

## Effects of the Strong Dollar

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This paper focuses on the effects, in the United States and abroad, of the sizable appreciation of the dollar since 1980. The magnitude of the rise in the real value of the dollar relative to the currencies of other industrial countries has been unprecedented in modern history. Its effects therefore deserve attention. Although this paper is devoted mainly to the consequences of the sustained upswing of the dollar, it recognizes that what goes up may also come down and takes a brief look at the major effects of a dollar depreciation.

### **Two preliminary questions**

If one is to discuss in a meaningful way the effects of exchange-rate variability—and in particular the large appreciation of the dollar between 1980 and 1985—one must be able to answer two preliminary questions: 1) "compared with what?" and 2) "in what context?"

The first question—"compared with what?"—signifies the need to specify a counterfactual path for exchange rates and, equally important, the counterfactual policies that could have brought about the different exchange rates. In the absence of such counterfactual scenarios, what is the meaning of "the effects of exchange rate variability?" What one wants to do is to compare the world as it has been with what it might have been. But what it might have been has to be credible. This means, among other things, that one has to be able to describe the policies that would have produced the might-have-been world.

I shall not spend a lot of time on this question. The conventional wisdom has it that much, even if not all, of the appreciation of the dollar since 1980 is attributable to high interest rates in the United States, and these high interest rates are, in turn, thought to be the result of the large budget deficit in combination with the Federal Reserve's monetary pol-

icy. It is widely believed that if the mix of fiscal and monetary policies in the United States had been less lopsided, the dollar would have risen much less. This, then, is the counterfactual scenario.

It is worth noting, parenthetically, that if one were trying to assess the benefits and costs of exchange-rate movements—which I am not doing in this paper—one would want to take account of the costs or benefits of the policies that would be required to dampen or prevent the movements of exchange rates.

This brings me to the second question—"in what context?" The counterfactual policies that would have produced different exchange-rate paths would have had effects on variables other than exchange rates. In other words, we have to treat exchange rates as endogenous variables. They are determined in a general equilibrium system. We know that much even if we do not—as yet—understand very well how exchange rates are determined.

For this reason, it is not valid to look at a change in exchange rates and ask, what have been the effects of that change? We also have to ask, what have been the general effects of the policies that were responsible for the change in exchange rates? Otherwise we may attribute to exchange-rate movements consequences that in fact follow from the policies that generated those exchange-rate movements. Let me give an example that anticipates some of what I shall have to say later. Roughly half of the decline in the real GNP of the United States in 1981-82 shows up in a drop in exports of goods and services. Much of this falloff in exports can be attributed to the appreciation of the dollar in 1981 and 1982. Does it follow that the recession would have been only half as deep if the dollar had not appreciated?

That would not be a valid inference. Suppose that the counterfactual policies that would have kept the dollar from rising were tighter monetary policies and higher interest rates in Europe and Japan. This is another answer to the "compared with what?" question. Tighter monetary policies in Europe and Japan would have caused more severe recessions in those countries and therefore weaker demand for U.S. exports. We also have to recognize that, if we assume that American fiscal and monetary policies had been as they actually were in 1981-82 but the dollar had not risen, some other components of aggregate demand in the United States would have fallen more as exports declined less. The policies that produced the exchange-rate appreciation affected other variables too.

With that introduction, I turn to the specific effects of the substantial appreciation of the dollar since 1980.

## U.S. current-account deficit, domestic demand, and imports

The U.S. balance on current account was very strong in 1980—much stronger than the bare statistics suggest. The depreciation of the dollar in 1977-78 led to a large increase in American exports and in the share of those exports in world markets. While the current-account balance of OECD countries as a group shifted toward deficit by \$80 billion in 1979-80, the U.S. current account moved toward surplus. This change was masked by the impact of the sharp rise in the price of oil in 1979-80.

The change shows up in the non-oil current account of the United States, which moved from a surplus of \$25.3 billion in 1978 to a surplus of \$76.7 billion in 1980, while the full current account moved only from a deficit of \$15.4 billion in 1978 to a surplus of \$0.4 billion in 1980.

The U.S. current account changed from a near-zero balance in 1980 to a deficit of more than \$100 billion in 1984. Most of this shift has occurred since 1982. Although the dollar appreciated during 1981—by more than 15 percent—and in the first half of 1982—by 11 percent—its impact on the current account was largely offset by the effect on imports of the 1981-82 recession.<sup>1</sup> Imports of goods and services, in current prices, fell more than ten percent from the second quarter of 1981 through the first quarter of 1983.<sup>2</sup> Almost all of this import decline was in petroleum imports, which are priced in dollars and therefore were unaffected by the appreciation.

The near-constancy of non-oil imports during the recession of 1981-82 reflected the offsetting influences of the appreciating dollar and the fall in aggregate demand in the United States.

From the fourth quarter of 1982 through the second quarter of 1985, gross domestic demand<sup>3</sup> increased 17.2 percent while imports of goods and services rose 52.8 percent, both measured in real terms. Merchandise imports increased 66 percent. If we assume that the income elasticity of demand for imports is 2.5 in a period of cyclical recovery<sup>4</sup>, we would have expected merchandise imports to grow by 43 percent as the

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<sup>1</sup> Unless otherwise indicated, trade-weighted average exchange rates are those computed by the Federal Reserve Board.

<sup>2</sup> Trade and balance of payments data in current prices are from the balance of payments accounts. Data on exports and imports of goods and services in constant prices are from the national income and product accounts. The major difference is that the latter exclude non-monetary gold from merchandise trade and interest on U.S. government debt from service payments.

<sup>3</sup> GNP minus exports plus imports of goods and services, which equals the sum of domestic consumption, gross investment, and government expenditures.

<sup>4</sup> Stevens, Guy V. G., and others, *The U.S. Economy in an Interdependent World: A Multicountry Model*, Board of Governors of the Federal Reserve System, 1984, p. 131.

result of the economic expansion. Thus, something like two-thirds of the increase in imports of goods since late 1982 might have been expected if the dollar had been stable, and one-third can be attributed to the appreciation of the dollar.

Meanwhile, the merchandise exports of the United States increased by six percent, in real terms, from the fourth quarter of 1982 through the second quarter of 1985. Exports have clearly been affected by the appreciation of the dollar. In the second quarter of 1985, they were lower in nominal terms than in 1980, and in real terms were down by more than 14 percent although total demand in other industrial countries was up. In the case of trade in manufactures, the OECD shows that in each of the years 1981 through 1984 U.S. exports lost market share; that is, the volume of U.S. exports of manufactured goods either declined more or rose less than the imports of manufactures by its trade partners. Over the four-year period, U.S. exports of manufactures rose 30.7 percent less than the imports of manufactures in its markets abroad. (OECD, 1985).

Taking account of the decline in exports as well as the growth in imports, we have reason to accept the Federal Reserve estimate that something like two-thirds of the increase in the U.S. current-account deficit is attributable to the appreciation of the dollar (Wallich, 1985).

It may be noted that we have related the import expansion to the increase in gross domestic demand rather than to GNP. Domestic demand is the appropriate variable but income elasticities have normally been computed in relation to changes in GNP. GNP and gross domestic demand have usually moved in close enough conformity that it made little difference which variable was used. That is not so for the period under consideration. From 1982:Q4 to 1985:Q2, real GNP increased 13.0 percent while real gross domestic demand went up by 17.2 percent. Thus, almost one-fourth of the expansion of domestic demand leaked abroad (in the form of enlarged imports and depressed exports) rather than being reflected in growth of GNP.

Until mid-1984, the economic recovery proceeded at a rapid pace. Real GNP increased at an annual rate of more than 6 percent in the seven quarters from the summer of 1982 to the spring of 1984, despite the widening external deficit. Even if the current-account deficit had not been increasing, it is doubtful that one could have expected the economy to expand faster. Federal Reserve policy is unlikely to have permitted that. Thus, those who ascribe loss of jobs to the growing trade deficit and the high dollar in that period of rapid recovery are probably wrong. If there had been a smaller external deficit, other components of aggregate demand would have grown less rapidly.

The story changes after mid-1984. From the second quarter of 1984 through the second quarter of 1985, real GNP increased two percent. It

cannot be argued that the Federal Reserve would have prevented faster growth of GNP during that period.

The slowdown of the economy after the second quarter of 1984 owes something to the weaker expansion of gross domestic demand. It advanced 3.3 percent from then through the second quarter of 1985. If the current-account deficit had increased no further after mid-1984 and therefore GNP had advanced at the same rate as gross domestic demand, GNP growth would have slackened from the pace of 1983 and the first half of 1984. But that was probably inevitable. Capacity utilization in industry had increased from a low point of 67.6 percent in late 1982 to 82.4 percent in the third quarter of 1984. Over the preceding year, capacity had expanded by 2.4 percent. Since GNP and industrial production have tended to grow at about the same rate, as is discussed below, we can conclude that there was scope for GNP growth of little more than three percent after mid-1984. This would have permitted a further **upcreep** of capacity utilization and a further reduction of unemployment.

While domestic-demand expansion slowed, the gap between domestic demand and GNP widened after mid-1984. In the following year, almost two-fifths of the increase in domestic demand leaked abroad.

### *The structure of U.S. output*

As GNP growth slowed in 1984-85, a considerably amount of anecdotal evidence appeared suggesting that, because of the effects of the strong dollar on tradable goods, the U.S. economy has become "two-tiered." (This analysis is based on data that does not incorporate the benchmark revisions of December 1985.) The manufacturing sector is said to be languishing while services and construction continue to flourish.<sup>5</sup> One of the aspects of this development is the transfer abroad of American production facilities. Numerous examples have been cited of the creation or expansion of overseas facilities.<sup>6</sup> The Commerce Department has estimated that majority-owned affiliates of American companies will increase capital outlays by 13 percent this year, compared with four percent in 1984; in manufacturing, the planned investment increase is 22 percent.<sup>7</sup>

Despite these reports, the aggregate data on the composition of U.S. output indicate very little, if any, weakening of manufacturing relative to total output. We present three types of statistical evidence: two measures of output from the national income and product accounts and a regression of industrial production on GNP.

<sup>5</sup> *The New York Times*, May 21, 1985, p. D1.

<sup>6</sup> *The Wall Street Journal*, April 9, 1985, p. 1.

<sup>7</sup> *Survey of Current Business*, March 1985, pp. 23-28.

Table 1 shows both goods output and value added in manufacturing as a proportion of GNP (the value-added data are published only on an annual basis). Goods output measures the flow of final products, in the form of goods, of the U.S. economy; total GNP is the sum of final outputs of goods, services, and structures. Value added (or income originating) in manufacturing measures the gross output of the manufacturing sector minus materials and services purchases from other sectors, which is equal to income earned in the manufacturing sector (Department of Commerce, 1985). In both cases, the economic activity is measured net of imports.

**TABLE 1**

**Goods Output and Manufacturing as a Share of Total Output in the United States**  
(\$ billions in 1972 prices; seasonally-adjusted annual rates; percent)

	<u>Goods Output</u>	<u>Manufacturing value added</u>	<u>GNP</u>	<u>1 ÷ 3</u>	<u>2 ÷ 3</u>
	(1)	(2)	(3)	(4)	(5)
1950	261.5	131.1	534.8	48.9	24.5
1960	335.8	171.8	737.2	45.6	23.3
1965	422.6	236.7	929.3	45.5	25.5
1970	486.9	261.2	1085.6	44.9	24.1
1978	662.0	357.2	1438.6	46.0	24.8
1980	668.1	351.0	1475.0	45.3	23.8
1981	693.1	359.7	1512.2	45.8	23.8
1982	660.6	336.6	1480.0	44.6	22.7
1983	688.6	354.1	1534.7	44.9	23.1
1984	764.5	391.2	1639.3	46.6	23.9
1982Q1	669.0	n.a.	1483.5	45.1	n.a.
Q2	662.0		1480.5	44.7	
Q3	657.9		1477.1	44.5	
Q4	653.6		1478.8	44.2	
1983Q1	658.9		1491.0	44.2	
Q2	681.6		1534.8	44.7	
Q3	698.1		1550.2	45.0	
Q4	715.5		1572.7	45.5	
1984Q1	744.9		1610.9	46.2	
Q2	767.4		1638.8	46.8	
Q3	766.8		1645.2	46.6	
Q4	778.8		1662.4	46.8	
1985Q1	773.0		1663.5	46.5	
Q2	770.8		1671.6	46.1	

Source: U.S. Department of Commerce, *Survey of Current Business*, various issues.

It may be seen in Table 1 that goods output and manufacturing activity, in constant dollars, have been remarkably stable as a proportion of GNP over the years. What is relevant for the purposes of this paper is that neither measure has decreased since 1980 despite the appreciation of the dollar. The small decline in the proportion in 1985 looks normal for a period of slow GNP expansion.

While goods output and manufacturing activity show no significant decrease relative to total output between 1980 and 1984, the appreciation of the dollar, and possibly other influences, have no doubt held down both the prices of goods and the profits of producers. This shows up when goods output and manufacturing value added are measured in current dollars. On this basis, goods output as a proportion of GNP fell from 43.3 percent in 1980 to 42.1 percent in 1984; manufacturing value added fell from 22.1 percent of GNP in 1980 to 21.2 percent in 1984.

We turn now to the relationship of industrial production to GNP. Industrial production moves closely with GNP over long periods but is more volatile cyclically. The relationship is captured in the following regression (Lawrence, 1984, p. 21):

$$IP = -0.0342 + 2.18GNP$$

(-4.8)            (12.6)

where IP and GNP are the annual percentage changes in industrial production and real GNP, respectively, and the numbers in parentheses are t-statistics. The regression was estimated with annual data from 1951 to 1981.

According to this relationship, industrial production rises at the same rate as GNP when the latter is increasing at an annual rate of 2.9 percent. When GNP increases more slowly than 2.9 percent, industrial production advances less than GNP and when GNP expands faster than 2.9 percent, industrial production increases faster than GNP. When GNP increases 1.6 percent annually, industrial production is constant.

Over the period from 1980 to the second quarter of 1985, industrial production rose 13.1 percent and GNP 13.3 percent. The annual rate of advance was about 2.8 percent. This is consistent with the regression for the period through 1981. From the second quarter of 1984 through the second quarter of 1985, industrial production increased at an annual rate of 2.4 percent and GNP increased 2.0 percent. This is a faster advance in industrial production than would have been expected from its relation to GNP in the period from 1951 to 1981.

Thus, neither goods output, manufacturing value-added, nor industrial production shows a significant slowing relative to the total output of the American economy during the period of dollar appreciation. Of

course, employment in goods-producing industries has fallen as a proportion of total employment. This ratio declined from almost 45 percent in 1960 to 31.1 percent in the first quarter of 1985. The reports on employment may well have created the impression that the goods-producing sector of the economy is shrinking, whereas what has actually happened is that productivity has risen faster in this sector.

It is well known that individual industries — textiles, shoes, and primary metals, for example — have indeed experienced slow or falling production. While total industrial production in the second quarter of 1985 was 13.1 percent above the 1980 level, iron and steel was up only 3.9 percent, non-durable consumer goods were up 10.6 percent, and textile mill products were down 2.6 percent. But the poor performance of these industries was offset by electrical machinery — up 24 percent; motor vehicles and parts — up 43.8 percent; and defense and space equipment — up 50.3 percent.

It appears that the effects of foreign competition and import penetration were offset by the capital goods boom — especially in computers, trucks, and automobiles — and the build-up of defense spending since 1980.

### **Impact abroad of U.S. current-account deficit**

It is clear from the analysis thus far that, even in the absence of an appreciation of the dollar, the United States would have exerted a positive influence on the growth of the rest of the world in the period since 1982. But the combined effect of rapidly-growing domestic demand *and* the appreciating dollar led to a much larger expansion of U.S. imports than in previous cyclical recoveries. U.S. imports of goods and services, in current dollars, increased about \$125 billion from the fourth quarter of 1982 through the first quarter of 1985. A rough measure of the impact on other countries is suggested by the observation that this constitutes 2.7 percent of the 1982 GNP of OECD countries other than the United States. Applying our earlier analysis, we can say that one-third of this boost to aggregate demand abroad was the result of the appreciation of the dollar.

How to measure the impact of the United States on other countries raises analytical questions. Changes in the current-account positions of other countries reflect not only the initial impulse — the increase in imports of the United States, which is mirrored in the increase in exports of other countries — but also the induced reaction to that impulse in the form of enlarged imports by those countries. Countries whose GNP growth was stimulated by larger exports to the United States absorbed more imports from their trade partners, including the United States, and

those imports are reflected in current-account positions.

A better measure of the impact of the United States on other countries would therefore seem to be the increase in U.S. imports and the increase in other countries' exports.

The change in exports of goods and services as a percentage of GNP (or in some countries GDP) in the previous year is shown in Table 2 for the major industrial countries.

On the basis of these data, it appears that in 1984 all of the increase of the GNP of France and Germany was attributable to export expansion. Of course, elements of domestic demand also expanded, but they were offset by the increase in imports.

In terms of absolute stimulus to real output, the export expansion was largest for Japan and Canada, especially in 1984. This is consistent with the fact that the United States accounts for relatively large fractions of the exports of these two countries. Yet, in Japan in 1984 and in Canada in both years, domestic demand increased faster than in other industrial countries except for the United States. It is not surprising that Japan and Canada enjoyed a superioreconomic performance in those years.

While Germany appears to have benefited from export-led growth in 1984, the increase in German exports as a proportion of GNP was no larger in 1983-84 than in the first two years of earlier cyclical recoveries. This is true also for other large European countries (BIS, 1985, p. 17). But for all these countries except the United Kingdom, the growth of GNP in the latest recovery was considerably smaller than in earlier recoveries. The obvious explanation is that domestic demand expanded much less this time, no doubt reflecting the austere fiscal policies being pursued by these countries. It is striking to observe that the structural budget balance in Germany, as a percent of GNP, has moved toward sur-

**TABLE 2**

**Growth of Exports of Goods and Services and of GNP, 1983 and 1984**

	1983		1984	
	Exports*	GNP	Exports*	GNP
Japan	1.0	3.4	3.6	5.8
Germany	-0.4	1.3	2.6	2.6
France	0.9	0.7	1.7	1.7
UK	0.3	3.1	1.7	2.4
Italy	1.1	-0.4	1.7	2.6
Canada	1.6	3.3	5.2	4.7

\*Increase as a percent of GNP in previous year.

Source: OECD, *Economic Outlook*, December 1984, (p. 48), June 1985, (p. 21).

plus since 1981 by more than the U.S. structural budget has moved toward deficit (OECD, 1985, p. 4).

In general, therefore, the combination of U.S. economic growth and the appreciating dollar has given a boost to the economies of other industrial countries. In some of these countries, restrictive policies restrained domestic demand, which held back economic growth.

As for developing countries, economic activity in the industrial world eased the plight they were in in 1982, **when the** debt crisis and world recession forced severe retrenchment of output. This shows up in a cut by 20 percent in the value of imports by non-oil developing countries from early 1981 to late 1982 (IMF, 1985, p. 52). From the fourth quarter of 1982 to the fourth quarter of 1984, the exports of non-oil developing countries increased, at annual rates, from \$318 billion to \$369 billion. Of this increase of \$51 billion, about \$21 billion—more than 40 percent—went to the United States.

In 1983 and 1984, the export volume of "non-fuel" exporters among developing countries increased 6 and 12 percent (fuel exporters comprise members of OPEC, some smaller oil-exporting nations in the Middle East and Africa, and Mexico). Although the unit value of their exports fell further in these two years, by 2.6 percent, the unit value of their imports fell by more—5.5 percent. As a result, they were able to increase imports by 7.5 percent in the two years 1983-84 and to expand real GNP by 2.7 percent in 1983 and 4.4 percent in 1984. Non-oil exporters, a category that includes Mexico, increased GNP 1.9 percent in 1983 and 4.2 percent in 1984 (IMF, 1985, p. 210).

It is unlikely that much of the increased exports of developing countries can be attributed to the appreciation of the dollar. To a large degree, the currency relationships of these countries to the dollar depend on their own exchange-rate policies. Although an increasing proportion of their exports has become price-sensitive as they have industrialized, most of the expansion of their exports is probably the result of economic recovery in industrial countries and of their own efforts to make their exports more competitive.

### **Impact of capital flows**

We turn now to the effects of capital flows to the United States. By way of introduction, it may be noted that the swing in current and capital account positions was relatively greater for the United States than for other industrial countries. The U.S. current account moved from a deficit of \$11 billion in 1982 to \$102 billion in 1984. The counterpart of this shift shows up only partly in the accounts of other industrial countries, which moved from a current-account deficit of \$17 billion in 1982 to a

surplus of \$36 billion in 1984. At the same time, the non-oil developing countries reduced their combined deficit from \$64 billion to \$24 billion.

Thus, while the U.S. deficit on current account increased from 0.3 percent of GNP in 1982 to 2.8 percent of GNP in 1984, the current account of OECD countries other than the United States went from a deficit equal to 0.4 percent of GNP to a surplus of 0.8 percent of GNP. The swing toward surplus was about half as large, relative to GNP, for other industrial countries as was the swing to larger deficit for the United States.

Countries with current-account surpluses necessarily experience net outflows of capital equal to those surpluses. Those capital outflows absorb savings that might have been utilized at home to finance investment. Or, to put the point another way, in the absence of these capital outflows, the countries would have had lower interest rates, which might have stimulated domestic investment.

Some observers in Europe have focused on this aspect of the economic and financial relationship of Europe with the United States, and they have consequently looked upon the U.S. current-account deficit and related capital inflow as exerting a depressive effect abroad.

The problem is analogous to the financing of a budget deficit within a country. If tax rates are reduced or expenditure is increased so as to enlarge the budget deficit, aggregate demand will expand faster. But the *financing* of the larger budget deficit, assuming that the central bank does not provide the funds, works in the opposite direction. The issuance of additional securities by the Treasury absorbs funds that would otherwise have been available to finance private expenditure and in this way tends to depress aggregate demand. In most circumstances, the demand-increasing effect of the enlarged budget deficit is thought to be considerably greater than the demand-reducing effect of financing it. In fact, if an economy is operating below its potential, fiscal stimulus will lead to growth of output and income, which normally generates more savings. This will contribute to the financing of the budget deficit and domestic investment.

If we view the increased exports and current-account surpluses of Europe and Japan as having imparted a stimulus to economies that were rather depressed, we are entitled to assume that this stimulus probably outweighed the depressive effect of the additional capital outflows.

Interest rates in some industrial countries were affected not only by the capital outflows that necessarily accompanied current-account surpluses but also by monetary policies that were designed to dampen depreciation of their currencies. These tighter-than-desired monetary policies may be viewed as a direct result of the dollar appreciation--or, more correctly, of the belief by monetary authorities in other countries that the dollar

would continue to be under upward pressure. These monetary authorities sought, through higher interest rates than they would have preferred on the basis of the condition of their domestic economies, to minimize the extent to which their currencies depreciated against the dollar. Although such depreciation brought a benefit in the form of larger exports, it also raised the prices of imports—especially oil—that are denominated in dollars. There is no way to quantify the effect of these tighter monetary policies where they prevailed.

Capital flows to the United States have been, as noted, more important as a proportion of GNP. Accordingly, the impact of such flows on interest rates has been larger in the United States.

The role of capital inflows in supplementing American saving has often been pointed out and does not call for extended treatment here.

In 1984, net domestic investment was equal to 7.2 percent of net national product (NNP) and the budget deficit (on income and product account) was equal to 5.4 percent of NNP. Net saving, including surpluses of state and local governments, came to ten percent of NNP. The shortfall of domestic saving—about three percent of NNP—was made up by the inflow of foreign funds. Thus, about 23 percent of the sum of net investment and the Federal budget deficit was financed from abroad.

As was observed earlier, not all of the external deficit of the United States is the result of the appreciation of the dollar. The more rapid growth of the U.S. economy in 1983-84 and the cutback in imports by developing countries would have enlarged the current-account deficit in any event. But, that deficit would have been less than half as large, in 1984, if the dollar had not appreciated.

If the dollar appreciation had been held down by a different mix of fiscal and monetary policies in the United States—a smaller budget deficit and a more expansive monetary policy—American interest rates need not have risen despite the smaller supply of foreign savings. On the other hand, if the dollar appreciation had been kept in bounds by market forces while U.S. macroeconomic policies were as they actually have been, American interest rates would have had to be high enough to keep domestic investment and domestic saving in balance with a smaller supplement from foreign saving. One could use an investment demand equation to estimate how much interest rates would have had to rise to reduce ex ante net investment to, say, 5-1/2 percent of the national product instead of the actual 7.2 percent in 1984. But there is little to be learned from such a computation. The point is that the higher U.S. interest rates—in the absence of dollar appreciation but in the presence of the existing mix of fiscal and monetary policies—need not have depressed the American economy. Rather they would have served to crowd out enough domestic investment outlays to match the smaller **current-**

account deficit. Thus, larger exports and smaller imports would have offset the lower investment outlays with little or no effect on growth in the short run. In the longer run, of course, lower net investment would have meant slower growth of potential GNP; but a smaller **current-account** deficit would mean a smaller decline in the net foreign assets of the United States.

If we ask what would have happened to the economies of other industrial countries if the dollar had not appreciated in the presence of the actual fiscal-monetary mix in the United States, the answer seems to be that they would have been worse off. Although smaller capital outflow would have tended to reduce interest rates, other forces—the need to keep interest rates in line with the higher rates in the United States—would have raised them. Moreover, exports to the United States would have increased less.

### **Impact on prices**

An appreciating currency is expected to reduce the prices of tradable goods relative to those of non-tradable goods and thereby to lower the average price level, compared with what it otherwise would have been. The opposite effects are expected to occur in countries whose currencies depreciate. It is the changes in the relative prices of tradable goods that lead to alterations in trade and current-account balances.

Movements in exchange rates can have further effects on average price levels if, by influencing consumer prices, they have an impact on the rate at which wages advance.

The direct effects on domestic prices come through two channels. Import prices tend to fall in countries with appreciating currencies and to rise in countries with depreciating currencies. Changes in import prices show up directly in price measures insofar as imports of finished products are part of the basket of goods purchased by consumers or businesses. Beyond that, changes in the prices of imported inputs to the production process affect the price level. The indirect effects of changes in the prices of imports show up as increases or decreases in the prices of import-competing goods produced in the home country; this is sometimes referred to as the competitive or umbrella effect.

Export prices are also influenced by exchange-rate changes; these prices are not reflected in consumer-price measures but they do affect GNP implicit price deflators. Import prices have indirect, but not direct, effects on these deflators.

Since the principal impacts of exchange-rate changes on domestic prices come through movements in import prices, there is something to be said for using an exchange-rate measure to which import prices are

closely related. The exchange-rate measure used earlier in this paper—the Federal Reserve trade-weighted average values of currencies—weights countries' currencies by the total value of their trade with other industrial countries. The IMF measure—MERM, calculated from the Funds' multilateral exchange-rate model—is based on a model designed to measure the effect of exchange-rate changes on trade balances. In order to gauge the effect of exchange-rate changes on U.S. prices, we utilize here an average weighted by the share of countries in American imports; the weights reflect countries' bilateral trade with the United States<sup>8</sup> (Woo, 1985, p. 512).

As may be seen in Table 3, the import-weighted average value of the dollar increased much less in the 1980s than the other measures. From the fourth quarter of 1980 to the fourth quarter of 1984, the import-

**TABLE 3**  
**Measures of U.S. Inflation and of Dollar Appreciation**  
(percent)

	1980		1981		1982		1983		1984	
	A	B	A	B	A	B	A	B	A	B
Consumer prices	13.5	12.4	10.4	8.9	6.1	3.9	3.2	3.8	4.3	4.0
GNP implicit price deflator	9.2	10.2	9.6	8.9	6.0	4.3	3.8	3.8	3.8	3.6
GNP fixed-weight index	9.8	10.1	9.6	8.9	6.4	5.2	4.2	4.0	4.3	4.2
PCE implicit price deflator	10.2	10.2	8.7	7.8	5.9	4.9	3.7	3.1	3.2	3.1
PCE fixed-weight index	11.2	10.9	9.4	8.3	5.9	5.2	4.0	3.4	3.9	4.0
<b>Federal Reserve</b>										
dollar index	-0.8	1.8	17.8	18.4	13.2	16.0	7.5	6.5	10.3	13.1
<b>MERM</b>	0.1	0.3	12.7	13.6	11.7	14.8	5.8	3.9	7.9	10.6
<b>Import-weighted</b>										
dollar index	0.1	-1.4	8.2	9.4	8.9	10.8	2.5	1.3	6.5	9.3

Note: A: year-to-year changes; B: December to December for consumer prices and fourth quarter to fourth quarter for other series. PCE: personal consumption expenditures. MERM: IMF index based on multilateral exchange-rate model.

Sources: U.S. Bureau of Labor Statistics, *Monthly Labor Review*; U.S. Dept. of Commerce, *Survey of Current Business*; Federal Reserve *Bulletin*; IMF, *International Financial Statistics*.

<sup>8</sup> This exchange-rate measure was constructed, at the Brookings Institution, in a manner similar to the Federal Reserve index except that the weights are countries' shares in U.S. imports.

weighted bilateral dollar index rose 34 percent while the Federal Reserve multilateral index went up 65 percent. The reason is that Japan and Canada, whose currencies depreciated much less against the dollar than those of other countries, account for a larger share of U.S. imports than of world trade.

The gain from using the bilateral import-weighted index is impressionistic rather than statistical. When an exchange-rate measure with multilateral trade weights is used in econometric work, the past relationship of prices to the exchange rate displays smaller coefficients than appear if a bilaterally-weighted average is used (Hooper and Lowrey, 1979, p. 15).

The appreciation of the dollar is generally credited with contributing to the decline in U.S. inflation, although there is no consensus on how large that contribution has been. A substantial part of the disinflation is the result of the recession of the early 1980s. Inflation has also come down in other industrial countries despite the fact that their currencies have depreciated against the dollar. In those countries, recessions have also occurred, recoveries have been much weaker than in the United States, and unemployment is, relatively, at very high levels.

We attempt in what follows to throw light on the effects of exchange rates on the observed changes in rates of inflation in industrial countries.

### *Inflation in the United States*

U.S. inflation, as measured by consumer prices, was rising even before the second oil shock in 1979-80. But the price advance accelerated in those years to "double digit" levels. In 1980, consumer prices increased 13.5 percent on a year-over-year basis and 12.4 percent from December to December. In 1976, consumer prices had risen 5.8 and 4.8 percent, respectively, on these two bases.

Various measures of the change in U.S. prices after 1980 are presented in Table 3. It may be seen that much of the reduction in inflation took place in 1981 and 1982, a period of recession. Most price measures in the table show a further lowering of the inflation rate in 1983 and 1984 but by considerably less than in the two previous years. It has to be remembered, however, that real GNP increased at an annual rate of about six percent from late 1982 to late 1984. In some earlier periods of GNP expansion at about this rate, inflation tended to accelerate rather than decelerate, as is indicated in Table 4. In both the mid-1950s and the mid-1960s, inflation picked up significantly when the economy expanded rapidly. In 1970-72, price controls held down inflation; in the second quarter of 1973, before the oil shock, prices were advancing at an annual rate of 7.2 percent. In the first quarter of 1975, prices were still

reacting to the quadrupling of OPEC's oil price that occurred in 1973. This inflation was temporary, as is discussed below; it subsided to less than four percent in the first half of 1976 and then advanced again. The recent period does, therefore, stand out as unusual in showing a reduction of inflation in the face of rapid growth.

**TABLE 4**

**GNP Growth and Inflation in First Two Years of U.S. Recoveries**  
(percent; seasonally-adjusted annual rates)

	GNP Growth	Inflation	
		Trough	Two years later
1982-Q:4 to 1984-Q:4	6.0	3.4	2.8
1975-Q:1 to 1977-Q:1	5.1	10.7	5.5
1970-Q:4 to 1972-Q:4	5.8	5.5	5.2
1964-Q:4 to 1966-Q:4	6.0	1.0	4.0
1954-Q:2 to 1956-Q:2	5.0	1.4	3.4

Note: Inflation is measured by GNP implicit price deflator in the quarters indicated. Source: U. S. Department of Commerce, *Survey of Current Business*

Another point is worth making. Much of the inflation of 1980 (Table 3) was undoubtedly the result of the 150 percent rise in the price of oil that occurred from 1978 to the first quarter of 1981. The 1980 inflation rate was temporary. The price level rose sharply but there is no reason to think it would have continued to rise at the 1980 rate. There would have been some subsidence of inflation in any event, especially since wages did not rise fully with prices; while consumer prices advanced 13.5 percent in 1980, average hourly earnings went up nine percent and total compensation per hour rose 10.6 percent.

Since inflation would have diminished of its own accord after 1980, one would expect the appreciation of the dollar to explain only a fraction of the total falloff in the rate of price advance. Beyond that, other forces were at work pushing down inflation. If these other forces—notably high unemployment—and dollar appreciation accounted for all of the decline in inflation, they would be over-explaining it.

There is still a question as to how much of the lowering of inflation is attributable to the appreciation of the dollar. We turn now to recent attempts to measure this effect.

The classic study of the effect of changes in dollar exchange rates on U.S. prices is by Peter Hooper and Barbara Lowrey (1979), who surveyed the literature and came up with consensus estimates of the impact

of a ten percent real dollar depreciation as measured by the Federal Reserve multilateral trade-weighted dollar index: if oil prices are not affected, the consumer price level will rise 1-1/2 percent; if oil prices rise by the same proportion as non-oil prices, consumer prices will rise 1-3/4 percent. Half of the price impact is estimated to take place within one year of the depreciation and the remainder within two to three years. These estimates assume that domestic economic policies "roughly offset any tendency for the path of real aggregate demand to change as a result of the depreciation."

On the assumption that these estimates would hold symmetrically for an appreciation of the dollar, we apply them in Table 5 to the years 1981-84. We assume that the full effect on consumer prices of each year's appreciation (.875 for each 11 percent increase in the price-adjusted dollar value) is felt by the end of the second year. As may be seen, on this basis prices in 1981-84 were about one-fifth lower than they would have been if the dollar had not risen. From 1980, 15 percent of the slowdown in inflation by 1984 was attributable to the appreciation of the dollar.

These results are about the same as those Jeffrey Sachs (1985, p. 128) derived from the Hooper-Lowrey coefficients, although our methods differ. Sachs used the MERM rather than the Federal Reserve index, on which Hooper and Lowrey based their estimates. This tends to give him

**TABLE 5**  
Effects of Dollar Appreciation on U.S. Prices  
(percent)

	1980	1981	1982	1983	1984 average	1981-84
Change in CPI*	13.5	10.4	6.1	3.2	4.3	6.0
Change in price-adjusted dollar		19.1	10.7	4.8	9.8	
Effects of 1981 appreciation		1.5	1.5			
Effects of 1982 appreciation			0.9	0.9		
Effects of 1983 appreciation				0.4	0.4	
Effects of 1984 appreciation					0.8	
Total price effect		1.5	2.4	1.3	1.2	1.6
Inflation without appreciation	13.5	11.9	8.5	4.5	5.5	7.6

\*Consumer price index.

Source: Federal Reserve Board.

a smaller exchange-rate effect on prices. On the other hand, he added to Hooper and Lowrey's consensus estimate a third year price effect equal to 0.3 percent for each ten percent exchange-rate change.

Peter Hooper (1984) has presented a simulation, carried out on the Federal Reserve multicountry model, of the effects of holding the dollar at its level of the fourth quarter of 1980. Through 1983, he finds that the consumer price level would have been, on average, one percent higher. This is slightly less than the impact derived from application of the Hooper-Lowrey coefficients.

Sachs' paper (1985) also includes a structural model which he uses to measure the effect of dollar appreciation on U.S. inflation. In a version of the model that allows prices to be reflected fully in wage behavior, Sachs finds that 45 percent of the falloff in inflation (measured by the personal consumption deflator) from 1980 to January-September 1984 was the result of the appreciation of the dollar. He attributes 55 percent of the inflation slowdown to unemployment.

Although we cannot offer definitive conclusions on the effect of dollar appreciation on U.S. inflation, it is evident that the effect was significant. The rise of the dollar probably accounted for more than one-sixth and less than one-half of the diminution of inflation from 1980 to 1984.

### *Inflation in other industrial countries*

What is noteworthy about those industrial countries whose exchange rates depreciated against the dollar is that, not only did inflation come down after 1980, it came down substantially (Table 6). The challenge is to explain how this happened. What we seek to do here is not to explore an effect of the rising dollar but to understand why what might have been the effect—higher inflation—did not occur..

As was observed above, it was to be expected that the 1980 inflation rates would subside to some extent. In Europe and Japan, as in the United States, the jump in the price level in 1980 was in large part a result of the rise in oil prices. It did not represent a sustained rate of inflation.

Still, we know that dollar exchange rates depreciated and that the domestic currency value of dollar-denominated imports increased. We also know that one of the complaints heard in Europe in recent years is that the increased cost of dollar-based imports, especially oil, was putting unwanted upward pressure on price levels.

Several influences were working in the other direction.

It should be noted, first, that a very large share of the imports of European countries comes from other European countries. For the members of the European Community (EC) as a group, half of total imports in 1984 were from other members of the Community. Almost two-thirds of

TABLE 6

Changes in Consumer Prices in Major Industrial Countries  
(percent)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>4th Q 1984*</u>
Canada	10.2	12.5	10.8	5.8	4.4	3.7
France	13.8	13.4	11.8	9.6	7.4	6.5
Germany	5.4	6.3	5.3	3.3	2.4	2.0
Italy	21.2	18.7	16.3	15.1	10.7	9.9
Japan	8.1	4.9	2.6	1.8	2.2	2.5
United Kingdom	-18.0	11.9	8.6	4.7	5.0	4.8
United States	13.5	10.4	6.1	3.2	4.3	4.0

\*From fourth quarter of 1983.

Source: IMF, *World Economic Report*, April 1985, p. 213.

the imports of EC members came from industrial countries other than the United States and Canada—that is, from countries against which there was little if any depreciation of EC currencies. Only eight percent of the imports of the EC came from OPEC nations.

Japan's import composition is different. Twenty-three percent of its imports came from the United States and Canada in 1984. Imports from OPEC comprised **32** percent of total imports and those from non-oil developing countries were about **25** percent of the total. Although Japan is much more dependent than Europe on imports that are either denominated in dollars or are from countries with exchange rates pegged to the dollar, the fact is that the yen depreciated much less than European currencies from 1980 to 1984. In that period the yen value of the dollar rose less than five percent while the Deutsche mark (DM) value of the dollar went up **57** percent. This compensated for Japan's greater exposure to dollar imports. Europe's larger dollar depreciation was compensated for by the fact that a relatively small fraction of its imports are priced in dollars or in currencies pegged to the dollar.

These facts show up in trade-weighted exchange rates where the weights represent bilateral trade. Table 7 presents multilaterally-weighted exchange rates as computed by the International Monetary Fund (MERM) and bilaterally-weighted exchange rates computed by Morgan Guaranty Trust Company. It may be seen that both the DM and the yen *appreciated* from 1980 to 1984 when their exchange rates are weighted by their bilateral trade. The DM appreciated against the other EC currencies, with which so much of its trade is conducted, and this outweighed its sizable depreciation against the dollar. The yen depreciated much less against the dollar than the currencies of most of its non-U.S. trade partners.

TABLE 7

**Bilateral and Multilateral Trade-Weighted Exchange Rates  
(1980 = 100)**

	1981		1982		1983		1984	
	MERM	MG	MERM	MG	MERM	MG	MERM	MG
Canada	102.9	99.8	104.9	99.0	108.3	100.4	106.3	96.9
France	89.4	94.3	81.3	87.4	74.2	82.0	69.7	79.2
Germany	92.7	97.2	96.5	102.8	98.8	107.6	96.1	107.4
Italy	86.7	91.1	80.2	85.6	76.1	83.3	71.1	80.1
Japan	113.1	110.8	106.6	103.2	117.4	112.9	124.1	118.3
United Kingdom	98.9	102.3	94.2	98.3	86.7	91.8	81.9	88.3
United States	112.7	109.7	125.9	121.1	133.2	125.9	143.7	135.0

Sources: IMF, *International Financial Statistics*, July 1985; Morgan Guaranty Trust Co., *World Financial Markets*, June 1985.

Another perspective comes from an examination of import prices, displayed in Table 8. Import prices in domestic currencies reflect both the movement of prices in exporting countries and exchange rates between importing countries and their suppliers. As Table 8 shows, Germany's import prices jumped more than 13 percent in 1981. The average price of Saudi Arabian oil was 13 percent higher in 1981 than in 1980, but non-oil commodity prices fell 15 percent. The value of the DM, bilaterally-weighted, depreciated more than seven percent that year. Although we cannot fully explain the recorded rise in Germany's import prices in 1981, it is significant that from 1981 to 1984 import prices rose only 8.1 percent, or at an annual rate of 2.6 percent. During this period, the price of oil fell more than 12 percent and the average prices of non-oil com-

TABLE 8

**Import Prices in Major Industrial Countries  
(1980 = 100)**

	1981	1982	1983	1984
Canada*	110.6	113.0	108.6	114.3
France*	118.5	132.9	143.2	158.0
Germany	113.6	116.2	115.8	122.8
Italy*	136.6	148.3	153.2**	167.5***
Japan	101.6	109.6	101.0	97.6
United Kingdom*	107.7	116.8	127.7	139.3
United States	105.5	103.8	99.5	101.3

\*Unit-value series

\*\* Break in series

\*\*\* January-September. Source: IMF, *International Financial Statistics*.

modities declined a further three percent. Thus, import prices did not put much upward pressure on the German price level, either directly or indirectly, after 1981.

The OECD (1985, p. 47) notes that European import prices are "running somewhat below what would be implied by aggregate indices of world trade prices in dollars converted at current exchange rates, assuming historical trade patterns." It is suggested that the explanation may be "the readiness of exporters to a national market to take cuts in margins in order to keep prices in line with domestic competitors and so retain market shares." This observation is consistent with anecdotal evidence about pricing by American exporters.

In the case of Japan, import prices increased and fell with the exchange rate in 1981 and 1982. On balance, however, import prices declined slightly from 1980 to 1984 as commodity prices, including oil, fell after 1981 and the bilaterally-weighted exchange rate appreciated. In fact, the yen appreciated from 1981 also on the basis of a multilaterally-weighted exchange rate.

As to other industrial countries, the movements of import prices largely reflect what happened to their exchange rates. Both the French franc and the Italian lira have been devalued in the exchange-rate grid of the European Monetary System. From 1980 to 1984, for example, the French franc value of the DM increased by more than 18 percent.

We have focused on the international influences on prices in Europe and Japan. In Europe, at any rate, the high level of unemployment and slow-growing economies must have had a substantial effect in reducing inflation. The advance of average hourly earnings and, more broadly, unit labor costs has slackened markedly in Europe and Japan. By 1984, four of the seven largest industrial countries were experiencing a decline in unit labor costs in manufacturing (Table 9). This does not tell us what

**TABLE 9**

Changes in Unit Labor Costs in Manufacturing in Major Industrial Countries  
(percent)

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
Canada	10.6	11.6	11.7	-0.1	-4.6
France	12.4	13.3	10.4	5.9	1.8
Germany	7.6	4.9	4.1	-1.1	-0.3
Italy	12.4	18.0	18.2	13.8	3.8
Japan	3.5	5.1	5.2	1.1	-2.9
United Kingdom	21.5	9.7	5.4	2.1	3.6
United States	11.6	6.0	6.6	-0.8	-0.3

Source: IMF, *World Economic Outlook*, April 1985.

was happening to costs in other parts of these economies, so we cannot quite conclude that what inflation exists in Europe and Japan is fully attributable to the depreciation of their currencies against the dollar.

### **Impact on debt burden of developing countries**

It was observed earlier that little, if any, of the increased demand for exports of developing countries can be attributed to the appreciation of the dollar as distinguished from the expansion of aggregate demand in the United States. The point was made that the exchange rates of developing countries in terms of the dollar depend on their exchange-rate policies. What matters is whether they peg to the dollar, another currency, or a basket of currencies and how they go about adjusting either the peg or an otherwise-established rate over time.

Unless the appreciation of the dollar altered the growth of gross domestic demand in all industrial countries taken together, there is little reason to believe that the volume of exports of the developing countries was affected. Other channels by which exchange-rate changes among industrial countries may have had an effect on developing countries are through interest rates and prices of imports and exports.

Taking the fiscal and monetary policies of the United States as given, the appreciation of the dollar enlarged its current-account deficit and net capital inflow. This in turn made U.S. interest rates lower than they would have been in the absence of dollar appreciation. It is true that, on balance, interest rates were higher in other industrial countries. But, most of the debt of developing countries is denominated in dollars and bears interest rates related to those on dollar obligations. Therefore, developing-country debtors benefited.

Expressed in dollars, both the export and the import prices of developing countries tend to decline as the dollar appreciates. What happens to their terms of trade is uncertain. In 1981-84, the terms of trade of all developing countries, including fuel exporters, fell 2-1/2 percent (IMF, 1985, p. 234).

Among the commonly-used indicators of debt burden is the ratio of debt to exports. Since developing-country export prices fall in dollar terms when the dollar appreciates, this ratio tends to suggest an increase in the burden of debt. But this is misleading, since the dollar value of imports of developing countries also declines with import prices as the dollar appreciates. This latter effect is not picked up in the debt-export ratio.

All in all, the debt burden of developing countries may have been eased somewhat by the appreciation of the dollar—given the U.S. policy

mix—since dollar interest rates were lower and the terms of trade were little affected.

### **Effects of dollar depreciation**

As these words are written, the dollar has depreciated significantly from its highs of late February 1985. Forecasting the course of the dollar is a hazardous enterprise. Nevertheless, the probability of a further, though not necessarily a continuous, depreciation is large enough to warrant brief consideration of its effects.

The impact on the U.S. economy will depend crucially on whether action is taken to reduce the budget deficit. In the absence of such action, the narrowing of the current-account deficit, when it occurs after the usual lags, will tend to raise interest rates in the United States. The extent to which this happens will depend on where the economy is operating relative to its potential.

The rates of growth of other industrial countries will tend to decrease with the slower expansion of U.S. imports resulting from the depreciation of the dollar. The restrictive stance of fiscal policy in much of Europe and in Japan will become more salient and the need to alter fiscal policy will become more compelling. Once expectations in financial-markets are attuned to a depreciating dollar—or, at least, a stable dollar—industrial countries that have maintained tighter-than-desired monetary policies will be able to relax those policies. It is hard to predict how widespread and how large those monetary-policy changes will be. In the case of Germany, whose economic performance to a large degree sets the tone for Continental Europe, one would not expect monetary policy to change dramatically, if at all.

Since the price effects of depreciation against the dollar have been surprisingly moderate in Europe and Japan, one should not expect the opposite exchange-rate movement to alter inflation markedly in those countries. The trend toward falling inflation would continue, perhaps a bit more strongly.

Only when Europe brings its unemployment down is inflation likely to pick up, but that would have no connection with dollar exchange rates. If anything, the depreciation of the dollar will, as is implied above, slow the expansion of the European economies.

One of the more interesting questions is, will the United States experience a significantly higher inflation rate—or a larger jump in its price level, which is not necessarily the same thing. From our consideration of the price effects of dollar appreciation, we have reason to expect a larger jump in prices as the dollar goes down. Since we do not have conclusive evidence for the contribution of the appreciation to lower inflation, we

cannot make confident quantitative predictions about the price-raising impact of dollar depreciation.

Whatever the initial price effect, the important matter for the longer run is whether it gets translated into higher inflation. That depends on how wages react to the jump in prices.

Wage behavior in the United States has been remarkably moderate during the recovery since 1982. It is beyond the scope of this paper to examine the reasons or to forecast wage behavior. It is not beyond hope that the inevitable upward price pressures that will accompany a dollar depreciation will be a one-time phenomenon rather than a continuing higher rate of inflation.

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