Editors' Summary

THE FOUR PRINCIPAL ARTICLES and two reports in this issue of *Brookings Papers on Economic Activity* were presented at the fourteenth conference of the Brookings Panel on Economic Activity held in Washington on September 12–13, 1974. Of the six papers, two deal with wage inflation, two with unemployment, and two with petroleum supplies. Unemployment and wage inflation are standard fare for macroeconomists and have been the subjects of many papers in previous issues of this journal. On the other hand, the energy crisis is a new concern of macroeconomics, which was analyzed in this publication initially by William Nordhaus in his article, "The Allocation of Energy Resources," (BPEA, 3:1973).

In the first article of this issue, Edward Gramlich develops systematic and comprehensive estimates of who bears the burden of an increase in national unemployment. Using detailed information on about 2,600 families who, during 1967–72, participated regularly in a panel conducted by the Survey Research Center of the University of Michigan, the paper traces the effects of an economic slump on family incomes along four routes: (1) the direct impact resulting from more unemployment of the chief breadwinner of the family; (2) the added burden from shorter working hours by the family head; (3) the loss in earnings of "secondary" workers (typically wives and teenagers); and (4) the cushioning of family income provided by transfer payments, such as unemployment insurance and welfare. Gramlich's estimates do not en-

compass the adverse effects of a slump on the quality of jobs (such as reduced opportunities for promotions), nor do they assess the cushioning effect of lower income tax bills for the victims.

In appraising the direct unemployment effect, Gramlich uses his large sample to estimate the influence of various personal characteristics of the head of the family on his or her vulnerability to unemployment. He finds, for example, that unemployment is likely to be greater among family heads who lack high school diplomas, who are normally engaged in low-paying occupations, who have frequently changed jobs in the past, and who reside in states that provide especially comprehensive unemployment insurance coverage. Many of these personal characteristics of the head are related to the normal income of the family. Thus heads of families with poverty-line incomes (roughly $5,000 for a family of four in 1974) tend to have less education and more past changes in jobs than do the heads of middle-income families, and hence are more vulnerable to unemployment.

Taking account of the average personal characteristics in various income groups, Gramlich estimates that an increase in the national unemployment rate of 1 percentage point raises the unemployment rate of male heads of poverty-line families by 1.3 percentage points for whites and 2.1 for blacks. In contrast, at five times the poverty line (roughly $25,000 income), the additional unemployment experienced by white and black male family heads is about half those values, respectively. One of Gramlich's most striking findings is that female heads of families are much less vulnerable to increases in overall unemployment than male heads are, no matter what their income or race. A rise of 1 percentage point in the national rate increases the unemployment rate of female heads of families by less than a point—by as little as 0.5 point for high-income whites and, at the other extreme, by 0.9 point for poverty-line blacks.

When the reduction in work hours and the loss of earnings of secondary workers are taken into account, total losses in family earnings are nearly twice those due solely to the unemployment of the head; and they exhibit a somewhat altered pattern by type of family. Allowing for all three effects on earnings, Gramlich finds that each percentage point increase in the national unemployment rate reduces the personal income of families headed by men, on the average, by

—nearly 4 percent for blacks at the poverty line
—nearly 3 percent for whites at the poverty line
—about 2 percent for blacks at three times the poverty level
—about 1½ percent for whites at three times the poverty level
—about 1 percent for both races at five times the poverty level.

In contrast, the loss is typically under 1 percent for families headed by females in various categories of race and income.

Transfer payments offset the income losses, but only partially and erratically. Only a third of jobless male heads of low-income families report the receipt of unemployment insurance benefits; but those who receive them recover thereby nearly two-thirds of their pretax losses in earnings. Gramlich notes that unemployment benefits are probably underreported in his sample, but not by enough to change the basic picture of skimpy coverage at low-income levels. Welfare payments provide a particularly important offset to earnings losses of women who head families. All in all, unemployment insurance, welfare, food stamps, social security, and miscellaneous transfers replace about 31 percent of the pretax loss of earnings for poverty-line families headed by males and about 56 percent for those headed by females.

Even with the cushioning provided by transfer payments, the loss of family personal income due to a 1 percentage point rise in the overall unemployment rate ranges between 2 and 3 percent for poverty-line families headed by white and black men. Thus, Gramlich demonstrates, a recession imposes a very regressive "tax" on the incomes of poor families headed by males, with an extra levy on blacks.

In the second article, Robert Hall presents a new analysis of how labor market conditions determine the evolution of the wage level and hence the rate of wage inflation. His modeling of the wage determination process unites three characteristics of labor market and wage behavior that have been recognized individually but not previously integrated. First, in the process of shopping for jobs, workers find better opportunities when unemployment is low than when it is high; trying to do as well as possible for themselves, they are thus more likely to quit jobs and venture forth into a tighter labor market. Second, the rate of increase of wages responds to the ease or tightness of labor markets,

but not because the unemployed compete for available jobs by offering to work for less. On the contrary, the labor market operates with wage scales established through collective bargaining or bureaucratic personnel policies that respond, at best, very indirectly to unemployment rates. Third, past inflation casts a long shadow and plays an important role in determining current wage changes and inflation.

Central to Hall's model of how the wage level is determined is the concept of the scale wage, which he traces to earlier analyses by labor economists such as John Dunlop and Melvin Reder. At intervals, firms set a scale wage (or, more accurately, a whole set of scale wages for different job categories) at a level that they believe will just permit them to fill future job openings with appropriately qualified personnel. Depending on whether the labor market is easier or tighter than expected, the scale wage may turn out to be too high or too low. In the former case, the firm takes workers with especially good qualifications. In the latter case, it has to accept workers who are less qualified than it would prefer. In either case, the true cost of labor, which Hall describes as the "marginal effective wage," will differ from the scale wage. When the scale wage is to be adjusted again, the firm will reflect its actual experience—its marginal effective wage—in the new setting. A tight labor market pushes the marginal effective wage above the scale wage and raises subsequent settings of the scale wage. Thus, in Hall's model, the strength of economic activity initially alters effective wages, and that, in turn, directly influences firms' estimates of the necessary change in the scale wage; this process contrasts with that of other models in which economic activity initially affects price inflation and then influences wages by affecting expected inflation rates.

Hall provides statistical estimates of the wage determination process from two separate applications of his model. In one, he uses direct evidence on the scale wage inferred from the union contracts of five large employers. In the other, he uses more conventional aggregate wage data in a model implied by his scale-wage formulation since economywide scale wages are not observable. Hall finds some evidence that the rate of wage increase will accelerate indefinitely if unemployment is maintained at too low a level. While scale wages will lag behind marginal effective wages when labor markets are tight, the successive responses of employers in setting the scale wage can yield the "accelerationist" result produced by some previous models. However, the lags in Hall's model

are long and hence the rate of wage inflation—whether slowing or speeding up—changes only gradually in response to labor market conditions.

Hall estimates the equilibrium rate of unemployment—the rate that would just sustain an established rate of wage increase—from both statistical applications. Largely because of changes in the demographic composition of unemployment of the sort previously analyzed by George Perry (*BPEA,* 3:1970), the estimated equilibrium unemployment rate in today's economy is rather high: 5.1 percent from the analysis of five major employers; and 5.5 percent from the aggregate wage equation, which Hall regards as the more reliable basis. Hall's message is that, in today's economy, wage inflation will accelerate gradually or decelerate gradually depending on whether the unemployment rate is below or above 5.5 percent.

Hall interprets the present wage inflation in light of his results. He attributes most of it to running the economy with unemployment below the equilibrium rate during the last half of the 1960s. And since only in 1971 was the unemployment rate distinctly above the estimated equilibrium, conditions in the labor market accelerated wages further on average in the 1970–73 period. Thus, Hall concludes that "today's high rate of wage inflation is the result of a decade of continuously tight labor markets, even though the shift in the composition of the labor force has masked the tightness in recent years."

In their detailed, analytical discussions of Hall's paper, both Robert J. Gordon and James Tobin suggest amendments to the model and question some of its conclusions. In particular, the omission of prices as a direct influence on wages is identified as a key issue and one that may be particularly relevant to the present wage outlook because prices have been rising more rapidly than wages. In addition, the pessimism implied by the model about attainable unemployment rates in the future could be modified if employers, in fact, adapt to the changing demographic composition of labor supplies in ways that are excluded from Hall's model.

The last two major articles in this issue analyze the supply of U.S. domestic oil. While the articles employ quite different models of analysis, both analyze various aspects of the competitiveness of the oil industry and the role of government policy toward the industry, and both esti-

mate the U.S. supply of oil that would be forthcoming at different prices. Interestingly, on several key issues, their conclusions are sharply different. In the first article on oil, Paul Davidson, Laurence Falk, and Hoesung Lee argue that inadequate competition in the domestic industry has been a significant factor in raising oil prices; but they offer optimistic estimates of potential U.S. oil supplies in the decade ahead. In the second article, Edward Erickson, Stephen Millsaps, and Robert Spann contend that U.S. oil production is effectively competitive; but they paint a pessimistic outlook for the expansion of U.S. production.

A major distinguishing theme sounded by Davidson and his associates is their stress on speculation concerning future oil prices as a key influence on current production. It is generally recognized by economists that oil producers will hold back output if they expect the price to rise over some future period by more than enough to make up for the forgone interest return obtainable from selling oil currently and investing the proceeds. But the possibility that expectations will diverge sharply from current market prices is rarely taken seriously. In contrast, Davidson and his associates argue that expected future profits from withholding production—what they call the "user cost" of producing currently—can be large and important. (It might be noted that both papers on oil in this issue employ the term "user cost" but each gives it a different meaning.)

As evidence of speculative withholding of production, the authors point to a tripling from 1971 to 1973 in the number of "shut-in" producible zones offshore—areas that are drilled and capable of producing but not actually yielding output currently. They believe that a significant user cost developed as a result of the formation of the cartel by the Organisation of Petroleum Exporting Countries and the expectation that the producing countries will keep boosting oil prices in an effort to test the full extent of their monopoly power. Moreover, they argue that the development of the OPEC cartel interacts with the market power of the multinational companies. First, the companies may also choose to exploit their market power more fully in a situation of rising crude-oil prices, raising the prices to their customers by more than the charges imposed by the host nations. Second, the companies are obliged to cooperate with the host nations lest they be expropriated; hence they may enforce the cartel arrangements even if doing so forces them to serve merely as tax collectors for the producing countries. Third, the com-

panies have vested interests in the enhanced value of their U.S. oil re-
serves, which would be gravely impaired by the discovery of a cheaper
alternative energy source.

This analysis leads to several recommendations for major changes in
federal policy toward the oil industry. First, the authors recommend an
accelerated program of leasing offshore tracts and shale lands to inde-
pendent producers and government-sponsored energy corporations.
They want these alternative sources developed by producers who do
not have a vested interest in the preservation of the values of existing
oil reserves. Second, the authors would insist on rapid exploitation of
new sources, even exceeding rates that are normally regarded as the
maximum consistent with long-term efficiency. They attach a particular
premium to a short-run expansion of output because it might generate
expectations of declining prices for OPEC oil and thus hasten the dis-
integration of the cartel. Third, they propose vigorous antitrust actions
to dissolve multinational conglomerate energy companies. Fourth, they
would accept long-term regulation, price controls, and stiff windfall
taxes if necessary to forestall expectations of substantial profits from
current withholding of output.

If (but only if) adequate policy actions are taken to avoid a general
expectation of rising oil prices and that monopoly power in the in-
dustry is reduced to the level that prevailed in 1971, the authors are ex-
ceedingly optimistic about Project Independence. They believe that U.S.
self-sufficiency is attainable in 1980 with crude-oil prices (deflated into
dollars of 1974 purchasing power) in the range of $5 to $7 per barrel.
Underlying this optimism is a statistical model that uses the actual rents
paid for oil-producing lands to estimate the productivity of additional
resources in discovering and extracting more oil. From such an analysis,
the authors estimate the long-run elasticity of U.S. domestic supply at
1.6, about double the estimate made by Erickson and his associates.
Moreover, because they believe production can be expanded promptly
from shut-in zones and other areas now operating below capacity, they
regard the 75 percent rise in U.S. output required to achieve self-suf-
ficiency in 1980 as quite feasible.

In their paper on oil, Erickson and his associates take an almost dia-
metrically opposite view of the current competitiveness of the domestic
industry. They point to a 25 percent decline in the "real price" (that is,

the price deflated by the consumer price index) of gasoline, excluding taxes, from 1951 to 1972. What's more, during that period, real markups fell sharply in refining, the very area where giant companies have the largest share of the market. They read this historical record as evidence of competitive behavior, which refutes the charge of cooperative or collusive action by the companies. They emphasize the monopoly power that the producing countries wield, but see that as existing independently of the multinational oil companies.

Erickson and his associates also deliver a contrasting verdict on the outlook for domestic supply. They estimate a supply function for U.S. production in the "lower forty-eight" (that is, excluding the Alaskan fields, for which no history exists) by relating the demand for oil reserves to the price and "user cost" of oil. The higher the ratio of price to user cost, the higher will be the desired level of reserves. Actual reserves adjust to the desired level with a time lag that is estimated in the model. Thus, armed with quantitative estimates of the response of reserves to price and user cost and of the time lag involved in this response, the authors can generate estimates of U.S. reserves in future years for various prices and user costs.

In this paper user costs depend on interest rates and effective tax rates on oil profits. The latter in turn are influenced not only by the standard corporate income tax rate, but also by the percentage depletion allowance and the provision for expensing intangible drilling costs —the special tax provisions enjoyed by the oil industry, which are a crucial issue in the current debate on energy policy. The authors calculate that removal of these two special incentives would raise user costs by 45 percent, thus requiring a 45 percent higher price to achieve a given level of reserves (and production) of oil in the lower forty-eight states. Alternatively, at a given price of oil, reserves in the lower forty-eight would be 17 percent smaller in 1985 if the incentives are eliminated than if they are retained. However, since development of Alaskan reserves is not expected to hinge on these tax incentives, the difference in total U.S. oil reserves would be only about 10 percent. And the total U.S. energy supply, including other fuels, would be lower by only an estimated 3 to 5 percent. Thus, the authors conclude, the elimination of the special tax incentives for oil would be worthwhile since at present they impede the rational discussion of energy policy and misallocate resources.

With or without the special tax incentives, Erickson and his associates are relatively pessimistic about the future growth of U.S. reserves. Their estimate of the price elasticity of desired reserves is only 0.76. Thus a 10 percent rise in price (or decline in user costs) would result in a 7.6 percent rise in desired reserves. And the adjustment of actual reserves to the desired level would be slow, with only about half of the adjustment completed after seven years. Without the special incentives, at a price of $8 per barrel, reserves in the lower forty-eight would rise only slightly from present levels over the next decade. At a price of $12 per barrel, these reserves would rise by 4½ billion barrels over the next five years and by about 8 billion barrels over the next ten years, pointing to production increases above current levels of just under ½ and 1 billion barrels a year, respectively. While the authors do not estimate future demand or supplies of other fuels, it is clear that large increases in production from Alaskan reserves would be needed to attain self-sufficiency even by 1985. And the price of oil would remain high.

The strikingly different projections of U.S. oil supply presented by these two papers illustrate the uncertainties that must surround such a look into the distant future. And the totally different statistical models employed in the two papers illustrate the lack of a firm basis even for modeling the discovery of crude oil. In an extensive critique of the two papers that follows them in this issue, Charles Schultze outlines some aspects of the process of oil discovery and production that might usefully be incorporated in future attempts to estimate supply.

In the first of the two shorter reports in this issue, Arthur Okun discusses the puzzling behavior of unemployment in relation to real gross national product during the first half of 1974. From the fourth quarter of 1973 to the second quarter of 1974, the unemployment rate rose only from 4.7 to 5.1 percent, in the face of a 2 percent decline in real gross national product. On the basis of past historical relationships, that dip in output would have been expected to increase the unemployment rate by 1.5 percentage points rather than the actual rise of 0.4 point. Okun cites previous instances in which unemployment was surprisingly low relative to output; these generally emerged in the late stages of economic expansion, when output slowed down and yet firms kept adding to employment in response to their previous experience and continuing buoyant expectations.

Much the same behavior may have marked the first half of 1974. Firms interpreted the decline in output as a temporary interruption of economic growth caused by the oil embargo. In Okun's judgment, these overly optimistic expectations, reinforced by encouraging income statements that reflected capital gains on inventories, produced unusually strong demand for labor during much of 1974. Businessmen now appear to be engaged in an agonizing reappraisal of the severity of the slump, and are likely to cut employment sharply in the months ahead. When this paper was presented, the last reported unemployment statistic was the 5.4 percent rate for August. In the next two months, the rate rose to 6.0 percent. Okun expects the unemployment rate to move further upward and cross 7 percent by mid-1975, even if real output does not fall further.

In the final report, Michael Wachter examines wage developments in the early 1970s from three different perspectives: (1) movements in relative wages among industries; (2) recent major collective bargaining settlements and their implications for the near-term wage trend; and (3) the forecasts of conventional, simplified equations for wage inflation in 1975.

In his look at relative wages among industries, Wachter finds that they are essentially in equilibrium now, in contrast to the situation of 1968–69 which embodied a relative squeeze on union wages and led to the large collective bargaining settlements of 1969–71. But, in Wachter's judgment, the present relative balance does not promise moderation. Newly negotiated settlements have recently accelerated sharply, not because of abnormal wage differentials among industries, but because of the rapid rates of price inflation of 1973–74.

Finally, because of the strong influence attributed to past price inflation in determining wage changes, Wachter's equations point to a serious wage inflation in 1975. Under a range of alternative assumptions that span unemployment rates of 6 percent to 7 percent and price inflation rates of 6 percent to 10 percent by the end of 1975, Wachter consistently projects rates of wage increase between 10 percent and 12 percent throughout 1975. The sizable lags operating on wages preclude the likelihood of a wage slowdown in 1975, according to Wachter's analysis.