A
broad definition of stabilization measures might be those policies that attempt to reduce excessive or unsustainable balance of payments deficits or the rate of inflation. Both are symptoms of too much demand relative to output, so stabilization could also be defined as a better balance between aggregate supply and aggregate demand. Either definition accommodates a wide range of policies, from fine-tuning aggregate demand to making radical changes in the economic role of the state. But in every case, two factors will decide whether a particular policy is appropriate: first, the nature of the disturbance that produced the imbalance between demand and supply; second, the trade and exchange rate regime in force.

Imbalances between aggregate demand and aggregate supply can emerge for a variety of reasons. Until the 1970s, the most common source of balance of payments deficits was overexpansionary demand-side policy—large budget deficits, financed either through the banking system or by unsustainable levels of foreign borrowing. But other factors can lead to balance of payments difficulties. This paper discusses two of them: domestic supply shocks and external shocks. The important feature of a domestic supply shock is that returns received by some domestic factor come to exceed its supply price—as would happen, for example, after a rise in real wages in excess of productivity growth. A typical external shock is a deterioration in the terms of trade.

The appropriate policy response in each case is analyzed below. Then, focusing more narrowly on one instrument of policy, the exchange rate, the paper looks at the effects of a nominal devaluation on the real exchange rate, on the trade balance, and on domestic output. The final section turns to the special difficulties of reducing inflation in both closed and open economies.
Balance of Payments Adjustment

To see why the trade and exchange rate regime matters, consider a country with excess aggregate demand. It could choose to maintain its nominal exchange rate, allowing the real exchange rate to appreciate and an open balance of payments deficit to emerge. Or it could prevent an open balance of payments deficit by imposing import quotas. Finally, it could let the nominal exchange rate fall to offset the rise in domestic prices, while maintaining the real exchange rate and protecting the balance of trade—at the cost of higher inflation. Each policy implies a different outcome for relative prices and hence for the structure of the stabilized economy. Economies with fixed exchange rates cannot sustain domestic inflation higher than international inflation without running into balance of payments difficulties: the focus of policy in such cases is balance of payments adjustment. By contrast, economies which adjust their exchange rates can at least partly insulate their trade accounts from domestic demand: macroeconomic imbalance emerges for them as an acceleration in the rate of inflation. Countries using import quotas to bring their international payments into balance are a hybrid case.

Deficits caused by excess demand

In an economy initially disturbed by higher government spending unmatched by increased revenues, the government’s budget deficit will rise. This affects demand in two ways: directly, by increasing the public sector component of demand and, indirectly, where the deficit is financed through domestic credit creation, by raising the rate of growth of domestic liquidity and thus of nominal private spending.

Figure 1 shows how this increase in demand might affect the economy with a fixed nominal exchange rate. First, the story told by monetarist models. Starting from full employment, at a point such as A, higher spending leads to higher inflation and hence to an appreciation of the real exchange rate, a loss of competitiveness in the tradables sector, and a shift in the mix of output from A to B. Spending rises from A to C, creating a balance of payments deficit equal to BC, financed by a loss of reserves.

Keynesian models, by contrast, assume that the economy starts with unemployment, at a point such as D. With sticky nominal wages, the demand-induced rise in inflation leads to a lower real product wage in the nontradables sector. So the supply of nontradable goods expands, and output moves from D to B. The increased demand for tradables, however, causes a balance of payments deficit. Keynesian and monetarist models both suggest that higher government spending will mean faster inflation, a higher real exchange rate, and a deterioration in the balance of payments. But Keynesian models also predict a rise in output and lower real wages,
while full employment models emphasize the changes in the composition of output.¹

A fixed exchange rate regime puts a limit on the size of the deficit that the government can finance without running out of reserves. Harberger and Edwards (1980) found evidence that this does impose discipline. They looked at monetary policy in developing countries that did not change their exchange rates to restore external balance. They found that countries which avoided devaluation in general followed a “reserves target” policy; they let bank credit expand when reserves were increasing and reduced it when reserves were falling.² At the same time, a fixed exchange rate can automatically offset excess demand through the money supply process. Financing the balance of payments deficit with reserves implies a loss of foreign assets of the central bank and, in turn, a lower domestic money supply. If private spending bears a stable relationship to the money supply, and the monetary authorities take no steps to sterilize the loss of reserves, private spending will fall. This implies that part of the fillip provided to real private spending by an expansionary budget deficit will be temporary. In terms of figure 1 the economy may move initially to E but eventually reverts to B. In full-employment models, the balance of payments deficit will tend toward equality with the budget deficit, with no long-run effect on private spending.³

Restoring balance of payments equilibrium with full employment requires a smaller budget deficit and a lower real exchange rate. If prices on nontradables are sufficiently flexible, the government should focus directly on reducing aggregate spending. Lower spending will automatically reduce the nominal price of nontradables and hence the real exchange rate. But if prices of nontradables or nominal wages are rigid, external and internal balance can be reconciled only by raising the price of tradables through a devaluation.

Devaluation reduces private spending by cutting the purchasing power of financial assets denominated in domestic currency. Devaluation also affects the value of external debt in terms of domestic purchasing power: if domestic prices do not rise to match the price of foreign exchange, the real value of external liabilities will rise. This, too, may affect the level of aggregate demand. The more flexible the structure of the economy—that is, the easier the substitution between tradables and nontradables in both production and consumption—the greater the impact of the devaluation on domestic prices. And the more likely it is that the “real balance” effect of lower asset values will overshadow the deflationary influence of higher external liabilities.

This is an overview of the orthodox theory of stabilization policy. Aside from the political difficulties, implementing such a program meets two economic problems: the cost of the adjustment process and the technical issue of synchronizing monetary and fiscal policy with exchange rate adjustments.
The Costs of Adjustment

The issue of cost is more complicated than is often supposed. A starting point is the welfare loss of moving from C to A in figure 1. This depends on the ability of the economy to move resources from producing nontradables to tradables. One measure for this concept of cost is the change in the level of real expenditures associated with a given reduction in the balance of payments deficit—the ratio of AC (the reduction in expenditures) to BC (the payments deficit).

Structuralist models of adjustment (see, for example, Taylor 1981) implicitly assume that tradables are totally inelastic in supply, nontraded goods are perfectly elastic, and the pattern of spending is highly unresponsive to relative prices. Reductions in the current account deficit therefore have a large impact on both output and spending. By contrast, in relatively open economies where tradables account for a large proportion of output and where spending is responsive to prices, reductions in the current account deficit can be achieved with much less of a fall in real expenditures. But this concept of cost is not very helpful to policymakers.

The important policy question is what is the least-cost way to get from B to A. There are two sides to this. The first concerns the costs of reallocating resources between sectors. Existing macroeconomic models give little insight here. The costs will depend on a variety of factors, including the mobility and specificity of both capital and labor, the underlying rate of growth of the economy, and the rate of investment. The second issue is how to manage aggregate demand to move the economy from B to A. Theoretically, it should be possible to cut spending, shift the pattern of output, and maintain demand so as to ensure full employment. In practice this is extremely difficult. Inevitably, unemployment causes transitional welfare losses.

The transition will also affect the distribution of income. Because of the shift in the pattern of production, the demand for labor will change. If nontradables are labor-intensive, then a shift in relative prices against nontradables results in a fall in the demand for labor and a fortiori a fall in real wages. Real wages will, however, also be affected on the consumption side. If wage earners are heavy consumers of tradables, real wages will fall even further. By contrast, if nontradables account for a large proportion of the consumption basket, this will offset the fall in real wages. The policies used to cut aggregate demand also can affect the real wage. Reductions in government benefits (such as food subsidies) or increases in taxation (particularly indirect taxation) affect wage earners’ real incomes.

Where labor markets are perfectly flexible, cutting the real wage does not pose problems of adjustment. But if real wages are sticky, the devaluation will have no real impact; exchange rate policy by itself is
not enough to bring about a real devaluation and its associated switches in spending and resource reallocation. The only way to cut deficits in the balance of payments is to reduce real spending—at the cost of higher unemployment. Real wage rigidity apparently makes it impossible to reconcile domestic employment and external balance objectives. In theory, this dilemma may be defeated by taxing capital and subsidizing wage earners (Corden 1981). But capital is internationally mobile: a tax on profits would result in a decline in the returns to investment and thus a fall in inflows of long-term capital. The best policy, therefore, would be to tax the quasi rents on the existing capital stock while maintaining returns to new investment (possibly by some form of investment incentive).

**Synchronizing Policies**

Coordinating exchange rate adjustments with monetary and fiscal policy is difficult because a nominal devaluation itself has aggregate demand effects: a devaluation does part of the job of reducing real spending. To see this, suppose that a government eliminates its budget deficit and devalues at the same time. The devaluation, by raising the overall price level, increases the private sector demand for money balances and thus temporarily reduces private expenditures. If domestic credit creation stops as a result of a balanced government budget, private spending will fall further as the private sector rebuilds its money balances. For a time, the country could actually have a balance of payments surplus. (In figure 1, the economy might move from B to F before reverting back to A). A better policy would be to reduce the rate of credit creation gradually. Policy design must therefore take into account the effects of devaluation on aggregate demand.\(^5\) Short-term capital flows may aggravate these problems of coordination. A delay between the first sign that a devaluation is necessary and the actual devaluation is common under fixed exchange rates. Even if international capital mobility is highly restricted, expectations of a devaluation can lead to import hoarding and delays in the repatriation of export earnings. The result is a sharper fall in reserves. After the devaluation, the process is reversed and reserves rise again. Such instability leads to two problems. First, the initial decline in reserves means a bigger fall in the money supply before the devaluation—individuals, speculating on a devaluation, shift from holding domestic financial assets in order to hoard foreign goods. Large shifts in the demand for money make it hard for the government to control monetary conditions. The authorities may even try to offset the monetary contraction and thus add to the original pressure of excess demand. Second, speculative capital flows make it difficult to judge the underlying balance of payments position and the size of the devaluation that is needed to correct it.
In general, devaluation and reductions in fiscal deficits tend to be mutually reinforcing. For most developing countries, indirect taxes on tradables are an important source of revenue, while most government spending is on nontradables. Devaluations therefore tend to raise public revenues and automatically cut fiscal deficits and the growth of domestic credit. But not necessarily. If domestic financial assets are indexed and, as is often the case in highly indexed economies, some proportion of the loans from the domestic banking system is provided at fixed nominal interest rates, then inflation no longer acts as a tax on the private sector. In fact, it has the opposite effect. Inflation, and hence devaluation, increases the net real wealth of the private sector and boosts aggregate demand. This is likely to happen, for example, in Brazil and Israel. The expenditure-reducing effect of the devaluation may also be muted because of its fiscal impact. If the public sector has a large external debt, a devaluation raises the domestic cost of debt service and thus, at any given level of taxation, increases the budget deficit. Alternatively, if government revenues respond to higher inflation only after a delay (because of collection difficulties, for example) while spending rises at once, higher inflation will mean a bigger budget deficit. And if the budget deficit is financed by expanding the money supply, a devaluation could mean faster monetary growth.

The key to a successful stabilization program is a lower fiscal deficit. If political constraints rule that out, it becomes impossible to maintain a fixed exchange rate. The government has to choose between a policy of progressively higher import restrictions combined with periodic large devaluations and a policy that allows the exchange rate to crawl with the rise in domestic prices. Most authors have recommended some variant of the crawling peg as a second-best way to insulate both the balance of payments and the structure of relative prices from fiscal incompetence (see Krueger 1981; McKinnon 1981).

A crawling-peg regime works, in effect, by allowing the rate of inflation to rise to the point at which the inflation tax on financial balances is enough to finance the budget deficit. The higher the budget deficit, the higher the rate of inflation and the faster the rate of depreciation needed to achieve external balance. But, in practice, crawling-peg systems face three problems.

First, how to choose the rate of crawl? One option is to tie the exchange rate to the differential between the domestic and the international rate of inflation, thus stabilizing the real exchange rate. But this provides no means of changing the real exchange rate, as might be warranted, for example, by changes in the terms of trade or in the rate of growth. Another possibility is to tie the exchange rate to the level of international reserves—slowing the rate of devaluation when reserves build up and raising it when reserves decline. But this fails to distinguish between temporary changes in the demand for or supply of foreign
exchange, which should presumably be accommodated by changes in reserves, and permanent changes, which will require an adjustment in the real exchange rate. Other rules have been proposed, but no single rule will suffice: crawling pegs need active management based on several criteria.

The second problem concerns the capital account. When the rate of inflation is high, the opportunity cost of holding non-interest-bearing financial assets is high. This prompts a shift into financial assets denominated in foreign currency. Economies with high fiscal deficits also tend to have high reserve requirements on bank deposits and therefore a substantial gap between interest rates on domestic deposits and loans. This form of taxation encourages depositors to buy financial assets denominated in dollars (or other hard currencies) and borrowers to borrow abroad. The domestic financial system—the base underlying the inflation tax—shrinks. Thus for given levels of the budget deficit, inflation will speed up. Exchange controls may be necessary to retain even imperfect monetary control.

The third problem with crawling-peg regimes is that they make inflation all the more difficult to control. The system promotes the view that the authorities are willing to tolerate high rates of inflation; this reinforces inflationary expectations. Wage demands are made on the assumption that the authorities will prevent unemployment by depreciating the exchange rate and accommodating the increase in domestic prices. This builds inflation into the wage-setting process.8

Two Case Studies of Stabilization Programs

Two case studies of stabilization programs designed to reduce current account deficits are presented below. The first, Mexico in 1976, is an example of a stabilization program with little cost in output. The second, Peru from 1976 to 1978, is a contrasting case in which the output cost was large. A combination of cuts in government expenditure and a depreciation in real exchange rate did reduce Peru’s current account deficit, but only at the expense of high inflation.

Mexico. The balance of payments crisis of 1976 had its roots in a fiscal problem. The government had increased its spending to meet social goals, but without corresponding tax increases. As a result, its fiscal deficit, which had averaged 2.5 percent of GDP between 1969 and 1970, rose to a peak of 6.5 percent of GDP in 1976. That meant faster inflation, growing external debt, and massive capital flight in anticipation of a devaluation. For the same reason, people shifted from peso deposits to dollar deposits in Mexican banks (see table 1 on page 86).

The stabilization program had two major elements: a cut in the public sector deficit and a substantial devaluation of the exchange rate. These succeeded in reducing the current account deficit from a peak of 4.2
percent of GDP in 1975 to 2.0 percent of GDP in 1977. There was some slowing in output growth which was quickly reversed by 1978. The program’s effect on real wages was also small, although the measures did curb the high rates of growth that had been apparent before 1976.9

Monetary policy was a problem. To offset the contractionary effect of falling reserves in 1976, the authorities sharply expanded the rate of domestic credit creation. This policy of sterilization blocked one of the financial system’s automatic stabilizers and added to excess demand and the fall in reserves.10

The program was only partly successful in reducing “dollarization”: the devaluation created expectations of further devaluations to come. When the government liberalized the Mex-dollar deposit rate in 1977, in effect making Mex-dollars closer substitutes for dollars held abroad, it partially solved the problem. The new policy stemmed the capital outflow and diverted from the U.S. government to the Mexican government the seigniorage extracted from Mexican residents holding dollar assets.11

Peru. Table 2 provides a summary of the major macroeconomic developments in Peru between 1973 and 1979. From 1975 onward the public sector embarked on a large spending program unmatched by increased revenues and financed by external borrowing. When private external financing dried up in 1976, the government resorted to deficit financing from the banking system—and hence inflation—to finance the budget.12

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Table 1. *Mexico: Macroeconomic Data*

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As percentage of GDP

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Annual growth rate

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1974 = 100

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<td>1,253</td>
<td>1,723</td>
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Sources: World Bank, Economic Analysis and Projections Department data bank; *International Financial Statistics.*

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Table 2. Peru: Macroeconomic Data

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As percentage of GDP

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1972 = 100

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Percentage change

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a. From Cline (1981). The figures for the real exchange rate are based on a trade-weighted measure of the exchange rate. The figures for the nominal exchange rate provided here are, however, based on the exchange rate relative to the U.S. dollar.


Initial attempts at stabilization in 1975 and early 1976 included a devaluation of 30 percent, but they were flawed by a lack of complementary deficit-cutting measures. Inflation accelerated, eroding much of the real impact of the nominal devaluation, and the current account deficit remained at an unsustainable level. The problem was the familiar one that devaluation has only temporary effects on real spending and on the real exchange rate if it is not accompanied by measures to reduce the budget deficit. In late 1976 the Peruvian authorities shifted to a crawling-peg exchange rate. Action on the budget deficit was still limited, however, and a serious effort to bring the budget into some sort of balance was not made until 1979. As a result, the government had to keep a high rate of devaluation and a corresponding rate of inflation to ensure that the inflation tax was high enough to finance the budget deficit.

Deficits Caused by a Domestic Supply Shock

Balance of payments difficulties can also arise from a domestic supply shock, as when real wages rise more than productivity and lead to lower
"competitiveness." The essential characteristic is that the returns received by some domestic factor come to exceed its supply price. This has happened in Pakistan between 1979 and 1972 and in Portugal after 1974.

Figure 2 shows how a supply shock affects an open economy. Suppose that output is initially at A and spending at B, so that the economy is running a current account deficit of AB. In the short run a rise in real wages will affect both the supply side and the demand side, as increases in real wages lead firms to reduce their demand for labor. Output shifts from A to a point such as C, and unemployment emerges. On the demand side, higher real wages and lower profitability reduce investment. Spending shifts from B to a position such as D. The effect on the current account deficit is ambiguous; it depends on whether the investment reduction effect outweighs the output reduction effect (see Kouri 1979). If the elasticity of substitution between capital and labor is small, the output reduction effect will be small, but the effect on the profitability of new investment will be substantial—so the current account deficit may shrink.

So far, the excessive level of real wages causes domestic unemployment rather than an open balance of payments problem. But the government may try to maintain full employment and thus move the economy's output from C to a point such as E (see Soderstrom and Viotti 1979). Total spending and the current account deficit rise, and the real exchange rate appreciates. Because of its lower profitability, the country may find it hard to borrow abroad to finance its enlarged budget deficit. It will therefore see a rapid drain on its reserves.

The first priority is to improve profitability through a fall in real wages. If the government tried to offset the shock's domestic employment effects by higher spending, the process of adjustment is likely to involve a shift in spending and output from the public to the private sectors and a rise in private savings. Where a shortage of international reserves prevented expansionary fiscal policies, output may expand as a result of the decline in real wages, and with increased foreign capital inflows the current account deficit may rise. The policy response to excessively high real wages maintained by government expenditures is similar to the policy response to excess demand. Both call for a devaluation coupled with a cut in the budget deficit. But the events leading up to and following the stabilization program will be quite different in the two cases. With excess demand, a loss of international reserves is likely to accompany strong output growth and high employment. By contrast, following a real wage shock, a loss of international reserves goes hand in hand with a decline in long-term capital inflows, slower output growth, and rising unemployment.

Portugal. Table 3 provides a summary of the major macroeconomic developments in Portugal between 1974 and 1979. After the revolution in
Portugal in 1974, there was a sharp rise in real wages and a slump in output.14 Unemployment increased, and the current account deficit rose. This was, in part, due to the oil price increase. However, the oil price shock, the world recession, and the increase in Portugal's labor force caused by decolonization called for a fall in real wages at a time when real wages rose by 25 percent. Beginning in 1975, public spending increased to maintain employment and offset the decline in GDP. This led to a growing current account deficit. The government devalued the currency in early 1977 and, from the middle of 1977, allowed it to crawl in line with the differential between domestic and world inflation. The devaluation, together with wage controls, helped to reverse the trend in real wages, but the current account deficit continued to rise. The problem had become one of excess demand fostered by overexpansionary monetary and fiscal policies. In 1978, as real wages continued to fall, the government tightened credit and cut the budget deficit, which produced slower output growth but moved Portugal closer to external balance.

**Deficits Caused by External Shocks**

The 1970s saw major external shocks to the economies of developing countries and unprecedented current account deficits. Traditional analysis of the effect of a fall in the terms of trade on the balance of payments stresses two channels of adjustment. The monetary approach emphasizes that the reduction in real income following a fall in terms of trade would reduce the demand for real money balances. That would lead individuals to increase their spending relative to income, which would reduce their

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**Table 3. Portugal: Macroeconomic Data**

<table>
<thead>
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<td>6.9</td>
<td>5.3</td>
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<td>4.8</td>
</tr>
<tr>
<td>As percentage of GDP</td>
<td></td>
<td></td>
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<tr>
<td>Investment</td>
<td>24.9</td>
<td>16.4</td>
<td>20.8</td>
<td>25.4</td>
<td>23.3</td>
<td>22.4</td>
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<td>Fixed investment</td>
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<td>19.7</td>
<td>19.0</td>
<td>20.2</td>
<td>20.1</td>
<td>19.2</td>
</tr>
<tr>
<td>Stocks</td>
<td>5.2</td>
<td>-3.3</td>
<td>1.8</td>
<td>5.2</td>
<td>3.3</td>
<td>3.1</td>
</tr>
<tr>
<td>Domestic savings</td>
<td>10.4</td>
<td>3.8</td>
<td>6.0</td>
<td>9.2</td>
<td>9.5</td>
<td>4.9</td>
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<tr>
<td>Remittances</td>
<td>8.3</td>
<td>7.0</td>
<td>6.3</td>
<td>7.0</td>
<td>9.5</td>
<td>12.4</td>
</tr>
<tr>
<td>Current account deficit</td>
<td>6.2</td>
<td>5.6</td>
<td>8.0</td>
<td>9.2</td>
<td>4.3</td>
<td>-0.9</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1973 = 100</td>
<td></td>
</tr>
<tr>
<td>Nominal exchange rate</td>
<td></td>
<td></td>
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<tr>
<td>Real exchange rate</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real wages</td>
<td>113.7</td>
<td>125.4</td>
<td>125.9</td>
<td>114.1</td>
<td>107.7</td>
<td>104.4</td>
</tr>
</tbody>
</table>

*Source: Schmitt (1981).*
money balances and in turn cause a temporary balance of payments deficit. The resulting drop in reserves would reduce the nominal money supply until eventually the balance of payments returned to equilibrium.

According to a different approach, the fall in the terms of trade would reduce real income. That would lead to falls in both real consumption and real savings. As a result, the country would face domestic unemployment and excess capacity in the home goods sector, while facing a balance of payments deficit. The appropriate policy would be a devaluation to shift additional resources into the tradable sector and stimulate demand in the home goods sector.

During the 1970s the traditional framework for analyzing terms of trade shocks faced mounting criticism. The critics focused on three points. First, as argued by Sachs (1981) and others, a permanent deterioration in the terms of trade is a reduction in present and expected future real income. The effect of a loss in permanent income on the savings rate is indeterminate. Second, the traditional framework ignored investment and foreign borrowing, taking them as given. But a permanent change in relative prices will affect profitability in different sectors, and hence the pattern of investment and the optimal level of foreign borrowing. Third, and perhaps most important, change in relative prices will affect the distribution of income between sectors. The wage-setting mechanism is particularly important for the adjustment process (Bruno and Sachs 1981).

When the effects of external shocks on profits and investment are taken into account, many conclusions from the traditional models have to be changed. The outcome depends on the nature of the shock and the nature of technology—in particular, the relative capital intensity of different sectors, and the share of investment between traded and nontraded output. Take two examples.

First, suppose a country exports an "enclave" product that makes limited use of domestic factors, and that the country experiences a permanent fall in its world price. Assume that the country has two other sectors: nontradables and tradables. The fall in the country’s terms of trade results in a fall in the permanent income of the country; if savings rates remain constant, this will mean a fall in consumption. The relative price of nontraded output falls along with the decline in expenditure. If, as is commonly assumed, nontraded output is relatively labor-intensive, the depreciation of the real exchange rate will reduce the demand for labor, and real wages will fall. Labor moves from the nontraded sector to the traded sector. The decline in the relative price of nontraded output and the fall in real wages depress profits in the nontraded sector and increase them in the traded sector. What is the effect on investment? Suppose capital is immobile in the shortrun but mobile in the longrun. If the tradable sector is relatively capital-intensive, as has been assumed in the example given above, total investment will rise. And if capital in the
nontraded sector is hard to move, the investment boom will be stronger still.

As the capital stock adjusts, the investment boom tapers off. If capital is relatively immobile in the short run, there may be some degree of exchange rate "overshooting." The real exchange rate depreciates immediately after the external shock and then appreciates as the composition of the capital stock adjusts. This happens because for a time there is little investment in the nontraded goods sector, but a sharp rise in investment in the traded goods sector. Eventually this restores the relative price of nontraded output.18

In the second example it is assumed that the terms of trade fall because of a rise in the price of an imported intermediate good—energy, say. This causes an income effect and a supply-shock effect. The income effect is exactly like the effect of the decline in income just described. But in this case the import also affects production. A rise in its price influences factor returns from the supply side as well.

Again, the results depend on the precise relationships between capital, labor, and energy in production. At one extreme, energy may be used in fixed proportion with capital. The burden of the energy price rise would then fall on the quasi rents of capital and be paid for out of profits. At the other extreme, energy may be used in fixed proportion to output. This implies that in the short run a rise in energy prices directly reduces the marginal product of labor. The burden falls on real wages.

The impact of the oil price shock on the current account deficit hinges, as before, on its effects on investment. If the marginal product of capital rises with energy use, as econometric evidence seems to suggest, the rise in the price of energy prompts a fall in investment. But capital is not malleable, so the shift to more energy-efficient production processes may call for more investment.

The crux of the adjustment process is the need for change in two relative prices, the real exchange rate and the real wage. During the 1970s there were two approaches to this. The first was to devalue the nominal exchange rate. But this adds policy-induced inflation to the original inflationary shock from the oil price. In addition, a devaluation close on the heels of an oil price rise might reduce output because of the rise in the current account deficit and the effect of more expensive energy on the costs of production (see van Wijnbergen 1980). Finally, if real wages were rigid because of wage indexation, for example, a nominal devaluation would be quickly eroded. The second approach was to get the real depreciation by holding down aggregate demand and hence inflation. But such a policy would also hold down output. Furthermore, a squeeze on profitability could reduce investment more than consumption in the short run and thus delay the adjustment.

There are two other complications. First, judgments about the tightness of monetary policy are difficult, particularly when the external
shock is a rise in the price of imports. Lower real income leads to a fall in the demand for real money balances, while the rise in the price level leads to a decline in their supply. A simultaneous devaluation clouds the picture still further.

Second, there is a fiscal complication. After a supply-side shock, governments may want to increase their investment to adjust the public sector's capital stock to the new relative prices. But taxes on exports are often a significant part of revenues in primary producing countries; these will decline if the shock is a fall in export prices. So fiscal deficits often rise after a deterioration in the terms of trade. In effect, this converts the problem of the external shock into one of excessive domestic demand.

The policy response of developing countries to higher oil prices has received little attention. One exception is a recent study by Bruno (1983a); it compared a group of developing countries with the OECD countries. Real wages were more flexible in the developing countries, which may explain their better growth and investment performance in 1974–78.

External shocks have distributional implications. A real devaluation is a way to protect incomes in the tradable sector by transferring some of the income loss to the home goods sector. If the traded sector is mainly agriculture and the nontraded sector is protected (and energy-intensive) manufacturing, the effect will be magnified. Increased protection for manufacturing in many African countries since the oil price shock is a way to reduce the burden on nontraded manufacturing and shift at least part of it to rural producers of exports.

The Effect of Quantitative Restrictions

How does the response of an economy with import quotas differ from that of a more open economy when subject to shocks? Whatever the shock, there is no open balance of payments deficit, so the relationship between aggregate spending and income is not out of line. In a sense, the country has already adjusted to its lower, postshock income, but only at the expense of a gross misallocation of resources. Quotas also affect the distributional outcome: real incomes in the export sector will bear the brunt. After a domestic demand shock caused, for example, by higher public spending, the government claims the resources it needs with higher inflation and by taxing the export sector, not by running down reserves or borrowing abroad. Quotas raise the relative price of importables, which tend to be more capital-intensive; they are therefore likely to increase the demand for investment. But the supply of foreign savings is limited. Returns to investment fall because of too much investment in the imports sector and too little in the exports sector. Foreign creditors will cut the supply of external finance, and the current account deficit may fall (see McKinnon 1979).
Policies to move an economy with quotas back to its original position after a shock are similar to those already described. Devaluation has a smaller impact on prices than in the absence of quantitative restrictions, because the price of imports will not rise by the full amount of the devaluation. This corresponds to the fact that the original shock has a bigger effect on prices. The real balance effect, therefore, will be smaller. Most of the impact is on relative prices—the prices of exports and imports not subject to quotas relative to the prices of nontradables and protected imports.

Many authors have argued that a devaluation is more likely to have a contractionary effect on output when quotas are in force. Quotas usually mean that imports are weighted toward intermediate goods and necessities, that is, goods with relatively low elasticities of demand. As a result, the substitution effects of a devaluation are likely to be offset by the income effects. Furthermore, import duties tend to be high in quota regimes. The devaluation cuts import license premia and raises government revenues, thereby causing a transfer of income from the private to the public sector. If the government does not increase spending, total demand will fall. However, there may be significant expansionary effects on the supply side. If exports increase in the short run or the devaluation is accompanied by increased inflows of foreign capital, it will be possible to increase the availability of imports. If imports of intermediate non-competitive inputs rise, domestic supply will increase. Extra imports of final goods will magnify the relative price effect of the devaluation and reduce the domestic production of importables.

The effect of the devaluation on the current account balance is also ambiguous. It should increase exports, but many governments operating quotas use some form of foreign exchange “budget” to determine the quantity of import licenses to issue. An increase in foreign exchange earnings will therefore be matched by an increase in import licenses. The devaluation also pushes relative prices closer to their “right” levels, thus improving access to foreign capital. Foreign exchange constraints are loosened both through the effect on exports and through the capital account.

All this is broadly consistent with the findings of the National Bureau of Economic Research (NBER) study summarized in Krueger (1978). There was no consistent pattern in the response of the current account to the twenty-two episodes of devaluation studied. Imports generally increased; there were often long lags in export growth. The survey also found wide variation in effects of the stabilization programs on output.

Bangladesh. Between 1972 and 1974, in spite of external assistance flows of roughly 7 percent of GDP, a large public sector deficit remained; the government resorted to deficit financing from the banking system of roughly 2.5 percent of GDP. Inflation averaged over 40 percent a year in 1973 and 1974, the premia on import licenses rose dramatically, and
export volumes fell by 20 percent. The major macroeconomic developments are depicted in table 4. In 1975 the government devalued by 45 percent and demonetized large denomination notes.

The devaluation raised government revenues from import duties (the tax ratio rose from 4 to 7 percent of GDP), and this transfer of income from the private to the public sector virtually eliminated deficit financing from the banking system. The relative price of exports went up because of an increase in the price of exportables and a fall in the price of nontradables and importables, such as rice, subject to quotas. The current account deficit in foreign prices fell—but the current account deficit in domestic prices rose in the year after the devaluation, which indicates that the devaluation had reduced the demand for domestic output. Prices on nontradables and importables were relatively flexible, however: they fell in absolute terms. Although the devaluation exerted a deflationary impact on the home goods sector, this was primarily reflected in a fall in prices rather than in a fall in output. The change in the real exchange rate between 1974 and 1976 exceeded that of the nominal exchange rate.

Allowing for seasonal fluctuations in agricultural output, the devaluation had little effect on overall output growth. Cheaper food grains (which were a quasi nontradable) pushed real wages higher in the urban areas.

Table 4. Bangladesh: Macroeconomic Data

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<tbody>
<tr>
<td>GDP growth</td>
<td>7.2</td>
<td>3.4</td>
<td>7.0</td>
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<tr>
<td>Agriculture</td>
<td>5.3</td>
<td>-1.0</td>
<td>4.2</td>
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<tr>
<td>Real expenditures</td>
<td>7.4</td>
<td>3.4</td>
<td>4.3</td>
<td></td>
<td></td>
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<tr>
<td>1971 = 100</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Export volume</td>
<td>100</td>
<td>99.4</td>
<td>81.6</td>
<td>101.6</td>
<td>104.9</td>
</tr>
<tr>
<td>Import volumea</td>
<td>100</td>
<td>103.0</td>
<td>108.7</td>
<td>119.0</td>
<td>90.6</td>
</tr>
<tr>
<td>Nominal exchange rate</td>
<td>100</td>
<td>98.5</td>
<td>180.9</td>
<td>182.4</td>
<td>175.6</td>
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<tr>
<td>Real exchange rate</td>
<td>100</td>
<td>77.7</td>
<td>128.2</td>
<td>152.1</td>
<td>142.0</td>
</tr>
<tr>
<td>As percentage of GDP</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Gross investment</td>
<td>7.5</td>
<td>7.9</td>
<td>8.1</td>
<td>10.3</td>
<td>10.0</td>
</tr>
<tr>
<td>Gross savings</td>
<td>2.0</td>
<td>1.7</td>
<td>1.0</td>
<td>-1.3</td>
<td>4.1</td>
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<td>Current account deficit</td>
<td>5.5</td>
<td>6.2</td>
<td>7.1</td>
<td>11.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Budget deficitb</td>
<td>2.9</td>
<td>2.4</td>
<td>0.2</td>
<td>0.6</td>
<td>-0.6</td>
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<tr>
<td>Percentage change</td>
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<tr>
<td>Monetary growth</td>
<td>41.4</td>
<td>23.0</td>
<td>5.8</td>
<td>11.7</td>
<td>19.2</td>
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<tr>
<td>Inflation (consumer price index)</td>
<td>47.4</td>
<td>37.6</td>
<td>67.2</td>
<td>-8.4</td>
<td>2.4</td>
</tr>
</tbody>
</table>

a. Excluding food grains.
b. Financed from the banking system.

This section concentrates on devaluation—a subject of intense controversy. Debate hinges on three questions. Can a nominal devaluation bring about a real devaluation? What does a devaluation mean for the trade balance? How will a nominal devaluation affect domestic economic activity?

Nominal and Real Devaluation

It has long been recognized that a nominal devaluation will change the real exchange rate only if one of the following conditions hold: at least one price variable (for example, the nominal wage) is not tied to the nominal exchange rate; the nominal money supply does not rise to accommodate the higher level of prices; aggregate demand falls because of a cut, for example, in government spending.

<table>
<thead>
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<th>Will a devaluation change the real exchange rate?</th>
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<tr>
<td>Unemployment</td>
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<td>----------------</td>
</tr>
<tr>
<td>Nominal wage rigidity Yes</td>
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<tr>
<td>Real wage rigidity No</td>
</tr>
</tbody>
</table>

With unemployment and rigid nominal wages, a nominal devaluation is by itself enough to bring about a real depreciation. But if real wages are rigid, a nominal devaluation will have no effect on the real exchange rate. With full employment and rigid nominal wages, a nominal devaluation is necessary but not sufficient for a real devaluation. The outcome depends on monetary and fiscal policy.

Real wages are hardly ever entirely rigid in practice. Wage indexation, for example, allows discrete nominal changes in line with increases in the cost of living in some previous period. Higher inflation will mean a lower average real wage since real wages will be eroded faster between adjustments. A higher rate of nominal depreciation can therefore lead to a fall in the level of the real exchange rate.

Equally, other forces can offset the real effects of a devaluation over time. The “real balance” effect of a devaluation is usually temporary. Lower private spending may follow a devaluation while the private sector rebuilds its real money balances. At the end of that process, private spending may rise again. In addition, nominal wages may gradually lose their rigidity as labor contracts expire. Both mean that the real exchange rate is likely to overshoot its long-run level after a devaluation.

The structure of the economy is important too. The more open the economy and the greater its flexibility (reflected in high elasticities of substitution between tradables and nontradables), the smaller will be the effect of a nominal devaluation on the real exchange rate—and the greater its impact on domestic prices. Exchange rate policy in such a
case is better suited to insulating the economy from external price shocks than to achieving external balance.

The controversy surrounding nominal and real devaluation has generated surprisingly little empirical research. The most widely quoted series of studies is by Cooper (1971a, 1971b, 1973). It covered twenty-four devaluations in nineteen developing countries during 1959–66 and found that post-devaluation changes in prices and wages were far smaller than the fall in the value of the currency.2

Devaluation and the Trade Balance

Another criticism of devaluation as a policy instrument is that a real devaluation has little effect (or even a perverse effect) on the trade balance. It is important to distinguish between the trade balance in foreign prices and in domestic prices. For international reserve objectives, it is the trade balance in foreign prices that matters.

A devaluation should almost always help the trade balance in foreign prices. As long as the demand for imports and the supply of exports are at all affected by relative prices, and the elasticity of demand for the country’s exports is greater than one, the trade balance will improve.23 Most empirical studies suggest that the relevant elasticities meet these conditions. Khan (1974) examined fifteen developing countries and found that almost all exhibit price elasticities of import demand greater than one. If a country does face inelastic demand for its exports then a devaluation should worsen its terms of trade. Cooper (1971a) and Krueger (1978) found no evidence for this, which suggests that most countries are price takers in export markets.

The literature includes direct tests of the effects of devaluation on both the trade balance and the overall basic balance in the balance of payments (Cooper 1971a; Miles 1978). The evidence suggests that devaluations can improve the basic balance of the balance of payments but is less clear-cut for the balance of trade. This need not mean that the key elasticities are too small for devaluation to succeed. A successful devaluation can increase the trade deficit by raising profitability and net inflows of capital and thus cause investment to rise relative to savings. Foreign aid may also increase if devaluation had been a precondition for new funds.

The argument that the relevant elasticities are too low for devaluation to succeed often reflects a concern about the burden of adjustment. Where elasticities of supply of exports and demand for imports are small, a relatively large fall in real spending is needed to improve the trade balance. The change in the real exchange rate and the shift in relative prices between tradables and nontradables may also have to be large. This might mean sharply lower real incomes for producers in the nontraded sector or—if factors are mobile between sectors—a major
shift of producers to the traded sector. Heavy costs would therefore have to be borne primarily by producers in the nontradable sector.

**Devaluation and Output**

Some argue against devaluation as a tool for achieving balance of payments equilibrium because it exerts a contractionary effect on real output and employment, particularly in the short run (Cooper 1971a; Krugman and Taylor 1978). Devaluation reduces the real value of the financial assets of the private sector and, hence, its spending. The question, however, is not what happens to spending, but what happens to real GDP.

Under full employment, supply conditions determine the effects of devaluation. In figure 3, devaluation tries to shift the economy from a point such as A to a point such as B. Because cutting the current account deficit calls for a shift in the pattern of production, even with full employment GDP may fall.

With unemployment, the economy is at a point such as C—perhaps after some external shock that cuts the domestic demand for home goods. The conventional view was that a devaluation raises the demand for home goods by switching expenditures from imports to domestically produced goods. If nominal wages are rigid, as often assumed for Keynesian unemployment, the devaluation reduces real wages, and output in the home goods sector will expand. So the devaluation shifts the economy from C to B.

This view is criticized in Hirschman (1949) and in the seminal series of articles by Cooper (1971a, 1971b, 1973). A rise in import prices affects the demand for domestic output in two ways. First, there is the conventional substitution effect, which is positive. But if imports greatly exceed exports (that is, the current account deficit is large) there is in addition a negative income effect—higher nominal income in the exportable sector is more than offset by the higher nominal cost of imports. If the demand for imports is relatively inelastic, this income effect may outweigh the substitution effect and cause the demand for domestic output to fall.

Hanson (1983) examines the conditions under which a devaluation is contractionary; he concludes that as a rough approximation the following condition is required: $dm < (M - X)/M$, where $dm$ is the price elasticity of demand for imports and $M$ and $X$ are the nominal values of imports and exports respectively. Thus, if exports amount to 70 percent of imports, the elasticity of demand for imports would have to be less than 0.3 for a contractionary effect. The problem, therefore, is likely to arise only in countries with very large deficits in relation to their imports (large aid recipients such as Bangladesh, Sri Lanka, or Tanzania).
But a devaluation can exert a contractionary effect in other ways. If it redistributes income from groups (such as workers) with a low propensity to save to groups (such as owners) with a high propensity to save, consumption and hence aggregate demand may fall on that account too. Moreover, higher prices for imported intermediate goods with few domestic substitutes can lead to higher costs. That may require a rise in the level of nominal demand to maintain output at full employment. Finally, a contractionary effect might come from a temporary disequilibrium in the money market. A devaluation raises the domestic price level and the nominal demand for money. Unless investors expect a further devaluation soon, domestic financial assets become more attractive relative to goods and foreign financial assets; so the real demand for money rises too. As individuals build up their financial balances, their demand for goods is lower. With nominal wage rigidity, that will cause lower levels of output at least for a time.

All this means that a devaluation might make matters worse, moving the economy in from C to D in figure 3, instead of from C to B. At the same time, however, there are ways for a devaluation to help the domestic economy. If, for example, domestic output is constrained by supply factors such as the availability of imported intermediate goods, then a devaluation might help to ease input bottlenecks by allowing exports and the supply of foreign exchange to expand.

It seems that almost anything can happen to output after a devaluation. The outcome depends on the structure of the economy and the circumstances of the devaluation. It is therefore an empirical, rather than a theoretical, matter.

There have been two cross-sectoral studies of the effects of devaluation on aggregate demand and output. Cooper (1971a) found that, in fourteen of the twenty-four devaluations analyzed, the trade deficit in domestic prices increased. He concluded that contractionary devaluations are common. Connolly (1982), however, finds no connection between the rate of growth of output and devaluation in the 1960s. Many devaluations took place when economic activity was already low. While output fell below trend in thirteen of the twenty cases one year after devaluation, eleven were already suffering from reduced output in the year before. Seven countries saw faster growth after the devaluation, but this was easier to associate with recovery from the previous recession than with the devaluation.

Where devaluation causes a fall in output, the authorities can boost demand through monetary and fiscal policy. This is really an issue of policy coordination: devaluation should not be judged as a policy in isolation.

For example, suppose that a country is losing reserves as a result of a large budget deficit. An obvious remedy would be a cut in government spending and a devaluation. But suppose, too, that the devaluation is
expected to reduce the demand for home goods, for any of the reasons above. The government could add a one-time rise in the money stock to the typical policy package. This would offset the decline in output and the balance of payments should still improve because the devaluation reduces the ratio of imports to domestic output at each level of income. Unfortunately, the sharp rise in the money supply may damage expectations that the initial real effects of the devaluation can be sustained. If so, that would call for a sharper initial devaluation. Thus, the government might reconcile its objectives for domestic output and external balance, but only at the cost of a larger rise in inflation.

This example emphasizes the difficulty of coordinating several different policies after a devaluation. The government has to tie the supply of domestic credit to a fluctuating level of demand for nominal money balances and simultaneously manage the level of demand in the home goods sector to maintain production—all in an environment where expectations are highly unsettled.

The literature on how to stop inflation in developing countries is far smaller than the literature on its causes. This section looks at anti-inflation policy and starts with a simple model of the inflationary process.

Assume that the economy is closed or that the external account is insulated from domestic inflationary pressures through a system of a crawling peg combined with capital account restrictions (later, these assumptions are relaxed). The framework is shown in figure 4. Inflation is determined by the interaction of aggregate demand and aggregate supply. The aggregate demand curves (AD) are downward sloping; that is, faster growth of demand is associated with lower rates of inflation. This is because with low inflation a fixed growth rate of nominal money supply is higher in real terms, and this situation boosts aggregate demand. The aggregate supply curves (AS) slope upward. High inflation reduces the rate at which real wages grow (they are assumed to be fixed initially in nominal terms); so high inflation means faster output growth on the supply side of the model. Both sides of the model are in equilibrium where the curves cross.

**What Is the Output Cost of Disinflation?**

Consider a reduction in monetary growth. Initially it shifts the aggregate demand schedule down to the left—the extent of the shift depends on expectations in financial markets. Then that fall in the rate of growth of nominal demand must be split between a reduction in the rate of growth of output and a reduction in inflation. This split in turn depends
on whether the AS curve also shifts downward (as it will if inflationary expectations in the labor market respond quickly) and on the slope of the AS curve. As inflation begins to fall, the demand for real money balances begins to rise and the aggregate demand will fall further. The outcome for output and inflation depends on complex interactions between money growth, nominal wage behavior, and inflationary expectations in the markets for both labor and money.

Nominal wage growth may be relatively sluggish either because of institutional rigidities—such as wages being indexed to rates of inflation in earlier periods—or because of expectations that inflation will not fall. If so, a fall in the AD curve will be followed by a relatively small shift in the AS curve; that means less of a decline in inflation and more of a decline in growth of output. As inflation falls, so does the opportunity cost of holding money; the demand for financial assets may therefore start to rise. This poses a dilemma for the monetary authorities: if they accommodate the real increase in the demand for money by increasing the rate of growth of the nominal money supply, they will damage the credibility of their anti-inflationary stance; but if they do not let the money supply expand, the rising demand for liquidity will cause an even larger fall in the level of output.

This model is useful, but it ignores the fact that governments can use inflation as a tax. Lower inflation therefore entails higher taxes or lower spending. If government spending falls, cutting the inflation tax shifts activity from the public to the private sector. That, in turn, will alter relative prices and prompt a costly reallocation of resources. The “consensus” model also neglects real wages. Cutting the budget deficit generally requires higher taxes, and lower subsidies or lower real government spending. These will usually mean lower real wages; if the disinflationary program is to succeed, nominal wage growth has to fall even below the rate of inflation.

In addition, if inflation does not respond immediately to changes in the rate of growth of the money supply, then real money balances will fall at the start of a disinflation program. Real interest rates may therefore rise. This, in turn, affects the demand for labor, because firms have to look at the discounted marginal product of labor in industries with long lags between labor inputs and output. Real wages must therefore fall temporarily below their long-run equilibrium or the output and employment costs of disflation will be even greater.

The empirical literature on inflation is divided into two groups. The first focuses on the relationship between money and prices, but has little to say about output (see Harberger 1963; Diz 1971). The studies in this group found that after a fall in the rate of growth of the money supply, inflation initially keeps going and real money balances tend to fall. The real availability of credit declines and, where interest rates are flexible, real rates rise. Following a sustained fall in inflation, however, the op-
portunity cost of holding money falls and real money balances rise. Therefore, at some point during the disinflationary process, inflation falls quite dramatically below the rate of monetary growth.

A second body of literature looks at output-inflation tradeoffs. Much of it tries to model expectations and distinguishes unanticipated from anticipated changes in inflation (Hanson 1980; Edwards 1983). These studies find that the unanticipated component of inflation is negatively correlated with output. For example, Hanson finds that ten percentage points of an unexpected reduction in inflation lead to a fall in growth of 1 percent of GDP. The output cost of an unanticipated fall in inflation is higher when inflation has been stable (and predictable) in the past.

Harberger and Edwards (1980), however, find little evidence of a tradeoff between low inflation and high growth. Most of their sample of ten disinflationary countries (in which the initial inflation rate exceeded 50 percent and was cut within seven years) showed constant or increasing growth.

The Causes of Monetary Growth

The link between inflation and excessive monetary growth is widely accepted. So why do governments (or central banks) allow the money supply to grow too fast? The literature gives three answers.

The first stresses the connection between fiscal and monetary policy. With limited open markets for primary securities in most developing countries the treasury cannot directly sell nonmonetary debt to the non-bank sector. Government budget deficits have to be financed either by forced sales of government debt to the banking system—through relatively high reserve requirements on deposits—or by borrowing from the central bank and, hence, by creating money.

The second answer says that variations in monetary growth are attempts by the authorities to offset the effects of aggregate supply disturbances (particularly nominal wage increases) on output. For example, suppose the rate of growth of nominal wages suddenly accelerates. In terms of figure 4, the AS schedule shifts upward, inflation increases, and output falls below normal. If short-run nominal wage growth is not very responsive either to unemployment or to inflation, then in the short run changes in aggregate demand will affect primarily output. (Again in terms of figure 4, the slope of the AS schedule is relatively flat.) An expansionary monetary policy can therefore achieve an increase in output with minimal effect on inflation in the short run. Over the long run, expectations in the labor market adjust to the increases in money growth and the rate of inflation accelerates again. The monetary authorities must decide whether to accommodate the initial increase in wages at the cost of higher inflation in the future or whether to maintain monetary control at the cost of a short-run decline in output. According to what
might be called the accommodation theory, the authorities will usually choose the first course.

The third answer emphasizes the link between the money stock and the balance of payments. According to this view, the monetary authorities react to changes in reserve in a way that gives an inflationary bias to domestic monetary policy. On the one hand, when foreign reserves increase as a result of improved terms of trade and greater access to international capital flows, the effects on domestic liquidity are generally not sterilized. On the other hand, the effects of reserve declines are sterilized.

The link between monetary policy and budget deficits has received a great deal of attention in the empirical literature (for example, Harberger 1978; Aghelvi and Kahn 1980). Harberger and Edwards (1980) try to find common features in economies with high inflation. These countries are divided into three groups: those with acute inflation, where the rate of inflation exceeded 80 percent or more for at least two years; those with chronic inflation, where the rate exceeded 20 percent or more for at least five consecutive years; and "devaluation crisis" countries which, while attempting to maintain fixed exchange rates, found themselves ultimately forced to devalue. The last group is included because the pressures that ultimately force a devaluation are likely to be similar to the ones that underlie chronic and acute inflations.

The results are shown in table 5: the dominant feature is the change in public sector credit from the banking system. Loss of monetary control in most cases seems to have its roots in fiscal deficits financed through the banking system. The researchers found a cutoff point—around 0.5 percent of GDP—beyond which an increase in the fiscal deficit financed through the banking system is likely to set in train inflationary forces.

The accommodation hypothesis has not been so well tested. One exception is a recent study by Dornbusch and Fischer (1981). It examined a cross-section of seven countries (including Guatemala, Sri Lanka, and...

Table 5. **Key Variables in the Inflationary Process**

<table>
<thead>
<tr>
<th></th>
<th>Annual inflation rate (percent)</th>
<th>Increase in bank credit to the public sector as percentage of GDP</th>
<th>Annual increase in total bank credit (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute inflation</td>
<td>124.0</td>
<td>3.7</td>
<td>120.0</td>
</tr>
<tr>
<td>Chronic inflation</td>
<td>35.0</td>
<td>3.1</td>
<td>41.0</td>
</tr>
<tr>
<td>Devaluation crisis</td>
<td>—</td>
<td>1.8</td>
<td>15.0</td>
</tr>
<tr>
<td>Control group</td>
<td>2.1</td>
<td>0.5</td>
<td>13.0</td>
</tr>
</tbody>
</table>

*Source: Harberger and Edwards (1980).*
Israel, and South Africa) and found that wage inflation was an important determinant of monetary growth. Furthermore, it found that neither unemployment nor monetary growth had much of an effect on wage inflation; the Keynesian assumption of sticky nominal wages is therefore valid for short-run labor market behavior even in developing countries. For policy, this suggests that in the short run aggregate demand policies primarily govern the level of output (that is, the AS curve is relatively stable in the face of shifts in the AD curve).

Controlling Inflation in Open Economies

Where this analysis is extended to an open economy a variety of additional complications is encountered. These stem from the fact that the authorities have two new variables to juggle: the relative returns on domestic and foreign financial assets, and the real exchange rate.

The main theory is complicated, but the issues are illustrated in the following example. Suppose a country has a large budget deficit which is financed by money creation. To protect the external account from the effects of excess domestic demand, the rate of currency depreciation (and hence the rate of inflation) is set so that the increase in the demand for base money is equivalent to the fiscal deficit. Government spending is financed by an inflation tax, and the balance of payments is roughly in equilibrium.

Suppose the government now wishes to bring down the rate of inflation. It has three policy instruments: the size of the budget deficit, the rate of growth of the money supply, and the rate of devaluation. If the monetary authorities cannot reach agreement with the fiscal authorities on cutting the budget deficit, they might instead decide to reduce the rate of growth of the money supply. Tighter domestic credit will at least temporarily result in higher real interest rates, which will lead to an inflow of foreign capital. If reserve requirements are already very high and there is a limited market for government instruments, it will be very hard to sterilize these flows. This illustrates the well-known fact that in a world of mobile capital and fixed exchange rates, monetary policy alone is not an effective instrument for controlling domestic aggregate demand. (Where inflation does not respond quickly to monetary deceleration, a crawling-peg regime behaves much like a fixed exchange rate regime in the short run).

Another way to control inflation is through policy toward devaluation. Several variants have been attempted, including a preannounced schedule of gradual reductions in the rate of devaluation. A slightly different approach is to devalue by less than the rate of inflation in order to reduce the inflationary pressure. The first of these was tried in Argentina, Chile, and Uruguay, and the second in Colombia. These countries recognized the difficulty of controlling money supply in a world of high
capital mobility, and the danger that crawling-peg regimes might perpetuate inflationary expectations. But suppose that the goods market is open and that the rate of inflation does decline: the problem of financing the fiscal deficit remains. The rate of inflation is lower, so the inflation tax provides less support. As a result, the balance of payments deteriorates and the real exchange rate appreciates; the budget deficit comes to be financed by a decline in international reserves or through unsustainable levels of foreign borrowing. This is a simple point worth stressing. The rationale for choosing a "passive" crawling-peg system in the first place is to finance the budget deficit through the inflation tax, rather than by a current account deficit, and thus to protect the tradable sector. Abandoning the system reverses the process. As a result, although inflation will fall, it will not fall far enough to match the change of the nominal exchange rate. Part of the burden of the costs of reducing inflation will therefore be borne by the sectors most exposed to international competition.

Different problems arise when the goods market is relatively closed but the capital account is relatively open. The domestic rate of inflation becomes relatively unresponsive, certainly in the short run, to changes in the rate of nominal depreciation. A slower rate of depreciation prompts capital inflows. This leads to a temporarily higher real exchange rate and lower real interest rates; the capital flows might even stimulate domestic demand enough to boost inflation.

When there are serious doubts about its willingness or ability to sustain this policy stance, the government will face the worst of both worlds: an appreciating real exchange rate accompanied by high real interest rates. For in the face of a higher real exchange rate, falling competitiveness, and slow progress on inflation, there is a danger that the government will abandon its experiment and cut the real exchange rate by a discrete devaluation. This danger may be embodied in a large risk premium on domestic interest rates (see Calvo 1983).

But suppose that the monetary authorities can convince the government to cut the budget deficit. That will reduce the rate of growth of the money supply. Furthermore, suppose that, in order to bolster the effects of this disinflationary package on inflationary expectations, the monetary authorities announce a schedule of progressive reductions in the rate of devaluation. The difficulty is that the budget cuts and the reduction in the rate of growth of money supply must shift spending from the public to the private sector as the inflation tax is whittled away. If, as is generally assumed, public expenditures tend to be more intensive in the use of nontradables, then the disinflationary package needs to be accompanied by a lower real exchange rate. This implies that the rate of inflation has to fall even further than the drop in the rate of nominal devaluation—at least for a period. Theoretically, the right combination is a one-time devaluation to get relative prices right, followed by a
decelerating rate of devaluation to set expectations on track. Juggling both the level of the exchange rate and the rate at which it is depreciated, and making both of these consistent with a set of expectations about which little is known, is extremely difficult.

The article focuses on the design of stabilization measures to correct excessive balance of payments deficits and moderate the rate of inflation. It distinguishes three sources of balance of payments difficulties—excessively expansionary aggregate demand policies; domestic supply shocks stemming, for example, from increases in real wages in excess of productivity growth; and external terms of trade shocks. It also analyzes the effects of devaluations. The second part of the article discusses policies aimed at reducing the rate of inflation and summarizes the theoretical literature on the dynamics and the transitional costs of adjustment to lower rates of inflation in closed economies. Evidence on the adjustment costs of disinflationary policies is reviewed, and the discussion is extended to some recent analysis of adjustment in open economies.

1. Khan and Knight (1981) in a study based on pooled cross-sectoral time series data for twenty-nine developing countries could find no statistically significant relationship between government spending and the level of output.

2. Such a rule may not be optimal if the economy is subject to a variety of disturbances from both external markets and the domestic economy. Aghelvi and Khan (1980) performed a series of simulation exercises on a group of eight countries to evaluate the effects of following a similar policy. Using a simple macroeconomic model, they compared the monetary policies adopted with a hypothetical policy of keeping the rate of growth of domestic assets of the central bank constant. They found a clear tradeoff between lower inflation and better balance of payments performance on the one hand and faster real growth on the other.

3. This in essence is the key policy implication of the monetary approach to the balance of payments. For the theory underlying this approach, see Frenkel and Johnson (1976) and Corden (1981), chaps. 1–3.

4. This is a neglected aspect of the impact of adjustment on wages; see Corden (1981).

5. See Corden (1981); for a useful discussion of these problems, see Bruno (1983b).

6. See Aghelvi and Khan (1978) for empirical evidence on this latter phenomenon.

7. See the papers in Williamson (1981) for a comprehensive survey of crawling-peg regimes.

8. For a discussion of stabilization programs aimed at reducing the rate of inflation in crawling-peg regimes, see the section “Controlling Inflation” below.


10. See Cumby and Obstfeld (1983). Most of the literature on sterilization policies has focused on whether sterilization is effective given the level of capital mobility. There has, however, been very little work on the more normative issue of the circumstances under which sterilization is warranted.

11. See Ortiz (1983) for a historical overview of the causes and consequences of dollarization in Mexico. Although the Mex-dollar market acted as a useful mechanism for reducing short-run speculative capital flows from 1976 on, its effectiveness depended crucially on the commitment to full convertibility. In 1982, as the public’s confidence in this commitment declined, the Mex-dollar market ceased functioning as a shock absorber, and large capital outflows occurred. In August 1982 the monetary authorities decreed that Mex-dollars could no longer be transferred out of the country and fixed the exchange rate...
at which Mex-dollars could be converted into pesos. These decisions marked the end of the Mex-dollar system.

12. See Cline (1981) for a description of economic policies during this period. Cline does not make clear whether the rise in government spending was motivated by the desire to maintain employment in the face of the fall in exports or whether it was an independent factor. A consequence of the rise in government expenditures was that the demand for labor was maintained and, through the provision of subsidies, real wages were raised. In effect, the foreign borrowing was used in part to maintain the real income of wage earners.

13. For a fuller treatment of the effects of real wage shocks to the economy and empirical evidence on the OECD countries, see Sachs (1979).

14. This particular section draws heavily on Krugman and Braga de Macedo (1981), both of whom attach a great deal of emphasis on the wage-shock explanation of events. Other accounts that also emphasize the problem of real wages include Schmitt (1981) and Dornbusch (1981).

15. Some have even argued that the rate of time preference is likely to fall as real income falls so that a permanent deterioration in the terms of trade is more likely to be accompanied by a rise in savings rates.

16. This criticism was bolstered by empirical evidence in Sachs (1981), from a cross-section of developing countries, that variations in investment demand were the principal determinants of current account positions while savings rates were, in practice, relatively stable.

17. As is common in all two-sector models of the type under consideration, the effect on real consumption wages is somewhat ambiguous. Real product wages in terms of tradables certainly fall. The effect on the real consumption wage, however, depends on the distribution of the consumption basket between the two goods.

18. For a complex but rigorous outline of the sequence of events in the adjustment process, see Bruno (1982).

19. Partial equilibrium analysis has generally led to the conclusion that a devaluation has no effect on the domestic price of importables but merely reduces the premia on import licenses by the full amount of the depreciation. When general equilibrium effects are included, however, the result does have to be modified. The rise in the price of exportables can induce substitution effects that tend to lead to a rise in the price of both nontradables and protected importables. This is analogous to when a nominal devaluation in an open economy leads to a rise in the price of nontradables, thus partially eroding the accompanying real exchange rate change.

20. The typical sequence of events surrounding a devaluation in a quota regime may also include short-term capital outflows in anticipation of the devaluation followed by an inflow. For the issues raised by short-term capital flows, see McKinnon (1979).

21. There is a further problem of measuring changes in output when relative prices are changing dramatically.

22. For a different approach, see Harberger (1963). Using an analytical model with two sectors, tradable and nontradable, assuming nominal wage rigidity and elasticities of supply and demand applicable to Chile, he finds that a 50 percent devaluation will raise the price of nontradables by roughly 25 percent.

23. If the elasticity of demand is less than one, export taxes could be employed to exploit the country’s monopoly power in the market for exports. The conditions for an improvement in the trade balance are, therefore, even less stringent than the ones described above.

24. It is unclear how to interpret nine of these cases, in which the trade deficits in both domestic and foreign prices rose. If the demand for exports is elastic, as Cooper concludes, then a rise in the trade deficit in foreign prices must be due to factors other than the devaluation.

25. The framework is based on the model in Selowsky (1973).

26. The slope of the aggregate supply schedule is equal to \((1 - \delta)/\delta\xi\), where \(\delta\) is the share of labor in value added and \(\xi\) is the elasticity of substitution between labor and
capital. Thus the output effects of disinflationary demand policies will tend to be higher, the bigger the share of labor in output and the lower the elasticity of substitution between labor and capital.

27. See Cavallo (1981) and van Wijnbergen (1982) for models that capture the effects of real interest rates on the cost of working capital, the supply of output, and the demand for labor.

28. There has, however, been more systematic analysis of monetary growth for industrialized countries. Gorden (1977) examined eight major OECD economies to evaluate the significance of the “wage-push” theory of monetary growth. In addition, Willet and Laney (1978) examined the hypothesis in the context of the United Kingdom and Italy.

29. For a useful discussion on alternative policies in high inflation, crawling-peg regimes, see Dornbusch (1980).

30. It may also be necessary to assume that there are capital controls to stop the private sector from escaping the inflation tax by holding foreign financial assets.

31. Calvo (1983) has an alternative explanation for Argentina. He argues that inflation was so high that a decline in the rate of inflation led to an increase in the revenues derived from the inflation tax. These led to a rise in government expenditure, which in turn caused an appreciation in the real exchange rate.

32. See Rodriguez (1982) for a more formal analysis of this set of policies.

33. The rate of inflation will be less responsive to slower depreciation when nontraded goods are a large proportion of total output. Stabilization programs have, in part, been accompanied by liberalization measures, precisely to reduce the proportion of quasi nontradables in output and to expose more of the economy to international competition.

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