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Introduction

The subject of this conference volume is the U.S. inflation of 1965-1974 and, to some extent, its interrelationship with inflation in other countries. The period covered is one during which Federal deficits grew and rates of monetary growth were high. There was also an exceptional variety of developments of the kind that are frequently considered in the analysis of inflation. There was the Vietnam buildup, Medicare, a housing boom, devaluation of the dollar and a shift to floating exchange rates, wage and price controls, the rise in crude oil prices and severe bottlenecks in primary product industries. All these developments were associated with both a high rate of inflation and marked changes in relative prices.

It is not my intention in this introduction to summarize each of the papers in the volume. At the conference, discussants were asked to summarize the papers before offering critiques of them. As a result, the reader will find convenient summaries in the discussants' comments, as well as in the concluding sections of many of the papers. Rather, my intention here is to put the conference in perspective in relation to the period of economic history on which it focused, to point out the new ground broken in the papers, to highlight broad areas of agreement and disagreement about the source of the decade's inflation, and to indicate the path of future research suggested both in the papers and by the discussion at the conference.

From the end of 1964 to the end of 1974 the consumer price index rose 66.0 percent, or at an average annual rate of 5.2 percent. In this century only the inflations of 1910–1920 (7.5 percent per year) and 1941–1951 (5.8 percent per year) surpass that of the decade 1965–1974 in terms of intensity. It is interesting that each of these three decades spanned at least one war, which may say more about the disturbing frequency of such outbreaks than about the cause of inflation. To sound a perhaps unwarranted note of optimism, let me also point out that the rate of inflation in the ensuing decade was markedly less: –1.8 percent per year in 1920–1930 and 1.4 percent in 1951–1961.

As one might expect, during 1965–1974 there was considerable fluctuation of the rate of inflation about its average for the period. For changes over twelve-month spans, the rate varied from a low of 1.9 percent to a high of 12.2 percent; it was higher on average in the last half of the decade than in the first half. In terms of the joint variation of the rates of inflation and changes in final output, the ten years can be broken down into several episodes. The year 1965 and the first half of 1966 can be characterized as a period of strong output growth associated with the Vietnam buildup, and of a rekindling of inflation, which had been relatively quiescent since 1958.

Economic activity slowed in 1966–1967 and output was almost flat for one quarter, but this was not tantamount to a recession as usually defined. The expansion of output that began in 1961 was, thus, not interrupted, giving rise to an unusually long expansion and raising the question of whether the business cycle was still alive. It was the 1966–1967 behavior of output that probably gave rise to the interest in growth cycles. But the 1966–1967 experience also had another, perhaps more important, impact—one on policy-makers. The overall rate of inflation slowed markedly during the growth slowdown. This suggested anew that policies effecting merely a slowdown in the rate of growth could bring about marked abatement of inflationary pressures. It also brought about renewed interest in Phillips-curve relationships. However, upon closer examination, the bulk of the slowdown in the rate of advance of the CPI during this period turned out to be due to the behavior of farm product prices, which responded, as they usually do in the short run, to the marked changes that often occur in supply. In late 1966, supplies of farm products, particularly livestock, had risen from depressed levels in the preceding twelve months.

The third episode was the resumption of fairly strong rates of output growth from mid-1967 to the third quarter of 1969. This was

accompanied by the resurgence of inflation as food prices turned upward and other prices, particularly those of services, increased at an accelerating rate. A key element in the rapid advance of service prices was the continuation of the steep rise in medical care services, a trend that seems to have begun in 1966 and is associated by some with the adoption in 1965 of Medicare and Medicaid.

In 1969 monetary and fiscal policy turned restrictive, and a recession began late in the year. Inflation slowed very little as measured by the fixed weight deflator for gross private output. That measure, unlike the CPI, is not affected by movements in the mortgage interest rate, which dropped sharply between 1969 and 1970. During the recession the fixed weight deflator rose 5.1 percent, compared with an increase of 5.2 percent during 1969.

The recovery began in the first quarter of 1971 with a rise in real GNP that was particularly sharp because auto output had been depressed by a strike in the fourth quarter of 1970. But the growth of real output slowed markedly thereafter, rising at a rate of only 2.9 percent in the second and third quarters. As a result, the unemployment rate hovered at the relatively high 6 percent level that it had reached during the recession. But inflation did not abate; as measured by the fixed weight deflator for gross private product, to exclude the effect of changes in mortgage interest rates, it continued to run at a rate of 5.4 percent during the first two quarters of 1971. In the second quarter, this combination of inflation and unemployment, coupled with a rapid deterioration in the U.S. balance of payments position, created considerable pressure for additional policy measures.

On August 15, 1971, the United States adopted wage and price controls for the first time since the Korean War. The controls began with a ninety-day freeze on wages, prices, and rents. In an equally dramatic step, the United States, for the first time since 1934, suspended the convertibility of the dollar into gold or other reserve assets.

The control program lasted through April 1974 but underwent a number of changes. During the freeze a set of mandatory standards for wage and price behavior was developed. Called Phase II, it was in place from the end of the freeze until January 11, 1973. Phase III followed, distinguished importantly from its predecessor in that emphasis was placed on self-administration of the regulations; the requirements for prenotification of intended wage and price changes were dropped in most sectors of the economy. But as the pace of inflation accelerated in the winter and spring of 1973, the

program was made more stringent, chiefly by reintroducing pre-notification requirements. A freeze was put in place once more, on June 13, 1973; it lasted about sixty days. It was followed on August 12 by Phase IV. The rules in this phase were stricter in some respects than those of Phase II after which they had been patterned. But they provided far more flexibility in dealing with shortages and were intended to provide a means of smoothing the transition to an uncontrolled economy. The main vehicle for achieving both objectives was the provision permitting decontrol of specific sectors on a selective basis.

From the third quarter of 1971 to the first quarter of 1973, when the first freeze and Phase II of the control program were in place, real GNP grew at an annual rate of 6.9 percent. This was the fastest pace for any six-quarter period since the one ending in the fourth quarter of 1951, the Korean War period. During the same six quarters, inflation as measured by the deflator slowed to a rate of 4.3 percent. But toward the end of the period there were emerging signs of its acceleration, visible in the price increases for raw commodities, which were particularly sharp for farm products.

Increases in real GNP began to slow in the second quarter of 1973, reflecting some capacity ceilings, and turned negative in the first quarter of 1974 under the impact of the oil embargo and a marked acceleration of inflation. Real GNP continued to decline throughout the year at an increasing rate after the embargo ended. The rate of inflation reached into the double-digit range in the first quarter of 1974, mainly as a result of the rise in crude oil prices. It remained there for the rest of the year, as prices of other primary commodities jumped substantially and wage rate increases accelerated to a rate of more than 10 percent. The larger part of these increases occurred after the sharp runup in crude oil prices and the termination of controls on April 30, 1974.

Analysis of inflation during all or part of 1965–1974 is the subject of the papers in this volume. The diversity of inflationary forces during this period and the policies designed to combat them are reflected in the analytical foci of the papers. As one might expect, considerable attention is given to assessing the impact of controls. The shift to floating exchange rates and apparent increased interdependence of national economies are reflected in the analysis of the effect of U.S. inflation on Canada and of the transmission of inflation and exchange rate change among several industrialized countries. The marked shift in relative prices toward the end of the decade is reflected in the significant extent to which analyses are conducted at a more disaggregated level than has up to now been

employed in the analysis of general inflation. But macroanalysis is not eschewed in this volume. It contains aggregative analysis in both Keynesian and monetarist frameworks as well as a focus on the role of expectations in producing inflation.

Administered pricing, another hypothesis about the nature of general inflation, in which prices respond belatedly, if at all, to changes in demand, did not receive much attention from the authors, and the discussants did not criticize them for it. Perhaps this is because administered price hypotheses usually are examined during recessions in an attempt to explain the apparent downward inflexibility of wages and prices during such periods of the cycle. There was only one recession during 1965–1974, the one of 1969–1970. Administered pricing might come to the fore again when economists analyze the behavior of prices in the rather steep recession of 1974–1975.

Much of the diversity in the analyses presented in the volume is a result of the inclusion of the years since 1970. That the developments of those years affect the analysis of price behavior can be seen by a comparison of the topics covered at this conference with those addressed in a comprehensive conference on price behavior held just four years earlier—October 1970. That conference, *The Econometrics of Price Determination*, was sponsored by the Board of Governors of the Federal Reserve System and the Social Science Research Council.

The main focus of the 1970 conference was on the Phillips curve or the inflation-unemployment trade-off. Wage behavior was accorded the central role in the explanation of inflationary bias in the economy. Recall that this was at a time when the profit share was falling and increases in unit labor costs rather than unit profits were dominating price change. Related issues addressed at that conference included the natural rate hypothesis and the role of expectations. The need was expressed for experimentation with direct measures of price expectations; one paper in this volume reports results of using such measures. Some, but not much, attention was given on that occasion to the role of materials prices and capital costs, particularly in the context of industrial-sector price equations. A similar amount of attention was given to the international transmission of inflation.

While only one paper at the 1970 conference dealt with price behavior at the industry level, the reader of this volume will find that about half the papers are based on disaggregated analysis of price behavior. And the approach to disaggregation varies. Bosworth and Vroman develop their price equations from a stage-of-

process approach in which differences are examined in the behavior of consumer price index components and prices of similar products in the wholesale price index. Al-Samarrie, Kraft, and Roberts and also Nadiri and Gupta use breakdowns along SIC lines in manufacturing to help them explain the prices of gross outputs. Nordhaus and Shoven also use gross output prices, analyzing them in an input-output framework. Lawrence Klein reports results of one-digit-sector value-added deflators embedded in the Wharton model, thus establishing a link between sectoral and macroeconomic effects. A similar link between sectoral and macro effects is established in the CANDIDE model of the Canadian economy, as reported by Bodkin, Chabot-Plante, and Sheikh. Hirsch develops an aggregate capacity utilization index that mirrors underlying microlevel bottlenecks in manufacturing industries.

There are two major reasons for the shift to greater disaggregation in the studies of price behavior in this volume. The first is the interest in analyzing the effectiveness of controls in the specific markets in which they were applied. The second reflects interest in explaining the "commodity inflation" of 1972-1974 and in tracing its impact through to the prices associated with final demand.

But admittedly the findings of sectoral analysis cannot be generalized until more is known about the relationship between changes in relative prices and the overall rate of price change. If, for example, price increases were smaller than predicted by structural models for sectors in which prices were controlled, it does not follow obviously that controls were effective for the economy as a whole unless this result is buttressed by findings concerning developments in the uncontrolled sectors. Nor would even this broader analysis support such a final conclusion about controls without an examination of their effect on output, employment, investment, and expectations, as Kusters points out. Similarly, a conclusion that the bulk of the 1972-1974 burst of inflation is attributable to the sharp rise in commodity prices says nothing about the general inflation until the source of the rise in primary commodity prices is understood.

Nonetheless, sectoral price studies must precede attempts to address the broader questions about the nature of inflation regardless of how the inflationary process is viewed at the macro level. For the monetarist, such studies can be of use in explaining the lags found in the workings of monetary policy and the time path of the distribution of a change in money demand between price and quantity in reaching a new equilibrium. For the Keynesian, sec-

toral studies can be useful in defining the zone of full employment in relation to the aggregate supply curve as well as in determining which, if any, prices are relatively inflexible downward and whether the inflexibility applies only within a certain range of downward shifts in demand.

In addition to their pervasiveness in this volume on price behavior, several other points about the sectoral price studies stand out. In the 1970 Conference on the Econometrics of Price Behavior, sectoral studies were criticized because materials and capital costs were not specified as determinants of prices in the industries under investigation. In the sectoral research presented in this volume, that criticism appears to have been taken seriously. Materials input prices were found to have a significantly large impact on output prices, and the effect of capital costs, though small, was also significant in a number of industries.

Another shortcoming of earlier studies that was remedied in the research presented here relates to the double counting of price change that is implicit in the use of certain aggregate indexes of the wholesale price index system. Research on the behavior of prices for the manufacturing sector (and its major components) usually focused on the WPI for manufactured goods, an aggregate index that includes prices of goods sold within the manufacturing sector as well as outside it. The emphasis in this volume is on input and output price indexes. These, if properly constructed, eliminate double-counting problems.

The analytical findings presented at the conference fall into two categories—those which pertain to the period as a whole and those which pertain to certain subperiods. For the decade as a whole, the results contained here are consistent with those reported elsewhere to the effect that macro models were not accurate in their prediction of wage and price behavior.

Two findings emerge concerning wage determination. The first is that as new observations on wage behavior during 1966–1973 are added in the estimation of Phillips-type wage equations, the coefficient of the price term appears to increase absolutely and relative to the coefficient of the inverse of the unemployment rate. This finding came to light in the 1970 FRB-SSRC conference and was substantiated, using more recent data, by Bosworth and Vroman in their paper. It is also implicit in the finding of Wachtel that the coefficient of the price expectations variable, which he substitutes for lagged price in several wage relationships, becomes significant only after 1965. The same result also appears indirectly in the paper by Bodkin, Chabot-Plante, and Sheikh, in which the sensitivity of

Canadian inflation to U.S. inflation is found to have increased from 1960-1965 to 1966-1970. These empirical results all point to an increasing importance of the feedback from prices to wages in the inflation of 1965-1974.

Another finding about wage determination equations is that there were large prediction errors in 1970-1971. The unusually large increases during those two years in settlements in the unionized sector are examined in the papers by Kosters and by Bosworth and Vroman. The latter quantify the contribution of errors in wage equations for the union-negotiated sector to errors in aggregate wage rate equations. These large residuals declined markedly during controls, making it difficult to assess the impact of the program on wages. If the large residuals were merely aberrations, then controls had no effect. If they marked a significant shift in wage behavior, then the program had the effect of restoring historical relationships between wage rates and their determinants.

With respect to prices, there is no conclusive indication that prediction errors were rising as a percent of actual inflation rates. In the most comprehensive aggregative econometric analysis in the volume, that of Klein, underestimation of price change accelerates in 1968-1971, decelerates in 1972-1973, and accelerates again in 1974. It is only in predicting the level of the price of final output that accelerating errors occur, a finding of both Klein and Anderson and Carlson, the latter's based on the monetarist model of the Federal Reserve Bank of St. Louis.

At the sectoral level, prediction appears to improve when account is taken of the devaluation and the sharp rise in prices of primary commodities, both domestic and imported. Nordhaus and Shoven find that from November 1970 to October 1973, wage rates and import and raw commodity prices explain, both directly and through their impact on other prices, the bulk of the price change observed in the WPI. From October 1973 to July 1974, these prices and wages explain less of the overall rise in the WPI. This suggests that margin widening occurred. Perhaps it was due to an increase vis-à-vis the past in the extent to which firms passed through into prices, the rise in costs associated with the cyclical deterioration of output per man-hour that occurs just before and after the economy reaches a cyclical peak, as it did in 1974.

Nothing in these results suggests the abandonment of any existing theories of wage and price behavior. What they do suggest, however, is that there is, as yet, no single, unique approach to analyzing price behavior, which, when implemented empirically, can explain the inflation of the past decade. The promise of price

analysis is that it may lead to the development of a more reliable structure for simulation and prediction.

The diversity of inflation-related developments during 1965-1974 has already been remarked. Two that occurred in the latter part of the decade received the bulk of attention at this conference. This first is the wage and price control program that began in 1971; the second is the pervasiveness after 1972 of rapid inflation among industrial countries and its relationship to the devaluation of the dollar and to floating exchange rates.

The effect of controls is explored by Klein, Bosworth and Vroman, Kosters, Nadiri and Gupta, and Al-Samarrie, Kraft, and Roberts. As might be expected, there are differences in the conclusions of each. The differences about the effect of controls would probably be multiplied if the quantitative studies of those effects were broadened to include not only their impact on wages and prices but also on output, foreign trade, and investment. The econometric results reported suggest that the conclusions reached about controls are quite sensitive to the theoretical specification used, the sample period to which the regressions are fitted, and the level of disaggregation at which the analysis is conducted.

The findings of Kwack and of Nordhaus and Shoven, already mentioned, provide some insight into the interrelationships among the rapid inflations of 1973-1974 experienced by most industrialized countries outside the Communist bloc. Kwack finds that a decline in one country's exchange rate worsens its inflation-unemployment trade-off while improving that of its trading partners. Nordhaus and Shoven show that the rise in U.S. import prices after devaluation contributed importantly to the inflation rate of the United States.

While varied in approach and finding, these studies of particular inflation-related developments suggest we are on our way to understanding either the development or its impact, depending on which it is appropriate to focus. It would appear that economists are far from having to "dummy out" periods of economic history such as the Vietnam buildup, wage and price controls, or the 1972-1974 worldwide commodity inflation. What is suggested, however, is that more disaggregation is needed and that national models of various countries should be linked, research strategies that are currently being pursued.

In summarizing the research presented at the 1970 Conference on the Econometrics of Price Determination, James Tobin said, "there is more reason to be optimistic about wage-price econometrics than about resolution of the inflation-unemployment di-

lemma." Notwithstanding the failure of wage and price equations to predict the intensity of the recent inflation, that conclusion is appropriate for this conference as well. The results reported here suggest that through disaggregation, consideration of international effects, and improvement in specification, tools can be developed to warn of the emergence of significant changes in inflation rates.