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Fiscal and Monetary Policies in Moderate Inflation

by

**Karl Brunner, Michele Fratianni,
Jerry L. Jordan, Allan H. Meltzer, and
Manfred J. M. Neumann**

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Carnegie-Mellon University
PITTSBURGH, PENNSYLVANIA 15213

Graduate School of Industrial Administration

William Larimer Mellon, Founder

Carnegie-Mellon University

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KARL BRUNNER, MICHELE
FRATIANNI, JERRY L. JORDAN,
ALLAN H. MELTZER, and MANFRED
J. M. NEUMANN

Fiscal and Monetary Policies in Moderate Inflation

*Case Studies of Three Countries**

Academic and popular discussions of inflation have increasingly emphasized institutional arrangements and social conventions. Terms like "wage drift," "cost push," "monopoly pricing," and "relative shares" appear frequently and often dominate discussions of inflation. Policies to prevent inflation, increasingly, look to control of individual price changes, particularly money wages and the money prices of products produced by large corporations, as a means of preventing a rise in the general price level.

The foundation for the many institutional approaches to inflation is weak and the arguments are imprecise. Often, the basis is a conjecture that unemployment is less acceptable to the electorate than inflation, so that whenever choices are made, governments choose to trade more inflation for more employment. Neither the usual rationale for the choice, nor the evidence to support it, is very convincing. Inflations have been slowed and even stopped. Deflations have occurred, at times,

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Karl Brunner, editor of the Journal of Money, Credit, and Banking, is professor of economics and director of The Center for Research in Government Policy and Business, University of Rochester; Michele Fratianni is professor of economics at Indiana University; Jerry L. Jordan is economist with the Federal Reserve Bank of St. Louis; Allan H. Meltzer is Maurice Falk Professor of Economics and Acting Dean of the School of Industrial Administration at Carnegie-Mellon University; and Manfred J. M. Neumann is professor of economics at the Free University of Berlin, Germany.

during the last two decades even in countries where governments are elected by popular vote. Nearly a decade of estimating the trading ratio at which unemployment is exchanged for inflation has produced neither evidence of a stable trade-off nor a reliable basis for maximizing votes.

Economic theory offers three main explanations of inflation.¹ The monetary explanation, by far the oldest, emphasizes the effect of changes in the quantity of money. Inflation is defined as an increase in some broad-based index of prices. An increase in money is a necessary condition for inflation, and any maintained increase in money relative to real output is a sufficient condition for inflation. Institutional details have a distinctly secondary role. They are important for specifying the set of monetary arrangements and the conditions under which the stock of money changes. To a first approximation, the effect of money on prices is independent of the arrangements under which money is produced.²

The usual Keynesian explanation emphasizes the role of aggregate expenditure. Increases in aggregate expenditure increase output until full employment is reached. Prices rise when there is aggregate excess demand and continue to increase until aggregate money expenditure equals full employment output at current prices.

The Keynesian theory of inflation says much more than classical theory about the effects of inflation on the distribution of income. Keynes argued that inflation redistributes income from laborers to owners of property income, and he relied on redistribution, differences in the marginal propensity to spend and progressive tax rates to bring inflation to an end.³ Keynes' theory was, for a time, looked upon as an advance toward generality because it eliminated the exclusive roles of changes in money as the motor-force in inflation. In its own way, however, the theory was more narrowly conceived. The reliance on progressive taxation and redistribution of income from workers to property owners to bring inflation to an end limits the range of application to countries with progressive taxation. More importantly, there is no evidence showing a generalized redistribution from workers to owners of property during inflation.⁴

The emphasis in Keynes' theory on progressive taxation and redistribution probably contributed to the emphasis given to institutional arrangements in contemporary discussions of inflation. The predilection of Keynesians, particularly vulgar Keynesians, to confuse the effects of general and relative price changes contributed to the resurgence of institutional explanations of inflation and the now prevalent notion that inflation can be stopped by having a government board or commission control some set of money prices and money wages.

A main impetus for the Keynesian emphasis on the role of institutions in inflation came with the development of the Phillips curve.⁵ If the position of the curve

¹The theory of inflation has been surveyed in Martin Bronfenbrenner and Franklyn D. Holzman [2] and by Harry G. Johnson, [9].

²The qualifying phrase is needed to allow the differences in the effect of prices on the production of money under different monetary standards.

³J. M. Keynes [11].

⁴R. A. Kessel and A. A. Alchian [10].

⁵A. W. Phillips [14].

could be controlled, institutional rearrangements that shift the Phillips curve would be a solution to the so-called "cruel dilemma" of inflation and unemployment. Some form of partial or total wage and price control, masquerading under a number of pseudonyms, came to be looked upon as a solution.

Keynes' discussion of inflation put a great deal of emphasis on the government's fiscal policy and particularly on government expenditure. The emphasis may be due more to the timing of his book and the set of problems he was addressing than to any belief that budget deficits or government expenditure is the sole or even the most important cause of inflation. Nevertheless, the fiscalist view of inflation has become an established view, and we consider some evidence on the role of fiscal policies in recent inflations.

A third economic theory of inflation puts main emphasis on private, not public decisions. Waves of optimism, unanticipated economic expansion, new technology, or some similar force raises the anticipated net return from real capital above the market interest rate. Investment expands relative to saving. With real resources unchanged, or growing slowly, prices rise.

The emphasis on differences between real (or natural) and market rates gives the theory a Wicksellian cast. The emphasis on an excess of investment over saving as the driving force is as acceptable to Keynesians as to Wicksellians. We call this theory of inflation the Wicksell-Keynes theory to distinguish it from the Keynesian fiscalist theory. The emphasis on private investment decisions makes the general framework acceptable also to the many economists of the past who developed "over-investment theories" of inflation.

In this paper, we are concerned with mild or moderate inflations. We use the terms to refer to the type of inflation experienced in all developed economies during the postwar years. Without attempting a precise definition, we can describe some characteristics: Prices rise but do not accelerate steadily. Average rates of change per decade are positive but well below the rates described as hyperinflation. Annual rates of inflation above ten percent are rare, and relatively high rates of inflation are generally followed by decelerations. Some deflationary episodes may occur.

One set of issues that concern us includes such widely discussed topics as the effects of inflation in an open economy with fixed exchange rates and the ability of an open economy to maintain a less inflationary policy than its trading partners while maintaining fixed exchange rates. We do not dispute the proposition that, in the long run, exchange rates reflect prices and therefore relative rates of inflation. At issue are the speed and timing of adjustments, the ability of countries to reduce or minimize the effects of foreign inflation, and the effects of the acceleration and deceleration of policy that have become common in countries with moderate inflation.

A second set of issues is the relative importance of the three explanations. The sufficient conditions for inflation differ in the monetary, fiscal and Wicksell-Keynes theories. There is now considerable evidence for the proposition that increases in money are a necessary condition for sustained moderate inflation, for hyperinflation

and for non-moderate inflations. There is also considerable theoretical and empirical foundation for the proposition that once-and-for-all changes in the stock of money change the price level. Much less is known about the effects on prices and output of changes in the government budget deficit financed by issuing debt. There is little, if any, empirical evidence of the effects on the price level of fiscal changes or changes in real, private expenditure that occur independently of changes in money. An understanding of moderate inflation requires analysis of these changes and evidence of their effect.

This paper attempts a preliminary investigation of the relative roles of monetary and fiscal policy and of domestic and international influences on price changes in three countries. Each of the countries—Germany, Italy, and the United States—experienced periods of inflation, periods of stable or declining prices, accelerations and decelerations of policy variables, deficits and surpluses in the balance-of-payments and other changes capable of discriminating between the three economic theories and the now popular institutional explanation. We begin with a brief exposition of a framework linking the three theories of inflation and distinguishing between them. Then we discuss the broad movements of prices and output in the three countries and case studies of the inflationary and deflationary episodes in each of the three. Although we do not use the standard econometric techniques to analyze the data and test propositions, we believe that the case studies provide useful evidence on the relevance of a number of propositions for the analysis of moderate inflation.

A FRAMEWORK FOR ANALYSIS OF MODERATE INFLATION

A central issue in the postwar discussion of inflation is the relation of inflation and unemployment. Keynes explained unemployment as a consequence of institutional restrictions that prevent money wages from falling. His explanation was, often, irrelevant for the postwar experience. Unemployment frequently occurred during periods of rising prices and money wages.

An attempt at reconciliation came with the development of the Phillips curve. Inflation was interpreted as a consequence of aggregate excess demand, and unemployment was attributed to institutional features of the economy. The union of the two was the association of rates of unemployment and rates of wage or price change, the precise relation depending on institutional arrangements prevailing in a particular country.

The Phillips curve is entirely devoid of implications supporting or rejecting the institutional interpretation of the association between inflation and unemployment. The same association is part of our own and other “monetarist” and non-“institutionalist” explanations of the division of monetary changes between prices and real output. The difference between the institutional and other explanations is in the role assigned to institutional and structural features of the economy. Writers

in the Keynesian tradition rely heavily on institutional arrangements to explain the shape and position of the Phillips curve.⁶ We rely on an alternative explanation.

The alternative has developed as part of the "new microeconomics" and the work relating costs of search, costs of acquiring information, and costs of adjustment.⁷ Markets do not clear or adjust costlessly. The simultaneous appearance of inflation and unemployment is seen not as institutional datum but as a stage in the adjustment of the economy to new information.

Elsewhere, two of us have presented a macroeconomic analysis based partly on the new microeconomic theory.⁸ In this section, we restate some principal relations of the theory and show some of the interactions between the markets for assets and output in a four-quadrant diagram. Then, we use the theory and the diagram to compare some of the principal implications of the monetary, fiscal, and Wicksell-Keynes theories of inflation.

The main relations of our framework describe behavior on the markets for output, money, credit, or bank earning assets as responses to the price P of real capital, market interest rates i , and prices p of current output y . Wealth consists of human and net non-human wealth, the latter an appropriately valued sum of real capital K , the monetary base B , and the stock of outstanding government securities held by banks and the public S . The markets for assets proximately determine equilibrium values of the asset prices and interest rates P and i ; the output market proximately determines equilibrium real expenditure, real output, and the price level of current output. The equilibrium positions depend on inherited wealth and on the anticipations of producers and purchasers. Five equations state the conditions for equilibrium and provide a general idea of the underlying framework. Own price elasticities of demand equations are negative and cross-elasticities are positive. Direct elasticities of demand always exceed cross-elasticities in absolute value. Direct price elasticities of supply are positive.

Aggregate real expenditure, $d + g$, includes real private domestic expenditure and real government expenditure on output. Equation (1) shows the dependence of private expenditure on prices and interest rates. Equation (2) is a price-setting function. The principal variables omitted from these and other equations (and shown with dots) are wages, anticipations, and the components of wealth. Wages and anticipations have importance for the adjustment of output and the analysis of inflation. Their role is made explicit below.

$$y = d(i, P, p, \dots) + g \quad (1)$$

$$p = p(y, \dots) \quad (2)$$

⁶Some examples are: Robert Solow [15], James Tobin [16], and George L. Perry [12].

⁷Armen A. Alchian and William R. Allen [1] and Edmund S. Phelps [13].

⁸Karl Brunner and Allan H. Meltzer [3,5]. We rely on this framework throughout, but we do not repeat the presentation here. Statements about the size and direction of responses on various markets are developed more fully in the two papers.

The bank credit market proximately determines the market rate of interest and distributes the stock of government debt between banks and the public. The nominal stock of bank credit E consists of loans and government securities held by banks. The banks' demand, $a(i)B$, is the product of the credit multiplier a and the monetary base B . In equilibrium, the banks' demand is matched by a supply of earning assets to banks, σ . Both depend on interest rates and asset prices.

$$a(i, y, P \dots)B = \sigma(i, P, y, p, S \dots) = E. \quad (3)$$

The nominal stock of money M depends on decisions of banks and the public and on the monetary base. Equation (4) states the nominal stock $m(i)B$ as the product of a money multiplier m and the base. For equilibrium, the nominal stock must equal the amount demanded, L , at prevailing prices. The money equation proximately determines the price level of outstanding real capital P .

$$m(i, y, P \dots)B = L(i, P, y, p \dots) = M. \quad (4)$$

A full stock-flow equilibrium is achieved in a stationary economy if, and only if, the government budget is balanced. The government's nominal expenditure G and tax collections t depend on prevailing prices and output and decisions about real government expenditures g , wage payments, tax rates, interest payments, and the like. Equation (5) is the condition for a balanced budget. The dependence of G on interest rates and the stock of securities occurs because interest payments on the outstanding debt are part of expenditure.

$$G(y, i, g, S \dots) = t(y, p \dots). \quad (5)$$

Open market purchases and sales exchange base money for debt. Budget deficits and surpluses increase or decrease the outstanding debt held by banks and the public. In a closed economy, the outstanding stocks of base money and government debt reflect the cumulated effect of past financial policies—decisions on the size and financing of the government's deficit or surplus and decisions to increase or decrease base money and money by buying or selling government debt in the open market.

In an open economy, the sources of the monetary base include foreign exchange reserves, and changes in the base reflect the deficit or surplus of the balance of payments. Since our interest here includes the opportunities in an open economy to prevent moderate inflation while maintaining fixed exchange rates, both of the principal source components are relevant.

Some other modifications of our framework are required, also. Expenditure must be redefined to include real expenditure by foreigners. Let $D = d(i) + g + x$ be total real expenditure with x defined as real exports of goods and services at domestic prices. The supply offered on the output market can be augmented by imports. We let s denote the amount of real goods and services supplied by do-

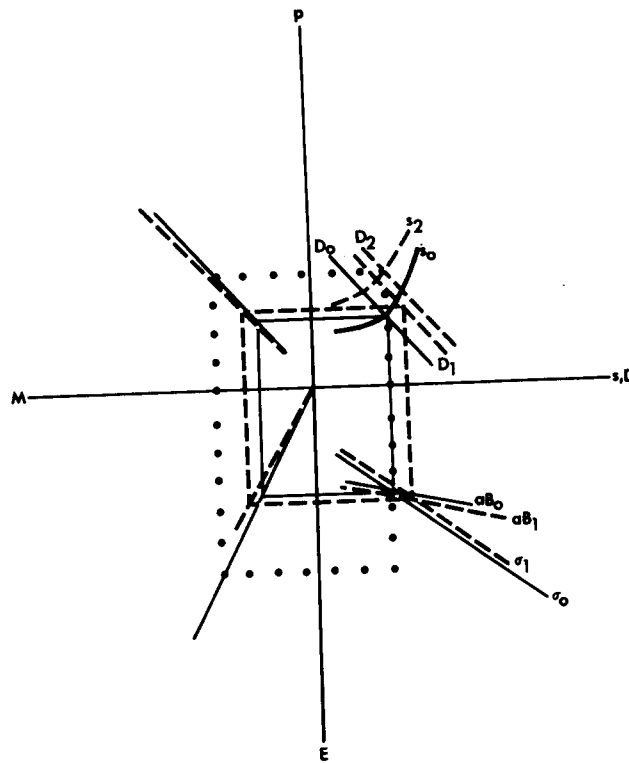


Fig. 1 A Change in Money

mestic production and imports. D and s depend on foreign as well as domestic prices. Similarly, government debt and real capital can be purchased by foreign as well as domestic buyers, and the domestic public can borrow abroad or purchase foreign assets. Adjustment of the equations to reflect these factors introduces the prices of foreign and domestic assets into the demand and supply equations. By changing domestic asset prices and interest rates relative to foreign prices, fiscal and monetary policies can delay, and perhaps offset, the effects of differences in output prices on the balance of payments.

This sketch of the underlying analysis can be further elaborated by presenting some of the principal relations in a four-quadrant diagram. Figure 1 relates expenditure D , output plus imports s , bank credit E , money M , and the domestic price level p . There is no way to show the simultaneous determination of asset prices, output prices, interest rates, money, bank credit, the budget deficit and the balance of payments deficit required by the modified set of equilibrium conditions. Figure 1 supplements the five equilibrium conditions but does not provide a complete summary of the underlying relations.⁹

⁹For a more complete statement, see the papers referenced in the previous footnote. Detailed discussion of the asset market equations can also be found in Albert Burger [6] and in K. Brunner and A. Meltzer [4].

The upper right quadrant shows the principal relations of the output market. The slopes reflect the properties of the underlying hypothesis. The slope of the supply (s) equation shows that the rate of price change increases as output rises relative to available resources, as in equation (2). The output market equations contain the principal items of the balance of trade. Substitution of imports for domestically produced goods lowers the rate of price increase resulting from a given increase in expenditure. Increases in domestic prices relative to foreign prices reduce exports. A rise in the price level of domestic output relative to the prices of foreign output increases the balance of trade deficit. However, the adjustment does not occur instantaneously. Costs of acquiring information about export markets and import substitutes are no smaller than costs of acquiring information about opportunities in domestic markets.

The lower right quadrant shows the principal relations of the credit market drawn as linear functions of real expenditure. Changes in expenditure and real income change both the public's supply of earning assets to banks and banks' demand for earning assets. The banks' response depends on the effects of income on the distribution of deposits between time and demand account and other properties of the a -function. The slopes, as drawn, reflect the dominant effects of real income on the asset supply (σ) equation, a consequence of the dependence of σ on the expected real yield on real capital and the dependence of the expected real yield on real income.

The left side of the diagram summarizes a substantial part of the underlying hypothesis and the adjustment process connecting the asset and output markets. In the upper left quadrant, we show the relation between money and output prices. The scales can be defined so that the line bisecting the quadrant represents positions of constant real money balances. The line is undefined at the origin. Changes in the demand for money are shown by rotating the line on a ray through the origin. A reduction in the demand for real balances rotates the line to the right; increased demand rotates the line to the left. A rise in asset prices, other prices remaining unchanged, increases real balances; a rise in market interest rates reduces real balances. Equal absolute percentage changes in asset prices and market interest rates, other prices unchanged, increase the demand for real balances, under the hypothesis.

The remaining quadrant shows the equilibrium of the money and credit markets for a given position of the output market. The slope of the line is the ratio of m to a . The interest rate proximately determined in the credit market and the asset price level proximately determined by the money equations must be mutually consistent. The responses of money and bank credit to interest rates and asset prices differ. Increases in asset prices increase M relative to E and rotate the line in this quadrant to the left. Increases in market interest rates rotate the line to the right. The rotation of the line reflects the constraints placed on the signs of the responses of money and credit and particularly the relative size of direct and cross elasticities of the public's demand for money and supply of earning assets to banks.

The solid lines in Figure 1 show a position of stock-flow equilibrium. The balance

of payments and the government budget are balanced at the prevailing prices and exchange rate, so there are no net changes in the domestic or foreign sources of the monetary base to disturb the asset or output markets. The outstanding stock of government debt is constant, and there are no changes in the distribution between banks and the public. There are no open-market operations. Prices, and rates of return are equal to anticipated values, so no disturbances in the private sector disrupt the general equilibrium. Consumers are achieving their long-run consumption plans and supplying the requisite amount of labor services at prevailing real wages. There are no changes in borrowing or lending to disturb the output or the credit market.

We now consider three types of disturbances, a monetary, a fiscal and a real change. Our interest is in moderate inflation, so we confine our discussion to small departures from equilibrium. To keep the three changes separated, we discuss "pure" monetary, fiscal, and Wicksell-Keynes inflations. These terms are defined more precisely below.

Monetary Inflation

An increase in the monetary base or a reduction in reserve requirements increases money and the price level (temporarily). A "pure" monetary inflation occurs whenever the change in the base is independent of the financing of fiscal policy. The discovery of new gold mines when gold is used as an international reserve asset, or a decision to increase the monetary base by open-market purchases when the budget is balanced, are examples of "pure" monetary expansions.

Figure 1 shows an open-market purchase. Solid lines are, as before, the initial position of stock-flow equilibrium. Broken lines show the initial effects of the purchase.

The exchange of base money for debt changes the level and composition of wealth, reduces the market rate of interest and increases the asset price P . The increase in the base increases the banks' demand for earning assets, aB_1 , and the stock of money. The real balance effect increases expenditure D slightly under our hypothesis. The purchase of securities reduces the outstanding stock held by banks and the public, shifting the σ -function to the right. The effects on the bank credit market are shown by the new, partial equilibrium position at the intersection of the dotted lines in the lower right quadrant at $aB_1 = \sigma_1$.

Open-market operations change relative prices. In this case, asset prices are higher, and interest rates are lower than in the initial equilibrium. The rise in P and decline in i increases the money stock relative to bank credit, as shown by the rotation of the line in the lower left quadrant.¹⁰ The increase in P and reduction in i also affect the demand for money. Equilibrium on the asset market requires that the increased stock must be held. The upper left quadrant shows that real money balances are now higher than in the initial position as a result of the changes in output, interest rates and asset prices.

¹⁰The effects of open market operations and changes in expected yields on money and bank credit are discussed in more detail in Brunner and Meltzer [4].

New production is a substitute for securities and existing real assets. Since asset prices are higher and interest rates are lower than in the initial equilibrium, expenditure increases. Expenditure is now D_1 .

The asset markets are in partial equilibrium at the prevailing prices and output. The broken vertical line linking the output market and the bank credit market shows that the asset and output prices that determine aggregate expenditure also determine bank credit and money.

However, the output market is not in equilibrium. Real expenditure exceeds the real goods and services offered at current prices, $D_1 > s_0$. The budget has a surplus, if tax rates are progressive or tax collections are more responsive than expenditure, and the surplus must be financed by reducing the monetary base or the outstanding stock of securities. The financing of the surplus changes the equilibrium position of the bank credit and money markets and, by changing asset prices and interest rates, shifts the expenditure curve.

The increase in output and the price level also affect the supply side of the market. If employment, wages, and anticipations are allowed to change the increased demand for labor raises money wages and shifts the supply curve to the left (toward s_2). If the increase in output prices generates anticipations of additional price increases, suppliers and purchasers respond by increasing inventories and expenditure. The expenditure function shifts to the right and the supply function shifts to the left. Prices continue to rise.

Changes in output, price level, inventories, and anticipations generate increases in the public's supply of earning assets to banks. The σ -function now shifts to the left, reversing the initial decline in interest rates. The rise in interest rates and the increase in bank credit disturb the equilibrium of the money market. The changes in money, credit, asset prices and interest rates again shift the expenditure function. Under fixed exchange rates, exports fall relative to imports as output prices rise; foreigners borrow less and lend more as market interest rates rise.

The adjustment to a new position of stock-flow equilibrium depends on the properties of the functions and the policies pursued. Let the change in the base be a once-and-for-all change. If tax rates are progressive and tax collections are not lagged behind receipts of income, taxes rise relative to expenditure. With the base unchanged, the budget surplus forces a reduction in the stock of outstanding securities. The effect of the budget surplus and debt retirement is to reduce prices. Even if the base increases, the inflation is damped by the budget surplus and reduction in securities. Prices continue to rise only if the rate of increase in the monetary base is large enough to dominate the effects of the budget surplus and reduced stock of debt.

Suppose, however, that taxes are lagged, tax rates are not steeply progressive and the government maintains real expenditure. The rise in prices and output increases nominal expenditure relative to current tax collections. The larger the price increase, the larger the deficit and the amount of securities issued. In this case, prices rise with no further increase in the monetary base.

The size of the price increase and the rate of price change induced by a pure

monetary expansion depend on three aspects of financial policy. First, the larger the initial increase in the base, the more prices must rise to restore stock-flow equilibrium. Second, the more progressive the tax rates and the smaller the lag of tax collections behind receipts of income, the larger is the budget surplus induced by higher prices and real incomes. The larger the budget surplus, the larger the amount of debt and base money withdrawn to finance the budget surplus. Third, the larger the proportion of the budget surplus financed by withdrawing base money, the smaller the rise in prices. In the limit, the financing of the budget surplus restores the base to its previous value. The economy returns to the position shown by the solid lines in Figure 1.

The speed of adjustment of prices also depends on private decisions and anticipations and the policy-makers' response. If suppliers' anticipations form quickly, there is a surge of private borrowing in anticipation of the higher prices for goods and services expected in the new equilibrium. Anticipated gains from holding inventories induce a reduction in goods and services offered on the market and an increase in inventories. The supply curve shifts to the left, to s_2 as in Figure 1. To the extent that purchasers anticipate price increases, current expenditure increases, raising prices and output. The shape of conventional Phillips curves implies that, in the early stages of inflation, purchasers form anticipations more quickly than suppliers.

The increases in expenditure and output, whether or not supplemented by changes in anticipations, increase the public's supply of earning assets to banks and raise interest rates. Central banks traditionally attempt to control market interest rates. If the central bank prevents the increase in interest rates, the monetary base rises, further stimulating the economy and adding to the inflationary pressure. The amount of base money issued to keep interest rates from rising, the more prices must rise to restore equilibrium.

Suppose, however, that after an initial increase the base remains unchanged. The budget surplus is financed entirely by retiring debt, and no attempt is made to offset the effect of changes in desired borrowing or anticipations on interest rates. Tax rates are progressive, and tax collections do not lag receipts of income. Real expenditure for goods and services by government remains unchanged.

The composition of wealth in the terminal and initial equilibrium differs under these conditions. Relative prices must change, and the terminal price level must be lower than the initial price level. The principal reason is that the reduction in the stock of outstanding securities lowers interest payments, so the government budget has a surplus when the initial price level is restored. To balance the budget, with unchanged tax rates, tax collections must be lower in the terminal than in the initial equilibrium. This is accomplished by a fall in the price level.

Once domestic markets for assets and output return to full equilibrium at the lower price level and interest rate, there is a balance of trade surplus and a capital account deficit. Unless the two are offsetting, the exchange rate must be changed to restore full equilibrium.

The necessary conditions for a higher price level after adjustment to a once-and-for all change in the base are proportional tax rates or fiscal policy actions that

change government expenditure and tax rates so as to keep the government budget balanced. The standard, long-run solution shown by the dotted lines in Figure 1 cannot be obtained in our analysis of a pure monetary inflation. In that solution, after full adjustment of all markets and market prices, including exchange rates, equilibrium is reached at the initial level of output (intersection of s_2 and D_2), a higher price level, an unchanged ratio of money to bank credit, higher asset prices and unchanged interest rates. We have found no set of assumptions that, together with the government's budget equation, yield these implications for the static analysis considered here.

The inflationary process initiated by a pure monetary operation involves government decisions about the financing of the budget surplus and private decisions about expected prices and interest rates. The properties of the final equilibrium, the size of the inflation and the speed of adjustment depend on these decisions. Our discussion of a pure Wicksell-Keynes inflation and a pure fiscal inflation brings out some of the relationships.

Wicksell-Keynes Inflation

The qualitative properties of the response to a change in anticipations do not depend on the reason for the change. An autonomous change in the anticipated yield on real capital induces changes in output, prices and the public's supply of earning assets to banks similar to those considered in our discussion of the response to changes in money. Any change in expenditure resulting from purchasers' anticipation can be described as a change in the anticipated yield on real assets, or if preferred, as an increase in the natural rate of interest.

A "pure" Wicksell-Keynes inflation is the change in prices resulting from a change in the anticipated yield on real assets with unchanged monetary base and unchanged fiscal policy. Figure 2 shows the response to a change of this kind.

The initial conditions in Figure 2 are identical to the conditions shown in Figure 1. The economy is in full equilibrium at the positions shown by the solid lines connecting the four quadrants. The slopes and positions of all curves are the same as before.

An autonomous increase in the anticipated yield on private capital shifts the expenditure function to the position shown by the broken line D_1 . There is now an excess demand for goods and services. Prices rise, but only slightly, in the initial adjustment. Costs of acquiring information limit the size of the change.

The anticipated increase in real return increases the public's desired borrowing and reduces the demand for money. These changes are shown in the three remaining quadrants that describe the asset markets by (1) a shift of the σ -function to the left that raises the stock of credit, (2) an increase in bank credit relative to money, and (3) a decline in the demand for money. With the monetary base unchanged, the increased supply of earning assets to banks can be accommodated only at higher market interest rates. The rise in interest rates relative to asset prices is shown by the rotation of the line relating money and bank credit in the lower left quadrant.

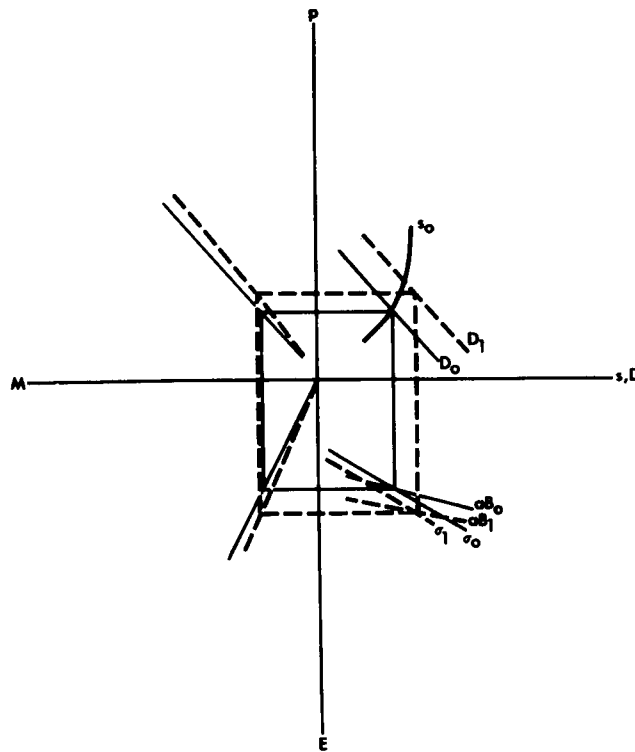


Fig. 2 Fiscal and Wicksell-Keynes Inflation

The decline in the demand for money is shown by the broken line in the upper left quadrant.

At the new, partial equilibrium, asset prices and interest rates are higher. The broken line connecting the four quadrants shows the new position. The rise in asset prices, interest rates, output and prices, with unchanged tax rates, raises tax collections relative to expenditure, puts the budget into a surplus position and requires a reduction in the outstanding stock of debt or in the monetary base. The excess demand for output disturbs the position of the labor market raising money wages, shifting the supply curve to the left just as it did in the pure monetary inflation. If the changes in prices and output generate anticipations of additional increases, the anticipated increase in prices raises expenditure and the supply of earning assets to banks and reduces the demand for money. If the central bank attempts to limit or prevent increases in market rates, the monetary base increases adding to the inflationary pressure and accelerating the rate of price change.

Each of these changes induces exactly the same response as in the case of a monetary inflation. The speed of adjustment, the size and timing of the changes depend on the choice of monetary and fiscal policies and the formation of anticipations

just as in the case of a pure monetary inflation. If the monetary base remains unchanged and the budget surplus is used to retire debt, the stock of securities is smaller in the new equilibrium.

The convergence to long-run, stock-flow equilibrium depends on the change in anticipations and the properties of the tax functions. A steady increase in the anticipated net yield on real capital is self-limiting whenever tax rates are progressive and tax collections do not lag substantially behind the receipt of income. The reasons are similar to those discussed in the case of monetary inflation. For a permanent Wicksell-Keynes inflation, there must be lagged tax collections, non-progressive tax rates, changes in fiscal policy to remove incipient budget surpluses, or sufficient acceleration of the increase in the anticipated net yield on real capital to offset the deflationary effects of the budget surplus.

In a steady, Wicksell-Keynes inflation, anticipated and actual yields on real capital, per unit of real capital, increase steadily. The rise in real yields increases the market rate of interest. Market rates rise under the combined effect of rising real rates of return and any premium for anticipated inflation.

If the Wicksell-Keynes hypothesis were the principal explanation of observed inflation, real rates of interest would be highest in countries with the longest and largest inflations. The reason is that continued increases in the expected and actual real yield are required to maintain the prevailing inflation and induce additional inflation. Without continued increases in the real yield (or natural rate) Wicksell-Keynes inflations come to an end.

Fiscal Inflation

A pure fiscal inflation is the increase in prices induced by changes in government expenditure or taxes with an unchanged monetary base. The deficit is financed by increasing the outstanding stock of government securities. An inflation of this kind has features similar in some respects to a Wicksell-Keynes inflation. We again use Figure 2 to describe some of the main responses.

Keynes' discussion of wartime inflation represents one type of fiscal inflation.¹¹ Wartime expenditure requires a sustained increase in the government's real demand for goods and services. In a pure fiscal inflation, the purchases are financed by issuing securities. Real expenditure increases from D_0 to D_1 , and on the bank credit market, the supply of earning assets increases from σ_0 to σ_1 . Interest rates and output rise. The increased demand for output is accompanied by a rise in prices. The price increase stimulates production and reallocates output from private to government uses.

With unchanged tax rates and an unchanged monetary base, bank credit rises relative to money. The increases in real expenditure and the higher yield on government securities induced by the increase in the stock raise the anticipated and actual yield on real capital. Asset prices rise. Real money balances decline, as shown

¹¹ Keynes [11].

in Figure 2, and the decline is larger than in a Wicksell-Keynes inflation. The partial equilibrium position is shown by the broken line in Figure 2.

If government expenditure accelerates, interest rates and output continue to rise, and prices accelerate. Money wages increase, shifting the supply of output to the left and adding to the price increase. The adjustment described in the previous section is repeated. Once acceleration ceases (or is fully anticipated) the system moves toward equilibrium.

The new equilibrium differs from the equilibrium reached in the Wicksell-Keynes inflation. Government securities are larger and private capital is smaller; market interest rates are higher, and the price of real capital lower than in the previous case. The precise differences between the two cases depend on the degree to which debt and real capital are substitutes.

Monetary policy could prevent the inflation by reducing the base, lowering the money stock and the banks' demand for earning assets. An open market sale of securities or increase in reserve requirement ratios accelerates the rise in interest rates resulting from the increased supply of securities. Fiscal policy could prevent the inflation by increasing taxes enough to keep total real expenditure constant.

A once-and-for-all increase in real government expenditure induces a once-and-for-all increase in the price level, if taxes are progressive. Steady inflation of the pure fiscal type requires persistent increases in real government expenditure and the stock of securities or a long lag in tax collections. In a pure fiscal inflation, as in a Wicksell-Keynes inflation, real rates of interest rise, so after adjustments are completed market rates rise by more than the fully-anticipated rate of inflation and continue to rise with a fully-anticipated constant rate of inflation.

An increase in expenditure is one type of fiscal policy. Tax changes are another. Starting from the general equilibrium, reduction in tax rates on income from various types of wealth also increases prices, and a steady reduction in tax rates induces inflation. The reduction of taxes on non-human wealth has much the same effect as an increase in the anticipated yield on real capital in our analysis. The responses on the output, credit and money market are similar to the responses of a pure Wicksell-Keynes inflation.¹²

The size of the response to changes in taxes on non-human wealth depends on the openness of the economy. If foreign assets are close substitutes for domestic assets, an increase in taxes on private capital increases the demand for foreign assets relative to the demand for domestic assets and produces a deficit in the balance of payments. A reduction in taxes on domestic capital has the opposite effect. The balance of payments moves toward a (larger) surplus. Foreign reserves increase, and the monetary base rises.

Reduction in taxes on income from labor or human wealth can be analyzed in a similar way. The initial effect of a reduction is to increase real private wealth, the size of the budget deficit and the real return per hour of labor. These effects appear

¹²To the extent that tax rates were high enough to reduce the incentive to economize on the use of real resources, tax reduction increases output by increasing efficiency. Any gain of this kind reduces the price increase resulting from the tax reduction.

as increases in real expenditure and in the supply of real output. Analysis of the implications for prices, output, interest rates, etc. proceed in a manner similar to those discussed previously.

Other fiscal policies include changes in the government's demand for labor services, in the compensation of government employees, in the ownership of real capital, and in transfer payments. We have separated government purchases of goods and services from purchases of labor services because the transmission of fiscal and monetary changes involves changes in relative prices that are not adequately represented by total expenditure. An increase in the government's demand for labor services increases real expenditure by raising the value of human wealth. The increase also raises the money wage paid in the private sector; the s -function shifts to the left accelerating output prices. As in all pure fiscal policies, the deficit is financed by issuing debt. Interest rates rise, setting off an adjustment process in the asset market similar to the process discussed in other cases.

A persistent increase in the government's demand for labor involves a reallocation of resources, in this case labor, from the private to the government sector and changes in the composition of output. The reallocation raises prices and wages in the private sector. An increase in government wage rates, with unchanged real demand for labor, involves a spillover to the private sector that has the appearance of a wage-cost push inflation. The rise in money wages shifts the supply curve of privately produced output to the left. However, the disequilibrium on the output market cannot persist. The excess demand for goods and services raises prices until the excess demand is removed. "Wage-push" operating independently of continued increases in government wage rates or market forces is inconsistent with our analysis.

Each of the many starting points for fiscal inflation generates a different path. In each case, however, the qualitative properties can be represented by the same or similar processes, as in Figure 2. If the monetary base remains unchanged, the price increases induced by a particular fiscal policy, or by an appropriately weighted sum of fiscal forces, come to an end. For steady inflation, there must be continued increases in fiscal forces.

A Note on "Imported Inflation"

Inflation can occur in an open economy with fixed exchange rates as a result of monetary, fiscal or Wicksell-Keynes forces in other countries. Inflation that originates abroad is often called "imported inflation."

Analysis of imported inflation does not require any adjustment of the model or discussion presented in previous sections. Three mechanisms transmitting imported inflation are distinguished in the country studies that follow. One operates by changing the expenditure function. Exports rise. A second operates by changing the relative prices of imported and domestic goods. An increase in the price of foreign substitutes raises the price of domestic production. The analysis of an increase in exports or of an increase in domestic substitutes for foreign goods is similar to the analysis of a Wicksell-Keynes inflation.

The third mechanism transmitting inflation is a change in the monetary base. This mechanism operates whenever a balance of trade surplus or a surplus on capital account induces an increase in the foreign reserves of the central bank. Any increase in the base increases the money stock and starts a monetary inflation.

SUMMARY

Our analysis implies that the price increases that occur at the start of a moderate inflation can result from a monetary, fiscal, or Wicksell-Keynes process. Steady inflation, however, requires continued increases in money, fiscal forces, anticipations, or the real yield on capital. To maintain a pure monetary inflation, the monetary base must grow at a steady rate, and constraints must be placed on fiscal arrangements. To maintain a pure Wicksell-Keynes or pure fiscal inflation, anticipated real yields or the budget deficit and the stock of securities must increase steadily. In either of these latter cases, market interest rates rise steadily during periods of steady inflation. In the Wicksell-Keynes inflation, the rise in market rates represents the combined effect of constant, fully anticipated, inflation and steady increases in the real yield on real capital per unit of capital. The steady increases of market interest rates in a fully anticipated fiscal inflation occur under the force of continued increases in the size of the real budget deficit and the acceleration of the stock of debt.

Continued increases in interest rates during periods of steady inflation have not been observed. Nor are there cases of moderate inflation without any increase in money. We can, therefore, dismiss from further discussion pure fiscal inflation or pure Wicksell-Keynes inflation. Mixed inflations of the monetary-fiscal or monetary-Wicksell-Keynes type cannot be dismissed as readily.

Central bank policies sustain inflation whenever rising market interest rates, resulting from increases in anticipated real yields or increases in the stock of securities, are partly or wholly offset by open market purchases. The increases in the monetary base raise the stock of money and the price level. A maintained budget deficit, financed by issuing base money, is one example of a mixed inflation. Wartime inflations are of this type.

Sustained inflations of the Wicksell-Keynes-monetary type are less common. In an inflation of this kind, asset prices rise relative to output prices. Sustained increases in asset prices relative to output prices have not been observed, so inflations of this kind must terminate.

In each pure inflation and in each mixed type, increases in money wages and suppliers' price anticipations eventually shift the supply curve and reduce real output. Prices continue to rise, and the rate of increase may accelerate when output decelerates. Even if the monetary, fiscal or real impulse slows or stops, prices continue to rise. Just as excess demand does not immediately raise wages and prices, excess supply does not immediately reduce wages and prices. The speed of adjustment depends on the size of the inherited inflation and the size of the monetary and fiscal deceleration.

Persistent inflation during periods of decelerating or declining output does not require an institutional explanation or an institutional solution. The experiences of the three countries we are about to examine show a number of periods in which inflation decelerated or came to an end after the deceleration of monetary and fiscal impulses. As yet, none of the countries provides an example of an inflation that failed to decelerate following sustained decelerations of monetary or fiscal impulses.

THE EXPERIENCES OF THREE COUNTRIES: ITALY, GERMANY AND THE UNITED STATES

Each of the countries we studied—Germany, Italy and the United States—shows periods of accelerating and decelerating prices, periods of stable prices, and of rising and falling prices. Several of these episodes cannot be explained as the result of worldwide or foreign forces. In each country, there are periods of expansion induced by domestic impulses and brought to an end by domestic policies without any change in the exchange rate.

The three countries differ in stage of economic development, in institutional arrangements, and in the relative importance of foreign trade and the degree to which the economies are open to foreign competition. These differences permit us to examine the effects of acceleration and deceleration of policy variables under a variety of conditions. Unfortunately, data are not available on a consistent basis for each of the countries, and some data are not available at all. Differences in measurement procedures make comparisons difficult, and reduce the information provided by small changes. For these reasons, we limit our comparison to case studies of the larger changes in fiscal and monetary policies and the response to such changes.

We start with a discussion of the problems of measuring some of the principal variables. We then discuss the inflationary experience and the effects of anti-inflation policies in each country. In the conclusion we summarize some of the main findings and indicate some of the similarities and differences in the effects of policy and of changes in policy.

Measurement Procedures

There are three types of non-random disturbances to the stock-flow equilibrium—monetary, fiscal and real or Wicksellian. Separating each into a domestic and foreign component makes six types of disturbance. We have no measure of the real or natural rate, and there are no sequences in which rates of interest rise steadily with constant money stock. We have no way to identify, and no reason to expect, a Wicksellian sequence. We will, however, attempt to use evidence on the timing and size of changes to discuss mixed sequences involving changes in anticipated returns.

The appropriate measure of the domestic fiscal impulse for our theory is a linear combination of relative changes in government expenditure and tax rates weighted according to the effects on expenditure. The information required to construct the

weights is not available for any of the countries. Different measures were used for each country.

The full employment budget surplus or deficit is available only for the United States. Changes in this measure separate some changes in taxes and expenditure resulting from changes in output and economic activity but do not separate types of expenditure into purchases of goods and labor services as required by our hypothesis. Tax rates are weighted by income distribution patterns that prevailed at "full employment." Estimated average tax rates are revised quarterly, so some variations in the full-employment surplus or deficit are the result of these revisions and not the effect of changes in fiscal policy.

The measures of fiscal policy available for Germany and Italy are less refined. Our hypothesis implies that the appropriate measure of the budget deficit or surplus assigns greater weight to some change in tax rates than to changes in expenditures. Data are not available to construct the weights. For Germany, one of us developed a measure of fiscal stimulus that gives equal weight to government expenditure and the cumulated sum of discretionary changes in tax revenues. Our measure of fiscal stimulus for Italy is a modified version of the measure of fiscal policy used by the Banca d'Italia. Their procedure is based on Keynesian theory and assigns greater weight to changes in expenditure than to changes in tax rates. Weights are based on relatively crude estimates of initial impact on spending.¹³

To avoid some of these problems, we separate tax and expenditure policies where we are able to do so. Moreover, we concentrate on large changes in the thrust of fiscal policy where our measures are likely to be reliable indicators of the direction of change.

Money is used as the principal indicator of monetary impulses. Our theory implies that money is a more reliable indicator than other frequently suggested magnitudes. The growth rate of money, however, can be separated into the growth rate of the monetary base and the growth rates of various components of the money multiplier, and we do so where it appears to be useful.

The definition of money has been discussed at length. We retain the definitions used in our previous work. For Germany and the United States, money is currency and demand deposits. Time deposits are included in the Italian money stock.

Measurement of the foreign impulse poses many of the same problems as measurement of the budget deficit. Changes in the balance of payments result from changes in the foreign and domestic impulses and from induced changes in relative prices. Relative prices determine the portion of a foreign impulse absorbed by a country and also distribute the effect between asset and output markets. Changes on trade account, in response to relative price changes, affect both output and asset markets. Lacking a measure that separates autonomous and induced changes, we use the balances of trade and payments as indicators of foreign influence on domestic activity.

¹³The procedures for constructing the budget deficit or surplus are described in preliminary papers by Michele Fratianni for Italy and Manfred J. M. Neumann for Germany. The measure of fiscal stimulus for Italy follows the procedure developed by Bent Hansen [8].

Other measurement problems arise from lack of availability of quarterly data, well-known deficiencies of price-index numbers, the coverage of wage rate indexes and the extent to which "fringe" benefits are included, and differences in seasonal patterns, and in the effects of removing seasonal patterns. Specific problems are discussed where relevant to the interpretation of our findings. Throughout, we ignore small changes and generally rely on annual changes between corresponding quarters to remove seasonal effects and to reveal the broad tendencies that are our main interest.

Italy

Between 1958 and 1970, Italy experienced several substantial changes in the rate of inflation. Rates of inflation ranged from negative values early in the period to more than 8 percent in 1963. Table 1 shows annual rates of inflation for the period we consider.

The Italian economy is relatively open. The acceleration and deceleration of domestic prices in Table 1 leave their mark on the balance of trade. Each time inflation increased, the balance of trade declined, and each time inflation declined, the balance of trade increased. Balance of payments and official reserves are not as closely related to changes in the rate of price change. Capital movements were large, particularly in the more recent years.

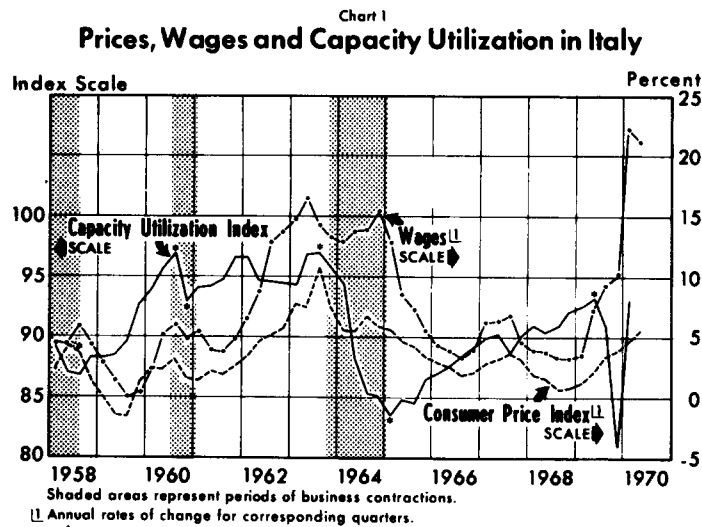
The size of the trade balance does not depend solely on Italian prices. The very large increase in the late sixties from the level of the early sixties probably reflects both foreign and domestic influences. The substantial deceleration of the price deflator from 1963 to 1966 occurred just as the United States shifted from stable to rising prices. The reversal of the trade balance came in response to the very rapid price deceleration in 1963-64 and was one of the main achievements of the sharp change in monetary policy during 1963. The persistence of the trade surplus in the face of rising domestic inflation reflects the rate of inflation in other trading countries.

Several episodes stand out in Table 1. Prices decelerated in 1958 and 1959 and from 1963 to 1968. Prices accelerated from 1961 to 1963 and from 1968 to 1970. Annual data for the GNP deflator do not permit more detailed exploration of the rate of price change. We substitute the consumer price index for a closer look at the

TABLE 1
Annual Percentage Changes of Price Deflator for Italian GNP*

1958	+2.40%	1965	+3.94
1959	- .32	1966	+2.14
1960	+2.12	1967	+2.96
1961	+2.70	1968	+1.46
1962	+5.78	1969	+4.12
1963	+8.63	1970	+6.24
1964	+6.26		

*Source: ISCO, Quadri della Contabilit  Nazionale Italiana per el periodo 1951-70 (May, 1971).



Prepared by Federal Reserve Bank of St. Louis

periods. Chart 1 shows the annual percentage rate of change in consumer prices, wages and a measure of economic activity, the index of capacity utilization in manufacturing, at quarterly dates for the same years.

For the period as a whole, rates of change of money wages and prices show similar patterns. Peaks and troughs in the two series occur at about the same time, and accelerations and decelerations frequently occur together. One exception is 1963-64. During these years, wages increased at a high rate while prices decelerated by 50 percent.

The movement of Italian wages and prices in this period is inconsistent with simple notions of wage-push inflation. The maintained high rate of wage increase did not accelerate the price level. The rate of inflation declined in response to market forces. The effect of market forces is shown by the decline in the growth rate of output, represented in Chart 1 by the steady decline in the capacity utilization index.

The rapid deceleration of wages in 1965, from a peak rate of 15 percent to approximately 3 percent, follows the very sharp decline in capacity utilization and the earlier deceleration of prices. Market forces overwhelmed union activity in this period. Evidence of similar import comes from the period 1966 to mid-1968. As long as capacity utilization remained at relatively low levels, wages and prices decelerated. After the utilization rate increased, prices accelerated, and after a brief delay, rates of wage change jumped to the highest percentage rates found in our data.

Fiscal policies operate very differently in Italy than in the United States or Germany. Few of the changes in fiscal stimulus are the result of changes in govern-

ment expenditure.¹⁴ The calculations of the Banca d'Italia show that expenditures nearly tripled between 1958 and 1963 without having any major effect on the size of the fiscal stimulus. Tax changes offset most of the effect of expenditure changes.

Some of the major sources of tax revenue are shown in Table 2. Social security taxes are an important source of revenue, and they have been changed, at times, to stabilize aggregate expenditure. Income taxes have a much smaller role and are subject to negotiation and bargaining between taxpayer and tax collector. Indirect taxes are the most important source of revenue. Gasoline taxes are raised or lowered to balance the budget.¹⁵ The importance of social security taxes and the limited importance of income taxes make the tax system highly regressive.

All major changes in fiscal policy during the period 1958-1970 were the result of changes in tax policy. Fiscal policy became highly expansive in 1964-65, shifted to contraction in 1966-67, and back to expansion in 1967-68. These movements correspond roughly to changes in employers' contributions to social security.

Under Italian law, employers pay a social security tax equal to 44 percent of so-called basic wages and salaries. From 1964 to 1966 and from 1968 to 1969, the government paid part of the employers' contributions. The effect was to reduce real wages paid by employers. If the reduction was expected to last, output and employ-

TABLE 2
Total Tax Revenues, Average Tax Rates of Central
and Local Governments, and Social Security Payments*

Year	Total Revenues from Income & Wealth Taxation		Total Revenues from Indirect Taxation		Social Security Contributions	
	Billion Lire (1)	Percent of National Income, Prior Yr. (2)	Billion Lire (3)	Percent of Private Consumption (4)	Billion Lire (5)	Percent of Wage Income (6)
1958	1010	7.16	2294	18.41	1450	19.15
1959	1101	7.23	2467	18.98	1626	20.06
1960	1203	7.43	2793	19.98	1824	20.31
1961	1288	7.36	3043	19.91	2021	20.25
1962	1561	8.03	3420	19.88	2442	21.03
1963	1770	8.06	3802	18.92	3117	22.06
1964	2084	8.27	4146	19.05	3575	22.62
1965	2343	8.49	4512	19.39	3563	21.35
1966	2592	8.74	4820	18.85	3733	20.92
1967	2925	9.07	5504	19.50	4374	22.16
1968	3177	8.98	5879	19.55	4925	22.95
1969	3523	9.18	6428	19.55	5197	22.00

*Sources:

(1)(3)(5)—Ministero del Bilancio, *Relazione Generale sulla Situazione Economica del Paese*.

(2)—Salvatore Vinci, "Consumie Distribuzione del Reddito," *L'Industria* (Jan.-Mar., 1971), Table A1.

(4)(6)—ISCO, *Quandri della Contabilità Nazionale Italiana per il Periodo 1951-1970*.

¹⁴The data are from Banca d'Italia, *Relazione Annuale*, 1969 and 1970, Tables aP2 and aM2.

¹⁵A primary purpose of the changes has been to raise revenues, not to stabilize economic activity. The choice of the gasoline tax for this purpose is based on a belief that the price elasticity of the demand for gasoline is relatively low and import substitution is relatively small.

ment were stimulated, temporarily, by the reduction in costs of production. In our framework, the effect of a maintained reduction in employers' wage taxes has the same effect on production and supply as a reduction in money wages.

Monetary and fiscal impulses generally moved independently. From 1958 to 1964, the monetary impulse was much more variable than the fiscal impulse. The growth rate of money, our indicator of the monetary impulse, rose from less than 12 percent to 17.5 percent between 1960 and 1963 and then fell to 7 percent by mid-1964, a decline of 50 percent in one and one-half years. The imprint of this rapid deceleration has already appeared in the rates of wage and price change shown in Chart 1 and in the increased trade surplus in Table 3. After 1964, the deviations around the mean are greater for fiscal than for monetary impulses. Chart 2 shows the two series.¹⁶

The growth rate of real GNP remained positive throughout the period 1959-70, (Chart 3), and industrial production declined in only one period. However, there were three periods of retardation in economic activity according to official pronouncements. These appear as shaded areas in the charts.

We have divided the period into five phases, using the principal changes in the rate of monetary expansion to denote turning points. There are three decelerations and two accelerations of money. For each phase, we compare the accelerations and decelerations of prices and output shown in Charts 1 and 3, to the changes in fiscal and monetary impulse and in the balance of trade.

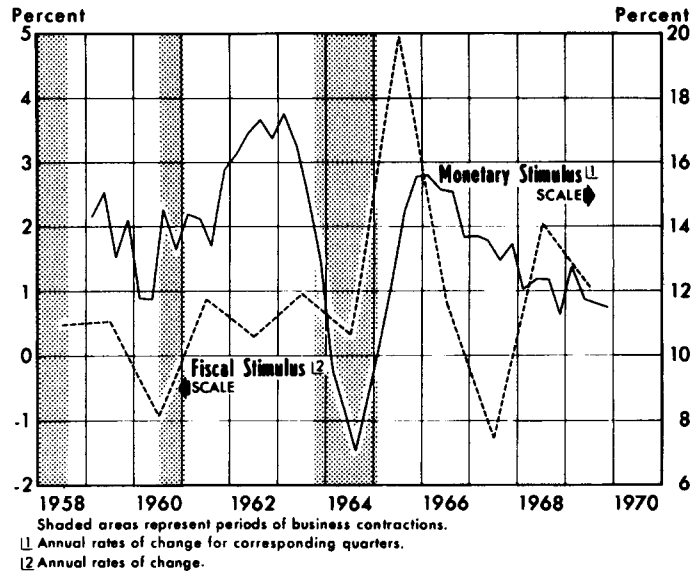
TABLE 3
Trade Balance, Balance of Payments, Change
in Official Reserves and Changes in
Banks' Net Foreign Position (in \$U.S. million)*

Year	Trade-Balance	Balance of Payments	Change in Official Reserves	Change in Banks Net Foreign Position
1958	564.2	895.4	895.4	0
1959	755.0	850.0	897.3	- 47.3
1960	317.0	442.5	174.4	268.1
1961	508.5	577.4	617.1	- 39.7
1962	276.4	50.4	480.7	-430.3
1963	-701.0	-1251.8	-602.0	-649.8
1964	619.6	773.9	442.3	331.6
1965	2209.1	1594.2	959.7	634.5
1966	2117.2	695.6	287.8	407.8
1967	1599.1	323.6	519.1	-195.5
1968	2626.9	627.3	- 60.8	688.1
1969	2368.5	-1391.2	-704.8	-686.6

*Source: Banca d'Italia, *Relazione Annuale*, various years

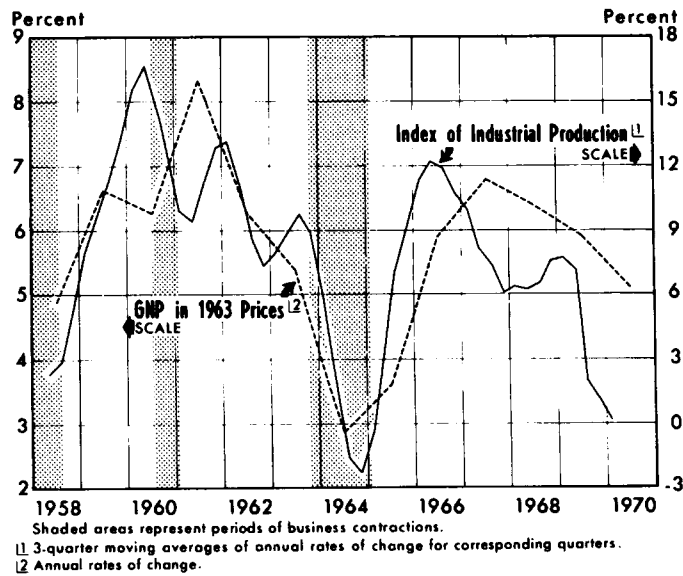
¹⁶Changes in the fiscal stimulus do not correspond to changes in the budget deficit. (There are no surpluses during the years we consider.) The fiscal impulse in Chart 2 can be negative where there is a deficit. This occurred in 1961. The deficit declined less than 10 percent in 1961, from Lit. 386 to Lit. 355 billion, but the fiscal stimulus became negative. The reason is that the components of expenditure and taxes are weighted according to an estimate of their impact on expenditure. The estimates are based on a Keynesian framework developed by Hansen [8].

Chart 2
Fiscal and Monetary Stimuli in Italy



Prepared by Federal Reserve Bank of St. Louis

Chart 3
Percentage Change in Real GNP
and Industrial Production in Italy



Prepared by Federal Reserve Bank of St. Louis

1. *Deceleration, 1959-60.*—Monetary, fiscal and foreign influences worked in the same direction. The growth rate of money declined from 15 percent to less than 12 percent. The effect of the deceleration of money was reinforced by an increase in excise and social security taxes. The balance of trade declined by more than 50 percent, and at least part of the decline is attributable to the recession in the United States and the deceleration in Germany.

Economic activity decelerated, but the deceleration was moderate. The growth rate of real GNP remained above 6 percent for the year, and the consumer price index rose gradually throughout the period.

The mildness of the deceleration of economic activity despite the sharp decline in the net balance of trade and payments reflects the very moderate decline in the monetary growth rate. Most of the decline that occurred resulted from a reduced growth of international reserves and is, therefore, a result of the reduced trade balance. The increase in foreign reserves declined from \$900 million to less than \$200 million (Table 3). The reduced growth rate of the monetary base was almost entirely the result of the reduced growth rate of the Banca d'Italia's international reserves.

The principal point of interest is the mildness of the decline in output in the face of the very sharp decline in the trade balance. The high rate of monetary expansion, maintained throughout the period, appears to have sustained activity. The next decline in the trade balance, 1963, provides a test of this proposition.

2. *Acceleration, 1960-63.*—Changes in the growth rate of money are the main changes in this period. The balance of trade and payments provided less stimulus than in 1958 and 1959. The fiscal impulse turned expansive early in the period and maintained a steady, positive influence throughout the acceleration and into the deceleration phase. The growth rate of money increased by 50 percent. Chart 2 shows a rapid acceleration in 1960 and another sharp acceleration in 1961.

The acceleration of the money stock is the result of a 30 percent increase in the monetary base and a rise in the money multiplier. The change in the base contributed two-thirds of the change in money. The Banca d'Italia did very little to prevent the acceleration even when the rate of inflation rose above 5 percent. A main action was a regulation requiring banks to reduce net foreign liabilities, but this had only a temporary effect. The entire budget deficit from mid-1960 through 1962—a total of Lit. 1100 billion—was financed by increasing the base. International reserves increased approximately Lit. 900 billion, and the base increased by Lit. 2000 billion.

The acceleration of money came at a time of relatively high capacity utilization. Nevertheless, output accelerated and the rate of price increase remained moderate for more than a year. In late 1961, prices and wages accelerated, reducing the growth rate of output and adding to the inflation. Our hypothesis implies that the decline in the growth rate of output and the increases in the rates of change of prices and wages would have occurred at the high rate of capacity utilization without further acceleration of money. A further acceleration of money occurred, however, and added to the inflation experienced during the next two years.

The Banca d'Italia made only hesitant efforts to control the growth rate of the base, so the period provides little evidence on the consequences of monetary control in an open economy with a fixed exchange rate. The episode is more informative about the effect of monetary acceleration starting from a high level and growth rate of economic activity. The response of output preceded the response of prices. The domestic effects occurred before the effect on the balance of payments. Additional increases in the growth rate of money in 1961 and 1962 did not prevent a deceleration of output, but prices accelerated.

3. *Deceleration, 1963-64.*—In an open economy with a fixed exchange rate, a comparatively large monetary expansion cannot persist indefinitely. The balance of payments deficit reduces international reserves, and the loss of reserves forces either a decline in the growth rate of the base and the money stock or a change in the exchange rate.

The third phase illustrates this process. The annual rate of monetary expansion fell from 17.5 percent to 7.1 percent from early 1963 to the third quarter 1964. The decline is not a result of a substantial change in the fiscal impulse. The budget deficit increased, and the entire deficit was financed by the central bank. The measure of fiscal stimulus remained small and unchanged throughout the period. Nor can the decline be explained as a consequence of reduced expenditure in foreign countries. The United States, Germany, and other principal trading countries expanded more rapidly than earlier.

The proximate reason for the decline is the relatively high rate of inflation. The trade balance turned negative and the balance of payments deficit rose above \$1.25 billion. The growth rate of Italy's international reserves fell from 14 percent in 4th quarter 1962 to -22 percent in 1st quarter 1964. Almost the entire decline in international reserves occurred in two quarters and is shown by the very large deceleration of money in late 1963 and early 1964.

Monetary policy contributed to the deceleration by sterilizing an average of Lit. 275 billion international reserves from 1963.IV to 1964.III. Variations in the portion of international reserves sterilized contributed to the deceleration of the monetary base and money.

The very large deceleration of money was followed within a quarter by a precipitate decline in capacity utilization and industrial production. The rate of price change (Chart 1) declined from 10 percent to 5 percent within three quarters. Wages continued to increase in 1963 and 1964 at rates considerably higher than the rates achieved during the acceleration phase of the expansion. The high rate of wage increase did not force an acceleration of prices. Both the consumer price index and the GNP deflator decelerated during the next two years.

4. *Acceleration, 1964-66.*—The fourth period began with a remarkable acceleration of fiscal and monetary impulses. The budget deficit approximately doubled partly as a result of reduced social security contributions. Most of the deficit was financed by increasing the monetary base. The increase in the domestic component

of the base was accompanied by a large increase in international reserves following the very large increase in the trade balance.

The international component of the base in 1965 and 1966 explains most of the difference between the growth rates of money in phases 3 and 4. The table shows the principal sources of change in the base in the two periods:

	Changes in the Base (billions of Lire)	
	Domestic Component	Non-sterilized International Reserves
Phase 3	+1273	-659
Phase 4	+1717	+882

5. *Deceleration, 1966-69.*—The fiscal stimulus collapsed in 1967, and the budget deficit declined by $\frac{1}{3}$ following full restoration of employers' social security taxes. The monetary authorities continued to sterilize from 8 percent to 10 percent of international reserves. The growth rate of money declined only gradually, as shown in Chart 2. At the end of 1967, the growth rate of money remained above 13 percent.

There is little support for the fiscalist explanation of moderate inflation in this period. Industrial production, real output, and capacity utilization show no sizeable response to the large changes in fiscal stimulus. Consumer prices rose faster in 1967 than in 1966. Reduction in social security contributions in 1968 restored part of the fiscal impulse and probably contributed to the acceleration of industrial production late in the year. But, the very large changes in budget deficit—a 30 percent decrease in 1967 followed by a 60 percent increase in 1968—leave little mark on output, production or prices.

The acceleration of inflation and deceleration of industrial production in 1969 cannot be explained entirely by domestic policies. Monetary expansion slowed, but the sharp deceleration of 1963 was avoided. Some part of the rising inflation, however, must be attributed to the continuation of a relatively high rate of monetary growth. The Banca d'Italia pegged interest rates and, therefore, provided the rate of growth of base money required by the peg. A Lit. 1000 billion net increase in the monetary base financed a budget deficit of Lit. 1800 billion while international reserves declined by Lit. 400 billion. Money grew at a 12 percent rate.

The balance of trade increased by 66 percent in 1968 and remained strongly positive in 1969. A strong foreign impulse, therefore, sustained economic activity and accelerated inflation in the face of declining monetary and fiscal forces.

Germany

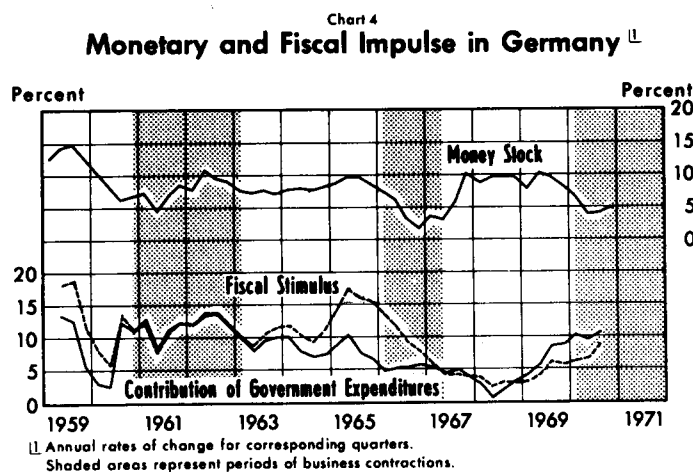
Germany experienced three accelerations and three decelerations of output and prices between 1959 and 1971 including one recession in 1966-67. Price movements were much smaller than changes in real growth or than the price changes in Italy. Until the end of the decade, inflation remained below 5 percent and, for part of the period, prices remained almost constant.

The GNP deflator is available quarterly, and is used as our measure of inflation. Producers' prices of industrial products are used as a supplement. Consumer prices are a less reliable measure. Several components, including agricultural prices, are controlled. As measures of output, we use the growth rates of real GNP and industrial production. All references to growth rates refer to annual rates of changes between corresponding quarters.

Fiscal policy has a dominant role in official discussions of economic policy, and changes in fiscal policy have been undertaken to stabilize the economy. Federal law requires governments at all levels to coordinate budget decisions in the interests of stabilization. Despite the importance assigned to fiscal policy, no reliable indicator of fiscal policy has been developed.¹⁷

Money is defined as currency and demand deposits and the growth rate of money is used as the indicator of the monetary impulse. Chart 4 shows the indicators of the monetary and fiscal impulses used in our study. Once again, there are periods in which the two indicators diverge. As in Italy, we divide the period into six phases corresponding to periods of monetary acceleration and deceleration.

The foreign stimulus is measured again by the balance of trade, and we again compare changes in the trade balance to broad movements in domestic and foreign prices to see whether there are periods in which real external impulses increased expenditure and raised prices. Table 4 provides summary statistics for the balances of trade and payments. Charts 5 and 6 show the measures of real economic activity and prices used in the study.



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¹⁷The general approach here follows the procedure discussed in E. G. Corrigan [7]. Total fiscal stimulus is the cumulated sum of cash expenditures of all governments and discretionary changes in tax revenues from 1958 to the particular quarter. Annual percentage changes between corresponding quarters of adjacent years are then computed using a three-quarter average and assuming continuous compounding.

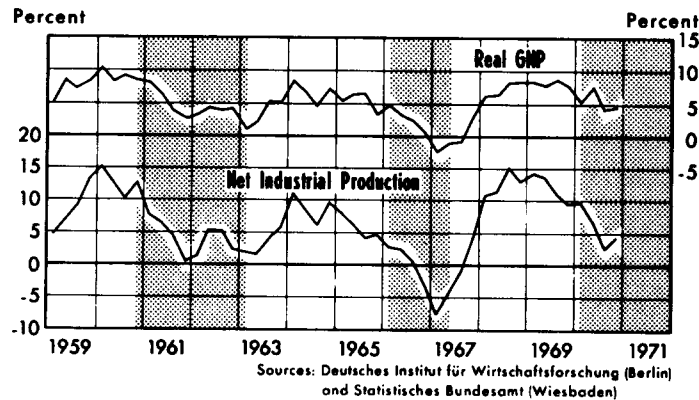
TABLE 4
The German Balance of Payments (in DM Million)*

Year	Surplus in Balance of Goods and Services	Surplus in Balance of Payments
1959	+ 7,241	- 1,692
1960	+ 7,981	+ 8,019
1961	+ 7,273	- 822
1962	+ 3,260	- 877
1963	+ 5,756	+ 2,740
1964	+ 5,295	+ 435
1965	- 346	- 1,283
1966	+ 6,363	+ 1,952
1967	+15,858	- 140
1968	+18,216	+ 7,009
1969	+14,650	-10,262
1970	+11,805	+21,912

*Source: *Monthly Report of the Deutsche Bundesbank* (January, 1972), Statist. Sect., Table IX, 1.

1. *Deceleration, 1959 to Mid-1961.*—The growth rate of money reached a peak of 14.8 percent in the third quarter of 1959. During the next year, monetary growth declined steadily and fell by approximately 60 percent. After a brief interruption, the decline continued. By mid-1961, the growth rate had fallen to 4.7 percent. The deceleration of money in these two years reflects a decrease in the money multiplier. The growth rate of the monetary base remained within a narrow range. The stability masked large changes in the components, mainly a substitution of foreign for domestic sources.

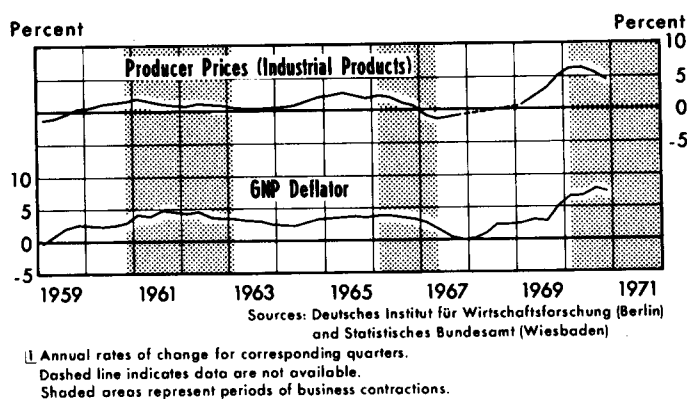
Chart 5
Real Economic Activity in Germany ¹



¹ Annual rates of change for corresponding quarters.
Shaded areas represent periods of business contractions.

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Chart 6
Prices in Germany ¹



Prepared by Federal Reserve Bank of St. Louis

The fiscal indicator declined from 18 percent in mid-1959 to 6 percent a year later. There is no evidence of a response of the base to the decline in the fiscal stimulus or to the increase in the growth rate of government expenditure beginning in the third quarter of 1960.

A large capital inflow and an increase in the trade surplus shifted the balance of payments from deficit to surplus in 1960. There is nothing in the balance of payments statistics to suggest that the deceleration of output and industrial production in 1961 is a delayed response to the U.S. recession of 1960. A large part of the capital inflow and subsequent outflow almost certainly reflects the anticipation of revaluation.

Capital movements, however, do not fully explain the steady deceleration of money in 1959-60. Most effects on the growth rate of the base were offset by changes in the domestic component. The money multiplier started to decline in 1959 partly in response to an increase in the ratio of currency to deposits, but mainly due to the large increase in time and savings deposits, presumably in anticipation of revaluation.

After mid-1960 the decline in the growth rate of money dominated the effects of a more expansive fiscal impulse. Output and industrial production decelerated sharply. Growth of real GNP fell from the range 8-10 percent in 1960 to 6 percent in the second quarter 1961 and continued to decline. Prices continued to increase, and the GNP deflator accelerated during the first year of the contraction.

The lags measured from the peak rate of change in money to the peak rates of change in real GNP and the price deflator are, respectively, 2 and 8 quarters. The lags are the same for the fiscal as for the monetary impulse, since both reached a peak together. The principal difference between the two in this phase is that, late in the period, the fiscal impulse reversed direction and the monetary impulse continued to decelerate.

2. *Acceleration and Mild Deceleration, Mid-1961 to Early 1963.*—The growth rate of the monetary base remained between 8 percent and 10 percent from mid-1961 to the end of 1962. The growth rate of money increased to 11 percent then decelerated gradually. The movements of the fiscal and monetary variables are, again, very similar. The trade balance fell by 60 percent and the balance of payments shifted from surplus to deficit.

Real GNP shows a brief acceleration in 1962 followed by a further contraction that reduced the annual rate of growth to 1 percent at the start of 1963. Measuring the lag of output behind the fiscal and monetary indicators by the difference in the timing between the turning points of the series implies a seven quarter lag of real GNP growth behind the monetary and fiscal changes. If this is correct, we can interpret the slight increase in GNP growth during 1962 as a delayed response to the sharp increase in the growth rate of government expenditure in 1960. Alternatively, we can attribute the brief acceleration of real GNP in 1962 to the brief acceleration of monetary and fiscal impulses in 1961–62. Using this interpretation the lags are much shorter, no more than 2 to 3 quarters.

Prices decelerated gradually. A trough in the rate of change in the GNP deflator does not come until the second quarter of 1964. This measure of inflation implies a 4-quarter lag for the rate of inflation. Prices of industrial producers responded more quickly. A trough in this measure of inflation follows the trough in real GNP by only one quarter.

3. *Stable Growth and Mild Acceleration, 1963–Mid-1965.*—At the start of this period, there was a sharp increase in the balance of trade. The increase in trade reflects both the expansion in the United States and the deceleration of German prices in 1962. The foreign stimulus produced a rapid acceleration of output beginning in the first quarter of 1963.

The growth rate of the monetary base remained between 7.3 percent and 8.3 percent from the first quarter of 1963 to the end of 1964. The growth rates of money and the base are almost identical in each quarter. The first seven quarters of this phase are one of the most stable periods of German monetary policy. The fiscal impulse also remained within a narrow range.

At the end of 1964 tax policy became more expansive. Our fiscal indicator rises from 9 percent to 17 percent, the highest rate of increase during the decade. The growth rates of the monetary base and money increased and financed the increased deficit. The acceleration of the base is much smaller than the acceleration of the fiscal indicator because the rate of increase in international reserves again moved opposite to the domestic component and damped the inflationary effect of deficit finance. The decline in international reserves is the result of a large decline in the trade balance and the deficit in both trade and payments (Table 4).

The growth rate of real GNP reached a peak early in 1964, and fluctuated around the 6 percent level through the third quarter 1965. With an 8 percent growth rate of money and a 6 percent growth rate of real GNP, a simple quantity theory implies that prices should rise at approximately 2 percent. The data put the GNP deflator

between 2.5 percent and 3.5 percent from the second quarter of 1963 to second quarter 1965. Prices of industrials rose gradually to the 2.5 percent range at the end of this period.

Steady monetary and fiscal policies were accompanied and followed by relatively steady rates of inflation. Accelerations and decelerations of industrial production were somewhat larger than the fluctuations in any of the other series.

The peak growth rate in money during the mild acceleration of phase 2 was reached in the second quarter of 1962, seven quarters before the peak in the expansion of real output. The peak fiscal stimulus again coincides with the peak rate of monetary expansion, so the lag measured between peaks is again seven quarters. If we use this calculation to establish a timing relation, we must attribute the steady growth of real output and the deflator in 1964 and 1965 to the steady monetary and fiscal policies from 1963 through first quarter 1964. The deceleration of real growth in mid-1964 would then be attributable to two factors: (1) the mild deceleration of monetary and fiscal forces at the end of 1962 and (2) the gradual adjustment of output to a maintained inflation. This explanation does not fit the data well.

There are three problems. First, the explanation assigns no independent effect to the improved balance of trade in 1963 and 1964 or to the acceleration of the trade surplus in 1963 and the deceleration in 1964. Second, the relatively steady monetary and fiscal impulse in 1963-64 ended with an acceleration of both money and our fiscal indicator. If domestic policies explain the expansion, acceleration of domestic stimulus should be followed by acceleration of output or prices. Output decelerated and the rate of inflation remained virtually unchanged. Third, the lag of real output in this instance is much longer than in previous or later phases.

4. *Deceleration, Mid-1965-66.*—The deceleration of output in the fourth quarter of 1965 is mainly a response to reduced foreign demand. The weakness in the trade position during 1965 appears in the monetary statistics as a marked deceleration in the growth rate of international reserves in 1964. After the first quarter of 1965, international reserves declined. The effect on money was more than offset until mid-1965 but not thereafter.

The peak in the growth rate of money (9.8 percent) was followed by a deceleration that brought the monetary growth rate below 2 percent by the end of 1966. Our measure of the fiscal impulse decelerated, on our fiscal indicator from 17 percent to 7.7 percent, in the same period. Throughout this phase fiscal and monetary forces moved in the same direction and contributed to the decline in output and the deceleration of prices. The table below shows the rates of change in output and the price deflator from second quarter 1966 to the end of 1967:

Annual Rates of Change in Real GNP and the Price
Deflator between Corresponding Quarters (in Percent)

	Output	Prices
1966:I	3.34	3.85
1966:III	2.55	3.54
1966:IV	0.66	3.33

Annual Rates of Change in Real GNP and the Price
Deflator between Corresponding Quarters (in Percent)—(Continued)

	Output	Prices
1967:I	-2.40	2.67
1967:II	-1.11	1.59
1967:III	-0.74	0.44
1967:IV	2.91	0

The substantial deceleration of output ended in the recession of 1967. We believe the deceleration began as a response to the decline in foreign demand in 1964-65. Expansive domestic policy limited the deceleration for several quarters. After mid-1965 domestic policies turned to marked restraints and added to the deflationary impulse. The deceleration became a recession, the only recession in the decade as a consequence of domestic policy.

An increase in exports gradually increased the monetary base and slowed the deceleration of money. The balances of trade and payments show signs of improvement before there is any decline in the rate of inflation. The peak rate of decline in international reserves is in the first quarter of 1966. By the third quarter international reserves were rising.

Trade statistics for 1966 show a larger surplus than in any of the previous four years. Inflation in the United States, Canada, France and other markets for German imports initiated the turn. Deceleration of inflation in Germany added to the improvement once it was underway. The deceleration, on our analysis, is the result of the domestic economic policies pursued after mid-1965.

5. *Acceleration and Steady Growth, 1967-Mid-1969.*—The growth rate of money rose in the first quarter of 1967 and reached 10 percent by the end of the year. During the next six quarters the money stock rose steadily. Monetary and fiscal forces moved in opposite directions during most of this period. The rate of increase of government expenditure fell from 10 percent in early 1965 to 0.7 percent in the second quarter of 1968. This decline reduced the fiscal stimulus.

The recovery and the increase in money were a response to relatively low prices in Germany that induced an increase in foreign demand, an improved balance of payments and an increase in the base. The monetary impulse reached a trough in the fourth quarter of 1966. The acceleration of money was followed within two quarters by an acceleration of real GNP. After three quarters of monetary acceleration, the growth rate of output became positive, and the recession ended. The fiscal indicator remained contractive until much later in the recovery.

Prices decelerated until the first quarter of 1968, five quarters after the start of monetary acceleration. Steady monetary growth at 10 percent per annum was maintained, with one brief exception, in the seven quarters beginning fourth quarter 1967. Relatively steady growth of real GNP began three quarters later. During the next six quarters the maximum deviation of growth in real GNP from the mean growth rate of the period is one-half percent. Again, as in 1964, output decelerated gradually as prices accelerated. These findings support our hypothesis on the interaction of prices and output during sustained, moderate inflation.

The fiscal stimulus remained low and steady until late in the expansion, then doubled during 1969. The acceleration of the fiscal stimulus came at a time of monetary expansion and was followed by sharp acceleration of prices at the end of 1969. If we attribute the increased rate of inflation to the increased fiscal stimulus, we must accept a zero or even negative lag in response contrary to our previous findings for Germany.

An alternative explanation has more appeal. International influences dominate German prices and economic activity during this phase. The balance of trade surplus doubled between 1966 and 1967 and rose another 15 percent in 1968. This performance reflects, in part, the difference between the rates of inflation in Germany and other countries, especially the United States.

The trade surplus is reflected in the monetary statistics. The growth rate of the base is dominated by the growth rate of international reserves; the growth rate of money is a response to the growth of the base and the rise in the money multiplier. The latter is also affected by the balance of payments and the revaluation of the mark, just as it was at the start of the decade.¹⁸

6. *Deceleration, Mid-1969-70.*—Monetary growth declined slowly, then more rapidly, from third quarter 1969 to the second quarter 1970. Although the balance of trade remained expansive, the growth rate of international reserves declined from 21 percent to -31 percent within two quarters. A massive outflow of reserves followed the revaluation of the mark in October 1969. The effect of the outflow on money was partly offset by a reduction of reserve requirement ratios, so the growth rate of the base declined more than the growth rate of money. A steady increase in the domestic source component kept the growth rate of the base positive.

The fiscal stimulus increased steadily, but monetary change dominated fiscal as in the previous cases of divergence. By issuing base money to finance the government deficit, the Bundesbank reduced, but did not offset the deflationary stimulus provided by the decline in international reserves. Output decelerated very gradually and prices accelerated until mid-1971. Five quarters after the deceleration of money—the third quarter of 1970—output decelerated sharply. The maximum rate of inflation, 8.5 percent, follows four quarters later.

The deceleration of real growth is no greater in 1970-71 than in 1966-67, despite the revaluation of the mark. The monetary deceleration is smaller in this period, partly as a result of capital movements after mid-1970, and partly as a result of the financing of the fiscal stimulus.

The lag of the maximum rate of price change behind the maximum rate of monetary expansion is seven quarters. However, the inflation remained at a rate only slightly less than the peak rate for several quarters before and after the peak. It is difficult to find evidence in the price data that the revaluation of the mark in

¹⁸As in the earlier period, 1959-62, the dominant effects are a change in the currency ratio (1967-68) followed by a change in the ratio of savings to demand deposits in 1969. The latter includes the inflow of foreign deposits in anticipation of revaluation. A similar inflow in 1961 probably reflects a similar anticipation at the time. In 1961, the inflow increased time deposits relative to demand deposits; in 1969, demand deposits rose relative to time deposits.

1969 altered anticipations of inflation. A slightly stronger case for the effectiveness of decisive institutional change can be found in the deceleration of producer prices; the peak rate of inflation in this series comes much earlier than the peak in the rate of increase of the deflator. The deceleration of industrial production and industrial prices conform to a pattern observed in other periods. Rates of change of industrial prices in Germany lag rates of change of industrial output by at least one quarter but lead the deflator. The deceleration of prices following the revaluation conforms to the pattern found in previous decelerations.

The United States

Our last case study, the United States from 1948 to 1971, has five decelerations of prices, four accelerations, and one, three year period of stable prices. Chart 7 shows three broad-based price indexes. The general movements of the three are similar. Turning points generally occur at about the same time.

We do not discuss each phase of monetary and fiscal acceleration and deceleration in as much detail as in previous cases. Numerous studies of the relative effects of monetary and fiscal changes are available. We concentrate on a few selected episodes of interest for institutional explanations of inflation and for comparison of the monetary and fiscal explanations. The trade and balance of payments position have a much smaller effect on domestic output and prices and are ignored.

1. Korean Inflation, 1951-52.—The largest inflation and deflation of the period occurred at the time of the Korean War. Within three years wholesale prices accelerated from -7 percent to 18 percent, then decelerated to -4 percent. Other indexes show similar, though less dramatic, swings. The acceleration began in 1949, before the outbreak of the war, and proceeded at the same rate before and after the war started. Neither the timing of the acceleration nor the subsequent fall in wholesale prices, lasting two years, can be adequately explained as a wartime inflation terminated by wage and price controls. Whatever the effect of war and controls on anticipations, neither provides a full explanation of the change.

There appears to be no need for an institutional or ad hoc explanation. The acceleration and deceleration of prices is matched by an acceleration and deceleration of output. The rise in output and the acceleration of production began before the war. Fiscal forces, full employment expenditure and receipts, were deflationary and contractive, but the increased growth rate of money, early in 1949, started an expansion. With the start of the Korean War, full employment government expenditure accelerated. The rate of change of government expenditures increased from -10 percent to 70 percent in one year. Tax receipts accelerated also, but by a much smaller percentage.

The very large increase in fiscal stimulus provides evidence on the fiscalist thesis. The acceleration of fiscal forces accelerated output and prices. However, both the acceleration and deceleration of output precede the acceleration and deceleration of government expenditure, so the fiscal explanation alone cannot explain the expansion. Anticipation of expenditure may provide the required supplement. The

very large changes in expenditure at the start of the war reduced the cost of acquiring information about fiscal actions and perhaps strengthened anticipations of a rapid expansion.

The sharp turn in the rate of inflation must be attributed, in part, to the very large increase in the growth rate of real output. With fixed resources, expenditure cannot accelerate without raising prices of inputs and outputs. Relatively large changes, as in 1950-51, reduce the cost of acquiring information and speed adjustments.

A similar explanation holds for the deceleration. Our version of the fiscalist theory implies that a deceleration of the fiscal impulse accompanied by a maintained growth rate of money reduces the rate of increases of expenditure and slows the rate of inflation. The reduced growth rate of expenditures and excess demand slowed the adjustment of real output.

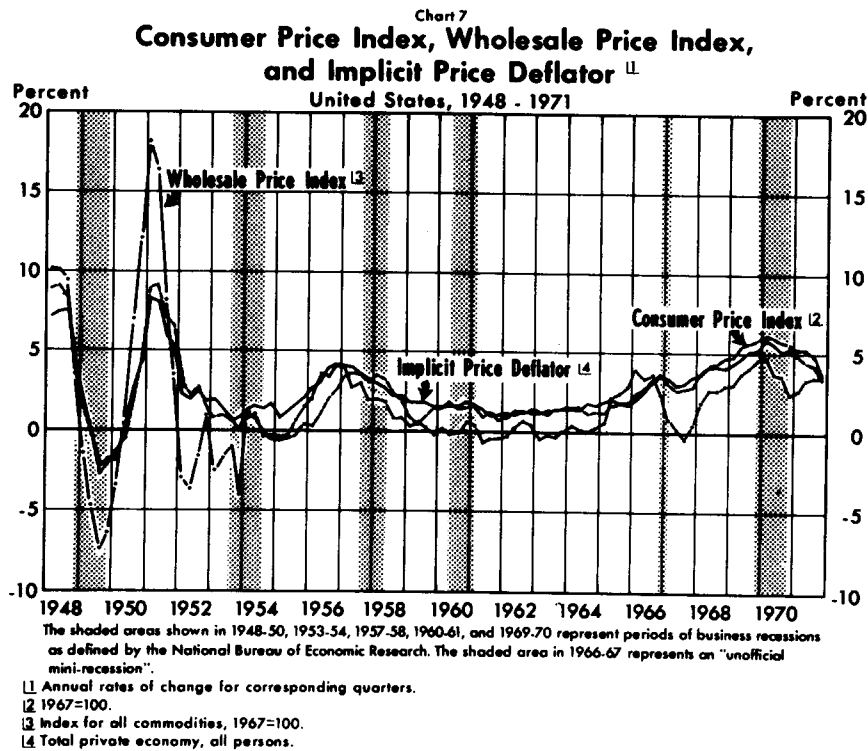
The imposition of price controls may have contributed also to the speed or timing of these changes. Direct evidence is lacking. However, controls do not explain the decline in wholesale prices; no attempt was made to reduce prices. Purchasers' adjustment to decelerating prices seems a more likely explanation and appears to be consistent with the timing of changes in prices and production. Output and prices decelerated throughout 1951. Prices declined in 1952 prior to the decline in the production index.

2. Stable Prices, 1962-63.—A second attempt to control or modify price changes started in 1962. Controls were less formal and more selective, and only a small unspecified set of prices and wages were subject to controls.

Chart 7 shows practically no change in the average rate of inflation until early 1965. It is remarkable that "incomes policies" were implemented during the only period of stable prices shown on the chart.

Wholesale prices declined during part of this period. The steady rate of inflation, or slight deflation, is attributable to the deceleration of real GNP in 1962 and 1963. The deceleration continued for more than a year and ended with a mild acceleration. During the entire period of price stability, the rate of change of real output remained below the rate achieved early in 1962. If "incomes policy" prevents prices from adjusting by reducing anticipations, it must also slow the adjustment of output. Under our hypothesis, price and output adjustments are not separate, but are related events.

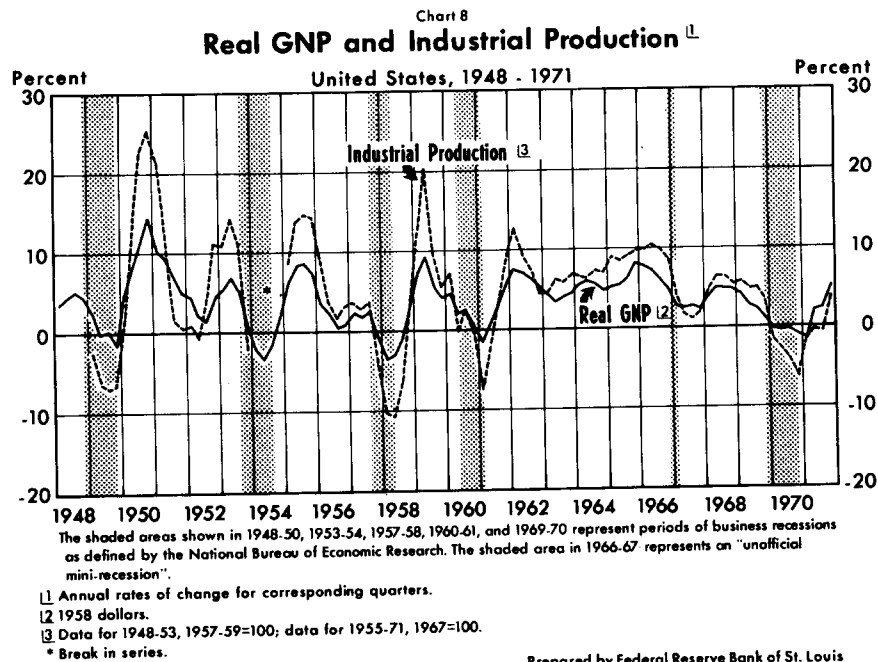
Our alternative explanation of the 1962-63 period attributes the deceleration of output and the falling or stable prices mainly to a reduced monetary impulse. The timing of fiscal changes cannot easily be reconciled with the acceleration and deceleration of output or with the stable and falling prices. Full employment expenditure and the full employment deficit accelerated until after the peak in the growth rate of real output. The fiscal indicators decelerated from second quarter 1962 until the tax change in early 1964. The deceleration of the fiscal stimulus probably contributed to the events of the period, but unless changes in fiscal variables lag behind output, the timing rules out a fiscal explanation of the shift from acceleration to deceleration.



The growth rate of money, currency and demand deposits, reached a peak in the winter of 1961-62 and declined until late in 1962. The growth rate of money increased in 1963 and, in the fourth quarter, passed its previous peak. The accelerations and decelerations of real and nominal output follow after a short lag. On our interpretation, the deceleration of output in 1962 is mainly a result of monetary deceleration. The mild acceleration of prices is the response to the output adjustment.

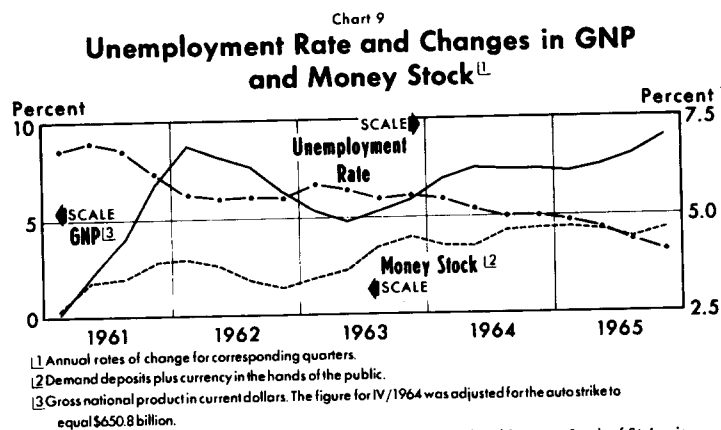
3. *The Start of Inflation, 1964-66.*—Chart 8 shows that the acceleration of money came to an end in late 1963. The changes in the growth rate of money in 1964 and the first half of 1965 were relatively small. Money grew at about a 4 percent annual rate. The growth rate of nominal GNP remained unchanged for almost a year. The stability of GNP growth hides the changing distribution between the growth of real output and inflation. Real output decelerated for two quarters, then accelerated to a peak at the end of 1965 (Chart 9).

The tax cut of 1964, a much heralded fiscal change, came at the end of the first quarter. Real GNP decelerated to a trough in the fourth quarter. No effect of the fiscal stimulus on the growth rate of output appears before the first quarter of 1965. The wholesale price index accelerates in the same quarter, the GNP deflator a few quarters later.



The start of the inflation appears to be a consequence of fiscal acceleration superimposed on stable monetary growth. The very brief monetary acceleration in the fall of 1965 and winter of 1966 combined with a decelerating fiscal stimulus to offset some of the effects of fiscal deceleration. Nevertheless, the annual growth rate of output declined in the first quarter of 1966.

Chart 8 shows that a small adjustment in the growth rate of real output, a response to price acceleration, started early in 1966. If the acceleration and de-



celeration of money had been avoided, we believe the economy would have experienced a small temporary acceleration of inflation in response to the fiscal stimulus. Instead, the growth rate of the money stock declined.

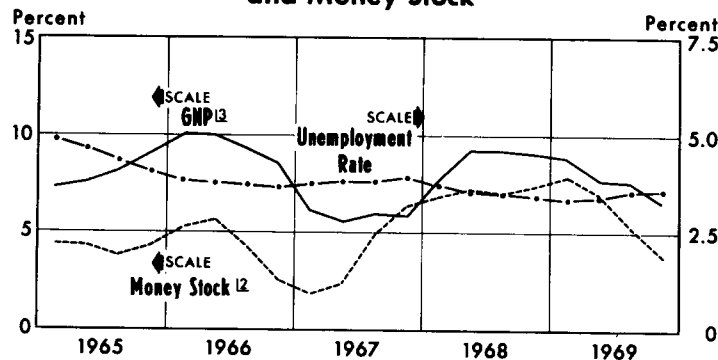
The peak in the growth rate of money comes too late to explain the deceleration of nominal GNP (Chart 10). Fiscal policy had become more expansive in 1966 and, therefore, cannot explain the turning point. We believe the interaction of the output market, and the redistribution of the fiscal and monetary impulse between prices and output again provides an explanation of the turning point. The sharp deceleration of money in the second quarter of 1966 added to the pressure for contraction.

4. Accelerating Inflation, 1967-69.—The fiscal stimulus expanded in the first quarter of 1967 then decelerated steadily for two years. Fiscal actions cannot explain the acceleration of prices. The money stock accelerated throughout the period and provides an adequate explanation. The growth rate of money is shown in chart 10.

The trough in the annual rate of monetary expansion is in the first quarter of 1967. The trough in the rate of inflation is in the second or third quarter, depending on the series used. The peak in the rate of monetary expansion comes at the start of 1969, a year before the peak in the rate of inflation.

Prices continued to accelerate for a year after the peak in the rate of monetary growth. The fiscal impulse remained deflationary during this period, although the size of the deflationary impulse became smaller after mid-1969. The decelerating monetary impulse eventually produced a recession. The very slow deceleration of real output and industrial production appears to have started in 1968, as a response to accelerating inflation and a deflationary fiscal impulse. Once monetary decelera-

Chart 10
**Unemployment Rate and Changes in GNP
and Money Stock ¹**



¹ Annual rates of change for corresponding quarters.

² Demand deposits plus currency in the hands of the public.

³ Gross national product in current dollars. The figure for IV/1964 was adjusted for the auto strike to equal \$650.8 billion.

Prepared by Federal Reserve Bank of St. Louis

tion began, real output decelerated more rapidly. In this deceleration, as in others, the monetary deceleration dominated the effect of fiscal forces.

CONCLUSION

The three countries we studied provided a large number of instances that cannot be explained solely as fiscal, monetary or Wicksell-Keynes inflations. The initial impulses in Germany and Italy often came from abroad, and in the U.S. and Germany, there is some evidence that inflation has been initiated by changes in fiscal policy.

No inflation sustained solely by fiscal or foreign stimulus was found. One reason is that budget and payments deficits or surpluses are, often, financed by withdrawing or issuing base money. There are, however, cases of large increases in expenditure with relatively small increases in the growth rate of money. Korean inflation in the United States is, perhaps, the most dramatic example.

Generally, we find that whenever fiscal and monetary forces diverge, the monetary impulse dominates subsequent events, although the speed and size of adjustment appears to be affected by the divergence. The U.S. and German experience in the late sixties contains several samples. Italy offers an additional example. A 30 percent decline in the budget deficit in 1967 followed by a 60 percent increase in 1968 leaves only a minor imprint on prices and output. The monetary impulse prevailed in both years.

During the sixties, both Germany and the United States had periods of relatively stable monetary growth lasting six quarters or longer. In both countries, stable policies were followed by stable rates of price change. Output fluctuated around a trend rate of growth. In Germany the rate of monetary expansion was above the rate of growth of output; output decelerated slowly. In the U.S. the rate of monetary expansion remained below the rate of growth of output during the first half of the decade; output accelerated slowly. These findings are in general agreement with our hypothesis about the interaction of asset and output markets and the effects of steady change.

Italian experience in 1960-63 offers supporting evidence of a different type. Acceleration of money began at a time of rapid expansion in economic activity. Output accelerated but inflation did not immediately increase. Once prices accelerated, additional monetary expansion did not prevent the deceleration of real output.

We find no evidence to support the institutionalist conjecture that prices no longer respond to market conditions. The three countries we examined offer no reason to conclude that new arrangements are required to slow or stop inflation.

Italy in 1963-64 offers a rather striking refutation of the "wage push" thesis. For more than two years in the mid-sixties, prices decelerated. Money wages continued to rise at a 7 percent or higher rate. The effect of wage increases in the unionized sector is not independent of market conditions, as the "institutional" approach to inflation and inflation control suggests.

In several cases, particularly in Germany and the United States, we measured the time between peaks and troughs in the rate of monetary expansion and the subsequent peaks and troughs in the rates of change of prices and output. The lag for prices was at times longer in Germany than in the United States. The length of the lag appears to depend on the size of the acceleration and decelerations of the monetary and fiscal impulses. Additional evidence is required, however, to form a firm basis for this proposition.

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