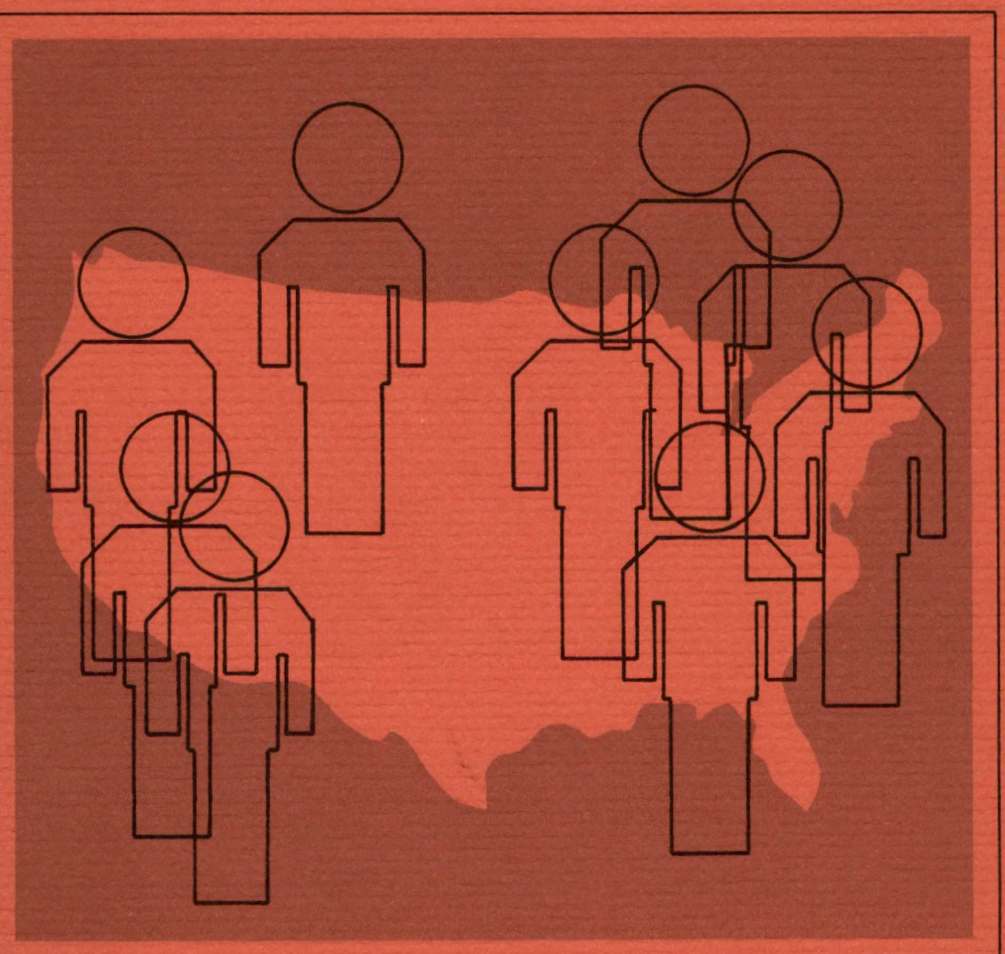
DOMESTIC AFFAIRS STUDIES

THE HYDRA-HEADED MONSTER

The Problem of Inflation in the United States

Phillip Cagan



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THE HYDRA-HEADED MONSTER

The Problem of Inflation in the United States

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. . . the inflation came in various forms—sometimes led by wages, sometimes by prices, by foods, by oil; sometimes it was domestic and sometimes imported. Many programs have been launched to stop it—without durable success. Inflation seemed a Hydra-headed monster, growing two new heads each time one was cut off.

Annual Report of the Council of Economic Advisers, 1974

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EMERGENCE OF THE "PROBLEM" OF INFLATION

Introduction

At the close of World War II many people, including professional economists, thought that the U.S. economy, no longer stimulated to overfull employment by armament expenditures, would return to its prewar condition of depression. Ironically, this widely accepted and gloomy projection of the future was dead wrong—as is often true of projections at historical turning points. The postwar period brought prosperity and rising prices, not depression and stagnation. The overhang of war-related scarcities and the lifting of price controls in 1946, followed by scare buying at the outbreak of the Korean War in 1950, set off bursts of inflation, and high aggregate demand kept the economy at or above the threshold of inflationary pressures for most of the 1950s. For the general public the spectre of depression faded and persistent inflation became the major concern.

During the 1950s fears of recurrent inflation could still be viewed as exaggerated, because timely changes in future policy seemed capable of avoiding the overexpansions in aggregate demand that started inflationary movements. Indeed, the inflationary pressures of the 1950s withered in the next half-decade, and concern with inflation abated. During the first half of the 1960s price increases were quite moderate. The wholesale price index fluctuated around a flat trend, and the consumer price index rose only 1¼ percent per year.

Yet it was also apparent that fewer sizable declines had been appearing in the aggregate indexes for some time. After the 1930s such declines occurred only during the 1949 recession and in whole-

I wish to thank Marten Estey, William Fellner, Gottfried Haberler, Marvin Kosters, Dan Larkins, Norman Mintz, and Anna Schwartz for helpful comments on an earlier draft.

sale prices following the scare buying induced by the Korean War. Without periodic declines, the trend of prices in the 1950s and 1960s was unmistakably upward.

Then in 1965 the Vietnam War set the stage for another round of inflation. Although monetary restraint finally engineered a business recession in 1970 and price controls were imposed in 1971, these policy actions made little enduring headway against the inflation. The failure was alarming. "The rules of economics are not working in quite the way they used to," complained the chairman of the Federal Reserve Board.[1] No one could doubt that inflation had become worse. The continuing rise of prices during 1970-72 despite a slack economy explains the public's shock when prices then skyrocketed in 1973, thrusting the wholesale price index up 18 percent that year. The prospect that the United States might not be able to avoid the perpetual high rates of inflation that had engulfed many other countries after World War II was now seriously contemplated by middle-of-the-road professionals and widely feared for the first time by the public. Inflation had become a frightful "Hydra-headed monster" to the Council of Economic Advisers.[2]

How and why had inflation become worse since World War II, finally soaring out of control in 1973 and 1974? Had it become uncontrollable?

Post-World War II views of the inflation problem evolved through several stages before they reached the present belief that the nation is prey to unending and perhaps escalating inflation. This essay surveys these developments as background for assessing what we know about inflation and what, lacking sufficient evidence, we can only conjecture. Although the postwar inflation has been a worldwide phenomenon, the United States was until recently largely insulated from foreign monetary influences. The discussion is confined to domestic developments, without any intention of denying international similarities and interrelationships. The emphasis is on changes in the behavior of prices and the associated problems of effectively controlling inflation in the United States.

Historical Changes in the Behavior of Prices

An overview of postwar U.S. price movements is provided by Figure 1. It shows the monthly changes (expressed as annual rates) of the

[1] Statement of Arthur F. Burns before the Joint Economic Committee, July 23, 1971, reprinted in *Federal Reserve Bulletin*, vol. 57 (August 1971), p. 656.

[2] *Annual Report of the Council of Economic Advisers*, February 1974, p. 21.

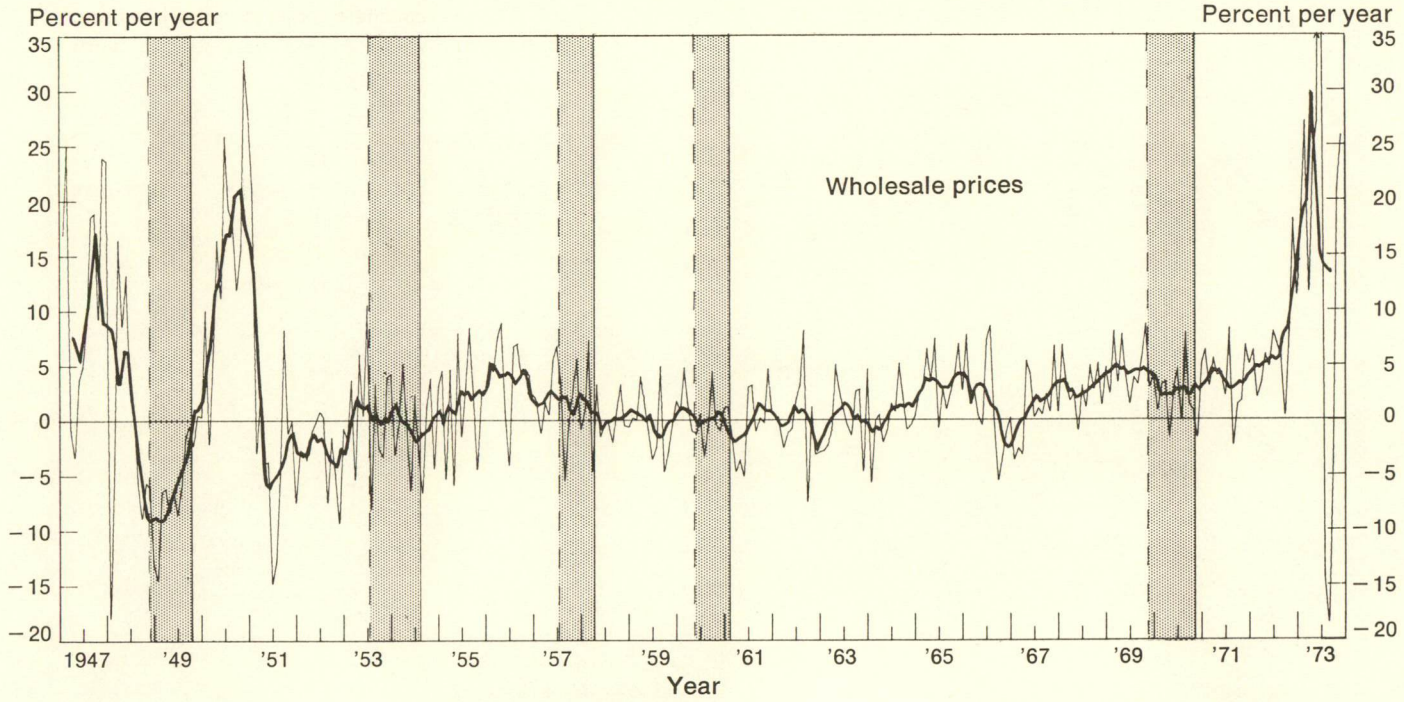
aggregate wholesale and consumer price indexes, plus centered six-month moving averages. Periods of business recession are shaded. As might be expected, the rates fluctuate considerably from month to month; but more important, the six-month averages show that inflation has also surged and subsided over periods of several years' duration. The surges generally came first in wholesale prices and gradually worked through the price system to consumer prices. The CPI has had a higher average rate of increase mainly because the long-run increases for services and housing have been greater than those for basic commodities and manufactured goods. These differences in price trends among components of the indexes reflect long-run supply conditions largely unrelated to general inflation.

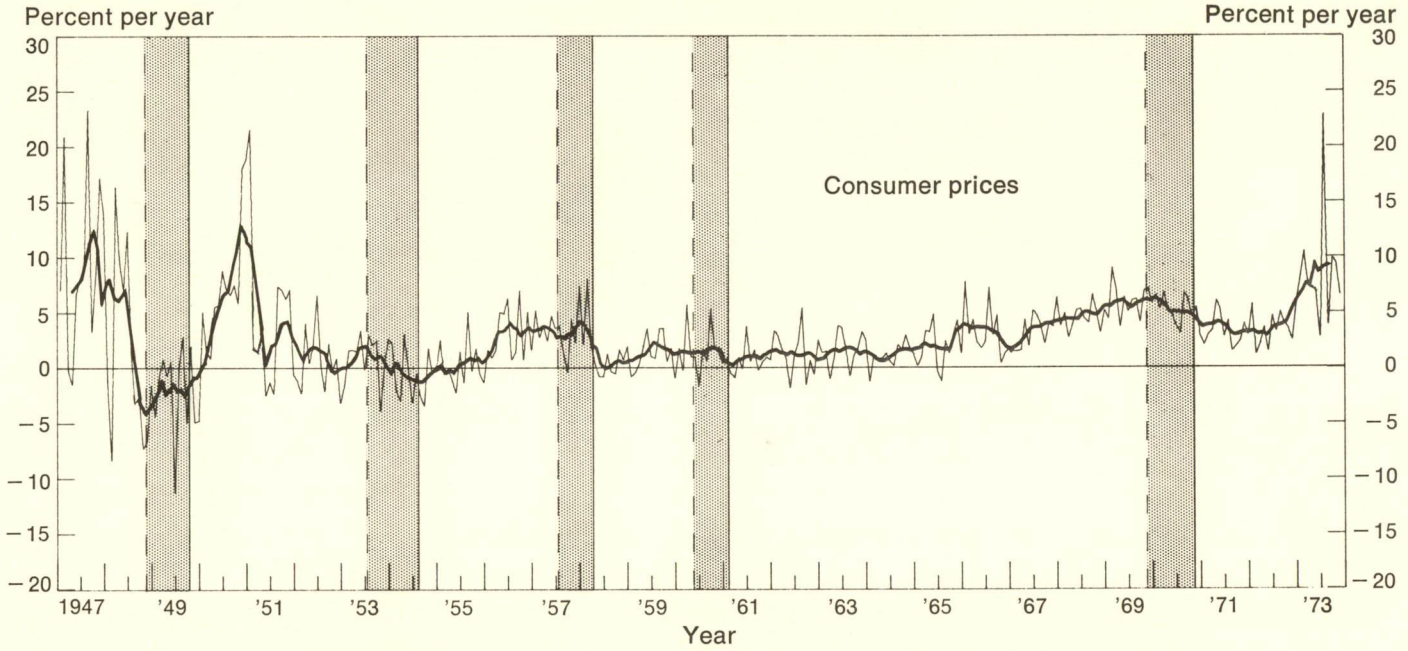
Four major inflationary movements have punctuated the postwar period. They originated in (1) the strong expansion of aggregate demand associated with World War II but partially delayed until the removal of price controls in 1946, (2) the outbreak of the Korean War in 1950, (3) an investment boom in 1955, and (4) the escalation of the Vietnam War in 1965. When the demand pressures eased, the price increases moderated but continued to ripple through the economy for some time. During the six postwar business recessions the wholesale price index rose hardly at all and in one (1948-49) it fell. But none of these were sufficient to reverse the increases during business expansions.

Table 1 compares these developments with earlier business cycles going back to 1890. Even in times other than the two world wars and the major depressions of 1920-21 and 1929-33, the amplitude of cyclical fluctuations in the rate of price change has varied appreciably. No trend either way appears until the 1950s, but then the amplitude diminishes for both expansions and recessions. As the averages reported at the bottom of the table demonstrate, the six cycles from 1921 to 1949 had much larger amplitudes on the average than the four from 1949 to 1970. The problem of persistent inflation is reflected in the fact that the attenuation of rates of price decline during recessions was greater than the moderation in the rates of rise during expansions. As a result, the change in rates of change from each expansion to the ensuing recession became less negative and, in the last two cycles, the change became positive—that is, the rate of price increase in the recession exceeded that in the expansion, perverse cyclical behavior not exhibited before. The distinctive feature of the postwar inflations has not been that prices rose faster in periods of cyclical expansion—many previous expansions had much higher rates—but that they declined hardly at all, or even rose, in recessions.

Figure 1

RATE OF CHANGE OF WHOLESALE AND CONSUMER PRICE INDEXES, MONTHLY AND CENTERED SIX-MONTH AVERAGE, 1947–73





Note: Shaded areas denote business recessions.

Source: Bureau of Labor Statistics.

Table 1

WHOLESALE PRICES OVER BUSINESS CYCLES, 1891-1970

Business Cycles [a]		Rates of Change [b] (percent per year)			Total Change (percent)		
Trough	Peak	Expansions (1)	Recessions (2)	Recessions minus expansions (3)	Expansions (4)	Recessions (5)	Full cycle [c] (6)
May 1891	Jan. 1893	−0.9	−12.4	−11.5	−1.5	−19.2	−21.0
June 1894	Dec. 1895	1.7	−4.5	−6.2	2.5	−7.0	−4.3
June 1897	June 1899	6.3	5.0	−1.3	13.3	7.7	22.0
Dec. 1900	Sep. 1902	4.6	−0.7	−5.3	8.4	−1.3	7.0
Aug. 1904	May 1907	3.7	−4.0	−7.7	10.6	−4.5	5.9
June 1908	Jan. 1910	8.3	−4.0	−12.3	14.1	−8.3	5.3
Jan. 1912	Jan. 1913	6.1	−1.8	−7.9	6.3	−3.6	2.6
Dec. 1914	Aug. 1918	18.8	−4.1	−22.9	98.9	−2.4	94.0
Mar. 1919	Jan. 1920	19.9	−33.8	−53.7	18.1	−66.0	−40.6
July 1921	May 1923	4.8	−5.3	−10.1	9.1	−6.4	2.5
July 1924	Oct. 1926	1.6	−2.6	−4.2	3.6	−2.9	0.6
Nov. 1927	Aug. 1929	−0.1	−13.2	−13.1	−0.1	−60.3	−60.3
Mar. 1933	May 1937	9.0	−10.1	−19.1	45.8	−11.5	30.6
June 1938	Feb. 1945	4.4	1.2	−3.2	33.9	0.8	35.0
Oct. 1945	Nov. 1948	13.6	−7.1	−20.6	51.9	−6.7	42.3
Oct. 1949	July 1953	3.2	0.0	−3.2	12.5	0.0	12.5
Aug. 1954	July 1957	2.3	1.7	−0.6	7.0	1.3	8.3
Apr. 1958	May 1960	0.1	0.3	0.2	0.2	0.2	0.4
Feb. 1961	Nov. 1969	1.4	2.6	1.2	13.5	2.7	16.5
Nov. 1970							
AVERAGES							
By period							
6 cycles, 1921-49		5.6	−6.2	−11.7	24.0	−14.5	8.4
4 cycles, 1949-70		1.8	1.2	−0.6	8.3	1.0	9.4
By period and similar severity [d]							
2 cycles, 1921-27		3.2	−4.0	−7.2	6.4	−4.6	1.6
2 cycles, 1954-61		1.2	1.0	−0.2	3.6	0.8	4.4

[a] National Bureau of Economic Research dates.

[b] Changes are computed between average levels of three months surrounding peaks and troughs; series are seasonally adjusted.

[c] The percentage for the full period approximates but does not exactly equal the sum of the percentages for the two subperiods in the preceding two columns.

[d] Severity of business recessions is based on Geoffrey H. Moore, ed., *Business Cycle Indicators* (Princeton, N.J.: Princeton University Press for National Bureau of Economic Research, 1961), vol. 1, p. 104, and updated in *53rd Annual Report* (New York: National Bureau of Economic Research, September 1973), p. 18.

Source: Bureau of Labor Statistics, wholesale prices, all items.

(The current expansion since 1970, which is not in the table, appears to be an exception to the moderation of expansionary price increases.)

Recessions in business activity have been milder on the average since World War II than formerly, according to various measures of aggregate activity.[3] The moderation accounts in part for the attenuation of price fluctuations—but not fully. The mild cycles in the 1920s were about as severe as those in the 1950s in terms of activity, yet price changes in the latter had a much smaller amplitude, as is shown in the last two rows of Table 1.

The consequences of this altered cyclical behavior for the total change in prices over business expansions and recessions are shown in columns 4, 5 and 6 of the table. The total price change in postwar business expansions was small compared with previous expansions, while the total change for postwar recessions was (except for 1948-49) typically positive though small. The total increase in prices over full cycles was not great in most of the postwar cycles, but recessionary declines did not offset the expansionary increases, and hence the price level consistently rose over each cycle. The cumulative increase in wholesale prices over the two decades 1949-70 was 40 percent,

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[3] Moore's measure of the average amplitude of decline during recessions in three indexes of business activity is as follows:

Peak	Trough	Average Decline (percent)	Rank (1 = most severe)
June 1899	Dec. 1900	14.4	11½
Sep. 1902	Aug. 1904	14.4	11½
May 1907	June 1908	29.5	5
Jan. 1910	Jan. 1912	12.0	14
Jan. 1913	Dec. 1914	23.2	6
Aug. 1918	Mar. 1919	22.0	8
Jan. 1920	July 1921	34.7	4
May 1923	July 1924	21.8	9
Oct. 1926	Nov. 1927	9.3	15
Aug. 1929	Mar. 1933	75.1	1
May 1937	June 1938	45.4	2
Feb. 1945	Oct. 1945	41.0	3
Nov. 1948	Oct. 1949	17.5	10
July 1953	Aug. 1954	14.3	13
July 1957	Apr. 1958	22.7	7

See Geoffrey H. Moore, ed., *Business Cycle Indicators* (Princeton, N.J.: Princeton University Press for National Bureau of Economic Research, 1961), vol. 1, Table 3.6, p. 104.

The table has not been extended to later recessions, but a separate ranking of the postwar period indicates that the 1961 and 1970 recessions were the least severe; see Geoffrey H. Moore, "New Work on Business Cycles," *53rd Annual Report* (New York: National Bureau of Economic Research, September 1973), p. 18. See also Solomon Fabricant, "The 'Recession' of 1969-70," in *The Business Cycle Today* (New York: National Bureau of Economic Research, 1972), pp. 89-136.

which was on a par with the gold-expansion inflation from 1897 to 1914.

Changes in the Distribution of Cyclical Price Changes since the 1920s

The first question that arises about changes in the cyclical behavior of any data series, particularly of price indexes, is whether they are partly fabrications of the special weighting and composition of the series. Another question is whether the aggregates hide significant differences in behavior among the components.

To provide an answer, Figures 2 and 3 present cumulative frequency distributions of essentially the same set of wholesale prices in mild business cycles of the 1920s and the period after World War II. These distributions avoid weighting and compositional effects by not combining the components into one total and by not changing the coverage. Figure 2 covers seven mild recessions back to the 1920s, omitting the large cycles of the 1930s and World War II. The forty-eight components include most of the major subsectors that span the full period without a significant revision and so pertain to essentially the same kinds of products, though the Bureau of Labor Statistics replaced individual items from time to time. Figure 3 is based on 1,100-odd products of the wholesale price index that had no major change in specification over the postwar period. Since few of these series carry back before 1947, this figure depicts only the five postwar recessions. Because it covers more series, it provides smoother and probably more accurate distributions.

Each component of the distributions in Figures 2 and 3 measures the change in the average rates of price change from the expansion period to the ensuing recession period. This *change* in the rates from expansion to recession eliminates any trend rate over the full cycle. The comparable measure for the aggregate index is shown in column 3 of Table 1.[4] The figures show the percentage of all the price series

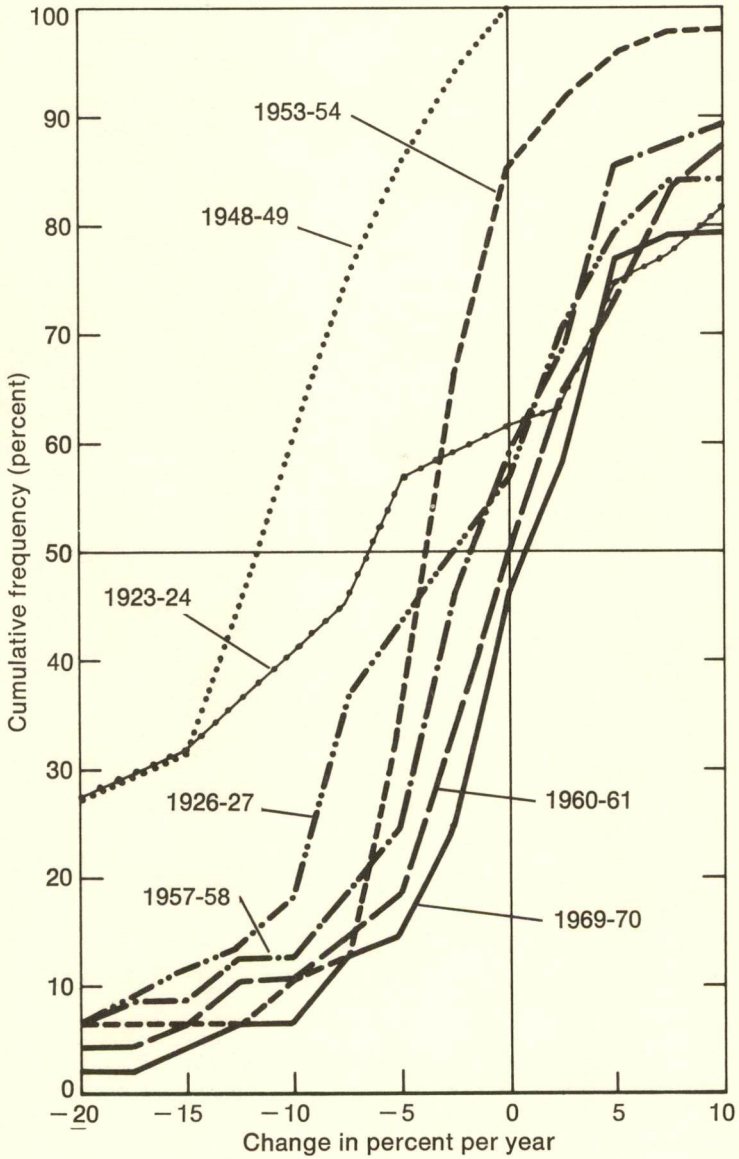
[4] There are some differences between Table 1 and Figures 2 and 3. In the figures, the first expansion after World War II was shortened to February 1947 through November 1948, because of the unavailability of earlier data for many of the product prices, and the last expansion was dated from December 1965 rather than from the 1961 trough, because the inflationary second half of this unusually long phase seemed more appropriate than the full period.

The rates for each expansion and recession phase were calculated from the three-month average surrounding each peak and trough month, except that calendar-year averages were used for the beginning of the two expansions in 1921 and 1924 because not all the needed monthly data have been published. For further details, see Phillip Cagan, "Changes in the Recession Behavior of Wholesale Prices in the 1920s and Post-World War II," *Explorations in Economic Research* (New York: National Bureau of Economic Research, forthcoming, Winter 1975).

Figure 2

CUMULATIVE FREQUENCY DISTRIBUTIONS OF 48 SUBINDEXES OF WHOLESALE PRICES IN MILD BUSINESS CYCLES, 1920s AND AFTER WORLD WAR II [a]

(change in rates of change from expansion to ensuing recession)



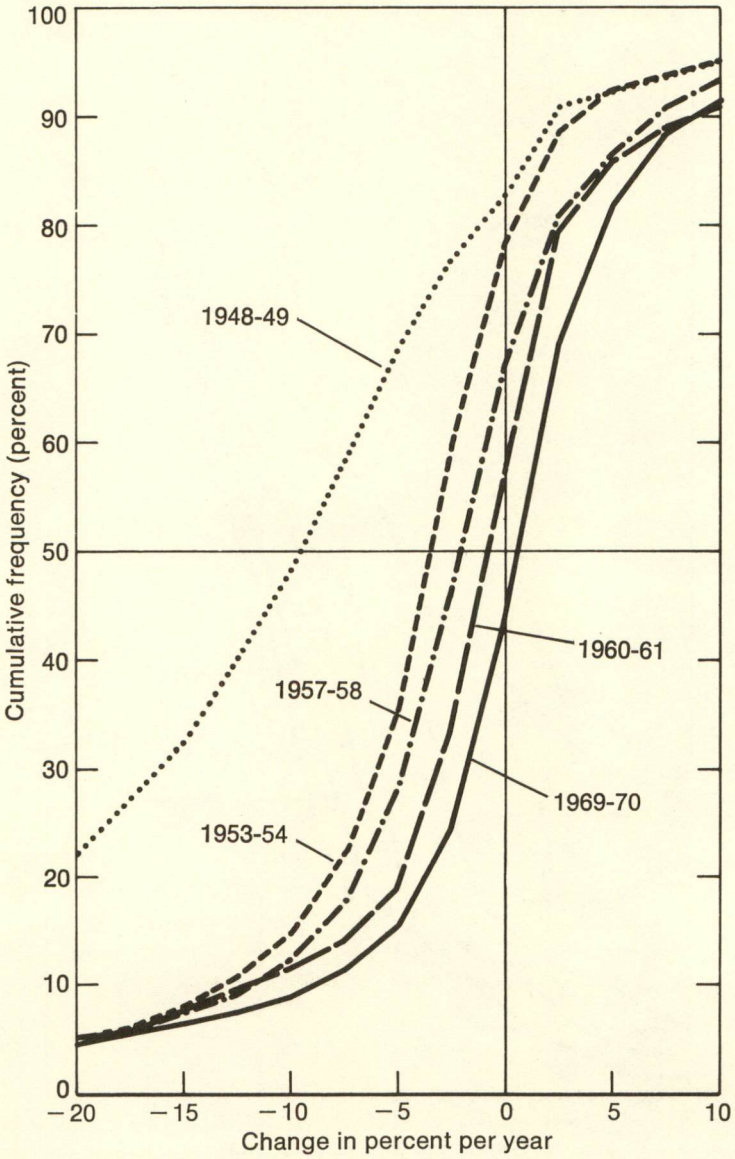
[a] Forty-four subindexes for 1923-24.

Source: Bureau of Labor Statistics wholesale prices.

Figure 3

CUMULATIVE FREQUENCY DISTRIBUTIONS OF ABOUT 1,100 WHOLESALE PRODUCT PRICES IN POST-WORLD WAR II CYCLES[a]

(change in rates of change from expansions to ensuing recessions)



[a] 1,138 price indexes for first four cycles and 1,106 for the last cycle.

Source: Bureau of Labor Statistics wholesale prices.

with changes in rates of change up to but not including the change shown on the bottom scale. Thus, at the zero point on the bottom scale, the vertical scale shows the percentage of price series for which the change in rate of change fell (that is, was below zero) from the expansion to the recession.

Figure 2 shows that the dispersion of price changes across the economy has generally declined since the 1920s.[5] Apparently the responses of prices in different industries have become more uniform. The 1949 recession is exceptional and should perhaps be disregarded as not representing typical peacetime behavior, since prices in that recession declined from the inflated levels carried over from wartime.

Although the distributions for the recessions following 1949 display a similar dispersion, they shifted consecutively rightward to larger increases and smaller declines, which confirms the diminishing size of the change in the rates of change from expansions to recessions suggested by the aggregate index in Table 1. This shift stands out more clearly for the comprehensive distributions in Figure 3. The proportion of price series depicted there that experienced a decline in rate of change ranges from 83 percent in 1949 to 44 percent in 1970. The progressive decline in price response to recessions occurs along the entire range of price changes and is fairly equal from one recession to the next, except for 1949.

The postwar declines in business activity became milder, as noted, but not consecutively. This characteristic of the cycles therefore contributes to, but cannot fully account for, the consecutive declines in price response. As confirmation of this conclusion, the

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[5] The range and dispersion of price changes across the economy is shown by the slope of the distributions. A perfectly flat distribution would occur if all price responses were located in the two outside intervals of less than −20 and of +10 percent or more per year; a steep distribution reflects a clustering of price changes in a narrow range. The distributions for the 1920s and for 1949 are much flatter than those for later cycles, indicating a one-time decline in the dispersion of price changes after 1949. (Evidence presented in the source indicates that a general decline in dispersion occurred for all product groups except raw materials.) Data for earlier recessions, back to the 1890s, suggest that dispersion had long been about the same as in the 1920s. See Frederick C. Mills, *The Behavior of Prices* (New York: National Bureau of Economic Research, 1927), Table 139, p. 421. Since the distributions cover the same set of price series, this decline in dispersion since the 1920s cannot be due to the inclusion of less volatile prices or other changes in composition that can affect the behavior of the aggregate index.

Reported wholesale prices do not catch secret rebates and price shading in weak markets. If these practices have spread in recent decades, they could produce a misleading apearance of a decline in flexibility. This possible bias in the data, which is examined further below, does not appear to explain the overall changes in price behavior.

1967 mini-recession (not shown in the figures) fell between the 1961 and 1970 recessions in terms of median price change but was milder than both in terms of decline in business activity.[6]

The startling failure of the 1970 recession to curb the inflation was not a new phenomenon, therefore, but simply a further step in a progressive postwar development. The median *change* in the annual rates of price change from expansion to recession in the 1949-54 cycle was a *decline* of 3.5 percentage points. In 1970 the median change was an *increase* of 0.6 percentage points. Although a similar analysis of consumer prices is not available, the dependence of consumer finished goods on wholesale prices implies that they behaved similarly.

Consequences for Policy

The diminishing response of prices to recessions, and by inference to periods of slack demand in general, compounds the problem of curbing inflation. Although stabilization policies since World War II have moderated cyclical expansions and the associated price increases, sporadic inflationary movements have not disappeared and by all indications are going to last longer in the future, while offsetting declines in prices no longer occur. The long-run trend of prices has tilted upwards. At the same time a given amount of restraint applied to the economy takes longer to curb inflation than it used to. Not only has inflation worsened since World War II—particularly since mid-1960—but the means to combat it have become less effective.

Inflation was a hydra-headed monster to the Council of Economic Advisers because it accelerated in successive sectors of the economy during 1973 and defied successive phases of controls. To be sure, the 1973 surge reflected several unusual circumstances and, by itself, neither initiated new trends nor signaled a new era. But 1973 marked a further step in the evolving persistence of inflation. Faith in the capability and determination of policy makers to subdue inflationary movements weakened. From a long-run view, inflation had become a monster not because of the outburst in 1973, but because it was developing greater resistance to the traditional remedies.

[6] For data on the 1967 mini-recession, see Cagan, "Changes in the Recession Behavior."

2

EXPLANATIONS OF THE INFLATION PROBLEM: A CRITIQUE AND SYNTHESIS

The Monetary Conditions Necessary for Inflation

Why has inflation become more persistent and more difficult to subdue since World War II? The answer is to be found in the way inflation is transmitted through the economy rather than in its sources, which remain the same as always. Let us first look briefly at the sources of inflation.

The persistence of inflation for many years at a time is not new. Indeed, prices have risen through most decades of recorded history, whereas extended periods of deflation such as that from the 1870s to the 1890s are the exception. The underlying conditions for a rising trend of prices are not in dispute. They can be summarized in three widely accepted propositions: First, when aggregate expenditures expand faster than the flow of goods and services, the expansion pulls up prices and supports a rising price level. Second, excess aggregate demand may originate from a variety of developments, such as an increasing government budget or a vigorous cyclical expansion in private expenditures. And, third, a rise in the money supply in excess of the growth in demand for money balances is necessary to support, and given time will produce, excess aggregate demand. Some inflationary movements that originate from scare buying, as in 1950 with the outbreak of the Korean War, or from a business boom, as in 1955, may continue for a while without a commensurate increase in the money supply, but higher and rising price levels cannot be maintained for long without monetary expansion.

An emphasis on monetary expansion as necessary and sufficient for inflation makes money a proximate cause but not in any simple sense *the* fundamental cause of inflation. There remains the question why in each instance the money supply expanded so rapidly. A few

historical examples will clarify the difference between proximate and fundamental cause. Following major gold discoveries in 1849, the money supplies of the gold-standard countries expanded rapidly, pulling prices up in the 1850s and 1860s. This sequence was repeated from the last decades of the nineteenth century into the second decade of the twentieth. Had a country abandoned convertibility into gold and allowed its currency to appreciate in relation to inflating currencies, it could have prevented most of its own inflation. The appreciation of the foreign exchange rate would have prevented most or all of the surplus in the balance of payments that led to the importation of gold specie. Here the gold discoveries in combination with the decision not to demonetize gold led to inflation.

Another example, characteristic of business cycles mainly before World War II, arises from the fact that expansions in economic activity generate rising demands for bank loans that can be accommodated to the extent that banks possess excess reserves and, to that extent, the money supply can be increased and inflation fueled. If excess reserves were to be absorbed by the regulatory authorities, the inflationary expansion could be stifled. Here cyclical expansions combine with banking practice and regulatory policies to produce inflation. A more recent example of money expansion as a proximate cause relates to the Federal Reserve policy during World War II, and some years after, of supporting the prices of Treasury securities. In achieving its purpose of keeping Treasury borrowing rates low, this policy let the market determine the money supply. As market demands for credit expanded, the Federal Reserve was powerless to exercise monetary restraint through the usual practice of selling Treasury securities, lowering their price, and raising interest rates; instead, the policy of support required the Federal Reserve to purchase Treasury securities in whatever amounts the market offered them. Monetary institutions and policies can thus work to accommodate the money supply to expanding economic activity, a process that creates new money to support rising expenditures.

The lessening importance of gold in the monetary systems of most countries since the 1930s is a precondition of the more rapid expansions of money supplies since then, but it is not the immediate reason for the expansions. In most countries today central banks have ultimate control over the money supply. In the United States the Federal Reserve controls the issue of currency and the quantity of bank reserves directly. It thus exercises effective control over the total money supply (narrowly defined as currency outside banks plus checking deposits), though unanticipated changes in currency use and bank operations will in the short run put the supply above or below

the targeted level. The problems of short-run control of the money supply have been extensively discussed in recent years.[1] Over longer periods of, say, four to six months, control of the money supply is virtually complete and, if monetary expansion supports inflation, it is because the Federal Reserve has allowed it to happen.

Why, then, does the Federal Reserve allow inflation to continue? No one wants inflation, least of all the federal caretakers of the nation's money. Nevertheless, they may acquiesce in a depreciation of money through inflation because forecasting ability and stabilization techniques are not sufficiently advanced to guide the economy to full employment and at the same time prevent sporadic inflation that, once under way, cannot be subdued except by subjecting the economy to a protracted period of idle capacity and unemployment. Forced idleness is political dynamite. A compromise is necessarily struck between a slow and moderate cooling of inflation on the one hand and a temporary restraint of economic activity on the other. If inflation cools more slowly now than formerly, as the evidence presented above indicates, policy makers are pressed to cut short the agony of restraint before price stability is achieved.

The Perverse Behavior of Prices when Demand Is Slack

Paradoxical as it seems, inflation has become a serious problem, not because prices rise faster than they used to in periods of business expansion, but because they are so slow to decelerate when demand is slack. The weak response to demand restraints is an exasperating puzzle to the public, a nightmare to the monetary authorities anxious to obtain quick results, and a challenge to economic theory. It is clear why prices rise when the quantity demanded comes to exceed the quantity supplied at the pre-existing price. Here the excess demand raises prices. The relationship between demand and supply goes a long way toward explaining virtually all large price changes, the level of prices relative to each other in the long run, and day-to-day prices of commodities traded on exchanges by open bidding. But prices for many products often do not fall, and some even continue to rise, when capacity lies idle and the quantity that both idle and employed resources are capable of producing exceeds the quantity demanded at the current price. To be sure, costs may continue to rise in an industry after it encounters slack demand because previous inflation is still working through the economy or because strong

[1] See, for example, William Poole and Charles Lieberman, "Improving Monetary Control," *Brookings Papers on Economic Activity*, no. 2 (Washington, D.C.: The Brookings Institution, 1972), pp. 293-335.

demand elsewhere in the economy raises resource costs. In general, however, persistent excess capacity in an industry has traditionally been thought to force first a deceleration of price increases and then a fall in the level of prices.

The steel industry offers a famous example of rising prices in the face of slack demand. From 1955 to 1960 the wholesale price index of iron and steel rose 21 percent while the index of all wholesale prices rose 8 percent. Over the same period, steel output fell 22 percent, and capacity utilization was estimated to range around 80 percent after 1955 and even lower during strikes and recessions. The price increases kept up the profit margin on sales despite the decline in output, but the rate of profit on equity fell, though not nearly as much as that for most other manufacturing industries.[2] Apparently the reported price increases were genuine and were not subject to the discounting prevalent in most industries when demand is slack.[3] Steel companies were accused of being a major contributor to "creeping" inflation, as steel prices accounted for 52 percent of the rise in the total wholesale price index from 1953 to 1958.[4] The industry became exhibit number one of the consequences attributed to cost-push inflation and of the evils of corporate profit grubbing. This reputation no doubt exacerbated President Kennedy's outrage when the industry raised prices again in 1962 following the administration's success in orchestrating a moderate wage settlement. (Direct pressures on the companies produced a rollback of these increases, whereupon the stock market plummeted as investors feared that other corporations might be subjected to similar treatment.)

The steel companies claimed that the price increases reflected earlier increases in costs and a need to restore profit margins that would attract capital to the industry. But that did not explain why prices had not adjusted much earlier, at the time that costs rose, nor why the price increases were so much larger in this industry than elsewhere in the economy. No single explanation for the unusual behavior of steel prices in that period is widely accepted, and the issue continues to be debated.[5]

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[2] On the profit rate, see Otto Eckstein and Gary Fromm, "Steel and the Postwar Inflation," in U.S. Congress, Joint Economic Committee, *Study of Employment, Growth, and Price Levels*, Study Paper No. 2, 86th Congress, 1st session (November 6, 1959).

[3] George Stigler and James Kindahl, *The Behavior of Industrial Prices* (New York: National Bureau of Economic Research, 1970), pp. 71-74.

[4] Eckstein and Fromm, "Steel and the Postwar Inflation," Table 3, p. 12.

[5] See Willard F. Mueller, "Industrial Concentration: An Important Inflationary Force?" and J. Fred Weston and Steven H. Lustgarten, "Concentration and Infla-

Steel prices have not "misbehaved" since then on so grand a scale, and it is tempting to dismiss the episode as an aberration, inexplicable but of no continuing significance. Yet the phenomenon of rising prices in slack markets is quite common. Furthermore, sometimes prices even rise faster in slack markets than in preceding periods of high demand. Wholesale prices of half of the commodities shown in Figure 3 rose faster in the 1970 recession than in the preceding 1965-69 cyclical upswing, even though the recession slackened demand in most of the economy. Although the proportion of accelerating prices in recessions has always been sizable, it used to be well under 50 percent. In the postwar period it has been increasing. If prices respond less to recessions, a given decline in aggregate expenditures means a greater accumulation of inventories and cutbacks in production schedules accompanied by layoffs. Since, thanks in part to improved stabilization policies, recessions have been milder in real terms since World War II, the reduced response of prices to postwar recessions implies that milder fluctuations in aggregate expenditures have had a proportionately greater effect on output than on prices.

If demand has not expanded, the public typically views a price increase as a plot by sellers to bilk buyers. But economic theory does not support such an interpretation of price increases. In general, maximum profit is achieved by lowering the price when the demand curve shifts down. This is especially so in the short run, when the size of plant is fixed and marginal cost falls with a decline in output, provided that the shift does not also appreciably decrease the price elasticity of demand for the firm's product (which usually is not to be expected). In large-scale manufacturing, marginal costs may remain fairly constant with sizable changes in output, and input prices may be fixed in the short run, so that a decline in demand would not reduce the profit-maximizing selling price very much. But the price would ordinarily fall a little and would not, on these considerations, remain constant or rise. Of course, collusion among sellers to maintain a higher price can, if successful, allow them to share monopoly profits, but, far from being automatically easier, collusion generally becomes more difficult when demand weakens. It therefore hardly seems sufficient by itself to explain the broad strength of prices in slack markets.

Large changes in output in most industries at the same time suggest that prices are not fully clearing markets in the short run,

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tion," papers presented at Columbia Law School conference, March 1974, on *Industrial Concentration: The Economic Issues*, forthcoming.

in the sense of equating the amount producers would like to supply with the amount demanded. Other clearing mechanisms then come into play. With excess demand, inventories are depleted, unfilled orders rise, and queues form. With excess supply, inventories accumulate, soon inducing curtailment of output and employment, with snowballing effects on aggregate income and expenditures. The Keynesian theory of the multiplier depicts this process, and recent work on the theory of economic adjustments shows how it works its way from industry to industry across the economy.[6]

In the literature on output adjustments, the failure of prices to change enough to clear markets on a short-run basis is largely taken as given. But that assumption is in fact the key to the problem of ending inflation. Why do prices not clear markets in the short run? Or, specifically, why do many prices respond sluggishly to shifts in demand? For prices fixed by contract, rates charged by regulated utilities, and most wages, the answer lies in institutional practices; but what is the explanation for the rest? While manufacturing prices have at times fallen precipitously, as in the business contractions of 1920-21 and 1929-33, usually they do not. To be sure, the available data do not record the secret discounting and shading of prices in slack markets, and actual transaction prices undoubtedly undergo larger fluctuations than the reported quotations suggest. The difference between reported and actual market prices is discussed further below. It does not appear to be important enough, however, to invalidate the observed insensitivity of most prices to shifts in demand.

The perverse behavior of prices raises three separate issues: First, why do most prices respond sluggishly to short-run shifts in demand? Second, why do many prices actually rise in the face of slack demand? And, third, why have prices reacted less and less sensitively to a slackening of demand since the early 1950s? The next section outlines an answer to these questions, and subsequent sections develop it further.

The "Costs" of Changing Prices

If, despite standard considerations of profit maximization, firms disregard short-run fluctuations in demand in setting prices, it must be because there are some "costs" to changing prices that they wish to avoid. But this merely pushes the question of sluggish response back

[6] See Robert J. Barro and Herschel I. Grossman, "A General Disequilibrium Model of Income and Employment," *American Economic Review*, vol. 61 (March 1971), pp. 82-93.

one step: What are these costs? Price changes obviously entail administrative costs, particularly for firms that offer a long list of items. The price for each item must be decided and transmitted to salesmen and customers; and prices charged by competitors must be monitored so that undesired differences can be eliminated. Minimizing price changes thus undoubtedly makes life easier for sellers (and perhaps too for regular buyers), assuming that prices never stray too far from their long-run optimal paths. But under most circumstances these administrative costs cannot pose a major deterrent to price changes.

For an industry with only a few firms, some writers argue that price reductions are avoided in an effort to prevent price wars that reduce profits for all in the industry. But sluggish prices appear broadly throughout the economy and they are sticky on the up side as well as the down side. Any special behavior of oligopolistic industries does not suffice as an explanation for the broadly observed failure of price changes to occur as often or as much as demand conditions appear to warrant.

The phenomenon needs a more general explanation, a theory of industry price adjustments in which the uncertainty over where the market "equilibrium" price is,[7] and the disruption to the market if every firm were to search for the equilibrium on its own, promote methods of coordinating price changes among firms in the industry. Although some industries can tolerate price differences, coordination generally appeals to sellers, because few can afford a reputation for charging more than their competitors for the same product and service. If all sellers simply charged the same, on the other hand, prices that are not determined on an open exchange would have no mechanism for changing. A method of coordinating price changes that takes all firms in an industry to a new price in unison is a benefit from the sellers' point of view.

Such a mechanism involves the dynamics of price adjustments, a subject on which economic analysis has not advanced very far. Some practical methods of facilitating coordination are well known, however. Certain events may trigger changes—a new industry wage

[7] See Kenneth Arrow, "Toward a Theory of Price Adjustment," in Moses Abramovitz, ed., *The Allocation of Economic Resources* (Stanford, Calif.: Stanford University Press, 1959), and Robert J. Barro, "A Theory of Monopolistic Price Adjustment," *Review of Economic Studies*, vol. 39 (January 1972), pp. 17-26. Robert E. Lucas ("Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review*, vol. 63 [June 1973], pp. 326-34) emphasizes the difficulty firms have in distinguishing between price increases specific to their industry, which warrant an increase in output, and general price increases to the whole economy, which do not warrant a change in output.

contract, for example, which focuses the attention of all sellers on setting a mutually acceptable price, or a rise in the costs of other commonly used resources. Certain firms may become price leaders that the rest of the industry is willing to watch and follow. As a last—and illegal—resort, a discussion among suppliers may produce advance agreement on price changes. Other, more sophisticated, methods may be employed. The more nearly perfect the coordination, the easier it is to keep prices continually in line with market conditions. Of course, such coordination is not likely ever to be perfect or easy. When it is imperfect but not absent, it works to reduce the magnitude as well as the frequency of responses to short-run shifts in demand that are regarded as reversible, and thus can help explain the observed weak response of many prices to slack demand.

Which industries are likely to exhibit this behavior the most? The coordination of price changes is a problem for markets in which the pricing decisions of one firm affect those of the others. In the terminology of economic theory, these firms are usually price setters as distinct from price takers. Price setters are generally associated with a monopoly or oligopoly situation, in which the market gives firms leeway in setting the price, and price takers are associated with a situation closer to perfect competition, in which the impersonal forces of demand and supply set prices. But the association is only suggestive. Most industries lie in between these two extremes and are hard to classify. Furthermore, monopoly bestows the power to extract quasi-rents above resource costs—a very different process from a slow or nonexistent response to demand shifts, which reflects the dynamics of market price adjustments. Analysis of the effect of industry characteristics on the short-run behavior of prices also is not yet very advanced. Although prices react almost immediately in a highly competitive market and slow response may be possible only where the number of firms is limited, it is not clear a priori whether effective coordination of price changes among a few firms should mean larger or smaller changes in the short run.

It turns out that concentrated industries (defined as industries in which the largest four firms account for a high percentage of sales) do display less amplitude of cyclical price changes.[8] This fact suggests that the greater coordination made possible by a smaller number of firms reduces the flexibility of prices. But the common conclusion

[8] "Sluggishness of response to excess supply is a feature of administered prices, whatever the market structure, but it may be accentuated by concentration of power per se," James Tobin, "Inflation and Unemployment," Presidential Address, *American Economic Review*, vol. 62 (March 1972), p. 14. For some supporting evidence, see Phillip Cagan, "Changes in the Recession Behavior."

that price inflexibility reflects increasing industrial concentration does not appear justified. Price inflexibility is not new,[9] although it has received greater attention since the 1930s. Perhaps it appears to be more important because products characterized by less flexible prices have become a larger fraction of the total over the years, but even this is not clear. In any event, it cannot be attributed to a supposed growth of concentration or big firms in the economy, but must, rather, be laid to a change in the operation of the price system. The diminished responsiveness of prices since World War II documented above pertains to nearly all products, the main exception being raw materials traded on commodity exchanges.

With inflation now more persistent, will it foster more effective methods of changing prices frequently and of speeding adjustments to fluctuations in demand? Under inflation, firms no doubt tend to change prices more often to follow upward trends in costs. Such changes are anticipated and can be easily coordinated. But adjustments to unanticipated deviations from the trend may remain difficult to coordinate and continue to be ignored. Therefore, although prices are continually rising in an inflation, they may decelerate slowly as an inflationary upswing subsides, because they still respond sluggishly to short-run changes in the rate of growth of demand. Indeed, since uncertainty about market prices is likely to make coordination more difficult, and since inflation—unless it is unusually steady—heightens uncertainty, prices may tend to deviate from anticipated trends less frequently during inflation than at other times, prolonging the transition to price stability. Thus, the very inflation that necessitates frequent changes in prices may at the same time foster an uncertainty that accounts for the dampened response of prices to fluctuations in demand since World War II.

The Dependence of Prices on Cost

Insofar as the coordination of price changes reduces the response to short-run shifts in demand, it makes prices relatively more dependent on influences from the cost side. The preceding interpretation of price

[9] See Don D. Humphrey, "The Nature and Meaning of Rigid Prices, 1890-1933," *Journal of Political Economy*, vol. 45 (October 1937), pp. 651-61, and Rufus Tucker, "Reasons for Price Rigidity," *American Economic Review*, vol. 28 (March 1938), pp. 41-54.

Inflexibility is not the same as the asymmetry commonly claimed for concentrated industries, in which prices rise more readily than they decline. This asymmetry is thought to occur because demand curves are regarded as inelastic in the short run and the industry increases short-run profits by raising prices. This possible bias in favor of rising prices is discussed later.

adjustments is therefore consistent with, and provides a rationale for, the apparent prevalence of unit-cost pricing in manufacturing industries.[10] Empirical studies have long found that short-run shifts in demand have small and often insignificant effects, and that, instead, costs play a dominant role. The most common form of this evidence is a statistical regression of price changes on changes in unit wage and materials costs and on a proxy for demand shifts (usually changes in the quantity sold or unfilled orders).[11] The latter variable usually has a small, and often statistically insignificant, regression coefficient, while the cost variables are highly significant and account for most of the total correlation. The implication of these studies is that prices largely reflect costs and are generally unresponsive to short-run shifts in demand.

Of course, by standard accounting practice, price per unit is distributed among the unit cost of labor, materials, and capital, and a profit margin, and must equal their sum. In terms of this accounting identity, a change in quantity sold due to a shift in demand affects the price and at the same time is reflected in costs and profits. Consequently, in the long run, changes in demand cannot be identified by the preceding regression unless they happen to be in the same direction and amount as the omitted capital and profit variables, which is not likely.

In the short run of a quarter or even a year, however, wage rates and materials prices do not react fully to changes in output. The profit margin rises and falls in the short run with changes in

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[10] In economic theory a condition of profit maximization is that price equal marginal cost times $\xi/(\xi\text{-}1)$, where ξ is the price elasticity of demand to the firm in absolute terms. Except under perfect competition, ξ would be greater than unity and less than infinity. Under this condition prices rise if ξ declines or if marginal cost rises. There is no reason for ξ to decline in recessions; if anything, it might rise. It is not clear what role the term $\xi/(\xi\text{-}1)$ plays in short-run price behavior, and it has been disregarded here.

Marginal cost changes when movements occur along the cost schedule due to shifts in demand or when the cost schedule shifts due to changes in unit factor prices. If demand shifts are unimportant, very likely so are movements along the cost schedule, and only shifts in the schedule are important for short-run price behavior.

[11] For a survey of empirical studies, see William D. Nordhaus, "Recent Developments in Price Dynamics," in Otto Eckstein, ed., *The Econometrics of Price Determination* (Washington, D.C.: Social Science Research Council and Board of Governors of the Federal Reserve System, 1972). For a detailed study of individual industries, see Otto Eckstein and David Wyss, "Industry Price Equations," in Eckstein, ed., *Econometrics of Price Determination.* For a survey of studies of British industries, see Department of Employment, *Prices and Earnings in 1951-69: An Econometric Assessment* (London: Her Majesty's Stationery Office, 1971).

output, and the quantity variable represents the effect of changes in demand on the profit margin. Therefore, the fact that the coefficient of the quantity variable is unimportant in these regressions strongly suggests that industry prices respond very little to changes in demand and are set largely to reflect unit costs.

Costs per unit of output also change as production is raised to higher and less efficient levels to meet increases in demand. These studies do not make clear whether such demand-induced changes in unit costs affect prices. One view is that they do not, which would mean that demand plays no indirect role either. This view implies that prices are determined by unit costs at a "standard" level of capacity utilization, with a markup over variable cost to cover fixed capital costs and to provide a target return on equity.[12] Since plants are designed to be most efficient at standard levels of output, prices, in this view, will equal minimum average cost in the short as well as the long run.

The empirical results thus do not imply a departure from traditional theories of *long-run* price determination, according to which prices gravitate toward long-run average cost. But the finding that demand plays little or no role in the short run as well departs from traditional theories and has generated much controversy. The regressions are supposed to identify shifts in demand and supply schedules, but they also pick up movements along these schedules. Sales and unfilled orders are affected by movements along, as well as shifts in, the industry demand schedule, and the unit-cost variables reflect not only changes in wage rates and the prices of materials but also movements along marginal cost schedules and substitutions among factor inputs. Yet, while these results suffer from deficiencies of the data, they support the proposition that manufacturing prices are not very responsive to short-run shifts in demand.

The empirical results that prices are closely correlated with unit costs but not with proxies for demand tie together with the notion that the coordination of price changes among firms is responsible for the unresponsiveness of prices to short-run shifts in demand, because one way to coordinate price changes is to base them on changes in the wage rates and materials costs that are similar for all firms in an industry. This dependence of prices on costs clearly exists in regulated industries and under "pass-through" price controls, where cost increases, but usually not an expansion of demand, can be used to

[12] See Otto Eckstein, "A Theory of the Wage-Price Process in Modern Industry," *Review of Economic Studies*, vol. 31 (October 1964), pp. 267-83; and Nordhaus, "Recent Developments in Price Dynamics."

justify higher prices. Most manufacturing industries also appear to relate prices to costs, though in varying degree according to their incentive and ability to coordinate price changes, and thus to disregard short-run shifts in demand.

This view of industry pricing in the short run is not derived from the standard theory of demand and supply but is inferred from empirical observations. It is incomplete in not providing a theoretical explanation of where and when it applies. But it is appealing because it describes behavior that is consistent with important characteristics of the inflationary process—namely, a slow response of prices to shifts in demand and continuing increases to catch up even after demand slackens.

The Transmission of Inflationary Pressures through Costs

The dependence of prices on costs can account for the fact that, once under way, inflation travels from earlier to later stages of production, rather than the reverse, even though most inflationary movements originate in excess aggregate demand for finished goods and services. An increase in aggregate demand first elicits an expansion of output and transmits increases in demand back to resource inputs. This process can take place even at full capacity, because under stimulus the economic machine can always turn out a little more by drawing on spare plants and equipment, overtime, and marginal workers. There is no sharp barrier of "full employment" at which prices begin to rise. Some prices begin to respond, though slowly, to the first signs of recovery from a recession. At first, as an expansion of demand spreads to lower stages of production, prices begin to rise in markets that respond quickly, most prominently those for raw materials. Later, wage rates begin to increase faster as selected labor markets tighten, but the response is delayed by union contracts and the traditional reluctance of firms to raise the pay of some and not all workers. Most firms raise prices only as their input costs are increased. Then, after the prices of final goods and services rise, workers bargain for cost-of-living increases in the next contract, which in turn are passed through the pipeline of costs to prolong the upward spiral.

A deceleration of inflation due to restraints on aggregate demand is transmitted in the same way and entails the same delays. Output is reduced, factor demands decline, and unemployment rises. Prices nevertheless continue upward, because cost increases are still working forward through the price system. The first prices to weaken are

generally those of raw materials and of other goods sold in highly competitive markets. The upward pressure on costs in subsequent stages of production thus eases, weakening prices first for intermediate goods and finally for finished goods at the retail level. Wages resist still longer, and service prices that are tied closely to wages are usually the last to reflect a change in aggregate demand. While there are always many exceptions to this pattern, it is broadly confirmed in the price indexes by subsectors.[13]

Since wage rates are slow to reflect changes in the growth of aggregate demand and are a major component of manufacturing costs, it might seem that manufacturing prices cannot decelerate much before wages do. In fact, these prices do decelerate ahead of wage rates, because demand restraints retard the rise in unit labor costs. A slackening of business activity leads firms to trim costs, chiefly by using workers more efficiently. This process is at first concealed by the retention of skilled workers who are not fully employed but who are held in the work force against the day when output again expands. In the ensuing recovery, unit labor costs decelerate rapidly, relieving a significant pressure on prices. As the rise in prices eases, the slower increases in the cost of living feed back on wage rates, allowing the process of deceleration to continue after the benefits of cost cutting have run out.[14]

The 1970 recession generally followed this sequence. Output per manhour (an overall indicator of efficiency) had actually declined during the peak of the cyclical expansion in 1969, and unit labor costs (private nonfarm sector) rose 8.2 percent in that year while compensation per manhour rose 6.9 percent. Output per manhour began to increase in the second and third quarters of the 1970 recession, but the drop in output resulting from the General Motors strike in the fourth quarter, as well as the continuing recession, held the increase to 1.7 percent for the year. Thereafter output per manhour began to advance sharply, so that from the first quarter of 1970 to the second quarter of 1971 it rose at an annual rate of 3.8 percent, and it accelerated to 5 percent per year in the first half of 1972. Although compensation per manhour rose about the same in 1971 and 1972 as in 1970, the advance in unit labor costs dropped from 8.2 percent in

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[13] See Geoffrey H. Moore, *The Cyclical Behavior of Prices*, Report 384 (Washington, D.C.: Bureau of Labor Statistics, 1971).

[14] See Geoffrey H. Moore, "Productivity, Costs and Prices: New Light from an Old Hypothesis," in *Explorations in Economic Research*, forthcoming; and Thor Hultgren, *Costs, Prices, and Profits: Their Cyclical Relations* (New York: National Bureau of Economic Research, 1965).

1969 to 5.0 percent in 1970 and to 2.2 percent per year overall in 1971 and 1972. Because profit margins began rising in 1971 from their depressed levels, the deceleration in unit labor costs had little immediate effect on most prices. But the rate of increase in the private nonfarm deflator peaked in the fourth quarter of 1970, and inflation began to subside slowly; the deceleration continued well into 1972, though the imposition of price controls in August 1971 obscured the normal pattern of events. As we now also know, what might have been a happy ending to the restraint imposed on the inflation by the 1970 recession was shattered by the explosion of prices in 1973.

Costs as Initiators of Inflation

According to the view of the inflationary process just expressed, many prices rise in slack markets because they undergo a step-by-step adjustment to a new equilibrium over a period of time and continue catching up well after the initiating period of excess demand has ended. Yet, because inflationary movements subside so slowly, it is often concluded that costs have a tendency to rise on their own. This cost-push theory of inflation merits attention because it is time honored, still very influential, and the source of important observations on the behavior of prices.

A large part of the literature on inflation is devoted to cost-push forces. They were cited often in the late 1950s, when demand pressures seemed insufficient to account for rising prices in slack markets. The prime sources of cost push are supposed to be labor unions with bargaining power to achieve rising incomes for their members and large corporations with at least some monopoly power to raise prices in pursuit of higher profits.

It is important to distinguish between costs as a possible independent source of inflation and as a channel for transmitting inflation. As noted earlier, many firms base prices on costs, which is sufficient to give the appearance that costs initiate inflation even when the culprit is excess demand. Whether some costs are, in addition, a major independent initiator of inflation is open to doubt. The doubt arises first from the implausible consequences for relative prices and wages of such a phenomenon. (Other reasons for doubt are discussed later.) Although unions and firms with monopoly power undoubtedly gain income relative to those without it, any such group is likely to seek the maximum amount in a once-and-for-all jump, whereas inflation is a continuing process. In particular industries monopoly power could

cause inflation during the period when it is first exercised, but how could such an inflation continue and recur?

Inflation is sometimes thought to stem from the intricate battle among incompatible claims of various monopoly elements for larger shares of total output. Such a battle might be described as starting with contracts for higher wages won by strong unions. Firms pass the increased costs through to prices, which reduces the purchasing power of the higher money wages. At the existing level of aggregate demand, the higher prices threaten to reduce output and employment, events that the monetary authorities attempt to forestall by expanding aggregate demand. Unions then bargain to recapture their initial real gains in the next contract, and wages and prices thus follow one another up a spiral of inflation.[15]

Conceivably this scenario applies to some European countries where strong union power blankets most of the economy and the nation's politics forces an aggregate demand policy of full employment at all times. But even in some countries where the power to set wages and prices is centralized in union and industrial associations, international trade often exposes the domestic economy to outside competition and inhibits a full-blown cost-push inflation. Such a scenario hardly applies to the United States where only a fifth of the labor force belongs to unions (and not all of them have strong bargaining power), where periods of rising unemployment occur and are tolerated even though deplored, where few firms can lay claim to monopoly power or anything close to it, and where power to set wages and prices is not centralized in nationwide associations. All these factors discourage the development of cost-push inflation in the United States, even though until recently the small importance of international trade provided the insulation behind which it could have occurred. To be sure, many unions and firms have long had the power to influence wages and prices within limits in their industry. And some nonunion firms that are subject to potential unionization may keep pay scales in line with union wage rates. Nevertheless, the maintenance of cost-push inflation in most of the economy when

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15 ". . . the world we now live in is one in which the monetary system has become relatively elastic, so that it can accommodate itself to changes in wages, rather than the other way about. Instead of actual wages having to adjust themselves to an equilibrium level, monetary policy adjusts the equilibrium level of money wages so as to make it conform to the actual level. It is hardly an exaggeration to say that instead of being on a Gold Standard, we are on a Labour Standard." J. R. Hicks, "Economic Foundations of Wage Policy," *Economic Journal*, vol. 65 (September 1955), p. 391.

aggregate demand is not excessive requires a prevalence of monopoly that has never existed in the United States.

The sequence of U.S. inflations, furthermore, does not point to costs as the source. Periods of slack demand in which prices are rising have invariably followed strong inflationary surges that can be attributed only to excess demand, and the price increases have eventually begun to decelerate after demand slackens. Wage increases have adjusted slowly to inflation and, after catching up, have moderated. These are not the patterns of cost-push inflation.

Much of the cost-push literature has focused on the pressure on prices exerted by corporate giants seeking higher and higher profits. The steel industry in the late 1950s has been the prime example; but, in fact, there are few other examples and none of equal importance. A study of machinery prices in the same period attributed their extraordinary rise to strong excess demand.[16] Moreover, the average profit margin for all manufacturing firms peaked in 1955 at the height of that inflation and was lower for the remainder of the 1950s and the early 1960s, contrary to the view that it was responsible for the continuing rise in prices.[17]

This evidence does not mean that unions and large corporations play no role in the inflationary process. But their role is not that of initiators of inflation.

Unions and wages. Unions lengthen the time it takes an inflationary impulse to work fully through the price system, and in later stages they appear also to strengthen each impulse. When inflation is rampant, union leaders agitate for large wage increases. Labor militancy hardens, bitterness deepens, and strikes become crusades. Rather than fight a long battle, employers often surrender. Construction wages in the late 1960s provide a dramatic example. The construction industry contains many separate unions, each in control of a critical skill. As the Vietnam inflation progressed and wage contracts escalated, the relative wages of different skill groups came to diverge from traditional patterns. As each group sought to reestablish its relative position, there began a leap-frogging sequence that,

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[16] Thomas A. Wilson, "An Analysis of the Inflation in Machinery Prices," in U.S. Congress, Joint Economic Committee, *Study of Employment, Growth, and Price Levels*, Study Paper No. 3, 86th Congress, 1st session (November 6, 1959). See also Richard T. Selden, "Cost-Push versus Demand-Pull Inflation, 1955-57," *Journal of Political Economy*, vol. 67 (February 1959), pp. 1-20.

[17] See chart of profits after taxes per dollar of sales for manufacturing in *Business Conditions Digest*, various monthly issues. This series reached another new peak in 1966 and has been lower since then.

with each new contract, catapulted the bargaining union ahead of others. Negotiated first-year increases reached 21 percent in the second half of 1970 and averaged 14.8 percent during 1969 to 1971, compared with 8.8 percent for negotiated first-year wage changes in manufacturing. Municipal unions exerted a new power over their wages during this period. Here in particular it was hard to distinguish among the effects of a strengthened bargaining position due to a favorable turn in demand and supply conditions, a new militancy reflecting the acquisition of political power, and ordinary wage push.

When slackened market conditions remove the justification for the maintenance of previous rates of wage increase, union members do not suddenly become receptive to a slowing of wage increases and their leaders do not moderate contract demands at once. In the construction trades, for example, union leaders took no public steps to dampen the exorbitant increases noted above, although privately they welcomed the Construction Industry Stabilization Committee, set up in March 1971 by the government as a means of bringing reality to the industry and of untangling a wage spiral that was pricing union workers out of jobs. Construction wage settlements then came down dramatically after the first quarter of 1972 to a range of 4½ to 6½ percent per year.

Although rates of increase of wages decelerate slowly after markets slacken and in that respect continue to push the inflation along, they do not generally accelerate and so do not intensify the inflation. Historically, the number of strikes has declined when the economy has weakened. If inflation then accelerates again, wages are slow to respond on the up side as well. The inflationary surge of 1973 illustrates this tendency. During that year, despite the strong advances of wages in 1971 and 1972 to regain the ground lost in the first stages of the Vietnam inflation, average hourly earnings in the private nonfarm sector (adjusted for interindustry shifts and overtime in manufacturing) continued rising at the 1972 rate of 6 to 7 percent per year. In the first half of 1974 the rise in hourly earnings accelerated only to 7¼ percent. In real terms this was equivalent to a 3 percent rise for long-run productivity growth and 3 to 4 percent for cost-of-living increases, which as it turned out was too little. Insofar as controls helped to hold wages down during 1973, they reinforced the usual lags to require a subsequent catch-up, and prolonged subsequent efforts to curb the inflation.

The lagging and catch-up behavior of wages reflects their delayed adjustment to the effect of inflation on workers' cost of living. Broadened experience with the reality of inflation since World

War II has gradually intensified anticipations of persistent inflation, which retards the deceleration of wages after each new round of inflation, thus prolonging inflationary movements and impeding the return to price stability. Even if some overshooting of wages occurs, however, it is not the same as initiating the movements. To blame unions for inflation is to blame them for catching up with past price increases and for seeking protection against future increases. Commodity prices that keep astride of inflation and thus do not have to catch up later illogically escape blame. Unions are not praised, as well they might be, for letting wages fall behind in the first place.

The fear has frequently been voiced that, if wages were all tied to automatic cost-of-living escalators, they would transmit inflationary pressures more rapidly and thereby intensify inflation. However, for a given inflationary pressure from excess demand, quick adjustments, while they speed up the price increases, do not necessarily push the ultimate level any higher. Yet negotiated wage gains to cover anticipated increases in the cost of living over the life of the contract, which become more common in a long-lasting inflation, pose a problem for subsequent policy efforts to reduce the rate of inflation. Lagged adjustments of wages to inflation may therefore be worse than immediate ones, because they may lead to overshooting and also, in prolonging the process, make a tough policy of restraint harder to carry through to completion.

Unions contribute to the problem of inflation, therefore, by reducing the flexibility of the rate of wage increase. This is not the same as the downward rigidity of wages or the upward push of which unions are often accused. In the first place, downward rigidity is of no importance, because price reduction is no longer considered a desirable policy objective. The problem, rather, is to halt further rises in prices, a goal that is not inconsistent with wage gains that hold to the 2 to 3 percent long-run rate of growth of productivity. In the second place, wages show few signs of exerting upward push, except in the special sense of maintaining rates of increase in the later stages of inflation whose justification has been removed by slackened market conditions.

In short, labor unions do not initiate inflation, and the problem would not disappear even if their power were severely curtailed; but they exacerbate the problem by perpetuating inflation once it gets started.

Administered prices. Misconceptions similar to those about unions surround the public's view of large corporations. It is natural to attribute power to organizations that are big, whether or not they

have any power; and wage and price increases are often seen as arising not from the pressure of general excess demand, as they usually do, but from the exercise of individual market power. The mystique of the powerful corporation is reflected in the concept of "administered prices," which supposedly generate cost-push inflation. Despite its questionable applications, I believe this concept is still important to an understanding of the inflationary process, though not as it is commonly presented.

The concept of administered prices was first introduced by Gardner C. Means in the 1930s to describe the tendency of prices of manufactured goods to decline less during the Great Depression than did prices of raw materials.[18] Means advanced the proposition that some industries can administer prices—that is, set them where they please—in contrast to competitive industries, whose prices are determined by the impersonal market forces of demand and supply. Administered prices are less sensitive than market-determined prices to declines in demand and to excess capacity. But the accusations against administered prices go beyond their failure to decline in slack markets, and make them responsible for spearheading cost-push inflation.

The market structure that fosters administered prices has never been pinned down. It has variously been identified as (1) an industry with monopoly; (2) less strictly, an oligopolistic industry (that is, one with a small number of major sellers as indicated by a "high" concentration of industry sales in the top four firms—a definition that embraces the industries with large manufacturing corporations); and (3) somewhat circularly, an industry that for one reason or another does not change prices very often.[19] I find the second view the most suggestive as well as the most useful, since data on industrial concentration make it possible to classify prices for empirical analysis.

As noted earlier, prices in concentrated industries respond less to shifts in demand. Such price inflexibility is not unique to concentration. It occurs also in connection with durable products (presumably because of the existence of inventories);[20] and also in connection

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[18] Gardner C. Means, *Industrial Prices and Their Relative Inflexibility*, Senate Document 13, 74th Congress, 1st session (1935), and National Resources Committee, *The Structure of the American Economy*, Part 2, June 1939. See also John M. Blair, "Administered Prices and Oligopoly Inflation: A Reply," *Journal of Business*, vol. 37 (January 1964), pp. 68-81.

[19] See George Stigler, "Administered Prices and Oligopolistic Inflation," *Journal of Business*, vol. 35 (January 1962), pp. 1-13.

[20] See Lester G. Telser, "When Are Prices More Stable Than Purchase Rates?" *Revue D'Economie Politique*, vol. 81 (1971), pp. 273-301.

with long-term contracts for labor and, in certain industries, for raw materials and energy supplies. Prices associated with all of these conditions tend to fluctuate less over business cycles than do other prices. This phenomenon is neither new nor rare. In historical data back to the 1890s prices of manufactured goods have generally displayed a smaller amplitude of fluctuation than have those of raw materials;[21] and the smaller amplitudes are likely characteristic of the more highly concentrated industries as well.

But the fact that they exhibit less price fluctuation does not mean that concentrated industries or large corporations spearhead inflation. Quite the opposite: in general they tend to slow it down. Because of their slower responses to changes in market conditions, prices in such industries lag behind in the initial stages of inflation and catch up only as the inflation subsides. It was this catching up in the waning phase of the 1955-59 inflation that fostered the view that such industries were an independent source of inflationary pressure. This popular diagnosis went astray, because it misread evidence accumulated over too short a period. With the benefit of longer observation, later studies showed that the catching up was completed by the early 1960s, after which, allowing for differences in labor and materials costs, concentrated industries no longer manifested price increases greater than those in other sectors.[22] (Some tried to explain why these price increases, if due to cost push, could ever end, as they did in the early 1960s, by the price guideposts of that period; but in fact the guideposts had no more than a marginal effect.)[23] To the extent that prices are set to reflect costs, the timing of price increases gives the appearance that inflation is due to rising costs when excess demand is the main source of the pressure.

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[21] Frederick C. Mills, *The Behavior of Prices* (New York: National Bureau of Economic Research, 1927), Appendix Tables 2 and 4, pp. 485-93, and Wesley C. Mitchell, *The Making and Using of Index Numbers*, Bureau of Labor Statistics Bulletin No. 656 (March 1938), Table 7, p. 42.

[22] Leonard W. Weiss, "Business Pricing Policies and Inflation Reconsidered," *Journal of Political Economy*, vol. 74 (April 1966), pp. 177-87, and "The Role of Concentration in Recent Inflationary Price Movements: A Statistical Analysis," *Antitrust Law and Economics Review*, Spring 1971, pp. 109-21.

[23] See George L. Perry, *Unemployment, Money Wage Rates, and Inflation* (Cambridge, Mass.: MIT Press, 1966), "Wages and the Guideposts," *American Economic Review*, vol. 57 (September 1967), pp. 897-904, and comments by Paul S. Anderson, Michael L. Wachter, and Adrian W. Throop, with reply by Perry, *American Economic Review*, vol. 59 (June 1969), pp. 351-70. See also Otto Eckstein and Roger Brinner, in U.S. Congress, Joint Economic Committee, *The Inflation Process in the United States*, 92d Congress, 2d session (February 22, 1972).

A repetition of the lag/catch-up pattern in these prices appeared during the Vietnam inflation. From 1967 to 1969 price increases for the more concentrated industries, after allowing for differences in labor and materials costs, were smaller, but in 1971 they became larger in a characteristic catching up as the inflation subsided.[24] Prices in concentrated industries fell behind in 1972, presumably because the price controls instituted in August 1971 had a greater effect on them than on other industries; and they fell behind again in 1973 as the inflation accelerated.

Administered prices have long been recognized as having such a lag/catch-up pattern. Yet the catch-up phase continues to be blamed as an independent source of cost push that can and should be restrained by price controls.[25] Such a policy makes no sense. In general, over the long run, administered prices gravitate toward a level consistent with profit maximization just as all other prices do. Some firms with monopoly power may administer their prices to obtain monopoly profits, but that has nothing to do with the rising prices experienced in inflation. Prices that lag should be allowed to catch up and reestablish the relation to other prices that demand and supply conditions generate in equilibrium. The new equilibrium will be attained eventually, and the sooner the better. Restraining the catch-up of administered prices will only delay it.

The concept of administered prices is useful in the analysis of short-run dynamics, to refer to prices that tend for certain reasons to be unresponsive to short-run shifts in demand. But the concern long focused on administered prices as the source of a cost-push inflation

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[24] See Cagan, "Inflation and Market Structure 1967-73," in *Explorations in Economic Research*, forthcoming.

[25] "With inflation, the demand curves of the firm and industry are moving persistently to the right. Under these circumstances there will normally be an incomplete adaptation of oligopoly prices. Prices will not be at profit-maximizing levels in any given situation, for the situation is continually changing while the adaptation is by deliberate and discrete steps. . . . I should like to argue that under quite commonplace conditions the lag in adaptation will be considerable and the unliquidated short-run monopoly gains substantial." John Kenneth Galbraith, "Market Structure and Stabilization Policy," *The Review of Economics and Statistics*, vol. 39 (May 1957), p. 127.

"So, only one course of action remains. This is some form of public intervention in the part of the economy where full employment or an approach to full employment means inflationary price and wage increases. . . .

"We are coming to accept the need for such intervention. The recent survey of professional economists by the Joint Economic Committee shows that between 40 and 50 percent of those interviewed or surveyed accepted the need for wage and price regulation as at least a reserve weapon against inflation." Statement of John Kenneth Galbraith, in U.S. Congress, Senate, Committee on the Judiciary, *Administered Prices*, 86th Congress, 1st session (March 11, 1959), part 10, p. 4930.

has diverted attention from important developments in the inflationary process and the associated policy problems.

Integration of the Evidence on Costs and Concentration

What are the implications of these various pieces of evidence on price behavior for the process of inflation? They can be interpreted as indicating that concentrated industries are more likely to be characterized by some discretionary price setting by firms, as distinct from the highly competitive markets for many agricultural products and raw materials, which are characterized by market-determined prices. The existence of inventories, as well as other characteristics of industries, may also be relevant to this dimension of the behavior of prices. The importance of price setting is that firms in industries where it is the rule appear to coordinate price changes with each other so far as possible. The various methods of coordination require these firms to disregard short-run shifts in demand and to depend instead on changes in costs. As a consequence, their prices exhibit smaller fluctuations over the business cycle and less sensitivity to accelerations and retardations of general inflation. They appear to be less flexible, and they impede the propagation of inflationary pressures through the economy. Their lags of adjustment are evident in an inflationary upswing by the fact that basic commodity prices move earlier and faster. As inflationary pressures wane, they make catch-up increases that present the paradox of rising prices at a time when demand is slackening and when many prices in "competitive" markets are stable or declining.

On this interpretation inflexible prices do not initiate inflation; but they play a crucial role in transmitting it and in delaying the success of policies to curb it.[26] The transmission of excess demand initially through increases in output and then in costs influences the dynamics of inflation by stretching it out. As wage rates catch up to past inflation and are passed through as further price increases, the cost of living goes up and feeds back on wages in a subsequent round of labor contracts. Thus the sequence of adjustments to inflation can appear to be unending and impervious to policies of restraint to unwind it. The persistence of inflation in the face of the 1970 recession and subsequent price and wage controls showed the extended and exasperating road that policy can follow in pursuit of price stability, in this instance only to end in failure.

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[26] For a similar interpretation see Thomas G. Moore, "Incomes Policy, Its Rationale and Development," in *Economic Policy and Inflation in the Sixties* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1972).

Downward Rigidity and Asymmetry of Price Changes

The greater public sensitivity to unemployment since the Great Depression, as attested by the passage of the Employment Act of 1946, has made the pursuit of policies of high employment politically attractive. These policies, together with a dependence of prices on costs and the accompanying slow response to shifts in demand, generate a potential for persistent inflation. The slow deceleration of an ongoing inflation when demand slackens means that output and employment are initially cut back to absorb most of the impact; and if signs of these cuts induce policy makers to take steps to expand aggregate demand, monetary support is provided for the existing level of prices, whatever it may be. The potential for inflation in high employment policies was widely associated in the 1950s with the "downward rigidity" of prices.

Downward rigidity is a corollary to the dependence of prices on costs: if costs never move downward, neither do prices. Allegedly, price changes can decline from a positive to a zero rate but not to a negative rate. When in the recessions of 1954 and 1958 the aggregate index of wholesale prices failed to decline in the historical fashion that had held true as recently as 1949 (see Table 1), the failure was attributed to downward rigidity. The new behavior had alarming implications. If during recessions prices and wages remained rigid at the levels attained in the preceding cyclical expansions, the economy could not return to full employment in the ensuing recovery without a commensurate expansion of aggregate demand. Yet if monetary policy provided the necessary stimulus to aggregate demand to achieve full employment, prices would begin each new expansion on the level attained at the end of the last one. Even should cycles in aggregate demand be miraculously ended, the composition of demand would be bound to fluctuate among industries. As demand in certain industries expanded, their prices would rise, while the prices of industries experiencing a complementary slack would not fall. The consequences of this scenario are clear: inflationary episodes are bound to occur sporadically; if prices do not decline between such episodes, they must trend inexorably upward.[27]

While the observed dependence of prices on costs implies that the short-run influence of demand is slight, if not necessarily nonexistent,

[27] See Arthur F. Burns, *Prosperity Without Inflation* (New York: Fordham University, 1957), and Charles L. Schultze, "Recent Inflation in the United States," in U.S. Congress, Joint Economic Committee, *Study of Employment, Growth, and Price Levels*, Study Paper No. 1, 86th Congress, 1st session (September 1959).

the notion of downward rigidity even more pessimistically implies that most prices never fall in response to a decline in demand. The obvious examples are wages [28] and utility prices determined by contract or set by regulatory commissions, none of which change at all until renegotiated. Industries vulnerable to public opinion or subject to government regulation may eschew price reductions for fear of inability to raise prices later, or as a safeguard against the imposition of price controls. If firms believe all declines in demand to be brief and increases to be permanent, the asymmetry in price changes is explained. But a belief in a rising trend of demand would mean that any deviations from the trend would be perceived as brief, and the rigidity would take the form of small and infrequent deviations from the upward trend in the rate of price change, not the specific form of an asymmetrical barrier to *negative* rates of price change. As a general rule for most industries, a pricing strategy that precludes a decline in prices seems difficult to rationalize.

Downward rigidity of prices is often attributed to oligopolistic industries. A common argument is that oligopolies could expand production and reduce their average costs, because they face downward sloping demand curves and production settles at the point where the demand curve is tangent to the downward sloping portion of the average cost curve. Attempts of any one firm to sell more, cutting into the shares of competitors, could bring on a price war that would reduce profits for all. Price stability thus requires general acceptance in the industry of the market shares resulting from nonprice forms of competition.[29] Since reductions in price threaten that cooperation, they are avoided, while increases occur more freely.

Although the danger of price wars may be greater under oligopoly, it does not follow that price changes are more difficult to coordinate and more assiduously avoided. Industries with only a few major competitors may even find it easier to coordinate price changes. In any event, as already noted, the prices of more concentrated industries identified with oligopoly do appear to lag during inflationary movements; but they appear to respond more slowly to

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[28] Since real wages rise with the growth of labor productivity over the long run, unit wage costs can decline so long as money wages rise less than the growth in productivity. In a period of slack demand, however, productivity usually does not rise, in which case a reduction of labor costs requires a fall in money wages.

[29] This behavior was attributed to oligopolistic industries by Paul M. Sweezy, "Demand under Conditions of Oligopoly," *Journal of Political Economy*, vol. 47 (August 1939), pp. 569-73. Sweezy's interpretation of price rigidity was criticized by George Stigler, "The Kinky Oligopoly Demand Curve and Rigid Prices," *Journal of Political Economy*, vol. 55 (October 1947), pp. 432-49.

changes in demand in *both* directions, and not asymmetrically less to decreases than to increases.

Nevertheless, the prevalence of downward rigidity is widely assumed. It is thought to be confirmed by the large number of reported prices that change very little during recessions. For example, in the 1961 recession 40 percent of the 1,100-odd wholesale prices covered in Figure 3 had rates of change between zero and 1 percent per year.[30] There is no doubt, therefore, that prices of manufactured goods change infrequently compared with the day-to-day or even hourly changes of commodities traded on organized exchanges. Yet the very large number of prices that remain unchanged during recessions raises questions about the validity of these data. One argument is that the data do not reflect the secret discounting and shading that are presumed to occur in actual transactions for industrial products when demand is slack.

In a major study of this question, Stigler and Kindahl collected from buyers actual prices paid for industrial products and, from these, constructed price indexes for the period 1958-63.[31] Their indexes move differently from the corresponding series compiled by the Bureau of Labor Statistics using reports of sellers, and controversy has arisen over the meaning of this divergence.[32] But, on the question of rigidity, it is clear that widespread market discounting occurs from list prices, and that downward rigidity of prices largely disappears in the data collected from buyers: in a comparison between sixty-two price indexes for manufacturing industries constructed by Stigler and Kindahl and corresponding BLS indexes, 31 percent of the BLS indexes did not change at all in the 1958 recession while only 3 percent of the Stigler-Kindahl indexes showed no movement; in the 1961 recession the percentages were 39 and 5, respectively.[33] The individual price series of the Stigler-Kindahl data show numerous small declines in periods of slack that do not appear in the BLS reported quotations,

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[30] The percentage of these wholesale prices with rates of change from zero to 1 percent per year in the postwar recessions was 1949, 29.6; 1954, 31.0; 1958, 25.7; 1961, 40.2; and 1970, 13.6. The percentage was lowest in 1970 because most prices were rising rapidly, though half of them at a slower rate than in the preceding years of cyclical expansion.

[31] Stigler and Kindahl, *Behavior of Industrial Prices.*

[32] See Gardner C. Means, "The Administered-Price Thesis Reconfirmed," *American Economic Review,* vol. 62 (June 1972), pp. 292-306, and Stigler and Kindahl, "Industrial Prices as Administered by Dr. Means," *American Economic Review,* vol. 63 (September 1973), pp. 717-21. See also Milton Moore, "Stigler on Inflexible Prices," *Canadian Journal of Economics,* vol. 5 (November 1972), pp. 486-93.

[33] Frequency distributions of 62 buyers' price indexes compiled by Stigler and Kindahl are shown in Cagan, "Changes in the Recession Behavior."

and the Stigler-Kindahl data do not show a major asymmetry in the dispersion of price changes.

These observations in no way refute the fact that many prices have been less volatile and less sensitive in recent recessions than they once were. But a less sensitive response of rates of price change to short-run shifts in demand is not the same as a downward rigidity of price levels. While most manufacturing prices show small *changes* in average rates of price change over a period, they do not display a barrier to negative rates or an asymmetry in the direction of response. The distributions in Figure 3 of changes in the rates of change from expansions to ensuing recessions do not bunch at zero, and all except that for 1949 exhibit a similar dispersion of changes in rates even though the distributions shift bodily to the right from one recession to the next.

While the tendency of rates of price change to resist going below zero was thought to be the main problem in the mild inflation of the 1950s, in recent experience a similar resistance appears at higher rates of inflation: now prices take almost as long to decelerate from, say, 6 to 3 percent per year as they once did from 2 to −1. This suggests that the problem is not so much a downward rigidity in price *levels* as a resistance to changes in either direction away from the going *rates of increase.*

The Tradeoff between Inflation and Output

As it became clear during the second half of the 1960s that inflation had become something more than a simple reflection of downward rigidity in prices, the problem came to be seen as the tendency of prices to continue rising in the face of slack demand. Output took the brunt of declining aggregate demand. The choices thus presented to policy were represented by a tradeoff between output and inflation: restraint undertaken to reduce the rate of inflation would also substantially curtail output. Similarly, stimulation applied to expand output would increase the rate of inflation.[34] As an example, the low rate of price change in 1962 and 1963 was associated with an unemployment rate of 5½ percent, and the subsequent reduction of unemployment to 3½ or 4 percent in the 1965-69 period by expansive policy actions led to a rise in the average rate of change in the consumer price index from 2 percent per year to 6 percent. The tradeoff

[34] Robert M. Solow and Paul A. Samuelson, "Analytical Aspects of Anti-Inflation Policy," *American Economic Review*, vol. 50 (May 1960), pp. 177-94.

became particularly unattractive in the recession of 1970. Monetary restraint curbed the inflation only slightly in 1970 and 1971 but it significantly retarded economic growth in those two years. The tradeoff relationship was a simple quantitative expression of these associated changes in output and the inflation rate.

While estimates of the quantitative relationship between inflation and output have never been viewed as more than a rough approximation of the complex dynamics of real-world inflations, it has proven to be even more complicated than was originally recognized. The first complication is that a change in aggregate demand affects output and prices at different times. A stimulative policy that increases expenditures raises output rather quickly, while the upward pressure on prices builds up more slowly as costs begin to rise. The initial tradeoff between output and inflation is for this reason weighted more toward output and less toward inflation than is true after the pressures pulling up costs and prices have had time to work through the system. In addition, the weighting between output and inflation depends upon the stage of the business cycle. At the bottom of a business recession when many resources are idle, output recovers with less upward pressure on costs and prices than is true in the advanced stages of expansion that depend mainly on overtime work. At high levels of capacity utilization, bottlenecks develop, unfilled orders rise, delivery times lengthen, and prices are pushed and pulled up at a quickening pace.

Although differences in timing make a proper assessment of the tradeoff between output and inflation extremely difficult, the stage of the business cycle can be partly taken into account by weighting the quantitative relationship to show a greater effect on output when the economy is depressed and a greater effect on prices when the economy is booming. This is usually done by expressing the tradeoff mathematically as a relationship between the rate of inflation and the gap between the actual and the potential level of output. Potential output is a reference point intended to approximate normal productive capacity ready for use at the moment. Even at so-called "normal" levels of capacity utilization, output can expand through a temporary "overuse" of productive facilities, though usually with substantial price advances. Hence potential output is not a barrier, and a negative gap can exist in which actual output exceeds the potential level. The gap is intended to measure the pressure of idle or scarce resources on prices. When the gap is large, the rate of inflation is low; as it narrows, inflation accelerates.

To be sure, this gap does not account for all price movements. At the bottom of cyclical contractions and despite a large overall gap, the first signs of recovery usually bring sizable price increases in markets for sensitive raw materials, partly as a recovery from previous deep declines due to distress selling and partly in expectation of higher sales to come. After these initial increases, prices in these markets may then stabilize until supplies become tight in the later stages of the cyclical expansion. Intermediate and finished products do not uniformly pass on these early increases in the cost of materials. While competitive industries respond directly to demand influences, others may not increase prices until tightening factor markets raise costs substantially above prerecession levels. Despite the variety of response patterns, price increases spread and speed up as more and more idled resources are put back to work. Thus a cyclical upswing elicits an expanding wave of price increases along the way.

The division of aggregate demand between output and prices depends in large part, therefore, upon the amount of idle capacity. Capacity involves both capital equipment and labor, though usually the measurement takes only unemployed labor into account. In assessing past experience on the tradeoff, one difficulty has been the changing level at which the labor force can be considered to be fully employed. Trends in the composition and mobility of the labor force have increased the incidence of unemployment. The participation of women has been increasing substantially; and because they typically move in and out of the labor force and change jobs more often than men do, the average unemployment rate at a given point in the business cycle has become higher. During the Korean War inflation, unemployment ranged from 2½ to 3½ percent, while under the higher inflation rates of the Vietnam War it ranged from 3½ to 4 percent. In the 1972 recovery, prices began to accelerate before unemployment fell to 4½ percent. Labor force developments have shifted the measured tradeoff between inflation and the gap between actual and potential employment, where potential is calibrated according to earlier experience. Insofar as the shift reflects the changing character of the labor force, however, it does not imply a change in the behavior of prices.

"Full employment" is a vague concept and difficult to measure precisely;[35] policy discussions undoubtedly would be less confusing without it. But, even allowing for changes in the full employment point, the adjusted tradeoff appears to have shifted over the postwar

[35] See Geoffrey H. Moore, *How Full is Full Employment?* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1973).

period toward higher inflation rates for a given gap between actual and potential employment. In recent years the full employment level has probably shifted to around 95 to 95½ percent of the labor force (that is, to an unemployment rate of 4½ to 5 percent) against 97 to 97½ percent in the early 1950s.[36] Thus, allowing for the difference in levels of full employment, the United States has experienced inflation rates of 5 percent per year or more in recent years compared with much lower rates in the past at the full employment levels then prevailing.

The inescapable implication of the recent escalation of inflation at higher levels of unemployment, as well as at conceptually comparable levels of full employment, is that wage rates are rising faster, presumably in response to the greater general inflation of prices. One reason is that wages respond with lags but gradually make up for past inflation as it is reflected in the cost of living. In addition, wages (and other prices, too, for that matter) also incorporate anticipations of future inflation, which can fundamentally affect the whole process.

Effect of the Anticipated Rate of Inflation on Prices and Wages

The phenomenon of anticipatory wage and price increases has received considerable attention in recent discussions of inflation. Anticipations of inflation are obviously relevant to any economic transaction fixed in dollar terms for a period of time, and therefore particularly relevant to wages. Due to both custom and union contracts, wages are changed infrequently, which makes the degree of inflation over the period until the next negotiation crucial to the current one if the purchasing power of workers' incomes is to be sustained. Anticipations of inflation prompt workers to bargain for wage increases sufficient to allow at the outset for anticipated increases in the cost of living over the life of the contract; or they seek escalator clauses, which automatically keep wages in line with the cost of living.

Although an effect of anticipations on wages used to be denied, there can be no doubt today that some anticipated rate of inflation has been built into wages, and that this accounts for continuing high rates of increase after the initial catch-up. Unemployment averaged 5½ percent from 1962 to 1964 while compensation per manhour in the private economy was rising 4½ to 5 percent per year. From 1964 to 1969 the unemployment rate fell to 3½ percent and compensation

[36] See William Fellner, "Employment Goals and Monetary-Fiscal Overexpansion," in *A New Look at Inflation* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1973).

escalated to 7½ percent per year; conceivably the tradeoff was at work. Then from 1970 to 1972 the unemployment rate again rose to 5 percent and above, but compensation accelerated almost to 7 percent per year, and in 1973 to 8 percent with unemployment still at 5 percent. These high wage increases can be reconciled with historical experience only by recognizing that the inflation rate had risen and was expected to continue to be as high.[37]

It is difficult to distinguish catch-up from anticipatory increases, to be sure, because each adjustment in wages tends to compensate for unanticipated increases in the cost of living since the last adjustment. Catch-up increases bring wages up to previous levels in real terms and do not add to existing inflationary pressures. Anticipatory increases take real wages above previous levels on the supposition that prices will soon catch up. Some evidence on anticipations is afforded by multi-year union contracts, since they are usually front loaded with especially large increases in the first year to compensate fully for past inflation. In 1970 and 1971 the first-year increases were running above 10 percent, but by 1973 they were not much above the second- and third-year increases provided in multi-year contracts (though the duration of contracts understandably shortened). The later-year increases in contracts negotiated in 1973 averaged from 5½ to 6½ percent per year, which indicated anticipations of continuing inflation, though by hindsight these increases were too low and future contracts would again have to include catch-up adjustments.

Anticipatory increases in wages can be confused with an ordinary wage push that is thought to initiate inflationary pressure. They have the same effect; the main difference is that they are an attempt merely to offset an expected inflation-bred reduction in purchasing power rather than to raise *real* wages. They also differ in timing and origin from ordinary wage push: they usually come in the later stages of

[37] The anticipated rate of inflation also shows up in interest rates. Financial instruments whose redemption value is fixed in terms of dollars can compensate for depreciation in purchasing power by paying a higher interest rate. If the interest rate under stable prices would have been, say, 3½ percent and inflation is expected to be 5 percent per year, a nominal interest rate of about 8½ percent compensates for the expected depreciation in real value of the principal and interest over the life of the instrument. Bond yields rose in the second half of the 1960s by almost 5 percentage points on the average; if the real rate of interest remained about the same (it may, of course, have risen some), this rise in nominal yields indicates a general market anticipation of about 5 percent inflation over the long run. (Short-term interest rates reflect anticipations over the near term, but they fluctuate so much for other reasons that the anticipatory component is difficult to judge; however, the substantial rise in the average level since the early 1960s is undoubtedly due in large part to anticipations of inflation.)

inflationary movements, after wages have begun to adjust, and they are not generally confined to the strongest unions but appear to germinate widely throughout the wage and salary structure.

Anticipatory increases in prices as well as wages avoid the money illusion of treating a dollar as a dollar when its purchasing power is falling. They can work to reinforce the dependence of prices on costs and to reduce the influence of short-run shifts in demand. The argument earlier was that the costs and difficulties of coordinating price changes in less than fully competitive markets foster a reliance on changes in unit resource costs as the best guide to the equilibrium price path. Although prices will be changed more often in inflationary periods, each new quotation will have to anticipate the future so that it stays reasonably close to the average equilibrium price until the next likely change. Since cost inflation in particular industries reflects the overall rate of inflation, anticipations of changes in particular costs will rely heavily on anticipations of general inflation.

To the extent that they are raised to allow for cost increases to come, prices follow an upward trend irrespective of market transactions. In this way the price system adjusts on a current basis to the anticipated rate of inflation and need not wait for the emergence of excess demand in each market to pull prices up. Anticipatory increases are the mechanism by which the price system adapts more efficiently to inflation. If the price adjustments are accurate, they clear markets on the average over time, and discrepancies due to short-run variations in demand from anticipated trends are absorbed by the usual fluctuations in inventories and unfilled orders. Obviously, real-world inflations are not so smooth as to make it easy for firms to track the market-clearing price levels, but, unless prices are changed very often, a prolonged inflation tends to induce anticipatory adjustments.

Anticipatory price and wage increases help to explain the persistence of inflation and the recent shift in the tradeoff between output and inflation. A short-run tradeoff exists because faster growth of aggregate expenditures raises the rate of inflation and expands the demand for labor at the existing money-wage structure while real wages decline. Hence employment and output initially rise. As wage contracts come to reflect the higher demand for labor and rate of inflation, real wages recover and cut back the expansion of employment and output. The initial reduction in unemployment is gradually lost even though the rate of inflation remains higher. In this way increases in the anticipated rate of inflation over the postwar period have shifted the tradeoff toward higher inflation rates at any given gap between actual and potential employment.

Anticipations are by their nature based on perceived trends and so do not change quickly. The price increases they induce are transmitted through the economy as higher costs to other products, just like any other increases, and thereby add to inflationary pressures. Anticipations thus build a momentum into inflationary movements that takes time to abate and that further shifts the initial impact of monetary restraint from prices to output. The restraint to subdue inflation works more slowly, because it must first retard the more responsive prices and then gradually penetrate the anticipations that are pulling up the others. Inevitably, the distortions and dislocations due to the differential impacts of restraint are serious and protracted.

The Tradeoff in the Long Run

Anticipations of the rate of inflation are bound to change as events unfold. What happens over time? The short-run effect of a policy restraint on aggregate demand reduces output and only gradually slows inflation, in large part because of anticipations; with time the price deceleration accumulates, and the longer-run effect on prices is bound to be stronger. Hence the *longer-run* tradeoff is more favorable to a policy of reducing inflation and achieving high employment. In the opposite direction, when policy stimulates aggregate demand, the effect on inflation will also be stronger in the long than in the short run; hence attempts to raise employment beyond a certain point will be inflationary in the long run even though the short-run effect on employment is favorable.

The final long-run consequences of the tradeoff have been sharply debated. In one view policy could institute some stable growth of aggregate demand to produce any selected long-run average rate of inflation, even zero, while output and employment would approach the same growth path of reasonably full utilization of resources whatever the rate of inflation. The argument is based on the proposition that the public is rational—that eventually it "catches on" to inflation. All prices and wages in time come to anticipate the trend rate of inflation completely, which removes any influence on long-run output and employment of the level of prices or their trend rate of change; hence, ultimately, *no permanent tradeoff exists.* In another view this full adjustment to inflation is never reached, particularly for wages. Consequently, price stability requires a permanent gap between actual and potential output that is larger than the minimum attainable; smaller gaps can be maintained, but they entail a permanently higher rate of inflation.

There are two issues here. The first is whether the level of unemployment that is consistent with price stability should be viewed as "full employment" and accepted as satisfactory even though lower levels are attainable. One answer is no, and the reason offered is that prices start to rise well before cyclical unemployment becomes zero and when the number of job seekers exactly matches job vacancies. The reason for this incipient inflationary pressure, aside from certain instances of union power, would have to be that variations in tightness among labor markets affect wages asymmetrically: "unemployment retards money wages less than vacancies accelerate them." [38] This would mean that at full employment—defined in this case as equality between the number of unemployed workers and job vacancies—the average wage rate rises faster than productivity growth.

The second issue is the question of whether there is some "natural" level of unemployment to which the economy gravitates irrespective of the level or rate of change of nominal wages,[39] so that a faster growth of aggregate demand and the accompanying higher rate of inflation would not permanently lower the level of unemployment. The short-run effect of an expansion in aggregate demand on unemployment is so evident over the business cycle that a permanent effect may also seem obvious to the man in the street; yet a permanent effect contradicts the economic principle that all prices and wages eventually anticipate the trend rate of inflation completely because workers and consumers are free of money illusion and adjust fully to demand and supply conditions.

Could the adjustment be incomplete? One argument is that the economy always harbors marginal workers who are ready to accept employment and who will be employed if the real wage for all workers falls. A step-up of inflation reduces real wages if money wages do not rise proportionately. But would employed workers accept this reduction? Failure of the supply of labor to respond to such a reduction in real wages implies an irrational money illusion on the part of workers, at least up to some threshold level, and is usually assumed away in economic theory. Some economists, however, do not think that such an insensitivity in labor supply is entirely implausible. Except for renegotiated union contracts, employers are the originators of changes in nominal wages, and for various reasons they may allow reductions in real wages due to inflation to persist. Most workers will not quit when their real wages fall due to inflation, because they are mainly

[38] Tobin, "Inflation and Unemployment," p. 10.

[39] Milton Friedman, "The Role of Monetary Policy," Presidential Address, *American Economic Review*, vol. 58 (March 1968), pp. 1-17.

concerned with relative wage levels vis-à-vis each other and do not pay close attention to the real purchasing power of their wages so long as it does not change substantially or continually.[40]

The evidence on these issues is difficult to interpret. When inflation accelerated in 1973, for example, wages did not immediately rise commensurately. What appeared to be an incomplete response, however, may have been only a slow response. A change in the inflation rate is not viewed as lasting until it has persisted for a time and, insofar as expectations are based on past and current experience, they are adjusted to that experience with a lag. Whether wages eventually adjust *completely* to the trend rate of inflation cannot be concluded from short-run behavior. Attempts to estimate the long-run outcome econometrically [41] have not been successful because of problems in measuring the anticipated rate of inflation.[42] Therefore, whether the adjustment is complete in the long run or not is uncertain, and the existence of a long-run tradeoff between inflation and unemployment remains an open question.

Recent discussions sometimes seem to imply that inflation is preferable to monetary restraint no matter how the long-run tradeoff turns out. It is argued that, so long as anticipatory adjustments to inflation are incomplete, inflation provides benefits in the form of reduced unemployment. That is what the tradeoff means. Then, if and when anticipatory adjustments are completed, inflation has no permanent effect on unemployment, but neither does such fully anticipated inflation affect the allocation of resources or the distribution of incomes. Inflation is virtually painless! [43]

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[40] See Tobin, "Inflation and Unemployment," and Albert Rees, "The Phillips Curve as a Menu for Policy Choices," *Economica*, vol. 37 (August 1970), pp. 227-38.

[41] George L. Perry, "Changing Labor Markets and Inflation," *Brookings Papers on Economic Activity*, no. 3 (1970), pp. 411-41; Robert J. Gordon, "The Recent Acceleration of Inflation and Its Lessons for the Future," *Brookings Papers on Economic Activity*, no. 1 (1970), pp. 8-41, and "Inflation in Recession and Recovery," *Brookings Papers on Economic Activity*, no. 1 (1971), pp. 105-58; and William Fellner, "Phillips-type Approach or Acceleration?" *Brookings Papers on Economic Activity*, no. 2 (1971), pp. 469-83.

[42] Thomas Sargent, "A Note on the Accelerationist Controversy," *Journal of Money, Credit and Banking*, vol. 3 (August 1971), pp. 721-25; Robert E. Lucas, "Econometric Testing of the Natural Rate Hypothesis," in Eckstein, ed., *Econometrics of Price Determination;* and Thomas F. Cargill and Robert A. Meyer, "Wages, Prices and Unemployment: Distributed Lag Estimates," *Journal of the American Statistical Association*, vol. 69 (March 1974), pp. 98-107.

[43] See, for example, Edmund S. Phelps, *Inflation Policy and Unemployment Theory: The Cost-Benefit Approach to Monetary Planning* (New York: W. W. Norton, 1972).

That is a rose-colored view. The reality of inflation is far from appealing. The dispute over the long-run tradeoff has unfortunately detracted from the serious problems of dealing with inflation in the short run. At any given time, adjustments are far from complete and, judging by the public outcry, inflation is extremely painful; at the same time bouts of higher unemployment are not highly effective against inflation. (The temporary reduction in unemployment induced by inflation is all a net benefit only if it is not necessary or desirable later to subdue the inflation.) Whatever the outcome of the long-run tradeoff, anticipations of inflation clearly prolong it in the short run and aggravate the problem of curbing it. Even if anticipations have so far been slow to incorporate the full intensity of actual inflation, they have nevertheless kept prices rising faster in periods of restraint on aggregate demand, and thus have compromised the immediate effectiveness of policies to curb inflation and compounded the difficulty of carrying them through to success.

Anticipations of Inflation and Uncertainty

Anticipations of inflation are a problem for policy, therefore, because they are slow to adjust and can keep wages and prices rising faster for a time than the rate justified over the longer run by policy restraints on demand growth. Yet this problem could lessen with various developments. Except for prices fixed by contract, the only direct constraints on the frequency of price changes are minor administrative costs, and presumably changes could be coordinated more frequently to prevent prices from straying far out of line in a rapidly changing inflation. The duration of contracts could be shortened. The pay provisions of union contracts could be negotiated more often. (Indeed, the duration of wage contracts has declined in recent years.) In addition, escalator clauses could help to keep wage and price contracts in line with a general index of prices, although selection of a single, universally applicable, index is difficult.[44]

Escalator clauses—so far more talked about than used—are said to reduce public resistance to inflation, because the benefited groups would be protected against inflation and the nation's determination to undergo the hardships of subduing inflation would fade. In this view, inflation would accelerate. While escalators reduce lags in the transmission of inflation and would speed up the adjustment of the

[44] Armen A. Alchian and Benjamin Klein, "On a Correct Measure of Inflation," *Journal of Money, Credit and Banking*, vol. 5 (February 1973), Part 1, pp. 173-91.

price and wage structure to inflationary pressures, they also speed up the response to an *easing* of inflation. Whether escalator clauses would make the rate of inflation any different over the long run is not clear. In any event, there is no justification for opposing them for groups that fall behind in inflation, even if the result is to speed up inflation for others who manage to maintain their relative position without them.

Neither a rise in the anticipated rate of inflation over the postwar period nor the spread of escalator clauses can account for the diminished response of prices to recessions since the 1950s. A higher anticipated rate of inflation makes the actual rates of price and wage change higher but would not affect their tendency to decline when markets slackened. Escalators might, if anything, hasten this decline. The dampened response appears to reflect instead a strengthened, general belief that inflationary movements will not be subdued quickly, as distinct from anticipations of a particular rate of inflation. Such a belief pertains to the likelihood of rising prices, but may well be accompanied by greater uncertainty over the particular rate of rise. Its acceptance has undoubtedly spread since World War II because of the demise of the traditional gold standard, which over the long run kept the growth of money stocks and therefore of prices more or less in line with the expansion in the gold stock. In recent decades, with money and prices no longer tied to gold, governments have been free to pursue full employment policies largely unconstrained by gold reserve requirements. The consequences of such policies are probably the most important reason for the prevalence and strength of the belief in recurring inflation. In the heyday of the gold standard before World War I, price movements usually reversed themselves (as shown by a negative serial correlation) after a few years; but since it was abandoned, the movements have had a positive relation—that is, when prices rose, their subsequent change was more likely to be up than down.[45]

In this environment there is little assurance that prices will stay within any bounds, and considerable uncertainty surrounds the future. The implication for behavior is a dampening of the initial response to a shift in demand because its permanence seems uncertain, and, at the same time, a reinforcement of the expectation that inflationary surges like that of 1973 will not be reversed because policy is committed to avoid declines in output and employment. The problem of controlling

[45] Benjamin Klein, "The Measurement and Social Costs of Inflation: The Recent Inflation and Our New Monetary Standard," paper presented at *Conference on Money, Unemployment, and Inflation*, University of Rochester, April 6, 1974.

inflation is thus exacerbated by a ready transmission of upswings through the price system and a laggard response of prices to a slowing of aggregate demand.

3

THE DILEMMA OF POLICY

The Declining Effectiveness of Policy Restraints against Inflation

Since World War II a central issue of policy has been whether price stability and full employment are compatible. With the explosion of prices in 1973 and 1974 after seven years of inflation, that issue has given way to the more frightening question of whether inflation can be controlled at all. Where debate once concerned the willingness and ability of the nation to live with permanent inflation of 3 to 4 percent per year in order to enjoy full employment, the public now is trying to cope with 8 to 10 percent inflation and worrying about the possibility of even higher rates. The inflation that began in 1965 followed three other postwar episodes, during which public dissatisfaction and concern was also manifest. An injunction to public officials to avoid inflation was not lacking.[1]

Part of the acceleration of inflation in 1973, to be sure, reflected the closer ties to foreign countries inherent in expanding international trade and finance: the acceleration was worldwide. The abandonment of fixed exchange rates in the early 1970s helped to loosen those ties, although it has not undone them entirely. Nevertheless, inflation had become a major problem in the United States primarily as a result of domestic developments. Although similar developments had occurred in other countries, inflation has been handled in most countries as a domestic problem, linked worldwide by the ties of international trade and finance but not determined by them.

[1] Public dissatisfaction with inflation appears to have affected voting in congressional elections from 1896 to 1970. See George Stigler, "General Economic Conditions and National Elections," *American Economic Review*, May 1973, pp. 160-67.

For U.S. policy in particular, the problem relates to the drawn-out process by which an inflationary impulse continues to work its way through the economy once the pressure of excess demand eases. To recapitulate briefly, the slow pace of the process can be traced to the sluggish response of most manufacturing prices to short-run shifts in demand. These prices are "administered" by individual sellers, as distinct from prices determined in the market from moment to moment by supply and demand, as on commodity exchanges. To be sure, administered prices are also determined ultimately by supply and demand conditions, but the determination is the outcome of a market process in which firms set their selling prices, not to clear the market at the moment, but to follow the perceived equilibrium path. Although the sluggish behavior of manufacturing prices has long been observed, its theoretical explanation has yet to be worked out. It appears to be the outcome of various methods to coordinate price changes among firms in the industry, with the purpose of avoiding the disarray and confusion of a group of competitors searching for an equilibrium price individually and at cross purposes. Price leadership is one method, and infrequent price changes are another. Coordination is also facilitated by basing selling prices on unit resource costs common to all firms in an industry. That accounts for the observed dependence of manufacturing prices on input costs and the apparent unresponsiveness of prices to short-run shifts in demand, which are absorbed instead by variations in inventories, unfilled orders, and output. As a consequence, inflationary surges in aggregate demand, which usually appear first in markets for final goods and services, are transmitted back to earlier stages of production via expansions in demand and output, affecting prices initially in basic commodity markets and then traveling forward from stage to stage in the form of increases in input costs. The tightening of labor markets occasioned by these expansions of output may lead to some immediate wage advances, but custom and union contracts make wage rates extremely sluggish, and delay the main effect on wages until renegotiation allows them to catch up to the rising cost of living. The higher wages then generate further increases in costs and prices which ripple up and down the price structure. Of course, as with most generalizations about the economy, this sequence has many exceptions; but recent episodes confirm the implication that, after an inflationary movement subsides, the price system takes several years to complete all adjustments.

The dependence of prices on costs causes prices to continue to rise after market demand slackens, a puzzling phenomenon that, at first sight, fosters the view that such prices are impervious to policies

to curb inflation. The sequence of cost-price responses also gives the appearance that costs initiate inflationary impulses, whereas excess demand is responsible in most cases. Prices in the more concentrated industries and of large corporations tend to increase more than other prices in the aftermath of inflationary upswings when demand slackens, because they lag behind at first and catch up later. These later price increases are criticized for spearheading a continuation of inflation when in fact they are bringing up the rear. Such lagged behavior slows and prolongs the transmission of inflation and, though a moderating influence, complicates the timing of policy restraints.

Labor unions are also falsely accused of initiating cost-push inflation, for they too generally lag and have to catch up later. But the complaint against unions has some merit, because catch-up wage demands of strong unions may interact to initiate a leap-frog sequence that brings about increases that go well beyond what market conditions would justify. The construction trades in the late 1960s offer the prime example. Under the pressure of this leap-frogging, cost push replaces demand pull in the later stages of inflation.

Wages and some prices also become less responsive to demand conditions to the extent that they are influenced by anticipations of the future rate of inflation. This becomes a serious problem should policy makers try to reduce the rate of inflation below the anticipated rate. Although a slow adjustment of the anticipated to the actual rate preserves a tradeoff between inflation and employment and therefore has been extolled, it is beneficial only for accelerations of inflation. For decelerations, slowly adjusting anticipations are a problem for policy because they build a momentum into rising prices that can be halted only over an extended period. This is true whether anticipations of inflation partially or fully adjust to the actual trend rate in the long run and whether the tradeoff is permanent or temporary.

Thus, when restraint on aggregate demand takes hold, inflation will begin to decelerate, but the deceleration may take a long time to make much headway, and in the meantime the restraint appears to be largely ineffective. Wages and manufacturing prices have always been sluggish, of course, and inflationary movements, when not reversed sharply as in 1921 and 1951, have always taken years to work through the price system. But the process was clearly working more slowly in the recessions of the late 1950s and of 1970-71 than had been expected from earlier experience. As Figure 3 showed, the same set of prices has become less and less responsive to business recessions over the postwar period, so that in the 1970 recession the average response was zero. The zero response did not mean that

restraint was not at work below the surface, for the inflation did begin to ease in 1971 even before the imposition of the freeze. Still, a mild recession like 1970 had less effect on prices than ever before.

Part of the smaller amplitude of cyclical fluctuation in prices reflects the reduced severity of business recessions since World War II, for which some credit goes to the contribution of economic research to improved stabilization techniques. Nevertheless, in addition to the smaller cyclical contractions in aggregate expenditures, the response of prices to a given amplitude of contraction has declined, so that now proportionately more of the contraction in expenditures falls on output.

What explains the diminishing response of prices? The anticipated rate of inflation has no doubt increased as actual inflation has progressed, but this by itself would not influence the magnitude of changes in *rates of price change*. Since the prices of nearly all products are less responsive (the main exceptions are raw materials), the phenomenon cannot be blamed on particular sectors characterized by union or corporate monopoly, or high concentration, though certainly unions impede the deceleration of costs in times of slack. Although strictly a postwar development, the phenomenon covers over two decades now and so qualifies as a trend. Such a broad and gradual change in price behavior seems to arise from a strengthened, general belief that inflationary movements will not be quickly subdued.

This belief has presumably been fostered by several developments: the upward trend of prices since World War II; the national commitment to stabilize economic activity and maintain high employment, as expressed in the Employment Act of 1946; and a growing suspicion that the nation's determination to fight inflation and endure the resulting economic slack may, when the chips are down, have weakened. Certainly, preoccupation with the extreme unemployment of the 1930s heightened sensitivity to *any* unemployment. Finally, a spreading awareness of the reduced effectiveness of the policy instruments, highlighted by the failure to avoid the spectacular acceleration of inflation in 1973, has no doubt further strengthened the belief that inflation is as likely to accelerate as to slow down. This would explain a reduced response of prices to declines in demand.

Whatever the reasons, the declining effectiveness of policy restraints against inflation can be documented by postwar changes in the behavior of prices. It may seem paradoxical to attribute the problem of controlling inflation to the *sluggish* response of wages and manufacturing prices to shifts in demand, but the effect is to prolong the adjustment of prices to policy restraints, so that, whenever infla-

tion gains a foothold, a restraint to be successful must be pursued with a vigor or persistence that the postwar sensitivity to unemployment no longer permits. Policy makers face a dilemma. Inflation can be stopped, but the traditional policies work less effectively, and the nation has become more reluctant to incur the costs of using them forcefully. Hence doubt of the nation's ability to control inflation deepens, thus weakening price responses and, in turn, the effectiveness of policy restraint. Thus does inflation feed on its own strength.

The Resort to Wage and Price Controls

In the search for a way around the policy dilemma, many people view direct controls on wages and prices as a natural step. Controls put a damper on inflation without seeming to require restraints on aggregate demand or any increase in unemployment. Aside from wartime, controls were loosely imposed as guideposts for wage and price increases in the early and middle 1960s and then were formally imposed in successive phases beginning in August 1971. The effect of the guideposts is debatable; at most it was small, according to the evidence. The controls of Phases I and II seem to have had an initial impact: the annual rate of increase of the deflator for private GNP (chain index) was 5.2 percent in the first half of 1971 (up from 4.7 percent for all of 1970), whereas it averaged 2.7 percent in the second and third quarters of 1972 following the first quarter catch-up increases after the freeze. This was too sudden a deceleration to be due entirely to the prevailing degree of slack in demand. The euphoria over controls produced by that deceleration was then dashed by the failures of Phases III and IV to stem the acceleration in 1973 and 1974.

From the public's point of view, price increases serve only to augment unnecessary profits of sellers, so a remedy that makes increases unlawful seems natural. The fact that, in the vast majority of cases, price increases are necessary to cover costs of production is lost in the oversimplification of this view. There is never a right moment when an inflationary process can be frozen by decree without imposing hardships on many sellers who need to raise prices to cover recent cost increases. Price controls interrupt this continuous process without removing the pressure for increases and so blindly dislocate the price system and disrupt production.[2]

[2] This was borne out in various ways under Phase II during 1972. For example, there were special problems in lumber due to the profit ceilings; see "Lumber: Fumblings of the Visible Hand" in First National City Bank, *Monthly Economic Letter*, December 1972. For an enumeration of other difficulties, see Assistant

Furthermore, controls are unlikely even to make the ultimate total rise in prices less than it would have been had they not been imposed, given the same path of aggregate demand. Prices gravitate toward an equilibrium determined by the interaction of demand and supply conditions. Constraints such as controls can delay the adjustment, but eventually prices will find their equilibrium through evasion or after the controls are lifted. If controls do not affect the final equilibrium position, their delay of price changes accomplishes nothing except to cater to the public's proclivity to find scapegoats for rising prices.

The common rationale for controls is that they prevent the exercise of union and corporate power to push up wages and prices. Hence enforcement usually focuses on the labor and corporate giants, even though the evidence shows that they do not initiate inflation but actually tend to lose ground as it progresses. When later they begin to catch up, controls penalize them for having fallen behind. Delaying their catch-up provides no permanent benefit. Controls are equally disruptive and ultimately ineffective whether price increases are an adjustment to higher costs, which maintains or restores a standard profit margin, or are pulled up by excess demand, which initially raises profits. Prices will eventually rise to the same equilibrium level. Controls are supposed to prevent "excess" profits, but the controls imposed by the Nixon administration exempted agricultural commodities, for which demand pull was strong, and for ease of administration were mainly enforced against large corporations, whose profit margins had been and were further depressed.

What case can be made for controls? One rationale is that they prevent wage and price increases due to anticipations of inflation. According to this argument, the anticipated rate of inflation enters into wage negotiations and to some extent into the setting of prices. Anticipations appear to adjust slowly to the actual rate of inflation and in an upswing induce lagging behavior. As inflationary pressures subside, anticipations may cause some wages and prices to perpetuate rates of increase whose justification has disappeared with the onset of slack market conditions. If controls prevent those increases or actually help to reduce the anticipated rate of inflation, they bring actual wage and price increases into line with slower growth in

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Secretary of the Treasury for Economic Policy Edgar R. Fiedler, "The Case against Rigid Controls," *Wall Street Journal*, April 19, 1973, p. 20. For problems in petroleum production, see William Poole, "Wage-Price Controls: Where Do We Go from Here?" *Brookings Papers on Economic Activity*, no. 1 (1973), pp. 285-99.

aggregate expenditures. If the controls go no further, they may prevent the prolongation of inflationary movements due to incorrect anticipations. By preventing prices from overshooting their equilibrium level, the controls achieve a higher level of employment.[3]

There is evidence of this effect of controls on construction wages after March 1971. It may have also been at work in the first year of general controls after August 1971, though there is no confirming indication of much deceleration in wages during that period. The main impact was on profit margins,[4] which had declined during the upswing of inflation from 1966 to 1969 and would sooner or later have to rise. The controls had no lasting benefit. When controls are most wanted by the public—in periods of rising demand-pull inflation—they collapse. This happened to the guideposts in the mid-1960s and to the freeze in June 1973.

To be effective and beneficial, controls must distinguish between those wage and price increases that represent catching up with past inflation and those that are anticipating future inflation. To prevent the former increases is futile; and such an attempt, if directed against union wages, creates strife. But at any moment the two kinds of increases are for all practical purposes indistinguishable. Furthermore, the anticipatory increases should not be repressed unless they are indeed mistaken, which implies that policy will in fact be successful in its intention to subdue inflation. In that event, controls may be marginally effective when they are least needed and demanded by the public. They cannot, moreover, rescue an unsuccessful policy. In view of their limited usefulness, their dislocations to the economy, and the danger they will mislead policy makers into believing that suppressed inflationary pressures are in fact subdued and thus into overstimulating the economy, as in 1972, their value as a placebo is not worth the costs. The bitter experience of 1973 and 1974 should have taught the public once again that controls do not help.

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[3] "The fact of the controls, plus their initial success [in 1971], had reduced inflationary expectations, held down total spending, restrained the tendency to boost wages and prices, and permitted output to rise more rapidly than it would otherwise have done." *Annual Report of the Council of Economic Advisers*, February 1974, p. 99.

[4] See Robert J. Gordon, "Wage-Price Controls and the Shifting Phillips Curve," *Brookings Papers on Economic Activity*, no. 2 (1972), pp. 385-421, and "The Response of Wages and Prices to the First Two Years of Controls," *Brookings Papers on Economic Activity*, no. 3 (1973), pp. 765-78. See also Michael L. Wachter, "Phase II, Cost-Push Inflation, and Relative Wages," *American Economic Review*, vol. 64 (June 1974), pp. 482-91.

The Bumpy Road Ahead

If controls offer no solution, and if the effectiveness of aggregate-demand restraint has diminished and little determination exists to step it up and sustain heavier cutbacks in output and employment, the prospects of subduing inflation are bleak. Sporadic outbursts, as in 1973, are bound to occur from time to time—indeed, more often and vigorously now in an inflationary world than ever. A growing belief in the persistence of inflation and fear of its escalation work to reduce the response of prices to restraint and make policy even less effective. A fight against inflation under these conditions is all uphill.

Yet the public injunction to fight inflation remains in force and, at least in public, policy makers remain committed to the battle. But what can they do? So long as public concern over unemployment rules out severe restraint, the only feasible policy is to maintain mild restraint for a long haul. Since the zone of demand-pull inflation moves about and cannot be predicted with precision, a cautious trial-and-error procedure is unavoidable in maintaining mild restraint. Furthermore, the response of prices is affected by the speed at which the zone is approached. The economy has to be kept below the zone of demand-pull inflation, which means braking cyclical recoveries like that in 1972 before they attain top speed and go too far. We know now that quick remedies for inflation do not exist and that restraint almost surely requires at least a mini-recession at the beginning and slow growth thereafter—though the earlier it is imposed in an inflationary movement the faster the results, as the difference between the effect on prices of the 1967 and 1970 slowdowns proved.

The standard method of curtailing aggregate demand is monetary restraint. Its effect on economic activity occurs in part through a restriction of the volume of lending and related investment spending, in which financial markets tighten and interest rates rise. The hardships thus imposed on certain sectors—particularly housing, which is dependent on mortgage funds, and on small businesses, which are dependent on bank loans—generate vociferous complaint. The only palliative is a special federal program to aid the stricken sectors, such as government funds channeled into the mortgage market. These programs do not alleviate the total pressure on financial markets but merely shift it from one sector to another. Ideally, the federal government should run a substantial budget surplus during times of monetary restraint to alleviate much of the financial pressure. This would require a timely reduction of expenditures or increase in taxes, however, and so far has not proved politically feasible. In

any event, there is no alternative to monetary restraint. If monetary growth is not reduced, no combination of other steps can have any lasting effect on inflation.

Galloping inflation had been held up as a danger to the U.S. economy since the early postwar years. When it did not materialize during the 1950s and early 1960s, the danger was dismissed. Now that it is coming true, recent experience hardly gives much ground for believing that policy can be more successful in preventing inflation in the future. But galloping inflation does carry one benefit—the impressive demonstration that it can indeed happen. We know now what mild inflation can eventually turn into, and the experience of the 1970 recession is a sobering lesson in how little to expect from a mild restraint on aggregate demand and inflation.

False hopes and promises can be put aside. Our recent education in the process of inflation will help us to be realistic. The traps that this process holds for policy are now evident: the slow response of prices to shifts in demand have led, on the up side, to a prolongation of stimulative policies, which increases the momentum behind rising prices, and, on the down side, to an impatience with restraints, because of the larger initial effects on output and employment than on prices, and to their premature reversal. The net outcome has been a policy on balance favoring stimulus and giving an upward tilt to the trend of prices. With the consequences finally in full view, the nation may be ready for policies that redress this imbalance and that promise, with time and patience, to subdue inflation.

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The author believes that, based on past policy failures, the prospects of conquering inflation are bleak. But he sees a ray of hope that the nation, having learned how inflation can escalate, understands that solid results from monetary restraint against inflation are slow in coming and may now be willing to stick with restraint long enough to achieve them.

Phillip Cagan is professor of economics at Columbia University, senior staff member of the National Bureau of Economic Research, and adjunct scholar of the American Enterprise Institute. He has written two previous essays on inflation for AEI, which appeared as chapters in *Economic Policy and Inflation in the Sixties* (1972) and *A New Look at Inflation* (1973).

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