 1982, collective bargaining settlements contained wage adjustments that were quite modest as compared with recent years. As shown on Chart 2, the average first-year increase of 3.8 percent was well under half the increase in 1980 and 1981, and just about equal to half the increase approved the last time the two parties settled.² Of course, part of this drop was in distressed industries, as 43 percent of workers received no increase. But the average for the remaining workers is still well below the previous year. Further, the wage agreements are not simply front loaded, with low increases in the first year only. The average increase over the life of the contract is 3.6 percent annually, excluding cost-of-living adjustments (COLAs). COLAs could add 2 percent or less in 1984, provided 1983 Consumer Price Index (CPI) growth remains in the

² The statistics cited in this paragraph are published by the U S Department of Labor, *Major Collective Bargaining Settlements in Private Industry, 1982* (January 1983)

forecasted 3-4 percent range.³ Thus, with a mean duration of thirty-one months, the 1982 agreements and similar ones negotiated in early 1983 appear to have locked in moderate wage growth for these industries for 1983 and 1984. Moreover, if these settlements reflect the wage trends emerging in the nonunionized sector, the next two years may bring a continuation of wage disinflation.

More rigorous statistical analysis also supports the view that wage growth will continue to fall or moderate over the next eighteen months even as the recovery progresses. In common with many earlier analyses, our research suggests that the critical determinants of wage inflation over the past twenty years have been (1) the level of the unemployment rate and (2) inflation expectations. This relationship of wage growth, inflation expectations, and the unemployment rate, which is summarized by the model described in Box 1, has been extremely stable and reliable over the past twenty years.⁴ Moreover, the relationship explains a large proportion of what to many has been the surprisingly rapid slowdown of wage inflation. The 4 percentage point decline in hourly compensation from 1980 to 1982 represents the sharpest slowdown over a two-year period since the 1940s. And when our estimated relationship, which is based on the 1961-79 period, is applied to the 1980-82 period, it suggests a 4.3 percentage point reduction of the growth of hourly compensation, very close to the actual 4 percentage point drop.

Such results obviously do not guarantee that past relationships will remain reliable, but they provide at least some analytical basis for formulating a forecast of the near-term outlook for wages. One way of assessing that outlook is to insert the Blue Chip consensus forecast of unemployment and price inflation into our equation and then to calculate a forecast for compensation growth. A projection done in this way shows *continued moderation* in wage growth in 1983 and 1984 (Table 3). The growth of compensation per man-hour would be 4-5 percent in each year. Despite the expansion, high unemployment rates—about 9 percent in 1984—will continue to exert downward pressure on wage growth.

This forecasting approach provides only a rough estimate of future compensation growth since it ignores the interdependence of wages and prices. In a more complete model, the slower wage growth would

³ According to the Bureau of Labor Statistics, about 60 percent of the workers are covered by COLAs that reimburse workers for approximately 70 percent of CPI growth.

⁴ For a more detailed discussion see Englander and Los, "The Stability of the Phillips Curve and Its Implications for the 1980s" (Federal Reserve Bank of New York Research Paper No. 8303), February 1983.

contribute to lower price growth. (Note that the Blue Chip consensus forecast has consumer price growth accelerating from 3.2 percent in 1983 to 5.1 percent in 1984.) Then, since inflation expectations in our model are measured by lagged price increases, compensation growth could be even slower than the 4.2 percent projection that uses the Blue Chip price inflation assumptions.

One risk is that supply shocks may occur and quickly rekindle expectations of rising inflation despite the weakness in labor markets. Although employee compensation is the major cost faced by firms, many economists believe that wages were not the primary cause of the inflationary upswings of the mid- and late 1970s. Instead, run-ups in the prices of food and oil contributed the initial spark to the speedup of inflation, and wages responded only with a lag. Again, in the 1980s there is some risk that sudden run-ups in energy or food prices or a steep depreciation of the dollar (which would raise import prices) could cause workers to press for higher wages.

However, there is currently little basis for projecting such shocks over the next eighteen months. The supply-demand balances in food and energy suggest that food and oil price increases will be moderate in the short run (Table 4). For example, the CPI for food is expected to rise by 3-4 percent in 1983 and possibly a bit more in 1984. It now appears that it would take a major crop failure, either here or abroad, to change that outlook by much. Imported oil prices are expected to remain flat over the remainder of 1983 and grow only slightly in 1984.

The international value of the dollar—another key factor in inflation—has continued to remain strong despite many forecasters' predictions of a decline. It now appears that, if a depreciation of the dollar does occur over the next eighteen months, it will not be large enough to affect significantly the wage and price out-

look. Data Resources Incorporated (DRI), for example, sees the dollar falling by about 8 percent over 1983 and 1984. Such a decline in the dollar, on a trade-weighted basis, would probably contribute less than 0.5 percentage point to inflation in 1983 and perhaps 0.8 percentage point in 1984.⁵ Since most of the Blue Chip forecasts already have assumed some decline in the dollar, it would take a very large drop to affect the compensation growth projection in Table 3.

Will a declining unemployment rate result in a speedup in wage growth?

The difference between compensation growth in 1984 of 5 to 6 percent that is projected by some other economic forecasters and our projection of about 4 percent is not large in absolute terms, given the variability of the inflation rate over the last decade. But whether or not compensation growth begins to speed up so soon after the start of a recovery, as reflected in the alternative forecasts, can have important implications for longer term inflation prospects. It is unlikely that the rate of compensation growth would increase in 1984 and then not change after that, unless real growth of the economy slowed down significantly. If compensation growth were to accelerate in 1984, it would in all likelihood be followed by continued escalation, assuming real economic growth through 1984 and into 1985 were to continue at a 4-5 percent pace. Also, in the past, even after it was clear that inflation had speeded up, forecasters have generally underestimated the size of the subsequent acceleration. If the predicted 1984 acceleration occurs, then forecasts of generally modest in-

⁵ For a more detailed discussion of the effects of a dollar devaluation on consumer prices, see Joel L. Prakken, "The Exchange Rate and Domestic Inflation", this *Quarterly Review* (Summer 1979), pages 49-55

Table 1

Alternative Inflation Forecasts

Four-quarter change in GNP deflator, in percent

Year	Chase Econometrics	Congressional Budget Office	Data Resources Incorporated	Office of Management and Budget	Blue Chip consensus
1983	5.0	4.7	4.6	4.5	4.9
1984	5.5	4.7	5.2	5.0	5.3

Sources: Chase Econometrics, *U.S. Macroeconomic Forecast and Analysis* (May 1983); Congressional Budget Office, *Five-Year Economic Assumptions* (January 1983); Data Resources Incorporated, *Review of the U.S. Economy* (March 1983); Office of Management and Budget, *April Update of 1984 Budget*; Blue Chip, *Economic Indicators* (May 1983)

Table 2

Does Inflation Accelerate in Early Stages of Recovery?

In percent

Trough of recession	Real GNP growth	Change in inflation rate*
First four quarters of recovery†		
1954-II	7.4	0.5
1958-II	8.4	0.9
1961-I	7.0	1.3
1970-IV	4.7	-0.3
1975-I	6.7	-5.1
1980-III	3.2	-0.1
Second four quarters of recovery‡		
1954-II	2.6	1.1
1958-II	1.7	-1.2
1961-I	3.3	-0.3
1970-IV	7.0	-0.4
1975-I	4.4	-0.8

*Implicit GNP deflator

†Growth rate in the four quarters after the trough minus growth rate in the four quarters before the trough

‡Growth rate in the second four quarters of recovery minus growth rate in the first four quarters of recovery

creases over the rest of the decade may be similarly low. Thus, it is reasonable to raise the issue of whether "slow" or "modest" acceleration in inflation might quickly turn into rapidly rising wages and prices.

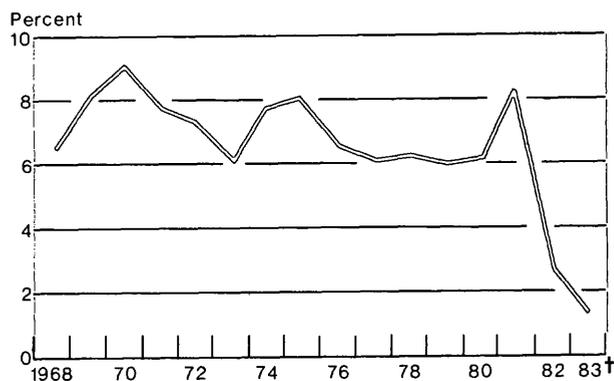
Some analysts, looking at simple relationships between wage growth and the unemployment rate, argue that an acceleration in wage increases within the next eighteen months is inevitable if the unemployment rate declines. They argue that the decline in the unemployment rate will result in tighter labor markets that will lead to more rapid wage growth. Our analysis suggests that this point of view is incomplete.

A lower unemployment rate will mean a higher rate of wage growth only if everything else is held constant. Statistical analysis of past data suggests that the trade-off at any given point in time t , looks something like the line AB, shown in Chart 3. Notice, if the unemployment rate at t were lower than the one associated with point W, the rate of wage growth would be higher. When moving between time periods, however, everything else other than the unemployment rate does not remain constant. A critical factor that can change between time periods is in-

Chart 2

Mean Wage-Rate Adjustment over Life of Contract in Major Collective Bargaining Settlements*

Annual rate



* Excluding cost-of-living adjustments (COLAs)

† First three months

Summary of Collective Bargaining Agreements

In percent

	1982	1981	1980	Last time 1982 parties bargained
Basic wage increases				
Average first-year wage increase (excluding COLAs) ...	3.8‡	9.8	8.3	7.9
Average annual increase over life of contract (excluding COLAs) ...	3.6	7.9	6.5	6.3

‡ 1982: 43 percent of workers received no increase; average increase for remainder was 7 percent; 25 percent of workers received increases greater than 8 percent.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

flation expectations. Statistical analysis also suggests that, if inflation expectations decline, the trade-off line for the period $t + 1$ will shift down to A'B' in Chart 3.

The movement between point W and point X in Chart 3 is intended to illustrate our estimate of the growth of compensation that is consistent with the Blue Chip projection for the recovery. Moderating inflation expectations, as measured by lagged inflation, can cause the unemployment-wage growth trade-off line to shift downward. (The 1982 and 1983 de-

clines in the inflation rate would be responsible for this.) This shift is enough to compensate for the effect of a decline in the unemployment rate, so that between periods t and $t + 1$ the shift between point W and point X results in the same rate of wage growth. But a more rapid decline in the unemployment rate could more than offset the effect of lower inflation expectations. The shift would be between point W and point Y , with the rate of wage growth increasing in period $t + 1$ compared with period t . A less rapid decline in the unemployment rate would lead to a reduction of wage growth.

Thus, while a decline in the unemployment rate clearly contributes an upward thrust to the rate of wage growth, it is possible for this to be offset by

the downward momentum of declining inflation expectations. Under the Blue Chip forecasts for prices and for the unemployment rate, the unemployment rate decline and the expectations effect exactly cancel each other out in 1984, so that wage growth is the same as in 1983.

Recently, many economic forecasts for 1983 and 1984 have been revised upward and projections of the unemployment rate revised downward from the 9.3 percent rate for 1984 used in our calculation. However, it is also possible that the inflation projection for 1984 implicit in the Blue Chip forecast is too high. Our research suggests that as long as the unemployment rate remains high—above 7 percent in 1984 and above 6 percent in 1985 and beyond—the expectations effect

Box 1: Estimating the Inflation-Unemployment Trade-off

To measure the trade-off between unemployment and inflation, we use the expectations-augmented Phillips curve (EAP) in combination with a simple price equation. The EAP curve relates the rate of change in compensation per man-hour (CCOMP) to: (1) the unemployment rate of prime age males (25-54 years) (URM25), as a measure of labor market tightness;* (2) a weighted average of past inflation rates as a measure of expected price inflation (CPCE), (3) upward changes in the prime age male unemployment rate (DURM25) to capture the cost of certain fringe and severance benefits received by laid off workers; (4) the increase in employer social security contributions (ECSS), a component of hourly compensation;† (5) the increase in the civilian labor force (CLHC) since the rapid influx of workers shifts the distribution of workers toward less-experienced and less-skilled (and therefore, presumably, to lower paid) workers, and (6) the share of unemployment benefits paid to workers unemployed more than twenty-six weeks (SURB27).‡

*The prime age (24-54 years) male unemployment rate as a measure of "slack" in the labor market was suggested by Phillip Cagan. See Phillip Cagan, "The Reduction of Inflation by Slack Demand", in W. Fellner, (ed.), *Contemporary Economic Problems 1978* (Washington, D.C., 1978), pages 13-45.

†The changes in employer social security contributions are expressed as a percentage of compensation per hour. From this, we subtract the increased contributions which occur as the overall level of wages grows. The remainder represents the effect of social security tax contributions in causing compensation growth to change.

‡Extension of unemployment benefits may reduce the incentive to search aggressively for new jobs, raising the unemployment rate while damping the disinflationary effects of higher unemployment.

A dummy variable, $D1$ accounts for the restraining effect of the price freeze in 1971-IV and the rebound after the relaxing of the controls in 1972-I.

The equation estimated by ordinary least squares (standard errors presented in parenthesis) is:

$$\begin{aligned} \text{CCOMP} = & 0.92 \cdot \text{CPCE} - 0.89 \cdot \text{URM25} + 0.60 \cdot \text{DURM25} \\ & (0.09) \quad (0.21) \quad (0.86) \\ & + 1.06 \cdot \text{ECSS} - 0.45 \cdot \text{CLHC} \\ & (0.24) \quad (0.13) \\ & + 4.15 \cdot \text{SURB27} - 4.59 \cdot \text{D1} + 6.23 \\ & (2.30) \quad (1.13) \quad (0.76) \end{aligned}$$

Period: 1961-I to 1979-IV

$$\begin{aligned} \bar{R}^2 &= 0.75 \\ \text{SEE} &= 1.30 \\ F(7,68) &= 33.0 \\ \text{DW} &= 2.16 \end{aligned}$$

We applied a series of recently developed econometric robustness tests to this EAP equation. The tests strongly suggest that this EAP curve is subject neither to permanent nor transitory stochastic shifts nor to permanent deterministic shifts. Additional evidence of its stability is provided by the excellent out-of-sample forecasting ability of this EAP curve in the 1980s.§

§For more details, 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 No. 8303), February 1983.

shown in Chart 3 will continue to exert a significant downward thrust to wage growth. Whether this would be sufficient to offset the effect of a more rapid decline in the unemployment rate depends on how fast the rate falls. We estimate that it is likely that wage growth will hold steady or slow down further as long as the unemployment rate declines by 1.5 percentage points or less over the next six quarters from its second-quarter level of 10.1 percent. This is still a somewhat steeper unemployment rate decline than is projected in many of the recently revised forecasts for the economy.

Wage inflation over the long term

While falling unemployment during the next eighteen months may not lead to rising inflation, for how long can economic growth proceed before wage inflation does begin to speed up? In recent years, it appears that the unemployment rate could not fall below 7 percent without an upsurge of inflation. And, indeed, this was the experience in 1978. Currently, many observers feel that the "natural" rate—the unemployment rate consistent with no speedup in inflation—will remain high through the 1980s.⁶ For example, in a talk given in November 1982, Martin Feldstein, the Chairman of the Council of Economic Advisers, suggested that the natural rate of unemployment will remain at 6-7 percent or above and not drop significantly over the balance of the decade unless programs such as job retraining induce major structural changes in the economy.

Estimates of the natural rate should be examined carefully. The higher they are, the more severe are the constraints on the economy's ability to expand without worsening inflation. However, the natural rate is not directly observable; it must be inferred from estimates of wage and price relationships. As such, it depends on all the factors which underlie the inflation-unemployment rate trade-off. All the issues have by no means been settled, but both theoretical work and statistical analysis suggest that productivity growth, demographics, and employer payroll taxes are linked to the trade-off. In general, more rapid productivity growth lowers the unemployment rate associated with nonaccelerating wages. Conversely, more rapid labor force growth and employer tax increases tend to raise the natural rate of unemployment. (The interactions of these factors are discussed in greater depth in Box 2.)

Analysis of the behavior of wages and prices suggests that the natural rate moved from about 4.5 percent in the early 1960s to over 7 percent in the mid- and late 1970s (Table 5). The key factor in the rise in the

Table 3

Projected Compensation Growth, 1983-84

In percent

	Underlying assumptions*		Projected compensation growth
	Civilian unemployment rate†	Consumer price growth	
1983	10.2	3.2	4.2
1984	9.3	5.1	4.2

*Blue Chip, *Economic Indicators* (May 1983)

†Average for year obtained by adding 0.2 to the unemployment rate of all workers including military.

Table 4

Food and Energy Price Increases Built into Current Forecasts

In percent

Forecast source	Projected price growth from 1983-I to 1984-IV (compounded, annual rate)	
	Food at home (CPI)	Oil†
DRI	4.2*	-7.6
Chase	5.8	-0.7
OMB	—	-3.6
CBO	4.9	2.9

*Food and beverages

†Crude oil—composite refiner acquisition cost.

Sources: Same as Table 1.

Table 5

The Natural Rate of Unemployment, 1961-82

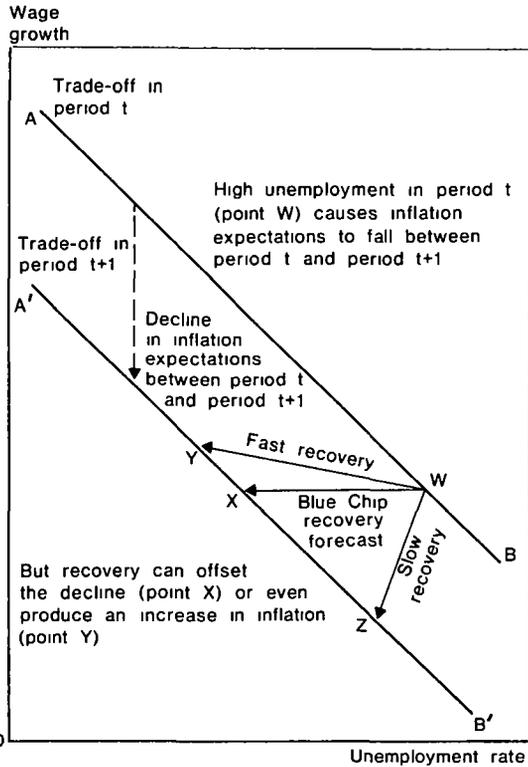
In percent

	1961-67	1968-73	1974-82
The increase in the natural rate of unemployment			
Natural rate of unemployment	4.4	6.2	7.2
appears to have been caused primarily by the decline in productivity			
Productivity growth	3.3	1.8	0.8
and a rapid upsurge in the labor force			
Civilian labor force growth	1.6	2.5	2.3

⁶ The technical appendix to this article discusses the calculation of the natural rate

Chart 3

The Inflation-Unemployment Trade-off during Recovery



natural rate appears to be the dramatic slowdown in productivity growth over this period, although rapid labor force growth, particularly in 1968-73, also contributed.

By projecting future trends in the major determinants of the natural rate—productivity, demographics, social security tax increases—we can estimate how low the unemployment rate can fall in the 1980s without an inflationary resurgence. Our benchmark assumptions come from the Administration's April 1983 scenario. They forecast trend productivity growth of about 1.7 percent over 1983-88 and civilian labor force growth of 1.6 percent.⁷ On the basis of these assumptions, we estimate that the natural rate could fall close to 6 percent in the mid- to late 1980s, giving the economy

⁷ The Administration scenario contains no social security tax projection. We assume that employer social security contributions will rise with inflation and according to legislated rate increases. At most, these increases may contribute 0.2 percentage point to the natural rate.

some breathing room for expansion without worsening inflationary pressures.

Of course, the actual path of inflation will depend on the pace at which the unemployment rate is lowered. But, under the Administration's long-term growth scenario, the unemployment rate would fall by 0.8 percentage point per year and would not dip below 6 percent until 1988. In the absence of exogenous price shocks, such a gradual recovery should not cause compensation to accelerate until the end of the period. In short, wages would not appear to be a major factor propelling inflation over the next five years under the projections of productivity, labor force, and unemployment made by the Administration.

Long-range economic assumptions that accompany the budget are often overly optimistic. If that is the case for the Administration's April assumptions, then a 6 percent estimate for the natural rate is too low. But it is not obvious that overoptimism characterizes the Administration's recent productivity assumptions. Much research has been devoted to analysis of the causes of reduced productivity growth in the mid-1970s. The important factors appear to be a slowdown in the rate of growth of capital per worker, changes in the age-sex composition of the labor force, and the impact of higher energy costs. While the contributions of these factors are not known with certainty, several studies have concluded that some combination of these factors accounts for over half the decline in productivity growth.⁸

The future outlook for capital formation has been much improved by the Economic Recovery Tax Act, although some economists believe that part of this is countered by the prospects for large Federal budget deficits. The teenagers and women who entered the labor force in the late 1960s and 1970s will continue to acquire experience over the next several years and can be expected to contribute more to total output than in the past. And most energy forecasters do not foresee another sharp run-up in oil prices, similar to the 1973 and 1979 experiences, during the remainder of the decade. It is for these reasons that those economists who have made long-range projections expect productivity growth to average about 1.8 percent annually over the next several years, about the same as the Administration.⁹ Their projections

⁸ J. R. Norsworthy, Michael J. Harper, and Kent Kunze, "The Slowdown in Productivity Growth: Analysis of Some Contributing Factors", in *Brookings Papers on Economic Activity* (1979 2), Edward F. Denison, *Accounting for Slower Economic Growth* (Brookings Institution, 1979), Edward A. Hudson and Dale W. Jorgenson, "Energy Prices and the U.S. Economy 1972-1976", *DRI Review of the U.S. Economy* (September 1978).

⁹ DRI, *U.S. Long-Term Review* (Spring 1983), *Morgan Guaranty Survey* (April 1983), *Chemical Bank U.S. Economic Outlook* (May 10, 1983).

Box 2: Determinants of the Natural Rate of Unemployment

The natural rate of unemployment is the unemployment rate consistent with no acceleration or deceleration of prices. This box examines some of the underlying determinants of the natural rate.

Productivity

In the past, many researchers tried to find a direct link from productivity to wages. In most cases the efforts were unsuccessful or unconvincing.* However, there is an indirect link from productivity to wages via unit labor costs. In the long run, price growth is mainly determined by the growth of unit labor costs, the difference between wage growth and productivity growth. Short-run cyclical factors, price shocks, and exchange rate fluctuations can alter this relationship for short periods of time, but they generally even out over longer intervals. To the extent that wage growth exceeds productivity growth, unit labor costs rise and feed into price inflation. Actual price inflation affects expected price inflation which, in turn, affects wage growth. Thus, faster productivity growth indirectly affects compensation growth by lowering the price inflation which corresponds to any given rate of wage inflation.

The effect of productivity is very powerful by our estimates. The decline in productivity growth from 3.3 percent in 1961-67 to 0.8 percent in 1974-82 raised the natural rate by about 2.5 percentage points according to our calculations. But this may overstate the effects somewhat, since part of the productivity decline undoubtedly results from cyclical factors in the 1974-82 period. Nevertheless, few analysts place trend productivity growth in the 1970s much above 1.1 percent, which implies a 2 percentage point increase in the

*Most researchers agree that trend productivity growth rather than current productivity growth should affect wages. However, few of the trend productivity measures have produced statistically significant results

natural rate of unemployment due to the productivity slowdown.

Demographics

Labor force growth affects the inflation-unemployment trade-off in complex ways. Rapid labor force growth tends to improve the measured trade-off because new workers are generally younger, inexperienced, and thus lower paid. This shifts the distribution of workers toward those at the bottom of the age and earnings scale, causing a slowdown in wage growth and a decline in the natural rate of unemployment. However, labor force growth also has offsetting indirect effects. If new entrants are less productive because of inexperience, more rapid labor force growth will tend to raise the natural rate by slowing productivity growth. Of course, if workers' wages are directly proportional to their productivity, then the two effects should exactly even out. However, our results, while tentative, suggest that on net more labor force growth tends to raise the natural rate of unemployment.

One reason that rapid labor force growth may raise the natural rate is that new workers and old workers may not be perfect substitutes. When labor force growth takes off rapidly, there may be a limit to the economy's ability to absorb the new workers, and some of them may have to queue temporarily as unemployed, worsening the trade-off. Or, new entrants to the labor force may take more time in their search for employment, again tending to raise the unemployment rate.

Most analyses suggest that the labor force growth rate will fall off in the 1980s, although a portion of the recent slowdown probably stems from the recession. Nevertheless, over the next few years the labor force will become more experienced and the economy may be better able to absorb a slower stream of new entrants than in the 1970s.

for labor force growth are also similar to those of the Administration. Moreover, in recent months, the productivity gains have surpassed any normal cyclical upturn. Were this to continue, the prospects would be for a natural rate of unemployment under 6 percent.

Of course, the reliability of all forecasts tends to diminish the further out they are drawn. The likelihood of unforeseen shocks increases as economic projections are extended further into the future. Nevertheless, it is important to realize that, in the absence of such shocks, there may be considerably more room for noninflationary economic expansion than is commonly assumed by many analysts. It is possible that

the pattern of growth and inflation in the mid-1980s may be closer to the 1960s model than the 1970s.

Summary

Based on the evidence of the past twenty years and forecasts of real growth and unemployment for the next five, the outlook for nonaccelerating wages and prices is probably better now than at any time over the past decade. In the short run, the unemployment rate will probably be high enough to keep wage inflation decreasing or flat. Over the medium to long term, two factors should prevent a significant upturn in inflation. First, if the recovery is gradual as ex-

Box 2: Determinants of the Natural Rate of Unemployment (continued)

Government policies

Government programs can affect the unemployment-inflation trade-off either directly or indirectly. Direct effects come from employer payroll taxes, social security being most important, although unemployment insurance contributions also may have some effect. Our results indicate that employer social security tax increases enter one for one into compensation—that is, workers do not seem to mitigate their wage demands as a result of employer payroll tax increases. In the past, such increases have had a small effect, raising the natural rate by 0.1-0.2 percentage points. The rate increases currently scheduled for 1983-88 are somewhat larger than in recent years but should nevertheless contribute only about 0.15 percentage points to the natural rate.

Another program which may affect the unemployment-inflation trade-off is the extension of unemployment insurance benefits. Evidence from our statistical analysis and other sources suggests that the extension of benefits may offset a portion of the effect of higher unemployment on wage growth.† In part, this simply may reflect the requirement that workers remain in the labor force to collect unemployment benefits. Extension also may reduce somewhat the incentives to search for work early during unemployment spells, raising the average duration of unemployment and thus the unemployment rate.

Other policies may have less direct effects, perhaps working through some of the factors discussed earlier. Easier immigration policies would tend to increase labor force growth, probably among relatively inexperienced and less productive workers, raising the natural rate. But investment incentives introduced in recent

†For example, see S. T. Marston, "The Impact of Unemployment Insurance on Job Search", *Brookings Papers on Economic Activity* (1975-1)

years may push in the opposite direction as the recovery picks up steam and capital per worker increases.

Protectionist policies while attractive in the short term may worsen the inflation-unemployment trade-off. By shielding weak industries, discouraging innovation, and diverting investment toward less competitive sectors, long-run productivity may suffer. More directly, domestic prices may shift upward if cheaper foreign products are blocked from the market. Potentially offsetting some of these effects are efficiency gains from running plants at nearer to full capacity. Nevertheless, over the long term, the losses from the protectionist policies are likely to outweigh the benefits.

More generally, the effects of foreign competition may differ in the short run from the long run. A rapid upsurge of imports, particularly if concentrated in specific industries, may increase structural unemployment in these sectors without significantly damping wage agreements in the economy overall. This would temporarily raise the unemployment rate which corresponds to any path of wage growth. The inflation effect may be muted, however, because the imported goods are likely to be cheaper than their domestic counterparts.

In contrast, the longer term effect of foreign competition may be to improve the inflation-unemployment trade-off. As workers move from the industries affected by foreign competition to other sectors, they should exert a downward effect on wage settlements in these sectors. As such, the net effect of competition may be to lower wage growth at any level of unemployment. Moreover, to the extent that the competition grows gradually rather than in a burst, the initial stage of increased structural unemployment may be avoided and the benefits from a more productive allocation of resources will be observed sooner.

pected, the unemployment rate will remain high relative to its natural rate even several years into the recovery. Second, it may take a lower unemployment rate than in the 1970s to generate inflationary wage increases because of renewed growth of labor productivity. If

we avoid major exogenous price shocks in food and raw materials markets and get improvements in productivity growth, the economy may finally pull itself out of the stagflation in which it has been mired for the last decade.

A. Steven Englander and Cornelis A. Los

Technical Appendix: Computation of the Natural Rate of Unemployment

The short-term behavior of compensation growth is described by the expectations augmented Phillips curve:*

$$(1) \quad w_t = p_t^e - bu_t + cx_t$$

where w_t is the rate of change in compensation per man-hour and p_t^e is the expected average rate of price inflation, u_t is the unemployment rate, and x_t captures all additional economic influences on compensation growth. A second equation allows inflation expectations to be determined by a simple adaptive expectations scheme:

$$(2) \quad p_t^e = p_{t-1}^e + \lambda(p_{t-1} - p_{t-1}^e).$$

The current expected average rate of price inflation is equal to the expected average rate of price inflation in the previous period adjusted by a fraction of the difference between this rate and the actual rate in the previous period. Price inflation is determined by unit labor costs:

*This is, in very simplified form, the estimated equation of Box 1

$$(3) \quad p_t = w_t - q_t$$

where p_t is the rate of change of prices and q_t is trend productivity growth. Applying the definition of the natural rate of unemployment, being that rate of unemployment at which price inflation remains constant, the natural rate can be found as a function of productivity and other real economic factors. When expected inflation equals actual inflation, we have from equation (2):

$$(4) \quad p_t^e = p_{t-1}^e = p_t.$$

Substituting equation (4) into equation (3) and then into equation (1) results in an expression for the natural rate of unemployment:

$$(5) \quad u_t = (cx_t - q_t)/b.$$

In our estimated equation the crucial trade-off coefficient b has a value equal to 0.89. Notice that the natural rate of unemployment is not a constant but is negatively related to productivity q_t and positively related to the economic variables represented by x_t which tended to raise wage growth in equation (1).