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Persistence of Inflation

The persistence of inflation in periods of high unemployment poses a central problem for modern economic policy. It suggests that the inflation rate can be brought down only if the economy is put through a severe and protracted recession. If policy makers are unwilling to accept a deep and prolonged recession, the citizens of modern industrial societies will be faced with chronic —perhaps accelerating— inflation.

This dilemma places a high premium on finding new ways to make price stability more consistent with low unemployment. So far, the search for such policies has been notably unsuccessful, but the exact measurement of changes in the relationship between the degree of unemployment and the rate of wage and price inflation is surely a prerequisite for the formulation of these policies. A new paper, **The Changing Cyclical Behavior of Wages and Prices: 1890-1976**, Working Paper No. 304, by **Jeffrey Sachs** of the National Bureau of Economic Research, represents an important contribution to refining the measurement of the short-run unemployment-inflation tradeoff and the way in which the tradeoff has changed.

Sachs goes about his measurement job in two ways. He first compares the rate of wage and price inflation before and after the eighteen business cycle peaks that have occurred since 1890. His second approach is to compare econometric estimates of the tradeoff between unemployment and inflation for the periods 1890-1929 and 1947-76. Both sets of measurements strongly support the view that inflation has become increasingly stubborn. The magnitude of increase in wage and price rigidity during business cycle downswings is startling. Between 1890 and 1929 a 1

percent decline in industrial production reduced inflation by about 0.45 percent; from 1950 to 1976 the same output decline slowed inflation by only about 0.10 percent. Taken at their face value, these figures mean that to achieve any given first-year drop in inflation, the drop in production must now be four times as large as it was prior to 1929.

Sachs's comparison over time of the behavior of wages and prices in the vicinity of business cycle peaks shows that both wage and price inflation have continued to yield to economic contractions. The rates of inflation have moderated during recessions in the years since World War II just as they did prior to the war. But there is a great difference in the degree to which recession leads to inflation abatement.

The increasing rigidity of wages and prices is not solely due to the fact that recessions have, on the average, been milder since World War II. Instead, prices and wages have been more rigid in recent times for all degrees of cyclical severity. The 1973-75 business contraction was severe by historical standards—about as severe as that of 1918-19. Yet the rate of wage inflation was actually higher during the recession of 1973-75 than during 1972-73; while the wage inflation rate slowed by 14.8 percentage points (from 27.8 percent to 13 percent) from 1918-19.

Sachs turns next to an estimation of changes in Phillips curve parameters over time. Analysis of the Phillips curve is central to much thinking about macroeconomic stabilization policy, because measurement of the unemployment-inflation tradeoff tells policy makers the answer to a crucial question: How much extra unemployment will society have to tolerate in the short run to achieve a given reduction in wage or price inflation? Sachs's estimates agree with the business cycle evidence: the unemployment-inflation tradeoff has worsened through time. In recent years policy makers have had to accept a greater increase in unemployment in order to achieve a given degree of inflation abatement.

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One benefit of studying how wage and price rigidity has changed over a long period of time is to focus attention on the long-term shifts in the structure of the U.S. economy that may account for the changes. "Complex changes in product and labor markets such as increased concentration, higher ratios of value added per shipment, increased unionization, and increased per capita investment in human capital have all played a role," Sachs says. Sachs indicates a number of possible shifts, but does not attempt to sort out the quantitative impact of these shifts. In this paper he chooses to concentrate on two possible causes of increasing wage-price rigidity that have received less analysis.

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The first is the impact of the activist policy to combat recession that has characterized the years since World War II. This activist policy, says Sachs, has changed the way in which workers and union leaders react to unemployment. In earlier days it seemed highly probable to them that the low demand that occurs early in a recession would persist for a long period of time. They were therefore willing to take cuts in money wages to save jobs. Since World War II, labor has correctly believed that a rise in unemployment will set in motion economic policies designed to bring about economic recovery. Accordingly, the willingness to accept lower money wages is reduced; union leaders and workers wait for the economic recovery instead. What is true about the change in labor's attitude toward wage cutting may also be true about business's attitude toward price cutting.

A second, and perhaps related, change has been a dramatic lengthening of the average duration of collective bargaining agreements. As late as 1948, the great majority of all wage contracts were of one-year duration. By 1972 most contracts were written for three years. This, Sachs believes, increases wage rigidity in two ways. The first effect is direct. Wages set by earlier contracts do not react in the short term to current, unexpected, cyclical developments. Second, there is a spillover from those sectors of the labor market covered by contracts to other sectors. Earlier research by Sachs has demonstrated that the larger the sector of the labor market covered by long-term contracts, the more rigid wages *not* covered are likely to be. (AC)

Inflation and Corporate Taxes

The taxation of corporate income has emerged as a key policy issue in the wake of growing public concern about the adequacy of capital formation in the United States. A new study by **Martin Feldstein**, NBER President, and **Lawrence Summers**, NBER Research Analyst, **Inflation and the Taxation of Capital Income in the Corporate Sector**, *Working Paper No. 312*, finds that inflation has greatly increased the tax burden on corporate source income. The authors calculate that in 1977 two-thirds of corporate income was paid in taxes. This tax burden was 50 percent greater than it would have been in the absence of inflation. The authors suggest that these inflation-induced increases in taxation

may reduce capital formation and channel remaining investment away from the corporate sector.

It is now widely recognized that inflation overstates corporate income by understating the true cost of replacing plant, equipment, and inventory at inflated prices. Official figures indicate that historic cost depreciation plus ephemeral inventory profits added \$59.3 billion to taxable profits in 1977, boosting corporate taxes by an estimated \$26.1 billion. Some analysts have argued that these adverse tax effects are more or less offset by the way inflation reduces the real cost of corporate debt, and that interest rates tend to compensate for expected inflation because both borrowers and lenders realize that debts will be repaid with shrunken dollars. They argue that corporations can deduct such nominal interest payments for tax purposes, overstating real interest expense and understating real profits and taxes. However, Feldstein and Summers point out that it is misleading to conclude that this offsets the additional taxes paid, because existing depreciation and inventory rules prevent this.

Inflation affects the taxation of corporate income not only at the corporate level, but also at the level of individual and institutional investors—through taxes on dividends, interest earnings, and capital gains. When considering the effect of inflation on tax rates, and on the aftertax incentives to accumulate capital and allocate it efficiently, it is the combined taxation of all income from corporate sources that needs to be considered.

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While corporations thus benefit as borrowers, those who lend to corporations likewise lose because their nominal interest earnings from corporate securities are taxed as though they were real income. Feldstein and Summers estimate that the overall marginal tax rate for individuals and institutions that lend to corporations is actually a bit higher (42 percent) than the relevant marginal rate of tax saved by corporations and their shareholders (40.4 percent). So the understatement of real interest costs and related tax savings for corporations that borrow is more than offset by a corresponding overstatement of real income and higher taxes for those who hold corporate debt, with no significant effect of debt remaining on the total taxation of income from corporate capital.

The \$26 billion of added corporate tax in 1977 due to the mismeasurement of depreciation and inventory profit, minus an estimated tax saving of \$15 billion from deducting nominal interest, leaves a net increase in direct corporate taxes of \$11 billion because of inflation. That, of course, leaves less profit to be paid out; taxes replace dividends. Nonetheless, increased shareholder taxes on illusory capital gains brought the net extra tax on corporations and their shareholders up to \$14.6 billion for 1977.

Adding to this \$14.6 billion the overtaxation of corporate creditors of \$17.7 billion, Feldstein and Summers conclude that inflation raised the real tax burden on income from corporate sources by \$32.3 billion in 1977. That additional tax due to inflation amounted to 54 percent of corporate tax lia-

bilities, or 69 percent of the real aftertax income of the non-financial corporate sector, including retained earnings, dividends, and real interest receipts of the corporations' creditors.

The authors estimate that inflation's excess tax on the unreal income of corporations and their owners has totaled more than \$80 billion from 1970 to 1977; the excess tax on providers of debt capital to corporations has exceeded \$100 billion. The combined excess tax on corporate equity and debt capital remained less than \$5 billion a year until 1966, doubled by 1970, doubled again by 1973, and has remained above \$20 billion a year ever since. Altogether, the effective tax rate on real capital income declined to less than 55 percent in 1962-67, then soared to an astonishing 95 percent in 1974, and has averaged 67 percent since then.

Inflation's impact on corporate taxation is also analyzed for each of twenty manufacturing industries. In general, manufacturers of nondurable goods are least affected, while three durable goods industries (primary metals, paper, and wood products) would have paid no taxes at all if depreciation had been excluded from taxable earnings. The higher tax rates in such industries could make it difficult for them to compete for capital, so that the tax effects of inflation probably distort the allocation of capital.

Inflation increased the effective tax rate on capital income in the nonfinancial corporate sector from 43 percent to 66 percent in 1977. Feldstein and Summers suggest that the lower real aftertax return on corporate capital may reduce the rate of capital formation, shift the remaining investment toward residential real estate and consumer durables, and misallocate capital among different industries. (AR)

Money and Exchange Rates

In a review of the different theories and empirical evidence regarding exchange rates, **Rudiger Dornbusch** of MIT and the National Bureau concludes that the depreciation of the dollar is largely the result of a structural deficit in the U.S. current account. Dornbusch contends that the United States now faces a structural deficit for two reasons. First, growth rates in other industrialized countries—especially Germany and Japan—have fallen relative to the U.S. rate. Demand for imports increases more in the United States, for a given increase in real income, than it does in other industrialized countries, so U.S. imports from industrialized countries are likely to grow faster than exports to them.

Second, and possibly more important, less developed countries (LDCs) have become more competitive in the manufacturing trade. The LDCs have achieved substantial industrialization, and they look to the world market for continuing sales growth. Moreover, the trend to heightened competition from LDCs may accelerate in the coming years as European and Japanese investments in these countries begin to bear fruit.

Since there is no evidence that the U.S. economy is being restructured toward a dynamic, trade-oriented stance, it is reasonable to expect that these two factors will give rise to worsening terms of trade for the United States and a continuing depreciation of the dollar. The higher prices of imports resulting from the dollar depreciation spill over to domestic products and hamper our efforts to contain inflation. However, the dollar's depreciation is necessary to restore U.S.

competitiveness and bring the current account back into balance. In addition, the resulting lower real price of U.S. exports helps to maintain or increase aggregate demand and employment.

Dornbusch argues that since the medium-term deterioration in U.S. competitiveness is largely inevitable, it is best not to use monetary policy to interfere with the accompanying depreciation of the dollar. Instead, he says, the United States should concentrate on a more basic reorientation toward fiscal and monetary policies that are conducive to investment and growth.

Dornbusch's analysis is contained in **Monetary Policy Under Exchange Rate Flexibility**, *Working Paper No. 311*. The paper lays out the analytical framework for assessing exchange rate questions and relates it to monetary policy before turning to empirical tests of the various models. Dornbusch begins with a description of the various exchange rate models. One of the simplest is purchasing power parity (PPP). It holds that rates adjust to offset movements in relative price levels, so that real price levels in different countries remain the same. For example, if U.S. inflation exceeds German inflation, the dollar will depreciate relative to the mark by a proportionate amount.

The monetary approach to exchange rate theory combines PPP with the quantity theory of money (i.e., that prices are a function of real money demand and nominal money supply). Under the monetary theory, exchange rates are determined by relative money supplies, the velocity of money, and real output. A change in any one will change the exchange rate. For example, a country's exchange rate will depreciate if its money supply increases faster, relative to its output, than other countries' money supplies. Thus, a move to a more expansive monetary policy will cause a country's currency to fall.

The balance of payments model is almost the opposite of the monetary model. It holds that rates adjust to the point where they balance receipts and payments from trade in goods, services, and assets. The exchange rate works to change relative prices, and thus competitiveness, and to bring trade into balance. Under the monetary model, in contrast, the exchange rate works to keep relative prices in balance.

Another approach to exchange rates, known as the Mundell-Fleming theory, focuses on the macroeconomic effects of interest rates and the role of capital flows in exchange rate determination. It holds that exchange rates enter into the determination of interest rates and economic activity, and that a currency depreciation has much the same effect as fiscal stimulus. For example, monetary expansion leads to a fall in interest rates and thereby stimulates demand. However, lower interest rates lead to exchange depreciation because of incipient capital outflows to countries with higher interest rates. The depreciation, in turn, boosts demand from foreigners, and income and output expand enough to push interest rates back to their former level. Dornbusch observes that the Mundell-Fleming model draws important attention to the role of interest rates in exchange rate determination and to the central role of net exports in aggregate demand.

The portfolio balance model is an alternative to Mundell-Fleming that emphasizes the limited substitutability of domestic and foreign assets and focuses on relative asset supplies. It introduces the exchange rate as a variable that,

along with asset yields, helps achieve a balance between asset demands and asset supplies. Under the portfolio theory, an increase in nominal domestic assets (i.e., money and securities) relative to foreign nominal assets leads to an equiproportionate currency depreciation. The current account figures into the portfolio model because foreign assets are acquired over time through current account surpluses.

Dornbusch next extends his analysis to include the role of expectations. Expectations are central to monetary policy under flexible rates because the spot rate is dominated by the course that the public expects it to take in the near future. In essence, the spot rate changes in response to changes in interest rate differentials and in expectations. If either of the variables changes while the other remains the same, the spot rate will change.

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Expectations can actually cause exchange rates to “overshoot” in response to monetary policy changes. In the long run, an increase in the money stock will raise prices and lower the exchange rate by equal amounts. However, prices are sticky and do not rise immediately, so the increase in the nominal money stock acts as an increase in the real money stock in the short run. As a result, interest rates fall. Because of the new interest differential, the exchange rate overshoots: it falls farther than it will in the long run, so that the anticipated exchange rate increase from the new, lower level offsets the new interest rate differential.

Overshooting helps explain the phenomenon of vicious and virtuous cycles, in which flexible exchange rates make inflation stabilization more difficult in soft currency countries and easier in hard currency ones. Overshooting may also negate the efficacy of monetary policy as a macroeconomic tool. If the inflationary pressure of currency depreciation quickly translates into domestic inflation, monetary expansion might simply create more inflation rather than more employment.

In the next step of his analysis, Dornbusch reviews the empirical tests of the various models. Purchasing power parity has proved generally correct over long time periods, but there can be systematic and persistent deviations from parity. The simple monetary model, in turn, is unsatisfactory since it relies on PPP and perfect price flexibility. Tests of the portfolio balance model very broadly support a monetary view, with the important addition of net foreign asset holdings in the determination of rates. The tests show that a current account surplus, by leading to the accumulation of foreign assets, gives rise to exchange rate appreciation. Dornbusch comments that he sees “the chief interest of the portfolio model as a direction of research that moves exchange rate theory away from money and PPP toward a perspective that emphasizes increasingly real variables: relative asset supplies, exchange rate expectations, the terms of trade, and the current account.” His preference is an extended Mundell-Fleming model that recognizes the determination of exchange rates in asset markets, the differential speeds of adjustment of asset and goods markets, and the

central role of expectations of future exchange rates in influencing the spot rate.

Next, the author briefly studies the impact of changes in the prices of traded goods (i.e., imports and exports) on the economy. The important questions are: What is the extent to which increases in import prices affect domestic prices? and What is the responsiveness of trade flows to relative price changes? The latter is important because it measures the extent to which depreciation-induced moves in competitiveness boost exports and aggregate demand. Dornbusch concludes that a 5 percent depreciation of the dollar will raise the U.S. price level by about 0.4 percent in the short run and about 0.8 percent in the long run. The trade response is much stronger: a 5 percent dollar depreciation will boost export demand by 10 percent in the long run, although the adjustment is slow. In sum, the evidence suggests that a fall in the value of the dollar will improve the current account balance, which will compensate somewhat for the inflationary effect of the fall. However, trade adjustment is so slow that induced depreciation may be a poor instrument for cyclical stabilization policy.

The theoretical framework and empirical evidence allow Dornbusch to draw some conclusions about the scope of monetary policy under flexible exchange rates, but he cautions that the conclusions are tentative because the theory itself is in flux. The conclusions are:

1. Expansionary monetary policy will depreciate the exchange rate and at least temporarily improve competitiveness.
2. The net effect of expansionary monetary policy on the current account balance remains uncertain because it depends on the relative magnitudes of the decline in interest rates, the response of aggregate demand to interest rates, and the composition of spending to relative prices. That is, expansion will lower the exchange rate and boost exports, but there will also be a potentially offsetting increase in imports arising from an increase in domestic demand due to lower interest rates and higher investment and consumption spending.
3. Monetary policy has an immediate effect on exchange rates, and the effect will be even more pronounced if monetary policy affects exchange rate expectations.
4. The instability of exchange rates arises because the very low interest elasticity of money demand implies that fluctuations in the demand or supply of money produce large fluctuations in interest rates and, in turn, large movements in exchange rates.
5. Exchange rates affect domestic prices. The more rapid and substantial the spillover to domestic prices, the more inflationary monetary policy becomes and the less effective it is with respect to aggregate demand.
6. The empirical evidence indicates that changes in real exchange rates and competitiveness induced by nominal exchange rate movements (i.e., deviations from PPP) persist for a considerable length of time. However, the reaction of trade flows and direct investment to these changes in relative prices are slow to come about, so that the net export channel cannot be counted on as one of the more rapid responses to monetary policy. (AE)