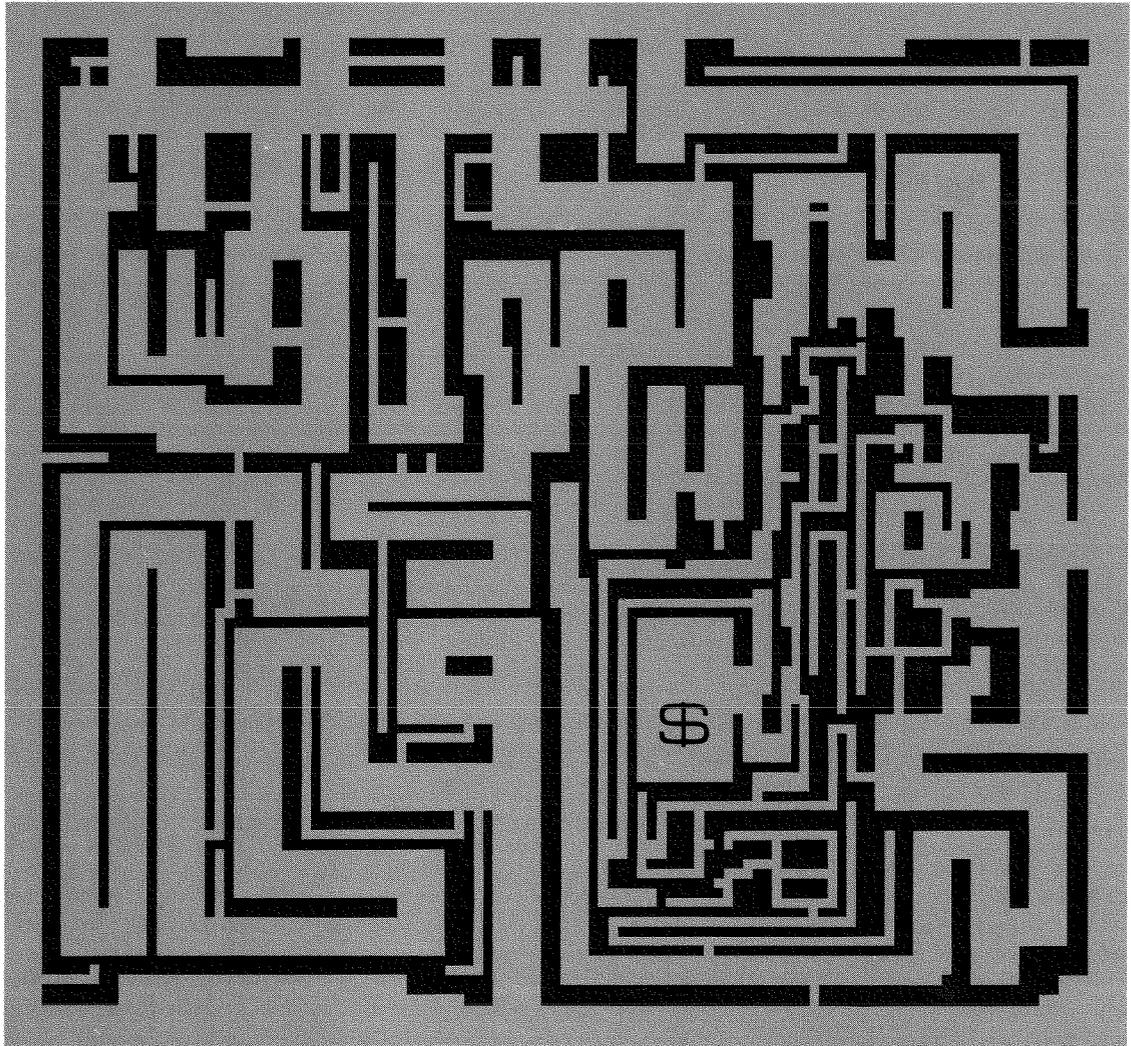


FEDERAL RESERVE BANK
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ECONOMIC REVIEW



CPI

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ALTERNATE STRATEGIES
TOWARD INFLATION

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The Phenomenon of Inflation, and the Prospects For Anti-Inflation Policy

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Inflation is currently judged to be the American economy's number-one problem by President Carter, Chairman Volcker, and most other prominent government officials, not to mention the American public. And reducing inflation, of course, is a primary goal of Federal Reserve policy. Clearly, then, the development of an effective anti-inflation policy is a crucial issue.

In order to address this issue, one must first analyze the nature of the inflation process itself, as well as the underlying economic causes of inflation. This is the aim of the present paper. We will evaluate the available theoretical and empirical evidence on the causes and costs of inflation as well as on the costs of anti-inflation policy. We will then use the results of this analysis to determine which anti-inflation policy has the most reasonable chance of sustained success.

To this end, in Section I we employ a simple macroeconomic analysis to present comparable statements of both monetary and cost-push (or income-share) theories of inflation. On the basis of that analysis, we conclude that all these theories require an accompanying increase in the money supply in order for them to provide a consistent account of continuing inflation. It follows that the various theories can explain sustained inflation, such as we have experienced, only to the extent that they can explain systematic increases in the money supply.

In Section II, we use these points to discuss what a meaningful test of the competing theories of inflation should show, and evaluate the empirical evidence on these terms. We see ample evidence there of a strong positive effect of the monetary aggregates on the price level, but find very little evidence that U.S. monetary policy has systematically reacted to accommodate cost-

push or monopoly-pricing factors. Also, despite mixed evidence, we find some signs of effects of government spending and federal deficits on the monetary aggregates. These results suggest that U.S. fiscal and monetary policies have had a substantial role in initiating and sustaining inflation over the last two decades.

In Section III, we discuss the economic costs of inflation. Besides increasing uncertainty and redistributing wealth, inflation also causes people to shift out of holding money balances into shopping more often, stockpiling goods, and making speculative investments—all of which lead to inefficient allocations of resources. Also, because of government tax regulations written in terms of nominal amounts, inflation distorts private decisionmaking. We conclude, then, that the costs of inflation are indeed significant.

The rest of our analysis concerns the costs of anti-inflation policy and the choice of the best policy to achieve that end. In Section IV, we discuss the output-employment costs of anti-inflation policy by considering current evidence on the Phillips curve inflation-unemployment tradeoff. The available evidence suggests that significant amounts of output and unemployment would be lost under any anti-inflationary fiscal and monetary policy. Still, it is doubtful that alternative or additional policy actions can avoid such costs while still slowing inflation.

In Section V we consider the implications of this analysis for the formulation of an effective anti-inflation policy. Here we attempt to answer three questions facing the policymaker: 1) Should inflation in fact be slowed? 2) What policy instruments should be used if we decide to slow inflation? and 3) How rapid a reduction in inflation should policymakers try to attain?

The answer to the first question might seem to be a foregone conclusion, yet it's useful to con-

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sider the pros and cons formally. We argue that the costs of inflation are considerable and recurring, whereas the output costs of stopping inflation, while considerable, are temporary, and would be almost wholly absorbed by the economy within a three-to-five year period following a sustained effort to reduce the rate of inflation.¹ In this light, the costs of stopping inflation do not appear to outweigh the costs of inflation itself. Also, given the substantial responsibility of fiscal and monetary policymakers for originally causing inflation, it can be argued that they should direct their efforts toward reducing the inflation problem today.

With respect to the second question, the importance of monetary factors in initiating and/or sustaining inflation implies that an effective anti-inflation policy must include a sustained reduction in the growth rates of the monetary aggregates. This is true even if one holds to a strict cost-push view of inflation. At the same time, we argue that tighter fiscal policy and the removal or easing of governmental regulatory burdens may successfully augment monetary policy by mitigating its contractionary effects on various sectors of the economy. However, we see no useful role for incomes policies in our anti-inflation strategy, partly because there is no clear evidence that wage and price restraints can mitigate cost-

push forces, and partly because such policies have historically tended to substitute for rather than complement monetary restraint.

Finally, with respect to the third question, the crucial issue in deciding how quickly to stop inflation is how the costs of stopping inflation can be least painfully imposed. Though political forces may push for a "quick fix", the lags from monetary policy to inflation make it impossible to achieve an immediate reduction in the inflation rate. Moreover, attempts to eliminate inflation quickly would make a deep recession inevitable, which would tend to shift political sentiment from fighting inflation to reducing unemployment, and thus could lead to stimulative policies and another inflationary cycle. This strongly suggests that restrictive policies should be implemented slowly enough to avoid a deep recession, but resolutely enough to have some lasting effect on inflation. That is, policymakers must avoid expansionary temptations once their policies begin to work in slowing inflation. Naturally, such a passive policy course could be politically unpopular, and thus hard to maintain. Nevertheless, it may be the only course of action that can generate a sustainable reduction in inflation without severely distorting or disrupting the workings of the American economy.

I. Inflation in Macroeconomic Theory

For our purposes, theories of inflation can be divided into two major groupings: monetary theories and cost-push—or more precisely, what Charles Schultze has called "income share"—theories of inflation.² Monetary theories cite accelerations in the growth of various monetary aggregates as the primary inciting and sustaining factor in inflations. Cost-push or income-share theories, on the other hand, stress the importance of supply factors, such as autonomous increases in important wages or prices, in generating continuing wage-price spirals. Usually, such autonomous increases are said to occur when firms or labor unions exercise their perceived monopoly power in an attempt to increase their profits or wage incomes, respectively.³ Their actions subsequently lead to price and wage increases throughout the entire economy.

As stated here, both types of inflation theories provide only partial explanations of the inflation process. Monetary approaches provide a reasonably complete description of how the money supply operates through demand and supply to effect an increase in the price level. However, the pressures—political or otherwise—which cause policymakers to allow the money supply to increase in the first place often are not described or documented as fully as are the effects of money on prices. On the other hand, income-share theories generally provide descriptions of the economic and sociological forces leading to cost-push behavior. However, most of these discussions do not provide a cogent enough analysis of how the momentum of cost-generated wage-price spirals can continue without severe disruptions of output and employment. These

respective analytical problems are discussed further below.

Economists typically define inflation as a sustained increase in the average price level, and thus in the money price of virtually all goods. However, industry-specific phenomena—such as bankruptcies, mergers, technological development, and changes in consumer tastes or supply conditions—typically change prices in one industry relative to another, but do not have much effect on the price level in general. Rather, such relative price changes serve as signals to the economy to shift resources among industries—and to shift consumption habits among goods—in order to promote economic efficiency. Some prices will rise and others will fall, but prices on average need not change at all. Under inflation, however, the dominant characteristic is an increase in virtually all money prices, with resource shifts either non-existent or primarily due to factors unrelated to the inflation itself. Thus, there is a fundamental conceptual difference between factors which lead primarily to *relative* price changes and those which lead primarily to *absolute* price-level changes, or inflation.⁴

There is also a distinction between factors which cause continuing inflation and those which cause only one-time movements in the price level. Thus, some factors can have a broad enough impact to raise the general price level once-and-for-all, but cannot cause continuing price increases. Therefore, these factors cannot seriously be considered as causes of sustained inflation such as the United States and other countries have experienced.

Inflation has been linked to increases in the money supply at least since the writings of David Hume some two hundred years ago.⁵ The reason is that increases in currency and deposit holdings by the public serve to *increase* demand—and so money prices—for all goods rather than to *shift* demand from one good to another. Moreover, an increase in the money supply serves to increase nominal demand for goods but does not change underlying real supply conditions (i.e., technology and factor supplies). Such an increase ultimately affects only prices, without necessarily inducing resource shifts from one industry to another.

Of course, in the short-run, before prices have adjusted fully, a higher money supply will induce higher output and employment, and other real effects. However, these will disappear once the economy has adjusted fully to the higher money supply.⁶ Furthermore, continuing increases in the money supply will exert continuing upward pressure on nominal demand, and so can cause continuing inflation.

In the days of the gold standard, monetary analyses explained secular increases in the supply of specie (gold)—and thus inflation—largely through expropriations or discoveries of gold and silver. In modern economies with fiat monies, the supply of currency and deposits is largely under the government's control, so a complete monetary theory of inflation must explain why the government would, in effect, choose to inflict inflation on an economy by expanding the money supply.

One obvious explanation is the political pressure to maintain high-employment and output conditions. Since prices and resources are not perfectly flexible in the real world, central banks are constantly under pressure to insure that their domestic money supply grows *at least* as fast as money demand. (Otherwise, there would be general downward pressure on prices, which could lead to depressed business conditions if the economy did not react immediately.) In such a case, the money supply inevitably would grow faster than money demand, and thus impart an inflationary bias to the economy.

Also, the lags from monetary expansion to inflation are longer than those from monetary expansion to increases in output. This naturally causes conflict between those with short-term time horizons, who are concerned with output and employment here and now, and those with longer horizons, who are more worried about long-term problems such as inflation and stable growth. When short-term problems are especially pressing, or when those short-run concerns gain superior political force, monetary expansion will accelerate, thus leading to accelerated inflation later on.

Another oft-cited explanation of inflationary monetary expansion is the tendency for higher government expenditures to be financed by

money creation rather than by higher taxes or bond sales to the public. The higher spending therefore leads to faster money-supply growth, which then eventually leads to accelerated inflation. It is important to realize that the same level of government spending would be much less inflationary when financed fully by taxes or bond issues to the public. Higher taxes would in effect shift demand from the general public to the government, so that the higher spending could be accomplished with a small one-time increase in the price level. Public bond issues would either shift demand from investors to the government, or would tend to increase interest rates in credit markets, in either case mitigating price rises.⁷ However, when money creation finances government spending, this serves to augment rather than offset the higher government demand for goods. What's more, the money supply will tend to continue growing as long as spending remains at a high level, so that a continuing inflation can occur.

In summary, increases in the monetary aggregates can be seen to lead to the general type of price increases which we have defined as inflation. Monetary theories also cite various political factors which can lead to the initial excessive monetary expansion.

Income-share theories attribute inflation to the struggles of business firms, labor unions, and other groups to increase their share of the economic pie. Initially, these groups attempt to exploit their perceived monopoly power to raise the prices of their goods or services. When higher wages raise costs and prices in an industry and/or when higher commodity prices raise the costs of producing other goods and of maintaining living standards, other firms and unions attempt to keep pace by raising their own prices, which can then cause a wage-price spiral to emerge. Various versions of this approach include cost-push, wage-push and sellers' inflation theories, as described in the writings of John Kenneth Galbraith, Abba Lerner, Edward Bernstein, and others. Similar theories cite shocks to particular industries—such as the OPEC oil price hike of 1973 or various crop failures—as the first causes which raise costs and so generate continuing inflationary spirals.⁸

All the phenomena discussed in this context are primarily sources of relative price change. By themselves, they represent, at most, temporary or one-time pressures on the price level. The typical problem for these theories is to explain how such one-time, industry-specific factors can induce a continuing, general inflation without disrupting equilibrium levels of output and employment.

Consider, for example, an increase in wages in an industry due to union demands. If all other wages and prices in the economy then increase by like amounts in order to maintain real incomes, real wealth will decline due to the lower purchasing power of cash and other assets with fixed money values. Therefore, demand would be insufficient to maintain full-employment output, so that either the price level would fall towards its previous level or the economy would go into recession. In other words, if all prices rise, but aggregate demand conditions remain unchanged, the new set of prices could not be an equilibrium and so could not be sustained.

Thus, for cost-push types of disturbances to be a source of continuing inflation—but not of continuing unemployment—there must be an accompanying stimulus to aggregate demand, as would be provided by an increasing money supply. Accommodative monetary policy in such a situation might occur if policymakers increased the money supply in order to avoid even the temporary losses in output and employment resulting from inflexible prices and inputs. Equilibrium output levels could then be maintained, because the increased money supply would serve to increase the equilibrium price level up to the level of actual prices, and thus to validate the higher prices.

This type of accommodating increase in the money supply must occur to sustain any inflation triggered initially by cost-push influences. An income-share struggle or supply shock would provide the initial spark, and the increasing money supply would provide the fuel to support the continuing inflation. Though analyses of this type emphasize various conflicts and shocks, and hardly even mention the money supply, an accommodative monetary policy nevertheless plays an essential role in sustaining such wage-price spirals.

The debate between monetary and income-share theories of inflation can therefore be couched in terms of which is more effective in explaining the actual expansion of the monetary aggregates. That is, does the money supply typically increase because of fiscal-and monetary-policy decisions, with wage and price

increases merely symptoms of a general inflationary situation—or are wage and price increases typically autonomous forces, with faster money growth validating higher prices in order to prevent business slumps?⁹ An analysis of the empirical evidence can provide some evidence on this issue.

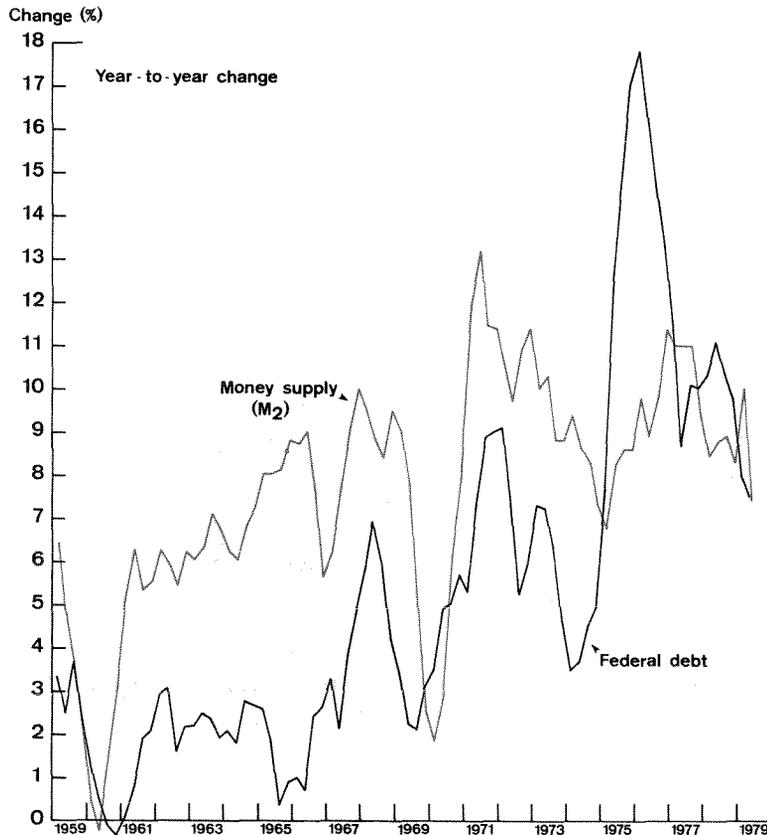
II. Inflation in Fact

Since 1964, consumer-price inflation in the United States has averaged 5.75 percent per year, and has tended to accelerate, and manufacturing wage rates have shown much the same behavior (Chart 1). Relative price changes have indeed occurred over this period, but, as documented in Fama and Schwert (1977), they apparently have not been systematically related to observed inflation.¹⁰ Nor have business slumps and unemployment followed every wave of price increases, or worsened as inflation continued. Rather, the

price level has moved inexorably upward throughout the period, during booms and serious recessions, and during shortages *and* surpluses for important commodities like food, steel, and oil. In other words, we have experienced a classic inflation, with actual price behavior generally characterized by accelerating rates of increase of all prices rather than by periodic changes in a few dominant commodity prices. Again, relative price changes and inter-industry shocks have occurred, but have not represented a

Chart 1

Changes in Money Supply and Federal Debt



dominant characteristic of the continuing U.S. inflation.

Over this same period, the monetary aggregates—such as M_1 and M_2 —have also grown at an accelerating rate (Chart 2), as has virtually every nominal variable that one could name. This concomitant increase in money and prices is consistent with our argument that the money supply must increase for inflation to continue. What is more impressive is the massive amount of statistical evidence which documents a systematic link between various money-supply measures and price levels over a wide range of economic experiences. For example, a recent study found that fluctuations in the M_1 measure were able to explain over 60% of quarterly fluctuations in U.S. consumer prices over the 1959-78 period.¹¹ Thanks to such results, economists nearly unanimously acknowledge the importance of money-supply growth in sustaining inflation.

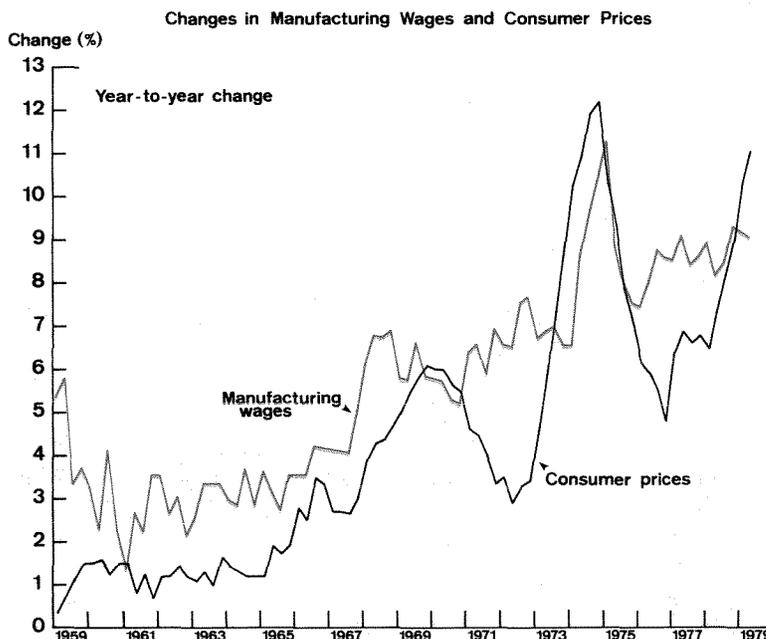
As discussed earlier, however, these results do not explain what factors lead to the initial monetary expansion, and so do not necessarily rule out cost-push-cum-accommodation theories. Still, some studies have directly addressed these issues.

But first, it may be useful to consider some of

the more traditional evidence used to support income-share inflation hypotheses. Over the last few decades, several articles have documented a relation between various factors (such as wage increases and changes in industrial concentration) and inflation rates, both secularly and at various points in the cycle.¹² As Levy (1979) points out, however, all these studies have two serious defects: their results are not shown to be inconsistent with a monetary theory of inflation, and the phenomena they cite are not shown to be sources of autonomous shocks rather than reactions to already existing inflationary forces. In any inflation, as we have seen, all nominal variables inevitably rise together. Therefore, merely documenting a statistical correlation between, say, wages and prices, does not rule out the possibility that both are being driven by a third factor, such as the money supply. In the jargon of statistics, tests of the cost-push theory have been of very low power, with little or no ability to rule out competing hypotheses.

A meaningful way to test between monetary and income-share theories would be to acknowledge the long-run monetary nature of inflation, and then to analyze the factors which cause monetary expansion, and so serve to generate or perpetuate inflation, as the case may be. If

Chart 2



income-share or cost-push factors have typically been the initial causes of inflation, then there should be a systematic effect of these factors on monetary policy—and so on the money supply—if the process is to continue. On the other hand, if ambitious political programs—operating through increased government deficits or expansionary monetary policies—have typically been the source of money-supply growth and inflation, this link too should be identifiable.

These issues have been addressed in independent work by Gordon and Bazdarich, with much the same results. Gordon (1977) tested for causal effects from various cost-push or supply-shock variables to the money supply, using data from seven major industrialized countries over the last two decades. Only for the United States did he find *any* systematic evidence of monetary accommodation, and even this evidence was extremely weak.¹³ Over a similar period, Bazdarich tested for monetary accommodation of wages and prices in the Pacific Basin (1978), and for monetary accommodation of a range of cost-push or supply-shock variables in the United States (1979). He found no significant evidence that the narrow money supply (M_1) or the monetary base systematically reacted to any of these factors. The wider money-supply measure (M_2) reacted systematically only to a few highly cyclical variables, such as steel prices, which may have tracked the cyclical nature of M_2 due to disintermediation and similar effects. For an overwhelming majority of the variables, the typical result was strong effects from the various monetary aggregates to the “cost-push” measure, but virtually no reverse effects.

In other work on the U.S. economy, Gordon (1978) concluded that only the acceleration of inflation in 1974 could be attributed to non-monetary factors—in this case to food and oil-price shocks. Still, Bazdarich (1979) found that even this period could be reasonably well explained by 1971-75 money-supply growth and by the 1972-73 removal of wage-price controls.¹⁴

One might argue that the twenty-year data periods used in these studies are too long to pick up the possibly temporary effects of various cost-push factors. Yet it is also true that such effects lose reliability and applicability if they do not hold up over extended periods of time. For

example, a statement that monetary policy reacted to wage pressures, say in 1964, is not testable at all, since we have only one observation—and that was in fact already used to formulate the hypothesis! Furthermore, even if we could prove this assertion, it tells us little about what caused inflation in 1978, or what will cause inflation in 1981. In other words, a theory must be general and have predictive power if it is to have any practical applicability, and the tests of various versions of cost-push inflation have revealed little evidence of these qualities.

As for the effects of government spending and deficits, Gordon (1977) found evidence that Vietnam War financing in the U.S. could explain some of the money-price phenomena in the U.S. and abroad in the late 1960's. Bazdarich (1979) also found evidence of systematic effects of both government spending and government deficits on M_1 and M_2 as suggested by Chart 2, although these results had some unsatisfactory features.¹⁵ In unrelated attempts to measure money-supply “reaction functions,” Barro (1976) and others have found effects of fiscal-policy measures and monetary-policy goal variables on various money-supply measures.

These studies identify systematic effects transmitted from various measures of fiscal and monetary policy to money-supply growth, and thence to inflation. Yet on the same terms, they generally fail to find such effects for cost-push variables such as wages, unit labor costs, and various commodity prices. Obviously, monetary-oriented theories cannot explain every wiggle in money supplies and prices, but over extended periods of time—over all phases of the business cycle—they appear to have significantly greater explanatory power for inflation than cost-push or income-share theories.

Still, the question may arise whether there really is a basic distinction between the two theories. While income-share theories cite business and labor pressures on the central bank as creating expansionary policies, monetary theories cite political pursuit of economic goals as leading to monetary expansion. Given the similar political undertones, does it make much difference which description is most accurate? If nothing else, the way in which we have contrasted these theories helps to illuminate the impor-

tance of the money supply and monetary policy in the inflation process. Moreover, the evidence suggests that Congress and the Federal Reserve have been more than merely passive agents swept along on a wave of inflation. These institutions

and the political process in which they operate have served to generate as well as perpetuate much of our recent inflation, which is an important consideration in our later discussion of anti-inflation policy.

III. Economic Costs of Inflation

Economists are often criticized, and rightly so, for underestimating the costs of inflation. This reflects the fact that most of the "costs" of inflation *recognized by the public* either represent redistributions of wealth among different groups, with little net cost to society, or arise from popular misconceptions. For example, if an increased money supply leads to higher prices, people on fixed nominal incomes, holders of cash, and creditors will lose. On the other hand, debtors will gain, as will also the beneficiaries of government activities financed by the money creation. Similarly, if inflation were caused by a wage-push-cum-accommodation set of events, those negotiating the higher settlement would gain, while creditors and those on fixed incomes would suffer. These direct gains and losses in wealth due to inflation roughly offset each other, leading to a redistribution of income, but not necessarily to a decline in national income.

Similarly, the public tends to perceive inflation as causing a decline in living standards as household incomes apparently fail to keep up with rising prices. Again, however, real incomes do not typically decline during inflations, and so no loss in real purchasing power occurs for the economy as a whole. Rather, perceived losses typically occur because consumers believe their nominal incomes are rising because of their own merit, and not because of any general inflationary phenomena. Thus, they believe their \$20,000 incomes would have accrued to them even if prices had not risen, so that they see a loss in purchasing power compared to what they would have had with \$20,000 incomes but lower prices. This naturally leads them to feel that they have been cheated, despite the inconsistencies of their underlying reasoning.

Economists often neglect the redistributions of wealth and increased misperceptions that are inherent in any real-world inflation, because these phenomena are not important in theoretic-

cal analyses of inflation. Still, wealth redistributions due to inflation represent returns based on chance rather than effort. These therefore distort the public's psychological incentive to prosper from thrift and hard work, rather than from speculative ventures. Similarly, the "losses" in purchasing power are real enough to families with expectations of future prosperity. These costs are very real to the voting public, and cannot be as easily dismissed by policymakers as they are by economists.

Furthermore, there are very real economic costs imposed by inflation, some of which show up even in theoretical analyses, and some of which are endemic to real-world economies with laws and contracts written in nominal terms. For example, inflation causes individuals to economize on cash holdings, and thus to substitute more time shopping and bartering for the convenience of using cash or financial instruments. The faster that prices rise, the faster money loses its value, and so the more costly it is to hold. This causes individuals to utilize inefficient means of transaction in order to hold as little money as possible.¹⁶ These phenomena have been deemed "shoe leather costs of inflation", as the public spends more time (wearing out shoes) in stores, between stores, or waiting in line, rather than holding more cash and spacing shopping trips farther apart.

Similarly, businesses typically attempt to avoid taxes on inflation-expanded profits by hiring extra accountants and tax consultants to devise (say) exotic depreciation or tax-shelter schemes. Furthermore, as inflation rises, the public experiences greater losses from not anticipating it correctly, and thus devotes more resources to research and information on inflation prospects and less to the production of tangible goods. The growth of T-bill futures, GNMA futures, and the gold market, and the growth of various forecasting services, are testimony to the

vigor of attempts to learn about and hedge against inflation. These efforts largely stem from the increased *variability* of the inflation rate, more than from an increased *level* of inflation, but typically, higher inflation is accompanied by a higher variability of inflation as well.¹⁷ These phenomena may not lower measured GNP, but they reduce living standards by drawing valuable resources (viz., leisure and financial expertise) to socially less efficient uses.

How important are these costs? Rose (1979) cites estimates that every one-percentage-point rise in the inflation rate costs between \$1 to \$3 billion in current dollars per year in extra transaction costs, or between 0.1 to 0.2 percent of real GNP per year. Moreover, these costs continue to accrue with continuing inflation. If we discount a permanent flow of such costs at a 2-percent real rate,¹⁸ the present value of the costs of each permanent percentage-point increase in the inflation rate would approximate \$100 billion, or 5 percent of GNP. These are very rough estimates of the real costs involved. Still, these costs can clearly be enormous—probably on the same order of magnitude as the temporary losses in employment and output caused by an anti-inflationary monetary policy.

Perhaps the most controversial question about the costs of inflation concerns its effect on economic growth. Some economists have concluded that inflation speeds growth by reducing money holdings and so encouraging saving and investment. Such results have typically been obtained in models where all unconsumed output necessarily went to productive investment. However, in the real world, when inflation causes consumers to decrease cash balances and consumption, they often substitute inventories of storeable commodities or precious metals rather than productive investment. Thus, the growth process might be unaffected or even impeded by inflation.¹⁹

The behavior of stock prices and commodity prices provide some evidence on this issue. If higher inflation increases the demand for capital investment, we would expect strong prices in periods of accelerating inflation. However, if higher inflation merely encourages commodity speculation, we would expect weak stock prices and volatile commodity prices during such peri-

ods. Gorham's (1979) findings were mixed on the relation between commodity prices and inflation. However, they showed a strong negative effect of inflation on stock prices, and no reliable sign of a positive effect of inflation on investment. Moreover, a casual look at the numbers suggests that the decade-long acceleration of inflation has coincided with slower growth in output and productivity.

All these costs occur even in simple theoretical analyses of inflation, but many more costs of inflation occur due to the nominal-value orientation of the U.S. legal system. A prominent example is the progressive income tax, where marginal tax rates are calibrated by dollar increments of income. If a worker's salary rises to "keep up" with inflation, the higher salary pushes him into a higher tax bracket, so that a larger fraction of his pre-tax income goes to taxes. Thus, he is left with a lower after-tax real income despite the "cost of living" adjustment. Since actual tax rates are not indexed regularly, inflation therefore can reduce after-tax real income for extended periods of time. Similarly, if the nominal value of productive capital rises due to inflation, the *nominal* rise will be treated as a *real* capital gain by the tax system and taxed accordingly. Therefore, inflation systematically lowers the after-tax real rate of return on capital.²⁰ Since the government receives these extra tax revenues, there is no immediate social loss. However, the tax system together with inflation lowers the effective returns to labor and capital investment—so that this lowers the incentives to work and invest, lowers the supplies of labor and capital to the economy, and so puts a drag on the growth of domestic output.²¹

Similar effects can occur because of deposit interest-rate ceilings (Regulation Q). When inflation pushes up nominal interest rates on other investments, interest-rate ceilings on deposits cut off funds for deposit institutions. This serves to restrict financing to sectors, such as housing, which depend on a steady flow of funds to deposit institutions. The interaction of rate ceilings and inflation thus impedes the efficient functioning of these sectors.

To summarize, even in an ideal economy with full information and perfect flexibility, inflation imposes significant costs by discouraging the use

of money in financing transactions and otherwise encouraging socially inefficient use of resources. In addition, real-world impediments—such as laws written in nominal terms—combine with inflation to further distort the allocation of

resources. These costs, together with the psychological strains caused by inflation, make inflation a very expensive experience for the national economy.

IV. The Inflation-Unemployment Trade-off

Numerous and diverse costs are incurred by an economy during inflation. On the other hand, the costs of stopping inflation can be characterized mainly by the losses in output and employment which anti-inflation policies are likely to impose. These costs can be discussed in terms of the current economic wisdom on the Phillips curve—the supposed inverse relationship between unemployment and inflation.

Samuelson and Solow (1960) first proposed the Phillips curve as an instrument of policy, partly in the belief that higher rates of inflation would allow the economy to achieve permanent reductions in unemployment.²² This belief stemmed from the then-observed empirical stability of the Phillips relation, despite the fact that economic theory had never achieved a satisfactory explanation of why such a trade-off should exist. However, once policymakers started to exploit this relationship, its stability began to disappear. High inflation rates failed to prevent higher and higher unemployment rates from occurring.

Friedman (1968) argued that no permanent trade-off actually exists between inflation and unemployment. Rather, he asserted that higher inflation temporarily leads to higher output and lower unemployment *solely* because, during any inflation, prices initially rise faster than people expect them to. This causes the public to confuse the general inflation process with a higher demand and higher relative prices for the goods they produce, so that they respond by increasing output and hiring more workers. Once the public has adjusted to the higher rates of inflation, unemployment will return to its “natural rate”, or perhaps even to a higher natural rate due to the distortions discussed above. At that point, an even higher level of inflation will be required to again confuse the public and thence reduce unemployment.

Friedman asserted that a fully anticipated inflation will not cause unemployment to drop below normal levels, so that there is no trade-off between *anticipated* inflation and unemployment, and no sustainable trade-off between *actual* inflation and unemployment. These insights explained not only the Phillips curve trade-off, but also the deterioration in the trade-off over time. Furthermore, the subsequent acceleration in U.S. inflation concurrent with rising unemployment insured the existence of a receptive audience for his ideas.

Following ten years of research on this “natural-rate hypothesis,” the economics profession has largely agreed on the importance of inflation expectations in correctly specifying the Phillips curve relation.²³ Economists also widely acknowledge that no permanent inflation-unemployment trade-off exists. The remaining debate centers on three issues affecting the nature of the short-run Phillips trade-off: first, how quickly expectations adjust to new phenomena, specifically to changes to policy; second, how quickly unemployment returns to its natural rate once expectations have adjusted; and third, how much the natural rate varies in response to exogenous shocks.²⁴

The first two issues are clearly concerned with the extent of short-run gains or losses in output and employment that would accrue from a shift in monetary and fiscal policy. The third issue is also related, since higher (or lower) unemployment levels may persist for long periods of time following policy shifts if the unemployment changes represent shifts in the natural rate as well. Therefore, estimations of adjustment lags which do not allow for shifts in the natural rate could conceivably be biased upward.

Unfortunately, because expectations cannot be observed directly, we cannot easily distinguish among the three types of adjustment lags consid-

ered here. Most studies merely attempt to estimate the lag from changes in prices to changes in output or employment. Pigott (1979) and McElhattan (1979), in evaluating these studies, both conclude that the empirical evidence roughly supports the long-run natural-rate hypothesis (i.e., that there is no long-run trade-off between unemployment and inflation), but they also find substantial lags from changes in policy to changes in inflation.²⁵

Pigott, however, also presents a somewhat conflicting analysis of recent international experience. Germany and Japan's slow growth during the 1970's has commonly been attributed to their anti-inflationary policies, whereas the U.S.' faster-than-normal growth has been attributed to a weaker anti-inflation policy. Yet Pigott finds output actually high in the German and Japanese economies, when compared to that in the U.K., Sweden, Canada, and Italy, even though these other industrialized countries have made little or no inroads into inflation. In other words, a comparison of Germany and Japan with the U.S. alone suggests that large output costs are associated with slowing inflation. However, a comparison with a number of other industrialized countries leads to a less forthright conclusion. Persistent slow growth abroad may have been due to anti-inflation policies, or perhaps more likely, to some common occurrence such as the rising relative price of energy.

Still, studies involving U.S. data have typically found that a contractionary monetary and fiscal policy will reduce output and raise unemployment over a subsequent three-to-five year period. Perry (1978) concludes that a contractionary policy which increased unemployment by one percentage point will require three years to shave one percentage point off the inflation rate.²⁶ Perry attributes these long lags to rigidities in nominal wages and prices, slowness in the adjustment of expectations, and the existence of cost-push factors prolonging inflation. Consequently, he suggests the need for some sort of incomes policies to retard the cost-push process and so ameliorate the output costs of slowing inflation.

Perry's analysis can be questioned on several

points. For one thing, his estimates of the length of the adjustment period following policy changes are longer than those in many monetary analyses, although his lags are similar to those found in other studies.²⁷ A more vulnerable conclusion is his argument that incomes policies can mitigate the output effects of tighter policy.

Presumably, the wage-price rigidities causing Perry's long lags could result from monopolistic behavior by firms and unions. Yet incomes policies would not directly attack these monopoly powers. For example, a union might exert monopoly power by controlling the supply of skilled labor that a manufacturer needs, or by persuading (contractually) a manufacturer to eschew non-union sources. An incomes policy might moderate the *explicit wage* that the union could charge the manufacturer, but it would not prevent the union from exploiting its monopoly power by demanding a myriad of *non-wage benefits*, including better health and pension plans, longer vacations, stricter seniority rules, etc. These would serve to increase unit labor costs as much as equivalent wage increases, and so would have much the same effects on output and employment under an anti-inflation monetary policy.

Therefore, just as price controls do not prevent queuing and other implicit costs from equilibrating supply and demand, incomes policies need not prevent firms or unions from exercising their monopoly power in other ways. Thus, they may not help—and may even hurt—the adjustment process to slow inflation.²⁸ Advocates of income policies virtually ignore these issues, but they can present a damaging argument against the efficacy of such policies.

The evidence on balance suggests that a substantial period of slow growth will follow any serious attempt to slow the rate of inflation. Furthermore, it is not clear whether incomes policies or the like can shorten this period. While the seriousness of these output costs varies across different studies, it would be hopelessly optimistic to believe that inflation could be slowed without some temporary losses in production and jobs.

V. Stopping Inflation—Odysseus at the Helm

Our conclusions can be used to discuss three basic policy issues: 1) Should inflation be reduced; 2) what instruments should be used in an anti-inflation policy; and 3) how quickly should we attempt to slow inflation.

With respect to the desirability of reducing inflation, a rough cost-benefit calculation can be devised. The costs of slowing inflation include the temporary declines in output and employment discussed in Section IV. The benefits include the removal of the recurrent costs of inflation discussed in Section III.

Perry's (1978) analysis suggests that one percentage-point higher unemployment for three years would be needed to slow inflation by one percentage point. Even if we assumed that each unit of labor contributes a constant share to GNP, these losses in present-value terms amount to less than a 3-percent reduction in GNP to slow inflation by one percentage point. Yet the losses from the continuing inefficient allocation of resources ("shoe leather costs," etc.) due to inflation were estimated at 5 percent of GNP for one percentage point of inflation, in present-value terms.

Consider also the likely sources of error in these calculations. Again, Perry's lags from tight policy to lower inflation are longer—and so his implied output losses from slowing inflation are higher—than those in monetary analyses of inflation. Moreover, it may be incorrect to assume that each percentage-point change in unemployment means a constant one percentage-point effect on GNP. This assumption abstracts from the productive input of capital and other factors in GNP, and also ignores the lower productivity of marginally employed labor, which would be the first to become unemployed. Thus, the output costs of slowing inflation are probably overstated. It could be argued in rebuttal that the costs of inflation are also overstated. However, our calculations included only efficiency losses and ignored other costs of inflation. Also, a 5-percent after-tax *real* rate of return was used to obtain our 2-percent discount rate, which is absurdly high, and so further understates the costs of inflation.²⁹

To be sure, these are very rough estimates of

the costs and benefits of slowing inflation. Nevertheless, they cast substantial doubt on the argument that inflation is best left alone—that the "cure is worse than the disease." Moreover, given our earlier conclusion that Federal government and Federal Reserve actions have been responsible for much of the problem, and given the public's increasing distaste for inflation, it would seem incumbent on policymakers to face up to the task of slowing the price spiral.

If, then, we conclude that a serious attempt should be made to slow inflation, what instruments should be directed to the task? Our earlier analysis clearly implied that slower growth in the monetary aggregates is a necessary part of any anti-inflation strategy. This is true whatever inflation theory one holds, since no type of inflation can continue without a sustaining monetary expansion. Deregulation of various industries, liberalization of tax laws, or even lower government spending financed by lower taxes (leaving money growth unchanged) would allow one-time declines in the price level, but by themselves could not permanently overcome persistent inflation such as the nation has recently experienced.

The evidence does not indicate which monetary aggregate the Federal Reserve should focus on. M_1 , M_2 and the monetary base all display similar statistical effects on prices. What would seem more important is that the Federal Reserve concentrate on a particular aggregate of its choice and not switch among aggregates when they give conflicting signals.³⁰ Otherwise, the Fed might be tempted to choose whichever aggregate was displaying the most convenient signal at a given time.

Actions to reduce government regulations, to liberalize (or index) tax laws, to reduce protective tariffs, and other such moves could help mitigate the contractionary effects of slower money growth, and could also provide a quick (albeit temporary) reduction in inflation. These steps thus could serve a useful role in augmenting or complementing an anti-inflationary monetary policy. But since these are supplementary actions, the basic question about them is whether they would be intrinsically good for the econo-

my, rather than how much of a temporary reduction in inflation they could effect.

A more vital supplementary policy would involve lower government spending and deficits. As we have seen, federal spending and deficit increases historically have apparently helped stimulate monetary expansion through the monetization of federal debt. A slower money-growth rate unaccompanied by lower deficits would eventually depress the whole economy, but would initially affect housing and similar sectors most heavily because of their vulnerability to high interest rates. Lowering the deficit along with money growth would reduce the strain on credit markets, and would probably allow a smoother approach to lower inflation rates.

A case could be made for incomes policies if one could show that cost-push factors have played a major role in generating inflation, but there is little compelling evidence on that score. Moreover, there is *no evidence* that incomes policies could successfully counter true monopoly power wherever such occurs. Finally, history suggests that incomes policies, when employed, have tended to license renewed growth in the money supply.³¹ The proponents of such policies usually emphasize that they are intended as a complement to slower money growth. Nevertheless, as a practical matter, policymakers typically become tempted to expand monetary policy when incomes policies can be relied upon to hold down prices temporarily. For these reasons, incomes policies apparently can do little good but much harm, and so probably should be left unused in formulating plans to slow inflation.

Finally, how fast should we try to reduce inflation? Recent history suggests that a policy of rapid reduction in money growth and inflation cannot be maintained for very long. A drastic reduction in money growth can cause a quick and deep recession. Once the resulting unemployment becomes severe, political sentiment shifts from concern about inflation to worry over unemployment. In that situation, policymakers may yield to short-run pressures and expand the money supply anew. After a brief decline, inflation would then accelerate once more and the situation would become as bad as (or worse than)

before.

This apparently is what happened in 1974-76. With inflation at 12 percent in 1974 (see charts), the decline in M_2 growth to 7 percent signified very restrictive policy. This shift, together with the oil-price hike, plunged the economy into a deep recession in 1975. But shortly thereafter, following public consternation over high unemployment, M_2 growth began to accelerate again—and it has since been the prime factor in causing the currently high rate of U.S. inflation.

In sum, the temporary costs of slowing inflation, and the temptation to avoid these costs through expansionary means, provide strong enticements to abandon anti-inflationary policies—even when these are seriously installed. Like the Sirens of the *Odyssey*, the short-run trade-offs facing policymakers with short-term horizons have a call that requires more than good intentions to resist.³²

It would seem that the surest way to reduce inflation on a permanent basis is to avoid the large cyclical swings in policy that create swings in public opinion as well. Thus, the rate of growth in the FOMC's chosen aggregate should be lowered slowly, say by 1 to 1½ percentage points per year, over a four-to-six year period.³³ Though increases in unemployment would still occur, these would be smaller than under a more drastic policy, and so would be less unpopular.

Of course, the gains in inflation would also come more slowly. Also, even during a mild slowdown, policymakers might be tempted to expand policy and so accelerate output growth. These pressures are not easy to abide, but they are nevertheless inevitable under any serious attempt to slow inflation. Like *Odysseus*, the policymaker will have to "tie his hands to the mast" until the progress of his policy takes him safely away from the "Siren's call." Reductions in inflation come slowly under such a policy, but they will not come at all unless the policy is maintained steadfastly for an extended period of time. Perhaps the pressures to "reflate" can be mitigated by introduction of supplementary measures such as those discussed above, which would likely reduce the output costs of slowing inflation.

In a sense, such a policy would involve some of the worst of both worlds. It will not achieve the

rapid declines in inflation which are politically desirable, and unfortunately it will create some losses in jobs and production which are politically painful. Yet as we have seen, a "quick fix" to inflation is unlikely to be maintained, while a "do-nothing" policy leaves inflation at levels that increase with each cyclical expansion. A gradual

but steadily maintained attempt to slow inflation runs the middle ground, and should elicit growing support as the public perceives that it is being followed. Although not a happy alternative, it appears to present the best choice available to the Federal Reserve, the Congress, and the Executive Branch.

FOOTNOTES

1. We say "permanently" here, because temporary attempts to reduce inflation that are rescinded by subsequent policy changes would periodically subject the economy to slow growth and lost jobs every time a tight policy is imposed.

2. See Schultz (1959), as well as the reference to this designation in Levy (1979).

3. We say "perceived" monopoly power, because in many studies it appears to make little difference whether the monopoly power actually exists or not. Given a slow reaction of demand to higher prices, as well as downward price rigidity elsewhere in the economy, a price increase even in a competitive industry could generate the type of inflation spiral propounded by cost-push theorists.

4. As shown in Section II, real-world inflations have typically been characterized by such general absolute price increases.

5. In fact, inflation traditionally has been defined as an increase in the money supply, and only recently have rising prices been associated with the word. Thus, **Webster's New International Dictionary, 2nd Edition, 1936**, defines inflation as a:

Disproportionate and relatively sharp and sudden increase in the quantity of money and credit, or both, relative to the amount of exchange business. Such increase may come as a result of unexpected additions to the supply of precious metals, as in the period following the Spanish conquests in Central and South America or the period following the opening up of large new gold deposits; or it may come in times of business activity by expansion of credit through the banks; or it may come in times of financial difficulty by governmental issues of paper money without adequate metallic reserves and without provisions for conversion into standard metallic money on demand. In accordance with the law of the quantity theory of money, inflation always produces a rise in the price level.

Whatever the quality of economic analysis in this definition, it is interesting to note that it describes inflation as *causing an increasing price level*. The definitional association of inflation with rising prices, as documented in newer editions of Webster's dictionary, has apparently arisen in English usage primarily through historical experience.

6. This assertion embodies the concept of "neutrality of money." The idea is that the nominal supply of currency

does not intrinsically affect real factors like tastes, industrial capacity, or demographics, and that a proportional change in the magnitudes of all nominal assets and prices would leave real conditions unchanged. Therefore, in the long run, the level of the money supply should have no effect on real magnitudes, but only on prices.

7. Theory specifies that in a full-employment economy, equal increases in government spending and taxes would raise prices, mainly because the lower after-tax level of private wealth would lower money demand. This higher price level would be consistent with the fact that, because of higher government spending, less goods would be left over for private consumption. What's more, this is a once-and-for-all increase in the equilibrium price level, rather than a continuing inflation.

Barro (1974), reflecting David Ricardo, also asserts that bond finance of a deficit is merely a substitution of future taxes for present taxes, since future taxes will need to be higher in order to service the government debt. Therefore, bond financing of spending should have identical effects as tax financing. Bailey (1971, p. 60 ff) and Buchanan (1976) also discuss these issues. While most economists do not accept this extreme specification, it's reasonable to believe that bond issues do raise expectations of future taxes somewhat, in which case they would still be less inflationary than monetization of government debt.

8. For further documentation and discussion of these analyses, see Levy (1979) or Bronfenbrenner and Holzman (1963). Gordon (1977) also discusses the possible effects of 1973 oil-price increases and crop failures on prices.

9. It may appear that income-share conflicts and political pressures for higher growth and employment are only slightly different manifestations of the same sociological forces, and that the various theories are therefore little different. Nevertheless, the different approaches to inflation do make a difference, as is discussed toward the end of the next section.

10. They found a predominantly uniform effect of inflation on prices in various commodity groups. That is, movements in the consumer price index had systematic effects on prices in individual commodity classes that were generally not significantly different from unity. Therefore, CPI movements do not appear to be related systematically to relative price changes. The exceptions to this result were in the categories of rent, homeownership, and utilities prices. These exceptions were found by the authors to be due to special factors, such as measurement problems (rent), as well as non-

market pricing of property taxes (homeownership) and of government-regulated monopolies (utilities prices).

11. This quantitative result is from Bazdarich (1979). As for the traditional work on money and prices, two hallmark works are the empirical studies by various authors in Friedman (1956) and the study by Friedman and Schwartz (1963). Important work can also be found in Meiselman (1970) and in a series of articles by Karl Brunner and Allan Meltzer, as well as many other monetary studies. Our emphasis on recent monetary work is not meant to downplay the importance of earlier analyses by Clark Warburton, Lloyd Mints, and many others, but to concentrate on the more sophisticated statistical analyses of the last twenty years.

12. Early empirical research was done by Means (1935), among others. More recent studies are found in Means (1972), the Cabinet Committee on Price Stability (1969), Wachtel and Adelsheim (1976), Eckstein and Brinner (1972), and Perry (1978). Levy (1979) surveys most of these results.

13. Gordon's technique used a Granger causality-test which measured the effects of wages on money-supply growth at lags of one to four quarters. Only at the third lag was the estimated effect significant for the U.S. Taken as a whole, these results did not show a significant effect. The one significant lag would be reliable evidence only if Gordon were testing the hypothesis that wages affect money at the third lag and at no other. The weaker hypothesis, that wages have *some* effect on money, however, is not supported by these results; that is, its alternative hypothesis that wages have no general effect is not refuted by this evidence.

14. While it's true that world crop failures occurred in 1973 and that oil prices jumped astronomically in 1974, it's also true that monetary expansion accelerated in 1971-72 in the U.S. and elsewhere. Also, in the U.S., price controls in 1971-73 served to suppress much of the inflationary pressure of this fast money growth, postponing it until after the controls were lifted in mid-1973. Bazdarich (1979) estimates that most of the inflation postponed by the controls should have occurred by late 1975. Consequently, he estimates the consumer price level for late 1975 using only money-supply data through 1975. This estimate differed from the actual price level by only three percentage points, suggesting that money-supply behavior could explain much of the total movements in prices over that four-year period.

15. Though government spending had significant effects on money-supply growth, the effects did not become positive until the fifth-quarter lag. Yet one would expect spending financed by money creation to have a much quicker effect on the money supply. Similarly, for statistical reasons (the use of seasonally adjusted data), the results for the effects of the government deficit on the money supply, though ostensibly significant, may not be reliable. See Bazdarich (1979) for details.

16. As evidence of the empirical importance of these phenomena, Gorham (1979) points to a 7-percent decline in real balances (i.e., the M_1 money supply deflated by prices) in the U.S. over the period 1973-78. Keynesian economists have generally taken this as a

sign of tight monetary policy over this period (e.g., Heller 1977 and Ackley 1979). Yet over such a long period of time, with the large price-level increases experienced, it seems more realistic to regard this phenomenon as largely induced by the demand for real balances. Thus, in a period where real GNP grew 20 percent, which by itself would suggest a rise in real-balance demand, the acceleration in inflation and in inflation expectations apparently led to a much larger drop in real-balance demand than would have occurred otherwise. Using regression analysis, Gorham also finds systematic evidence that inflation has lowered real balances (demanded) in the U.S. economy.

17. If an acceleration in inflation meant that the average rate of inflation increased, but that the variability of inflation around that average stayed much the same, then inflation would not imply an increase in uncertainty. In fact, however, the historical incidence of inflation is as described in the text. Sjaastad (1975) presents a theoretical explanation of this coincidence in the mean and variability of inflation.

18. Rose obtains the 2-percent discount rate in the following manner: He assumes a 5-percent after-tax real rate of return (clearly a very high estimate) and then subtracts an assumed 3-percent annual rise in "shoe leather" costs, reflecting a 3-percent expected annual rise in real GNP. Thus, present costs should be discounted at a 2-percent (5-3) rate. A lower real rate of return would result in a lower discount rate, which would result in even higher present values of these shoe-leather costs for each percentage point of inflation.

19. Tobin (1965) analyzed the general effects of inflation on growth. Using a consumption function that depended on the rate of inflation, rather than prices, he reached a presumption that inflation speeds growth. Sidrauski (1967), using utility maximization to derive consumption behavior, found no such effect. These and other studies are summarized in Dornbusch and Frenkel (1973).

20. Suppose a unit of capital yields a real rate of return r based on productivity, depreciation, etc. With an inflation rate π , the price of the good that the unit of capital produces will rise, as will the nominal value of the capital itself. Abstracting from relative price changes, then, the combination of real returns and inflation premia sum to a total pre-tax nominal rate of return of $r+\pi$, so that the pre-tax real rate of return ($(r+\pi)-\pi = r$) is unchanged by inflation. However, the inflation premia and the real return are both treated as income and so taxed by the government. With a tax rate t , then, the after-tax nominal rate of return is $(1-t)(r+\pi)$. If we then subtract the rate of inflation, the after-tax real rate—or the effective rate—of return of capital is $(1-t)r-\pi t$, which declines as inflation rises (or π increases). Thus, because of the tax on inflationary capital gains, effective returns to capital will fall as inflation rises, thus discouraging investment. Of course, the investor can postpone payment of these inflationary capital gains, but he must eventually pay them.

21. The Council of Economic Advisors (1979) itself has recognized a slowdown in the U.S. sustainable rate of growth. The Council cites as contributing factors the declines in productivity growth and in research and

development, both of which clearly could be reactions to unfavorable changes in after-tax returns due to higher inflation.

22. Discussion of these and other points in this section can be found in McElhattan (1979) and in Pigott (1979).

23. See Phelps et al. (1970) for seminal work on the expectations explanation of the Phillips curve.

24. In this respect, the existence of long-term contracts and other fixed commitments could allow unemployment to differ from the natural rate for a while even after expectations adjust. See Poole (1974) as well as McElhattan (1979). By the same token, however, these factors could also be seen as sources of changes in the natural rate.

25. Also, see Gordon (1976) for a detailed survey of the theory and evidence on the Phillips Curve.

26. This estimate is provided by William Poole, in the discussion following Perry (1978): "If Perry's estimates are taken at face value, a monetary policy that kept the unemployment rate 1 percentage point above the natural rate would be consistent with a decline in the inflation rate by 0.3 percentage point each year."

27. In Perry's analysis, the lag from unemployment to inflation is based on a "mainline" structural model involving aggregate demand, supply, etc. Policy variables affect inflation and unemployment in this model only through their effect on aggregate demand and supply. This framework is unquestionably correct in theory, but such an indirect method of estimation conceivably could bias the estimated reduced-form effects of the money supply on inflation and unemployment. That is, if Perry's hypothesized reduction in unemployment is to be effected through slower money growth, it's likely that a direct, reduced-form estimation of the effects of money on inflation and unemployment would produce shorter estimates of the lags than are contained in Perry's analysis. This is because the reduced-form effects are combinations of a number of structural effects. By estimating each structural effect individually, Perry may be introducing extra sources of error in estimating the reduced form than if he had estimated it directly. Thus, Bazdarich (1979), for example, finds much shorter lags from money to inflation and unemployment. The latter are more consistent than Perry's with the common "monetarist" dictum that

slower money supply growth will affect inflation with a lag of generally two years.

28. Incomes policies could hurt the adjustment process because the fringe benefits or tie-in schemes unions and firms might pursue are generally inefficient means of exploiting market power, compared to explicit wage or price increases. Thus, by fostering inefficient, second-best types of arrangements, the effects of monopoly power could be even worse under incomes policies.

29. See footnote 18 for details.

30. The question arises as to whether current Federal Reserve operating procedures should be relied upon to effect this slower growth in the FOMC's chosen aggregate, and/or what alternative operating procedures would be suitable. These questions are addressed in Judd and Scadding's article in this issue of the **Review**.

31. In the United States, money-supply growth actually declined in 1970 and early 1971, but then accelerated shortly after the imposition of price controls in August 1971. At the present time, also, it would be hard to argue that the Administration's wage-price guidelines have induced any significant slowing in the growth of M_1 or M_2 .

32. In Homer's *Odyssey*, Odysseus and his men prepare to pass through the straits of the Sirens, whose call no man can resist. He ties rags around his men's ears so that they won't be able to hear. Since someone must be available to signal to his men when it is safe, he leaves his own ears unbound, but has his arms tied tightly to the ship's mast, where he has to endure the agony of being unable to answer the Siren's call.

33. At present, underlying rates of change appear to be about 7 percent for M_1 and 9 percent for M_2 , although historically M_2 has tended to grow about 3 percentage points faster than M_1 . Also, available existing money-price evidence suggests that growth rates of zero for M_1 and 3 percent for M_2 are roughly consistent with the 3-percent per year inflation suggested by the Humphrey-Hawkins bill. Therefore, if we take this level as a goal, and reduce M_1 and/or M_2 growth by 1 to 1½ percentage points a year, zero M_1 growth and 3-percent M_2 growth would be achieved in four to six years, with 3 percent CPI inflation achieved in about six to eight years.

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